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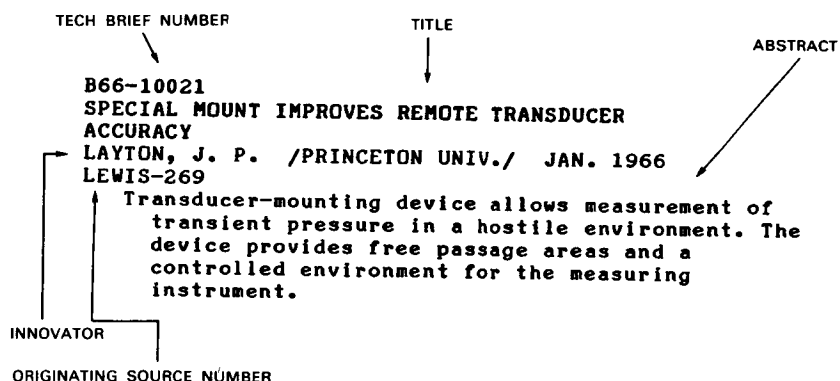
(CATEGORY)

National Aeronautics and Space Administration

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# Introduction

This *Cumulative Index to NASA Tech Briefs* lists the technological innovations published in this form during the period from 1963 through 1966. The main section is arranged in five categories: Electrical (including Electronic); Physical Sciences (Energy Sources); Materials (including Chemistry); Life Sciences; and Mechanical. A typical entry has these elements:



To help users locate information of value, three indexes are provided. The first is a subject index, arranged alphabetically:



Note that in this index several routes are opened for obtaining further information. If the title seems promising, the Tech Brief number and category may be used to locate the abstract, which will be found in the main section arranged sequentially by Tech Brief number

within each category. Further, the Tech Brief number can of course be used for obtaining a copy of the original Tech Brief.

The second index relates all items by the originating source and number to the Tech Brief number and category.

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This *Cumulative Index* replaces all previous issues of the *Index to NASA Tech Briefs* (NASA SP-5021) and supplements.

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## 01 ELECTRICAL (ELECTRONIC)

- B63-10006**  
SETTING OF ANGLES ON MACHINE TOOLS SPEEDED BY  
MAGNETIC PROTRACTOR  
VALE, L. B. MAY 1964  
ARC-5  
An adjustable protractor facilitates transference of angles to remote machine tools. It has a magnetic base incorporating a beam which can be adjusted until its shadow coincides with an image on the screen of a projector.
- B63-10024**  
SOLENOID PERMITS REMOTE CONTROL OF STOP WATCH  
AND ASSURES RESTARTING  
KODAI, C. JUN. 1964  
FRC-17  
A stop watch which may be remotely controlled by the use of a solenoid mechanism is described. When the solenoid is energized the coil spring pulls the lever arm and starts the balance wheel. When it is not energized, the spring pulls the lever and stops the watch.
- B63-10027**  
INCREASED PERFORMANCE RELIABILITY OBTAINED  
WITH DUAL /REDUNDANT/ OSCILLATOR SYSTEM  
NOLIS, W. M. /IBM/ MAR. 1964  
GSFC-36  
Two crystal-controlled oscillators, each with an associated buffer stage, provide an output at a common point. The circuit design gives high reliability control of output frequency and amplitude.
- B63-10033**  
INDIUM FOIL WITH BERYLLIA WASHER IMPROVES  
TRANSISTOR HEAT DISSIPATION  
HILLIARD, J. JOHN, J. E. A. APR. 1964 /SEE  
NASA-TN-D-1753/  
GSFC-42  
Indium foil, used as an interface material in transistor mountings, greatly reduces the thermal resistance of beryllia washers. This method improves the heat dissipation of power transistors in a vacuum environment.
- B63-10091**  
MODIFIED FILTER PREVENTS CONDUCTION OF MICRO-  
WAVE SIGNALS ALONG HIGH-VOLTAGE POWER SUPPLY  
LEADS  
MATHISON, R. P. MAY 1964  
JPL-63  
Very lossy powdered iron material, in the lining of a polyester resin, replaces the dielectric material in the short coaxial transmission line of a simple filter. The lossy material absorbs microwave signals along high voltage power supply leads.
- B63-10118**  
STEPPING SWITCH WITH SIMPLE ACTUATOR PROVIDES  
MANY CONTACTS IN SMALL SPACE  
MILLER, J. V. MAY 1964  
JPL-122  
To reduce the space required for a stepping switch with many contacts, a simple electromechanical actuator with a maximum number of wipers has been incorporated into a compact assembly. This small sized unit is inexpensive to fabricate.
- B63-10174**  
MODULAR CHASSIS SIMPLIFIES PACKAGING AND  
INTERCONNECTING OF CIRCUIT BOARDS  
ARENS, W. E. BOLINE, K. G. MAY 1964  
JPL-236A  
A system of modular chassis structures has simplified the design for mounting a number of printed circuit boards. This design is structurally adaptable to computer and industrial control system applications.
- B63-10193**  
REMOVABLE PREHEATER ELEMENTS IMPROVE OXIDE  
INDUCTION FURNACE  
LEIPOLD, M. H. JAN. 1964  
JPL-288  
Heat and corrosion resistant preheater elements are used in oxide induction furnaces to raise the temperature to the level for conducting electricity. These preheater elements are then removed and the induction coil energized.
- B63-10227**  
ELECTROMECHANICALLY OPERATED CAMERA SHUTTER  
PROVIDES UNIFORM EXPOSURE  
FORD, A. G. MAR. 1964  
JPL-357  
A unidirectional camera shutter employing a solenoid and mechanical linkages permits uniform exposure and minimizes distortion of the image formed in the camera.
- B63-10229**  
FLANGE ON MICROWAVE ANTENNA SUBREFLECTOR CUTS  
GROUND NOISE  
POTTER, P. D. MAY 1964  
JPL-362  
The subreflector of a microwave antenna has been redesigned so that its outer edge has a conical flange. This reduces noise by causing ground energy radiation to cancel out before entering the antenna.
- B63-10238**  
SHAPED SUPERCONDUCTOR CYLINDER RETAINS INTENSE  
MAGNETIC FIELD  
HILDEBRANDT, A. F. WAHLQUIST, H. MAY 1964  
JPL-381  
The curve of the inner walls of a superconducting cylinder is plotted from the flux lines of the magnetic field to be contained. This shaping reduces maximum flux densities and permits a stronger and more uniform magnetic field.
- B63-10250**  
LEVEL OF SUPER-COLD LIQUIDS AUTOMATICALLY  
MAINTAINED BY LEVELOMETER  
TENER, W. M. MAR. 1964  
JPL-397  
A levelometer system, in which the level of cryogenic liquid to be controlled affects the level of an electrolyte, automatically switches a pump on and off. A pressure-sensitive diaphragm can also throw a microswitch to start or stop the pump.
- B63-10255**  
TRANSFLUXOR CIRCUIT AMPLIFIES SENSING CURRENT  
FOR COMPUTER MEMORIES  
MILLIGAN, G. C. MAR. 1964  
JPL-406  
To transfer data from the magnetic memory core to an independent core, a reliable sensing amplifier has been developed. Later the data in the independent core is transferred to the arithmetical section of the computer.
- B63-10258**  
DOUBLE-THROW MICROWAVE DEVICE SWITCHES TWO  
LINES QUICKLY  
CLAUSS, R. STELZRIED, C. T. FEB. 1964  
JPL-410  
By combining a single-throw microwave switch with a microwave circulator in a circuit, two input lines can be switched quickly. There is only a brief transition time when both /or neither/ of the two lines are connected to an output line.

**B63-10262**  
IGNITING SYSTEM FOR MERCURY VAPOR LAMPS PROTECTS TRANSISTORIZED SUSTAINING SUPPLY  
GUISINGER, J. E. JUL. 1964  
JPL-421

A current from a sustaining power supply flows through the mercury vapor lamp and, as there are no resistors in series with this supply, the power is efficiently used. This high voltage igniting device protects the transistorized high current, low voltage power supply.

**B63-10264**  
NOVEL HORN ANTENNA REDUCES SIDE LOBES, IMPROVES RADIATION PATTERN  
POTTER, P. D. APR. 1964  
JPL-425

A horn antenna, combining two propagation modes at selected power ratios, reduces side lobes, and improves the radiation characteristics. Noise and unwanted signals are considerably suppressed.

**B63-10280**  
METER ACCURATELY MEASURES FLOW OF LOW-CONDUCTIVITY FLUIDS  
LOVE, E. G. MAY 1964  
JPL-0021

An electromagnetic flowmeter has been adjusted to minimize the errors inherent in measuring the flow of low conductivity fluids. This is done through use of a direct-coupled, differential cathode-follower, whose grid potential is adjustable with respect to ground levels.

**B63-10284**  
SMALL DIGITAL RECORDING HEAD HAS PARALLEL BIT CHANNELS, MINIMIZES CROSS TALK  
ELLER, E. E. LAUE, E. G. MAY 1964  
JPL-0029

A small digital recording head consists of closely spaced parallel wires, imbedded in a ferrite block to concentrate the magnetic flux. Parallel-recorded information bits are converted into serial bits on moving magnetic tape and cross talk is suppressed.

**B63-10321**  
IMPROVED VARIABLE-RELUCTANCE TRANSDUCER MEASURES TRANSIENT PRESSURES  
MORTON, R. W. PATTERSON, J. L. MAY 1964  
LANGLEY-10

A flush-diaphragm pickup and a feedback-stabilized carrier amplifier are among the features incorporated into an improved variable-reluctance transducer. This low-impedance device responds to steady-state as well as transient pressures.

**B63-10338**  
OPTICS USED TO MEASURE TORQUE AT HIGH ROTATIONAL SPEEDS  
KRSEK, A., JR. TIEFERMAN, M. DEC. 1964  
LEWIS-13

In measuring torque transmitted by a high speed rotation shaft, an apparatus has been devised which includes a shaft, an optical system and readout servomechanism. This highly accurate method uses only optical contact with moving part and is statically calibrated.

**B63-10342**  
RADIANT HEATER FOR VACUUM FURNACES OFFERS HIGH STRUCTURAL RIGIDITY, LOW HEAT LOSS  
VARY, A. MAY 1964  
LEWIS-39

Some problems associated with high temperature heaters for vacuum furnaces have been eliminated by the use of shaped filaments of refractory metal. These filaments, supported in cylindrical array by ceramic spacers, operate with high voltage, low current power.

**B63-10440**  
NEW APPARATUS INCREASES ION BEAM POWER DENSITY  
BALDWIN, L. V. SANDBORN, V. A. JUN. 1964  
LEWIS-73

To increase ion engine or rocket power, an ion source and emitter, an ion beam focusing electrode, and an ion accelerator are incorporated

into the system. In operation the space charge surrounding the ion emitter decreases, the ion beam density accelerates, and engine power increases.

**B63-10443**  
IMPROVED SENSOR COUNTS MICROMETEOROID PENETRATIONS  
DAVISON, E. H. MAY 1964  
LEWIS-76

A sensor, consisting of a thin dual-capacitor assembly with an outer film of thermal-control material, is used to detect micrometeoroid particles. A coincidence counting circuit is used to count the penetrations.

**B63-10493**  
TWO-STAGE EMITTER FOLLOWER IS TEMPERATURE STABILIZED  
SCHMIDT, M. H. /MCDONNELL AIRCRAFT CORP./ MAY 1964  
MSC-20

Two-stage temperature stabilized circuit using two transistors is described. Increase in temperature causes the base-to-emitter voltage of n-p-n transistor to become less positive whereas the base-to-emitter voltage of p-n-p transistor becomes less negative, so the temperature-induced variation in  $V_{sub 1}$  and  $V_{sub 2}$  cancel out.

**B63-10508**  
CIRCUIT SWITCHES LATCHING RELAY IN RESPONSE TO SIGNALS OF DIFFERENT POLARITY  
SMITH, L. S. /ELECTRO-OPTICAL SYSTEMS, INC./ MAY 1964  
WOO-055

A circuit using one power supply and two storage capacitors, which may be separately discharged in opposite directions through a relay in response to change in polarity of a signal, is described.

**B63-10511**  
FREQUENCY-SHIFT-KEYER CIRCUIT IMPROVES PCM CONVERSION FOR RADIO TRANSMISSION  
MIKSZAN, D. P. /WESTINGHOUSE ELEC. CORP./ JUN. 1964  
GSFC-80

A data logic circuit employing a fixed frequency, square-wave oscillator and flip-flop gates allows for the shifting from one frequency to the other at the end of a whole number of cycles of one shift frequency and at the beginning of a cycle of the second shift frequency.

**B63-10512**  
LOW-COST TAPE SYSTEM MEASURES VELOCITY OF ACCELERATION  
HARTENSTEIN, R. JUN. 1964  
GSFC-85

By affixing perforated magnetic recording tape to the falling end of a body, acceleration and velocity were measured. The measurement was made by allowing the tape to pass between a light source and a photoelectric sensor. Data was obtained from a readout device.

**B63-10514**  
COMPUTER CIRCUIT WILL FIT ON SINGLE SILICON CHIP  
SMITH, C. JUN. 1964  
JPL-513

A simplified computer logic circuit of two NAND/NOR gates and three additional inputs to accomplish the count and shift function is described. The circuit has capacity for parallel read-in, counting, serial shiftout, complement input and set and reset.

**B63-10529**  
CONNECTOR FOR THERMOCOUPLE LEADS SAVES COSTLY WIRE, MAKES RELIABLE CONNECTORS  
MILLER, H. B. APR. 1964  
LANGLEY-26

A connector for use in the thermocouple circuits which is silver-brazed to the metal thermocouple sheath on one end and crimped over the insulation of the flexible lead on the other, assures protection against breakage and abrasion. A moisture-proof insulating material is used to

encapsulate the wire junctions.

**B63-10536**  
HOT-AIR SOLDERING TECHNIQUE PREVENTS OVERHEATING OF ELECTRICAL COMPONENTS  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ FEB. 1964  
GSFC-91

By using a hot-air gun with a small orifice, heat may be localized to the soldering area of the chassis. The solder is placed around the capacitor which is inserted in the mounting hole so the ring is in contact with the chassis.

**B63-10537**  
SIMPLE CIRCUIT PROVIDES ADJUSTABLE VOLTAGE WITH LINEAR TEMPERATURE VARIATION  
MOEDE, L. W. /DATAMETRICS CORP./ MAR. 1964  
JPL-W00-029

A bridge circuit giving an adjustable output voltage that varies linearly with temperature is formed with temperature compensating diodes in one leg. A resistor voltage divider adjusts to temperature range across the bridge. The circuit is satisfactory over the temperature range of -20 degrees centigrade to +80 degrees centigrade.

**B63-10551**  
UNMANNED SEISMOMETER LEVELS SELF, CORRECTS DRIFT ERRORS  
SUTTON, G. /COLUMBIA U./ MAY 1964  
GSFC-100

An unmanned, self-leveling seismometer is developed which contains three subsystems- a mechanical, an electronic pickoff and feedback, and a leveling and vertical centering subsystem. Earth motions are detected by means of a seismic mass coupled to a coil-magnet assembly and a differential capacitor plate assembly.

**B63-10553**  
TRANSISTORIZED TRIGGER CIRCUIT IS FREQUENCY-CONTROLLABLE  
MOORE, E. T. /DUKE U./ JUN. 1964  
GSFC-111

A trigger circuit employing two unijunction transistor oscillators, whose frequency is varied by changing the base-to-base voltage, provides variable electrical control of the frequency.

**B63-10554**  
HIGHLY EFFICIENT SQUARE-WAVE OSCILLATOR OPERATOR AT HIGH POWER LEVELS  
HALL, J. E., JR. /DUKE U./ JUN. 1964  
GSFC-112

A square-wave oscillator circuit containing only simple resistor-capacitor combinations and transistors operates with high efficiency at relatively high power levels.

**B63-10555**  
COMPUTER DETERMINES HIGH-FREQUENCY PHASE STABILITY  
NICHOLS, G. B. JUL. 1964  
GSFC-113

Determination of phase stability of a high frequency signal using a computer is accomplished by a circuit using two auxiliary oscillators, multipliers and low-pass filters in cross correlation with the oscillator producing the signal of interest.

**B63-10561**  
TINY SENSOR-TRANSMITTER CAN WITHSTAND EXTREME ACCELERATION, GIVES DIGITAL OUTPUT  
MOSSINO, R. L. ROBINSON, G. NOV. 1964  
ARC-22

A self-pulsing oscillator transmits a pulsed signal. The time between pulses and the frequency are controlled by two networks. Variations in the component values in each of the two networks, due to environmental changes, appear as changes in frequency and time between pulses in the transmitted signal. Such a sensor is used to measure physical magnitudes.

**B63-10567**  
SIMPLE CIRCUIT CONTINUOUSLY MONITORS THERMOCOUPLE SENSOR

GREENWOOD, T. L. AUG. 1964  
M-FS-61

A series circuit was developed to check the continuity in thermocouple sensors. This method may be used in monitoring continuity in any dc voltage-operated control circuit.

**B63-10572**  
DEVICE CALIBRATES VIBRATION TRANSDUCERS AT AMPLITUDES UP TO 20G.  
GREENWOOD, T. L. AUG. 1964  
M-FS-86

A piezoelectric transducer provides accurate calibration of vibration amplitudes to 20 G. The calibration system uses an electromagnetically driven resonant beam to generate mechanical vibrations at a fixed frequency.

**B63-10579**  
SMALL FOAMED POLYSTYRENE SHIELD PROTECTS LOW-FREQUENCY MICROPHONES FROM WIND NOISE  
TEDRICK, R. N. MAY 1964  
M-FS-123

A foamed polystyrene noise shield for microphones has been designed in teardrop shape to minimize air turbulence. The shield slips on and off the microphone head easily and is very effective in low-frequency sound intensity measurements.

**B63-10596**  
FRONT AND BACK PRINTED CIRCUIT LAYOUTS PRESENTED ON SINGLE SHEET  
PERRY, J. OCT. 1964  
GSFC-93

A diazo photographic process of clear plastic masters is used in reproducing front and back printed circuit layouts of differing intensity on a single sheet.

**B63-10597**  
PRECISION GAGE MEASURES ULTRAHIGH VACUUM LEVELS  
HUDSON, J. B. SEARS, G. W. /GEN. DYN. CORP./ JUN. 1964  
GSFC-114

An ionization gauge in which internally generated X-rays are minimized is described. This gauge permits the measurement of gas pressures in ultrahigh systems of micro-pico torr /10 -18/.

**B63-10599**  
LIQUID SWITCH IS REMOTELY OPERATED BY LOW DC VOLTAGE  
MOORE, E. T. /DUKE U./ MAY 1964  
GSFC-119

A liquid switch which does not depend on any mechanical, gravitational, or inertial actuation is developed for use in space environments. It may be remotely operated on low dc voltage.

**B63-10600**  
CIRCUIT CONTROLS TRANSIENTS IN SCR INVERTERS  
MOORE, E. T. WILSON, T. G. /DUKE U./ JUN. 1964  
GSFC-120

The elimination of starting difficulties in SCR inverters is accomplished by the addition of two taps of the output winding of the inverter. On starting or under transient loads the two additional taps deliver power through diodes without requiring quenching of SCR currents in excess of normal starting load.

**B63-10603**  
MONOSTABLE CIRCUIT WITH TUNNEL DIODE HAS FAST RECOVERY  
HEFFNER, P. MAY 1964  
GSFC-132

A monostable multivibrator circuit using a tunnel diode makes it possible for the MSHV to exceed the performance of present multivibrators in two respects. The rise time of the output voltage is faster and the duty cycle is raised to approximately 95 percent.

**B63-10606**  
NEW SINTERING PROCESS ADJUSTS MAGNETIC VALUE OF FERRITE CORES  
VINAL, A. W. /IBM/ MAY 1964  
GSFC-129

A two-phase sintering technique based on time and temperature permits reversible control of the coercive threshold of sintered ferrite cores. Threshold coercivity may be controlled over a substantial range of values by selective control of the cooling rate.

**B63-10609**  
TEMPERATURE-SENSITIVE NETWORK DRIVES ASTABLE  
MULTIVIBRATOR  
INNOVATOR NOT GIVEN /RCA/ OCT. 1964  
GSFC-137

The development of a simple circuit using two zener diodes and five resistors, which provides a temperature-sensitive voltage to drive the astable multivibrator, is described.

**B63-10613**  
CRYOGENIC WAVEGUIDE WINDOW IS SEALED WITH  
PLASTIC FOAM  
CLAUSS, R. STELZRIED, C. T. JUN. 1964  
JPL-559

Waveguide windows made with polystyrene preformed plastic and sealed with foamed-in-place plastic are useful in any microwave waveguide system using cryogenic cooling.

**B64-10002**  
CIRCUIT RELIABILITY BOOSTED BY SOLDERING PINS  
OF DISCONNECT PLUGS TO SOCKETS  
PIERCE, W. B. MAR. 1964  
JPL-447

Where disconnect pins must be used for wiring and testing a circuit, improved system reliability is obtained by making a permanent joint between pins and sockets of the disconnect plug. After the circuit has been tested, contact points may be fused through soldering, brazing, or welding.

**B64-10004**  
ULTRA-SENSITIVE TRANSDUCER ADVANCES MICRO-  
MEASUREMENT RANGE  
ROGALLO, V. L. MAY 1964  
ARC-26

An ultrasensitive piezoelectric transducer, that converts minute mechanical forces into electrical impulses, measures the impact of micrometeoroids against space vehicles. It has uniform sensitivity over the entire target area and a high degree of stability.

**B64-10007**  
LOW-POWER TRANSISTORIZED CIRCUIT PROVIDES  
STAIRCASE WAVEFORM  
BREEN, G. D. JUL. 1964  
GSFC-48

A low input power transistorized circuit is used to generate a staircase waveform of high step uniformity. Other characteristics are low step droop, fast transition time, and no feedback.

**B64-10010**  
MODIFIED RF COAXIAL CONNECTOR ENDS VACUUM  
CHAMBER WIRING PROBLEM  
WEINER, D. MAY 1964  
GSFC-150

A standard radio frequency coaxial connector is modified so that a plastic insulating sleeve can be mounted in the wall of a vacuum chamber. This eliminates ground loops and interference from cable connections.

**B64-10016**  
COMPACT COAXIAL CONNECTOR FOR PRINTED CIRCUIT  
ADDS RELIABILITY  
RADECKE, T. F. MAY 1964  
MSC-57

Soldering and welding techniques are used to connect a coaxial cable to a printed circuit board. This device aids reliability control of equipment as standard connectors are bulky and heavy.

**B64-10017**  
BLOCKING OSCILLATOR USES LOW TRIGGERING  
VOLTAGE  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
DEC. 1964  
MSC-58

To prevent premature triggering of a blocking oscillator, a smaller magnetic core is added to the conventional oscillator circuit. This serves as a second blocking oscillator and has a lower triggering threshold.

**B64-10019**  
NEW METHOD USED TO FABRICATE GALLIUM ARSENIDE  
PHOTOVOLTAIC DEVICE  
ELLIS, S. G. /RCA/ JUN. 1964  
WOO-062

A new method for fabricating photocells, or solar cells, substitutes copper iodide for zinc diffusion. This produces a p-type surface layer and a photovoltaic junction.

**B64-10024**  
EFFICIENT CIRCUIT TRIGGERS HIGH-CURRENT, HIGH-  
VOLTAGE PULSES  
GREEN, E. D. /WESTINGHOUSE ELEC. CORP./ JUN.  
1964  
MSC-14

A modified circuit uses diodes to effectively disconnect the charging resistors from the circuit during the discharge cycle. Result is an efficient parallel charging, high voltage pulse modulator with low voltage rating of components.

**B64-10042**  
OHMMETER SENSES DEPLETION OF LUBRICANT IN  
JOURNAL BEARINGS  
ROSS, A. O. DEC. 1964  
LEWIS-37

An ohmmeter is used as a sensor to determine when the lubricating oil in a high speed journal bearing becomes depleted.

**B64-10064**  
DIGITAL LOGIC ELEMENTS PROVIDE ADDITIONAL  
FUNCTIONS FROM ANALOG INPUT  
MATTY, T. C. /MCDONNELL AIRCRAFT CORP./ JUN.  
1964  
MSC-64

A dc analog input can be used to produce an integrator with high dynamic range or a position servo with inherent stability. This is done by a switching system using digital-to-analog converters and an electronic switch to obtain the desired outputs.

**B64-10065**  
CONTINUITY TESTER SCREENS OUT FAULTY SOCKET  
CONNECTIONS  
GOLDING, G. MAY 1964  
JPL-596

A device, used before and after assembly, tests the continuity of an electrical circuit through each pin and socket of multiple connector sockets. Electrically insulated except at the contact area, a test probe is dimensioned to make contact only in properly formed sockets.

**B64-10080**  
IMPROVED INSERTION-LOSS TESTER  
FINNIE, C. J. SCHUSTER, D. JUN. 1964  
JPL-358

An improved test method accurately measures the insertion loss of RF components while avoiding amplifier drift. Currents are balanced across a bridge transformer with shorted probes and then with each component to be tested. Differences in adjustments indicate the loss.

**B64-10109**  
ANALOG DEVICE SIMULATES PHYSIOLOGICAL  
WAVEFORMS  
HICKMAN, D. M. NOV. 1964  
MSC-51

An analog physiological simulator generates representative waveforms for a wide range of physiological conditions. Direct comparison of these waveforms with those from telemetric inputs permits quick detection of signal parameter degradation.

**B64-10114**  
AUXILIARY SILVER ELECTRODE ELIMINATES TWO-STEP  
VOLTAGE DISCHARGE CHARACTERISTIC OF SILVER-  
ZINC CELLS

CHREITZBERG, A. M. /ELEC. STORAGE BATTERY CO./  
JUN. 1964  
GSFC-169

In silver-zinc cells, an auxiliary silver electrode is electrically connected to the positive terminal only during discharge. This eliminates the two-step discharge characteristic of such cells.

B64-10118  
USE OF PHOTOGRAPHS SPEEDS INSPECTION OF  
PRINTED-CIRCUIT BOARDS  
STARK, E. /IBM/ JUL. 1964  
MSC-72

The projected images of a printed circuit board and the engineering drawing are superimposed on a screen for visual comparison. This technique speeds inspection, reduces the incidence of error.

B64-10122  
SIMPLE TRANSDUCER MEASURES LOW HEAT-TRANSFER  
RATES  
LAUMANN, E. A. OCT. 1964  
JPL-466

A simple transducer is used to measure low rates of convective and conductive heat transfer from a fluid to a cooled surface under steady-state conditions. Temperature drop is measured by two thermocouples imbedded in a rod of low thermal conductivity.

B64-10143  
FIELD-EFFECT TRANSISTOR IMPROVES ELECTROMETER  
AMPLIFIER  
MUNOZ, R. NOV. 1964  
ARC-36

An electrometer amplifier uses a field effect transistor to measure currents of low amperage. The circuit, developed as an ac amplifier, is used with an external filter which limits bandwidth to achieve optimum noise performance.

B64-10144  
RING COUNTER MAY BE ADVANCED OR RETARDED BY  
COMMAND SIGNAL  
LIBBY, J. N. MOORE, H. D. JUL. 1964  
GSFC-101

A power logic circuit, with bidirectional capability, is used to drive small loads in planned sequence. This is designed in the form of a shift register, with a reversible ring counter.

B64-10150  
NOVEL CIRCUIT COMBINES PULSE STRETCHER WITH  
NOR GATE  
CLIFF, R. A. OCT. 1964  
GSFC-187

A pulse-stretching circuit added to a conventional NOR gate circuit detects a preselected state and produces a pulse that the pulse stretcher maintains for a long enough period to reset all counter stages.

B64-10158  
EMISSION TESTER FOR HIGH-POWER VACUUM TUBES  
LUNDY, C. OCT. 1964  
JPL-628

A simple emission-testing circuit for high power vacuum tubes to check their output stability is described. With modification it may be useful in testing mercury-arc rectifiers.

B64-10163  
FIELD EFFECT TRANSISTORS USED AS VOLTAGE-  
CONTROLLED RESISTORS  
INNOVATOR NOT GIVEN NOV. 1964  
M-FS-174

Two new methods of incorporating field effect transistors into circuit designs have resulted in linear response of this type transistor over a wide range of controlled voltage levels. This increases its usefulness as a voltage-controlled resistor.

B64-10171  
SUBMINIATURE BIOTELEMETRY UNIT PERMITS REMOTE  
PHYSIOLOGICAL INVESTIGATIONS  
INNOVATOR NOT GIVEN OCT. 1964  
ARC-39

A subminiature biotelemetry transmitter permits the measurement of biopotential response in humans or animals to controlled environmental stimuli without discomfort while engaged in normal activities.

B64-10173  
HIGH-PASS RF COAXIAL FILTER REJECTS DC AND LOW  
FREQUENCY SIGNALS  
BAILEY, J. W. MC AFEE, D. F. OCT. 1964  
GSFC-73

A low-loss RF filter element for coaxial transmission provides dc isolation and eliminates low frequency signals. The characteristic impedance of the transmission line is not affected, as the design permits direct connection of the filter to the line.

B64-10200  
BINARY SYSTEM GENERATES SIDEREAL RATE FROM  
STANDARD SOLAR RATE  
GRANATA, R. MC CAUL, P. OCT. 1964  
GSFC-190

A sidereal rate output from mean solar rate input is derived from a sidereal generator that uses digital division and multiplication techniques.

B64-10209  
RASTER LINEARITY OF VIDEO CAMERAS CALIBRATED  
WITH PRECISION TESTER  
INNOVATOR NOT GIVEN /RCA/ DEC. 1964  
GSFC-200

The time between transitions in a camera's video output is measured when registered at reticle marks on the vidicon faceplate. This device permits precision calibration of raster linearity of television camera tubes.

B64-10222  
COMPACT CARTRIDGE DRIVES CODED TAPE AT  
CONSTANT READOUT SPEED  
AUSTIN, D. C. OCT. 1964  
JPL-472

To facilitate storage and repetitive reading of short-program coded tape, a cartridge case, containing mechanical drive and readout assemblies, has been fabricated. The drive transports the tape past a conventional pickup device during the reading function.

B64-10226  
TEMPERATURE-COMPENSATION CIRCUIT STABILIZES  
PERFORMANCE OF VIDICONS  
INNOVATOR NOT GIVEN NOV. 1964  
JPL-486

A simple transistor circuit uses a thermistor to change the vidicon target potential in relation to temperature differences.

B64-10237  
APPARATUS MEASURES CONCENTRATION OF SUSPENDED  
DROPLETS IN GAS STREAMS  
BOOTH, F. W. DEC. 1964  
LANGLEY-31

An apparatus, operating on the principle of wet- and dry-bulb thermometry, permits intermittent or continuous measurement of the concentration of droplets dispersed in a gas stream over a wide range of gas pressure.

B64-10255  
ELECTRONIC DEVICE SIMULATES RESPIRATION RATE  
AND DEPTH  
THOMAS, J. A. NOV. 1964  
MSC-89

An oscillator circuit and a thermistor, in close proximity to a light bulb, periodically alter the heat output of the bulb by varying the voltage across its filament. Use of this simulator permits checkout tests on pneumographs.

B64-10258  
DIGITAL CARDIOMETER COMPUTES AND DISPLAYS  
HEARTBEAT RATE  
MITCHELL, V. M. NOV. 1964  
MSC-93

To compute the heartbeat rate from the waveform output of an electrocardiogram, a digital cardiometer with solid state circuit elements has

been developed. This computes the beat every 15 seconds and visually presents the data on numerical display tubes.

**B64-10259**  
PNEUMOTACHOMETER COUNTS RESPIRATION RATE OF HUMAN SUBJECT  
GRAHAM, G. NOV. 1964  
MSC-92

To monitor breaths per minute, two rate-to-analog converters are alternately used to read and count the respiratory rate from an impedance pneumograph over fixed intervals. The converter outputs are sequentially displayed numerically on electroluminescent matrices.

**B64-10271**  
IMPROVED TECHNIQUE FOR LOCALIZING ELECTRO-POLISHING FEATURES NOVEL NOZZLES  
INNOVATOR NOT GIVEN /GEN. DYN./ASTRONAUTICS/ NOV. 1964  
W00-101

Impingement electropolishing is accomplished by use of an electrolyte film, which is evenly distributed by an insulated nozzle designed to match the contour of the workpiece to be treated. The workpiece is connected to the positive terminal of a generator and the nozzle to the negative terminal.

**B64-10280**  
SERVO SYSTEM FACILITATES PHOTOELASTIC STRAIN MEASUREMENTS ON RESINS  
OTTS, J. W. NOV. 1964  
JPL-504

To facilitate photoelastic measurements of the strains developed by stresses applied to birefringent resins, a servomechanism is employed.

**B64-10281**  
PTC THERMISTOR PROTECTS MULTILOADED POWER SUPPLIES  
LEVERONE, H. MANDELL, N. NOV. 1964  
GSFC-236

A PTC /positive-temperature-coefficient/ thermistor placed in series with each branch load of a multiload circuit prevents power loss in parallel branches. This thermistor may be used in any circuit requiring current limiting or intended overload resetting.

**B64-10283**  
MOUNTING FOR DIODES PROVIDES EFFICIENT HEAT SINK  
INNOVATOR NOT GIVEN /RCA/ NOV. 1964  
M-FS-197

Efficient heat sink is provided by soldering diodes to metal support bars which are brazed to a ceramic base. Electrical connections between diodes on adjacent bars are made flexible by metal strips which aid in heat dissipation.

**B64-10299**  
RADIATION DETECTOR-OPTICAL HANGING DEVICE IS OF SIMPLIFIED CONSTRUCTION  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ JAN. 1965  
GSFC-251

A simplified radiation detector was designed which employs an activated continuous front surface consisting of either the diffused or barrier type of semiconducting material with a grid structure on the nonactivated side of the detector. Its form may be either a rectangular coordinate or a polar coordinate system.

**B64-10305**  
TRANSISTORIZED CONVERTER PROVIDES NONDISSIPATIVE REGULATION  
INNOVATOR NOT GIVEN /DUKE U./ DEC. 1964  
GSFC-238

A transistorized regulator converter efficiently converts fluctuating input voltages to a constant output voltage, avoiding the use of saturable reactors. It is nondissipative in operation and functions in an open loop through variable duty cycles.

**B64-10309**  
WELDING PROCEDURE IMPROVES QUALITY OF WELDS, OFFERS OTHER ADVANTAGES  
INNOVATOR NOT GIVEN DEC. 1964  
M-FS-32

An improved procedure for arc spot welding uses the SIGMA /submerged inert gas metallic arc/ method. This has resulted in welds of higher quality than are obtainable by conventional means.

**B64-10320**  
VOLTAGE GENERATOR SWEEPS OSCILLATOR FREQUENCY LINEARLY WITH TIME  
INNOVATOR NOT GIVEN /MELPAR, INC./ JAN. 1965  
M-FS-219

A voltage-tuned oscillator circuit is described which sweeps the output signal frequency linearly exponentially varying with time.

**B64-10330**  
ECONOMICAL FABRICATION PROCESS PRODUCES HIGH-QUALITY JUNCTION TRANSISTORS  
INNOVATOR NOT GIVEN /IBM/ DEC. 1964  
JPL-SC-065

A convenient, three-step fabrication process, with a p-type layer of gallium arsenide vapor-deposited on a starting wafer of germanium, is used to produce heterojunction-homojunction p-n-p transistors. These are of high quality with good injection efficiency and low capacitance.

**B64-10349**  
BANDWIDTH SWITCHING IS TRANSIENT-FREE, AVOIDS LOSS OF LOOP LOCK  
INNOVATOR NOT GIVEN /SPACE TECHNOL. LABS./ DEC. 1964  
W00-054

A circuit, in a wide bandwidth mode, overcomes transient-producing capacitance switching by maintaining an equivalent voltage at all times. Bandwidth switching may be done at any time, and integrity of the loop lock is maintained.

**B65-10001**  
CIRCUIT CONVERTS AM SIGNALS TO FM FOR MAGNETIC RECORDING  
INNOVATOR NOT GIVEN /RCA/ JAN. 1965  
GSFC-227

Convert AM signals to FM for magnetic recording by relaxation-type voltage-controlled oscillator /VCO/. This circuit may be used in radar, telemetry, and test equipment.

**B65-10002**  
TUNNEL-DIODE CIRCUIT FEATURES ZERO-LEVEL CLIPPING  
BUSH, E. G. JAN. 1965  
GSFC-241

Tunnel-diode circuit starts clipping action as input voltage crosses zero axis. This clipper circuit is effective as limiter in FM receiver.

**B65-10005**  
COMPUTER MODIFICATION REDUCES TIME OF PERFORMING ITERATIVE DIVISION  
INNOVATOR NOT GIVEN /IBM/ FEB. 1965  
M-FS-166

Time reduction in performing iterative division results from using a serial-by-parallel divider employing a look-ahead feature that predetermines the sign relationships of several iterations before the computer cycle begins. This method can be employed in any data handling system performing high-speed division.

**B65-10006**  
MODIFICATION INCREASES LIGHT OUTPUT OF INJECTION-LUMINESCENT DIODES  
INNOVATOR NOT GIVEN /RCA/ JAN. 1965 SEE ALSO  
B64-10283  
M-FS-192

Removing a section of the electrode area from the N-face of injection-luminescent diodes for pumping lasers substantially increases light output. Light is emitted from the N-face as well as from the four edges of the diode.

**B65-10010**  
INEXPENSIVE, STABLE CIRCUIT MEASURES HEART



## RATE

VICK, H. A. JAN. 1965  
MSC-95

Inexpensive transistorized circuit provides reliable analog indications of heart rate in response to preamplified electrocardiograph signal applied to its input.

## B65-10011

CIRCUIT IMPROVEMENT PRODUCES MONOSTABLE MULTIVIBRATOR WITH LOAD-CARRYING CAPABILITY  
GOLDMAN, N. E. SCHAFFERT, J. C. JAN. 1965  
GSFC-34A

Improved circuit provides greater reliability and load-carrying capabilities for monostable multivibrator.

## B65-10012

HELICAL COAXIAL-RESONATOR MAKES EXCELLENT RF FILTER  
INNOVATOR NOT GIVEN /RCA/ JAN. 1965 1965  
GSFC-243

Isolation of closely spaced transmitting and receiving frequencies of an antenna without insertion loss by filtering the receiver input is accomplished by an inner conductor with two winding helices and an outer conductor of aluminum. A tuning slug is at either end of the inner conductor form.

## B65-10013

ZENER DIODE FUNCTION GENERATOR REQUIRES NO EXTERNAL REFERENCE VOLTAGE  
BOLTE, G. BURNS, R. JAN. 1965  
JPL-33

Function generator utilizing parallel impedance networks with zener diodes produces functions which are discontinuous in slope. The function generated appears at the output of the parallel network in the form of a voltage varying in time.

## B65-10018

CARBON ARC IGNITION IMPROVED BY SIMPLE AUXILIARY CIRCUIT  
INNOVATOR NOT GIVEN /RCA/ JAN. 1965  
MSC-103

High voltage, low current pulse in series with arc power supply efficiently ignites a carbon arc. The easily and economically produced circuit is useful with arc burners and searchlights and with plasma jets.

## B65-10023

MINIATURE STRESS TRANSDUCER HAS DIRECTIONAL CAPABILITY  
SAN MIGUEL, A. SILVER, R. H. JAN. 1965  
JPL-591

Miniature stress transducer uses a semi-conductive piezoresistive element to detect stress only on specific axes. Measurement of internal mass stress is based on the compressive deformation of the transducer. The device is applicable to constant stress monitoring in building and dam structural parts.

## B65-10025

LOGIC REDUNDANCY IMPROVES DIGITAL SYSTEM RELIABILITY  
INNOVATOR NOT GIVEN /STANFORD RES. INST./ FEB. 1965  
JPL-SC-069

Redundant-channel system automatically corrects any single error in a set of three binary signal channels. This system is especially applicable to digital computers where data is transmitted in parallel channels.

## B65-10026

STEPPING MOTOR DRIVE CIRCUIT DESIGNED FOR LOW POWER DRAIN  
INNOVATOR NOT GIVEN /HARVARD COLL./ FEB. 1965  
GSFC-198

High power drain is eliminated by a circuit consisting of a divide-by-two stage, two identical inputs, a wiggle amplifier, driver, and power output stages to drive the step motor.

## B65-10028

TRANSISTOR VOLTAGE COMPARATOR PERFORMS OWN

## SENSING

CLIFF, R. A. FEB. 1965  
GSFC-228

Detection of the highest voltage input among a group of varying voltage inputs is accomplished by a transistorized voltage comparison circuit. The collector circuits of the transistors perform the sensing function. Input voltage levels are governed by the transistors.

## B65-10030

LIBRARY OF DOCUMENTS COMPRESSED INTO LAP-HELD DISPLAY KIT  
INNOVATOR NOT GIVEN /NATL. CASH REGISTER CO./ FEB. 1965  
MSC-125

A lightweight Apollo flight kit containing microfilmed data is packaged in a hinged box with a viewing screen cover, and a writing surface. It is secured to the users lap.

## B65-10033

PHOTOELECTRIC SEMICONDUCTOR SWITCH OPERATES WITH LOW LEVEL INPUTS  
INNOVATOR NOT GIVEN /IBM/ FEB. 1965  
JPL-SC-068

Photoelectric semiconductor switch with a buried emitter region avoids high-leakage currents across the emitter. It exhibits high emitter-to-collector transport efficiency beta at low signal levels.

## B65-10041

PULSE HEIGHT ANALYZER OPERATES AT HIGH REPETITION RATES, LOW POWER  
INNOVATOR NOT GIVEN /SPACE TECHNOL. LABS., INC./ FEB. 1965  
WOO-046

Simple multistage transistor gating circuit provides a pulse height analyzer that operates at high repetition rates and low power. The circuit compares the input pulse heights to discrete reference voltages.

## B65-10045

THERMISTOR CONNECTOR ASSEMBLY INCREASES ACCURACY OF MEASUREMENTS  
INNOVATOR NOT GIVEN /ATLANTIC RES. CORP./ FEB. 1965  
LANGLEY-62

Isolation of the thermistor from spurious heat transfer for accurately measuring ambient air temperatures is accomplished by a mounting consisting of a transparent plastic film bonded to a U-shaped phenolic board with depositions of aluminum on each face and upper edge, and a variable capacitor for fine tuning.

## B65-10047

CIRCUIT DETECTS ERRORS IN ADDRESS CURRENTS FOR MAGNETIC CORE ARRAYS  
INNOVATOR NOT GIVEN /IBM/ FEB. 1965  
M-FS-234

Address current error detector generates a signal whenever any error producing conditions arise in magnetic core arrays. Can be used with test equipment and memory storage units.

## B65-10048

MICROPARTICLE IMPACT SENSOR MEASURES ENERGY DIRECTLY  
ALEXANDER, W. M. BERG, O. E. FEB. 1965  
GSFC-252

Construction of a capacitor sensor consisting of a dielectric layer between two conductive surface layers and connected across a potential source through a sensing resistor permits measurement of energy of impinging particles without degradation of sensitivity. A measurable response is produced without penetration of the dielectric layer.

## B65-10050

NULLING PYROMETER USES KERR CELL SHUTTER FOR FAST RESPONSE  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ FEB. 1965  
NU-0010

Conventional pyrometer, in which Kerr cell replaces mechanical shutter and polarizers are

added to filters, yields rapid shutter response.

**B65-10051**  
METAL SHEATH IMPROVES THERMOCOUPLE USING GRAPHITE IN ONE LEG  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
FEB. 1965  
NU-0011

Thermocouple using graphite in one leg is sealed in a moistureproof metal sheath which permits high EMF output and good mechanical strength.

**B65-10052**  
ZENER DIODE IS STARTER FOR TRANSISTOR-REGULATED POWER SUPPLY  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
FEB. 1965  
NU-0015

Zener diode in parallel with a silicon transistor supplies the starting current for a transistor-regulated power supply.

**B65-10054**  
PULSE GENERATOR PERMITS NONDESTRUCTIVE TESTING OF COMPONENT BREAKDOWN VOLTAGE  
INNOVATOR NOT GIVEN /HONEYWELL/ MAR. 1965  
MSC-122

Nondestructive testing of the breakdown voltage of transistors and other electronic components is achieved by a simple relay circuit. The circuit operates by applying low-energy, high-voltage microsecond pulses to the components under test.

**B65-10055**  
FM OSCILLATOR USES TETRODE TRANSISTOR  
BOENSEL, D. W. MAR. 1965  
JPL-82

Tetrode-driven crystal oscillator achieves large frequency variations for a given input signal. Frequency control is obtained by variation of the second base current of the tetrode.

**B65-10056**  
VIBRATING-MEMBRANE ELECTROMETER HAS HIGH CONVERSION GAIN  
COON, G. W. DIMEFF, J. APR. 1965  
ARC-38

Vibrating-membrane transducer in a circuit can measure current below 10 to-the-minus 17 ampere. This electrometer has a high conversion gain and a minimum internal power consumption.

**B65-10057**  
FEED-THROUGH HAS POLYTERMINAL FEATURE  
SANDERS, L. H. MAR. 1965  
M-FS-25

Feed-through connector with individual solder pots in the polyterminal side provides good connections with small amounts of solder and permits visual inspection of bonds. Polyterminal also provides a friction mechanical bond to position conductors prior to soldering.

**B65-10059**  
METAL DIAPHRAGM USED TO CALIBRATE MINIATURE TRANSDUCERS  
INNOVATOR NOT GIVEN /ASTRO-SPACE LABS./ MAR. 1965  
M-FS-207

Dynamic comparative calibration system measures response of miniature pressure transducers. The system is composed of an electromechanically driven metal diaphragm, a calibrated and an uncalibrated transducer and an oscillator.

**B65-10061**  
SIMPLE CONTROL DEVICE SENSES SOLAR POSITION  
LONBORG, J. O. RANDALL, J. C. MAR. 1965  
JPL-638

The amount of solar radiation incident on a specially prepared bimetallic strip is simply and reliably controlled by a light valve. This device is valuable for systems requiring temperature regulation.

**B65-10062**  
PULSED PLASMA ACCELERATOR OPERATES REPETITIVELY WITHOUT COMPLEX CONTROLS  
SABOL, A. P. MAR. 1965  
LANGLEY-48

Self-repeating pulsed plasma accelerator operates with a wide variety of gases over a large range of pressures without complex control equipment. The accelerator combines a circular channel with a tangential channel at the entrance way of a high-velocity gas.

**B65-10066**  
FUEL CELL SERVES AS OXYGEN LEVEL DETECTOR  
INNOVATOR NOT GIVEN /GE/ MAR. 1965  
JPL-SC-072

Monitoring the oxygen level in the air is accomplished by a fuel cell detector whose voltage output is proportional to the partial pressure of oxygen in the sampled gas. The relationship between output voltage and partial pressure of oxygen can be calibrated.

**B65-10067**  
SENSITIVE LEVEL SENSOR MADE WITH SPIRIT LEVEL, GIVES ELECTRICAL OUTPUT  
BRYANT, E. L. MAR. 1965  
LANGLEY-49

Sensor incorporating a circular spirit level, electrical lamp and two pairs of photocells, provides an electrical indication of flat surface level deviation.

**B65-10068**  
AUTOMATIC THERMAL SWITCH ACCELERATES COOLING-DOWN OF CRYOGENIC SYSTEM  
WIEBE, E. R. MAR. 1965  
JPL-655

Automatic switch uses short stainless steel tube with copper heat sinks to accelerate helium gas' cooling and provides good thermal conductivity and good thermal insulation.

**B65-10069**  
FEEDBACK OSCILLATOR FUNCTIONS AS LOW-LEVEL PULSE STRETCHER  
INNOVATOR NOT GIVEN /SPERRY RAND CORP./ MAR. 1965  
GSFC-261

Low trigger pulses of the pulse stretcher circuit are obtained by forward biasing the transistor oscillator. The loop gain is kept below unity and prevents free-running oscillation. Two parallel feedback loops improve the stretching capabilities.

**B65-10072**  
SYNCHRONIZED PULSE GENERATOR NEEDS NO EXTERNAL POWER  
CANCRO, C. A. JANNICHE, P. J., JR. MAR. 1965  
GSFC-274

Simple circuit with high input and low output impedance generates a fast rise-time pulse synchronized with an input pulse of slower rise and fall times. Circuit requires no external power.

**B65-10073**  
SYSTEM MEASURES ANGULAR DISPLACEMENT WITHOUT CONTACT  
DAVIS, W. T. MAR. 1965  
LANGLEY-46

Optic system coupled to an electronic detection and measuring system converts angular movement of reflected light to a direct readout, without any direct contact with the object.

**B65-10076**  
LIGHT-SENSITIVE POTENTIOMETER MEASURES PRODUCT OF TWO VARIABLES  
HAERTSCH, O. C. MAR. 1965  
GSFC-240

The output voltage from a photoconductive potentiometer circuit using a galvanometer mirror reflecting the light beam is directly proportional to the product of the input voltage.

**B65-10079**  
PHOTOELECTRIC SENSOR OUTPUT CONTROLLED BY EYEBALL MOVEMENTS  
INNOVATOR NOT GIVEN /SPACO/ MAR. 1965  
M-FS-274

The difference between the infrared absorption of the iris and infrared reflectivity of the eyeball controls the operation of a device consisting of

an infrared source and amplifier, a cadmium selenide infrared sensor, and an infrared filter.

B65-10080  
PHASE DETECTOR CIRCUIT SYNTHESIZES OWN  
REFERENCE SIGNAL  
INNOVATOR NOT GIVEN /FAIRCHILD STRATOS CORP./  
MAR. 1965  
M-FS-247

Circuit with isolation amplifier connected to a frequency multiplier and synchronous phase detector synthesizes the phase reference signal from the phase modulated input signal.

B65-10085  
TRANSDUCER SENSES DISPLACEMENTS OF PANELS  
SUBJECTED TO VIBRATION  
PEA, R. O. MAR. 1965  
ARC-37

Inductive vibration sensor measures the surface displacement of nonferrous metal panels subjected to vibration or flutter. This transducer does not make any physical contact with the test panel when measuring.

B65-10086  
SYSTEM SELECTS FRAMING RATE FOR SPECTROGRAPH  
CAMERA  
INNOVATOR NOT GIVEN /AM. OPT. CO./ MAR. 1965  
LANGLEY-55

Circuit using zero-order light is reflected to a photomultiplier in the spectrograph monitors incoming radiation to provide an error signal which controls the advancing and driving rate of the film through the camera.

B65-10087  
APPARATUS MEASURES SWELLING OF MEMBRANES IN  
ELECTROCHEMICAL CELLS  
HENNIGAN, T. J. APR. 1965  
GSFC-280

Apparatus consisting of a pressure plate unit, four springs of known spring constant and a micrometer measures the swelling and force exerted by the polymer membranes of alkaline electrochemical cells.

B65-10089  
TRANSDUCER MEASURES TEMPERATURE DIFFERENTIALS  
IN PRESENCE OF STRONG ELECTROMAGNETIC FIELDS  
INNOVATOR NOT GIVEN APR. 1965  
ARC-27

Measurement of temperature rise of cooling water under pressure and in strong electromagnetic fields is accomplished by a transducer using a magnetically shielded thermocouple arrangement. The thermocouple junctions are immersed in oil to isolate them from electric currents in the water.

B65-10091  
SIMULATOR PRODUCES PHYSIOLOGICAL WAVEFORMS  
EKEROOT, S. MAR. 1965  
MSC-94

Physiological waveform simulator capable of producing signals to simulate an axillary and a sternal electrocardiogram, blood pressure, respiratory rate and body temperature. This may be used to check out bioinstrumentation.

B65-10093  
COMPUTER PROGRAMS SIMPLIFY OPTICAL SYSTEM  
ANALYSIS  
INNOVATOR NOT GIVEN /HONEYWELL/ APR. 1965  
GSFC-306

The optical ray-trace computer program performs geometrical ray tracing. The energy-trace program calculates the relative monochromatic flux density on a specific target area. This program uses the ray-trace program as a subroutine to generate a representation of the optical system.

B65-10096  
DIGITAL SYSTEM ACCURATELY CONTROLS VELOCITY  
OF ELECTROMECHANICAL DRIVE  
NICHOLS, G. B. APR. 1965  
GSFC-287

Digital circuit accurately regulates electromechanical drive mechanism velocity. The gain and phase characteristics of digital circuits

are relatively unimportant. Control accuracy depends only on the stability of the input signal frequency.

B65-10097  
VARIABLE VOLTAGE SUPPLY USES ZENER DIODE AS  
REFERENCE  
KLEINBERG, L. L. LAVIGNE, R. C. APR. 1965  
GSFC-262

Using a zener diode as the reference element, a simple transistorized circuit provides a stable variable reference voltage.

B65-10102  
SIMPLE CIRCUIT FUNCTIONS AS FREQUENCY  
DISCRIMINATOR FOR PFM SIGNALS  
BILLINGSLEY, J. APR. 1965  
GSFC-267

Simple circuit monitors the frequency of PFM /pulse frequency modulated/ telemetry signals. This discriminator can be used as a constant current integrator in such circuits as linear sweep and time delay.

B65-10103  
IMPROVED MAGNETOMETER USES TOROIDAL GATING  
COIL  
INNOVATOR NOT GIVEN /CORNELL UNIV./ APR. 1965  
GSFC-249

Improved magnetometer employs a cylindrical, high permeability magnetic core with a toroidal gating coil and a solenoid pickup coil. Flux interaction can be reduced by electrostatically shielding the pickup coil from the gating coil. The magnetometer principle can be applied to navigation devices.

B65-10105  
VARIABLE LOAD AUTOMATICALLY TESTS DC POWER  
SUPPLIES  
BURKE, H. C., JR. SULLIVAN, R. M. APR. 1965  
GSFC-291

Continuously variable load automatically tests dc power supplies over an extended current range. External meters monitor current and voltage, and multipliers at the outputs facilitate plotting the power curve of the unit.

B65-10108  
MAGNETIC FIELD CONTROLS CARBON ARC TAIL FLAME  
INNOVATOR NOT GIVEN /RCA/ APR. 1965  
MSC-139

Polarity of two electromagnets placed near the exhaust flue cancels out a high carbon-arc field. The arc tail flame is correctly drawn to the exhaust flue and contamination is diverted. This device should reduce maintenance cycles on any arc-powered illuminator.

B65-10112  
UNIUNCTION FREQUENCY DIVIDER IS FREE OF  
BACKWARD LOADING  
FAIRBANKS, A. F. APR. 1965  
JPL-W00-010

Simple frequency divider composed of relaxation oscillators uses unijunction transistors to reduce backward loading to a minimum. This circuit design is applicable in timing devices and sync generators for television systems.

B65-10118  
TRANSISTORIZED CIRCUIT CLAMPS VOLTAGE WITH  
0.1 PERCENT ERROR  
INNOVATOR NOT GIVEN /RCA/ APR. 1965  
GSFC-196

Transistorized clamping circuit clamps either of two voltage levels to input of digital-to-analog resistive matrix with 0.1 percent error. Clamping circuit technique has analog, digital, and hybrid circuit applications.

B65-10119  
VARIABLE FREQUENCY TRANSISTOR INVERTERS USE  
MULTIPLE CORE TRANSFORMERS  
INNOVATOR NOT GIVEN /DUKE UNIV./ APR. 1965  
GSFC-183

Magnetic-coupled multivibrators containing two or more square-loop cores with multiple windings in a single transformer package, provide indirect

frequency control and improved operational characteristics. This multivibrator can be used for power oscillators, nonlinear magnetic circuitry and telemetry circuits.

B65-10120

MULTIPLE TEST TUBES STIRRED MECHANICALLY  
LEON, H. J. STRONG, I. J. APR. 1965

ARC-42

Mechanical device simultaneously stirs multiple test tubes under controlled laboratory conditions. The invention provides a variable stirring rate, minimal amount of contamination of tube contents, unattended and simple operation, and easy maintenance and cleaning.

B65-10123

EFFICIENT THIN FILM HEATING ELEMENT TAKES  
MINIMUM SPACE

BUSCH, A. H. APR. 1965

GSFC-289

Light, thin-film heating element is formed by vacuum deposition of metal onto a nonconductive surface to be heated. This small-sized heater has a very fast response time.

B65-10124

VARIABLE FREQUENCY MAGNETIC MULTIVIBRATOR  
GENERATES STABLE SQUARE-WAVE OUTPUT

PAULL, S. MAY 1965

GSFC-AE-21

Variable frequency magnetic multivibrator operates in a full wave fashion to provide a stable square wave output over wide variations in temperature and power supply potential. This invention is applicable in clocks and control devices.

B65-10125

SIMPLIFIED ELECTROMETER HAS EXCELLENT  
OPERATING CHARACTERISTICS

BRANTNER, R. E. MAY 1965

JPL-413

Simplified and improved electrometer circuit provides high-input impedance, stability of gain and operating point, linear response, and low power requirements.

B65-10127

TRAVELING-WAVE TUBE CIRCUIT SIMPLIFIES  
MICROWAVE RELAY

ALLEN, W. K. IPPOLITO, L. J. NACE, D. A. MAY 1965

GSFC-299

Circuit with a sawtooth-modulated traveling-wave tube, which acts as a frequency converter and as an amplifier, simplifies microwave transmission. Lower power losses and reduced size and weight are also realized in this circuit.

B65-10128

PIEZORESISTIVE GAGE TESTS PIN-CONNECTOR  
SOCKETS

BOND, W. W. MAY 1965

JPL-675

Connector pin consisting of a piezoresistive crystal, retainer spring and a bridge circuit with voltmeter is used to test connector sockets and may be adapted for multiple socket testing.

B65-10137

INSTRUMENT CALIBRATES LOW GAS-RATE FLOWMETERS  
COPELAND, A. C. FULTON, W. C. SMITHER, M. A.

MAY 1965

MSC-134

Electronically measuring the transit time of a soap bubble carried by the gas stream between two fixed points in a burette calibrates flowmeters used for measuring low gas-flow rates.

B65-10138

HIGH-GAIN AMPLIFIER HAS EXCELLENT STABILITY  
AND LOW POWER CONSUMPTION

KLEINBERG, L. L. MAY 1965

GSFC-272

Transistorized amplifier, in which an external reference voltage controls gain, combines high gain with stability and low power consumption. This circuit is useful in electronic servo and portable audio equipment.

B65-10139

SPHERICAL ELECTRODE ELIMINATES HIGH-VOLTAGE  
BREAKDOWN

FINKE, R. C. VETRONE, R. H. MAY 1965

LEWIS-155

Spherical electrodes surrounding electrode-dielectric junctions eliminate high-voltage breakdown. The gap between the spherical electrode and the dielectric must be of an optimum size for proper operation. Modified, this electrode should be suitable as a high-voltage feedthrough between various liquid and gaseous media.

B65-10142

AUXILIARY CIRCUIT ENABLES AUTOMATIC MONITORING  
OF EKG'S

INNOVATOR NOT GIVEN /TEX. INST. FOR

REHABILITATION AND RES./ MAY 1965 SEE ALSO

B65-10143 AND B65-10010

MSC-106

Auxiliary circuits allow direct, automatic monitoring of electrocardiograms by digital computers. One noiseless square-wave output signal for each trigger pulse from an electrocardiogram preamplifier is produced. The circuit also permits automatic processing of cardiovascular data from analog tapes.

B65-10143

DIGITAL-OUTPUT CARDIOTACHOMETER MEASURES RAPID  
CHANGES IN HEARTBEAT RATE

VICK, H. MAY 1965 SEE ALSO B65-10010 AND

B65-10142

MSC-133

Cardiotachometer circuits produce an output voltage proportional to the heartbeat rate on a beat-by-beat basis. This is less complex and less costly than the digital cardiotachometers.

B65-10145

LOGARITHMIC AMPLIFIER USES FIELD EFFECT  
TRANSISTORS

STEWART, J. L. MAY 1965

JPL-509

Solid-state amplifier utilizes field effect transistors and planar junction diodes to provide a logarithmic response to a wide range of input signals.

B65-10146

FREQUENCY OFFSET IN LINEAR FM/CW TRANSPONDER  
ELIMINATES CLUTTER

INNOVATOR NOT GIVEN /MELPAR/ MAY 1965

M-FS-249

Clutter is eliminated by offsetting the frequency of a transponder signal with respect to an interrogation signal. This improves the tracking of aircraft and spacecraft by FM/CW transponders.

B65-10151

ROTOR POSITION SENSOR SWITCHES CURRENTS IN  
BRUSHLESS DC MOTORS

INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ MAY 1965

GSFC-315

Reluctance switch incorporated in an induction motor is used for sensing rotor position and switching armature circuits in a brushless dc motor. This device drives the solar array system of an unmanned space satellite.

B65-10152

CIRCUIT REDUCES DISTORTION OF FM MODULATOR  
INNOVATOR NOT GIVEN /RCA/ MAY 1965

GSFC-257

Correction circuit improves the linearity of a voltage-variable capacitor used to modulate a free-running oscillator. This improvement only applies to audio frequency modulation and will not correct for slowly varying dc input in some telemetry systems.

B65-10158

LASER BEAM TRANSMITS ELECTRIC POWER  
INNOVATOR NOT GIVEN /RCA/ JUN. 1965

GSFC-293

Semiconductor laser beam supplies sustained level of electrical power to remote location not served

by conventional conductors. This system would be useful where transmission of energy is critical, such as in nuclear reactors, or other hazardous environments.

**B65-10159**  
SOLID-STATE SWITCHING USED TO SPEED UP  
CAPACITIVE INTEGRATOR  
NEWCOMB, A. L., JR. JUN. 1965  
LANGLEY-104

Capacitive integrator circuit using silicon controlled switches /SCS/ insures output voltage linearly proportional to input pulse width. This circuit provides high input impedance and relatively low output impedance.

**B65-10161**  
INTERFEROMETER COMBINES LASER LIGHT SOURCE  
AND DIGITAL COUNTING SYSTEM  
INNOVATOR NOT GIVEN /MIT/ JUN. 1965  
MSC-151

Measurement of small linear displacements in digital readouts with extreme accuracy and sensitivity is achieved by an interferometer. Instrument combines a digital electro-optical fringe-counting system and a laser light source.

**B65-10165**  
SUPERCONDUCTOR MAGNETS USED FOR STAGGER-TUNING  
TRAVELING-WAVE MASER  
INNOVATOR NOT GIVEN /RCA/ JUN. 1965  
GSFC-292

Superconducting materials reduce size and weight of magnets used for stagger-tuning individual traveling-wave maser crystals. The invention is useful in microwave communication systems requiring a high information rate.

**B65-10169**  
PHASE SHIFT FREQUENCY SYNTHESIZER IS  
EFFICIENT, SMALL IN SIZE  
INNOVATOR NOT GIVEN /SPACE TECHNOL. LABS./ JUN. 1965  
M-FS-250

Phase shift frequency synthesizer produces suppressed-carrier signals at the sum and difference frequencies. All unwanted frequencies are suppressed by this small-sized synthesizer.

**B65-10178**  
INNOVATOR NOT GIVEN /DUKE UNIV./ JUN. 1965  
GSFC-130

Self-oscillating dc to ac converter with transistor switching to produce a square wave output is used for low and high voltage power sources. The converter has a high efficiency throughout a wide range of loads.

**B65-10182**  
FORCE CONTROLLED SOLENOID DRIVES MICROWELD  
TESTER  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1965  
WOO-125

Solenoid-driven device tests the integrity of a microweld joint between an electronic component lead wire and a wire ribbon by applying tension stress to the joint. Variable measured force is provided when either destructive or nondestructive testing is performed.

**B65-10183**  
MODIFIED INTERELEMENT SPACING IMPROVES YAGI  
ANTENNA ARRAY  
BECK, F. B. JUN. 1965  
LANGLEY-130

Symmetrical antenna array is designed by adjusting the Yagi disk interelement spacing so that the grating lobe of the array factor coincides with the first sidelobe of the element pattern.

**B65-10184**  
PRESSURE SENSOR RESPONDS ONLY TO SHOCK WAVE  
INNOVATOR NOT GIVEN /BOEING CO./ JUN. 1965  
M-FS-238

Pressure sensor responds only to high pressure crest of a shock wave, and will not respond to conditions of overpressure. The sensor uses plates of a battery to produce voltage output used to actuate an alarm signal or crew escape system.

**B65-10187**  
CRYSTAL MEASURES-SHORT TERM, LARGE-MAGNITUDE  
FORCES  
PFEIFFER, C. G. JUN. 1965  
JPL-77

By using the magnitude of piezoelectric crystal response to distortion and compression, this device measures transient accelerations and their rate of change. The invention could be used in a servo control system by supplementing the accelerometer and taking over its function when its range was exceeded.

**B65-10193**  
LOGIC CIRCUIT EXHIBITS OPTIMUM PERFORMANCE  
HUSSON, C. JUN. 1965  
LANGLEY-129

Performance of circuits are compared to determine the optimum circuit configuration for implementation into microelectronic functions. Comparison is made in terms of power drain, propagation time, and component variations with temperature and load.

**B65-10194**  
ANALOG-TO-DIGITAL CONVERTER HAS INCREASED  
RELIABILITY AND REDUCED POWER CONSUMPTION  
THORNWALL, J. C. JUN. 1965  
GSFC-246

Eight-bit analog-to-digital converter decreases average power consumption and increases component reliability. The converter uses solid-state components in pulse operation and magnetic core components for minimizing power consumption. The magnetic core components also increase reliability.

**B65-10195**  
DEVICE MEASURES FLUID DRAG ON TEST VEHICLES  
FREEMAN, R. JUDD, J. H. LEISS, A. JUN. 1965  
LANGLEY-34

Electromechanical drag balance device measures the aerodynamic drag force acting on a vehicle as it moves through the atmosphere and telemeters the data to a remote receiving station. This device is also used for testing the hydrodynamic drag characteristics of underwater vehicles.

**B65-10196**  
INEXPENSIVE ELECTRICAL CONNECTOR IS MOISTURE  
AND CORROSIONPROOF  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1965  
MSC-164

Compression-sealed electrical connector made principally of plastic components is used in a corrosive atmosphere. This inexpensive and moistureproof connector can be modified to provide a multiple-pin connector.

**B65-10197**  
IMPROVED SOLDERLESS CONNECTOR IS EASILY  
DISCONNECTED  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ JUN. 1965  
JPL-SC-060

Compression type solderless connector is easily disconnected and reassembled and resists vibration. The connector, which uses a tapered, split sleeve that is tightened by a nut into a mating bug, is used in place of standard solder lugs and to connect unsolderable wire.

**B65-10199**  
MODULAR THERMOELECTRIC CELL IS EASILY PACKAGED  
IN VARIOUS ARRAYS  
EPSTEIN, J. JUN. 1965  
GSFC-339

Modular thermoelectric cells are easily packaged in various arrays to form power supplies have desirable voltage and current output characteristics. The cells employ two pairs of thermoelectric elements, each pair being connected in parallel between two sets of aluminum plates. They can be used as solar energy conversion devices.

**B65-10200**  
DENSITY TRACE MADE WITH COMPUTER PRINTOUT

WILSON, M. JUN. 1965  
GSFC-322

Special drum for a computer-controlled printer improves density trace of scientific data. The drum provides uniformly shaped characters and evenly spaced variations of print density that precisely reflect data magnitude. This device plots temperature profiles, geographic contours, pressure gradients, electric potential gradients, and magnetic field configurations.

B65-10202  
QUICK-DISCONNECT COUPLING SAFE TRANSFER OF  
HAZARDOUS FLUIDS  
DEWITT, R. L. SCHMIDT, H. W. JUN. 1965  
LEWIS-125

Quick-disconnect coupling is used for uncoupling of plumbing during ground-to-vehicle transfer of cryogenic and hazardous fluids. The coupling allows remote positive control of liquid pressure and flow during the transfer operation, remote connection and separation capabilities, and negligible liquid spillage upon disconnection.

B65-10203  
TINY BIOMEDICAL AMPLIFIER COMBINES HIGH  
PERFORMANCE, LOW POWER DRAIN  
DEBOO, G. J. JUL. 1965  
ARC-41

Transistorized, portable, high performance amplifier with low power drain facilitates biomedical studies on mobile subjects. This device, which utilizes a differential input to obtain a common-mode rejection, is used for amplifying electrocardiogram and electromyogram signals.

B65-10204  
VOLTAGE VARIABLE OSCILLATOR HAS HIGH PHASE  
STABILITY  
HEARN, C. P. JUL. 1965  
LANGLEY-123

Two or more series RLC circuits are used with a negative feedback amplifier to make a voltage variable oscillator. This combination results in high phase stability and optimum frequency modulation.

B65-10206  
SENSITIVE ELECTROMETER FEATURES DIGITAL  
OUTPUT  
DOONG, H. JUL. 1965  
GSFC-288

Four-stage transistorized electrometer eliminates the need for a logarithmic compression network. It measures very low currents and produces a digital output directly indicative of the input current magnitude.

B65-10208  
HYBRID COMPUTER TECHNIQUE YIELDS RANDOM  
SIGNAL PROBABILITY DISTRIBUTIONS  
CAMERON, W. D. JUL. 1965  
ARC-34

Hybrid computer determines the probability distributions of instantaneous and peak amplitudes of random signals. This combined digital and analog computer system reduces the errors and delays of manual data analysis.

B65-10209  
OSCILLATOR CIRCUIT MEASURES LIQUID LEVEL IN  
TANKS  
INNOVATOR NOT GIVEN /IBM/ JUL. 1965  
M-FS-245

Oscillator circuits automatically measure the liquid level in tanks. The circuit employs a twin transmission line as a liquid level probe.

B65-10212  
DETECTOR CIRCUIT COMPENSATES FOR VIDICON BEAM  
CURRENT VARIATIONS  
INNOVATOR NOT GIVEN /RCA/ JUL. 1965  
GSFC-310

Signal detector circuit compensates for black level shifts in vidicons by dark current cancellation. It clamps the video signal to the dark current component of the signal. The device also compensates for background noise variation or

transducer bias fluctuations in other repetitive pulse systems.

B65-10213  
MULTIAXIAL ANALYZER DETECTS LOW-ENERGY  
ELECTRONS  
LIND, D. L. OGILVIE, K. W. WILKERSON, T. D.  
JUL. 1965  
GSFC-329

Three curved plate energy analyzers coupled with three electron multiplier tubes detect and measure low energy electron flux in several directions simultaneously.

B65-10215  
ELECTRICAL PROBE ENSURES RELIABLE CONTACT IN  
SOCKET  
INNOVATOR NOT GIVEN /IBM/ JUL. 1965  
M-FS-315

Spring-loaded probe makes a reliable electrical contact by producing a circular wiping motion at the tip when inserted into a mating socket.

B65-10218  
GRAPHITE ELEMENT SERVES AS RADIANT HEAT SOURCE  
JUL. 1965  
M-FS-105

Radiators using a graphite heating element as a radiant heat source have high heat flux and long operational lives. They are used to test the thermal resistance of materials.

B65-10221  
INSTRUMENT ACCURATELY MEASURES EXTREMELY LOW  
AIR DENSITIES  
INNOVATOR NOT GIVEN /ELECTRO-OPTICAL SYSTEMS/  
AUG. 1965  
M-FS-193

Gauge accurately measures low air densities in high-vacuum systems. It relies on the detection of near-visible light radiated from nitrogen molecules present in the system.

B65-10223  
VOLTAGE CONTROLLED OSCILLATOR IS EASILY  
ALIGNED, HAS LOW PHASE NOISE  
SYDNOR, R. L. AUG. 1965  
JPL-510

Voltage controlled oscillator /VCO/, represented by an equivalent rf circuit, is easily adjusted for optimum performance by varying the circuit parameter. It contains a crystal drive level which is also easily adjusted to obtain minimum phase noise.

B65-10225  
SIMPLE BCD CIRCUIT ACCURATELY COUNTS TO 24  
SPAFFORD, M. L. AUG. 1965  
GSFC-317

Ripple-through counter with divide-by-24 output pulse is used in digital control clocks to register hours and give a daily output signal. It uses commercially available digital modules that incorporate and-gates with flip-flops.

B65-10226  
MAGNETIC-SHIFT-REGISTER CIRCUIT CONTROLS STEP  
MOTOR OPERATIONS  
VEILLETTE, L. J. AUG. 1965  
GSFC-340

Magnetic-shift-register circuit controls bidirectional operations of a phase-pulsed step motor. The circuit draws no power in standby, is nonregenerative, and is insensitive to switching transients.

B65-10228  
SIMPLE CIRCUIT PRODUCES HIGH-SPEED, FIXED  
DURATION PULSES  
GARAHAN, N. M. AUG. 1965  
GSFC-285

Circuit generates an output pulse of fixed width from a variable width input pulse. The circuit consists of a tunnel diode in parallel with an inductance driven by a constant current generator. It is used for pulsed communication equipment design.

B65-10232

FIELD EFFECT TRANSISTOR PRESENTS HIGH INPUT IMPEDANCE IN AC AMPLIFIER

MARSHALL, J. H. AUG. 1965

JPL-500

Four-stage transistorized ac amplifier provides high input impedance and operates at low intrinsic noise levels. It is suited to carrier or narrow band sine wave applications.

B65-10233

HIGH-SPEED SQUARE-WAVE CURRENT LIMITER OPERATES EFFICIENTLY

INNOVATOR NOT GIVEN /LABKO SCI./ AUG. 1965

JPL-SC-073

Transistorized high speed circuit limits currents from a square-wave ac power supply. The current limiter resets after each half cycle of the square wave and thus minimizes power losses.

B65-10234

SIMPLE CIRCUIT REDUCES TRANSISTOR SWITCHING TIME

INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./

AUG. 1965

GSFC-314

Silicon-controlled rectifier /SCR/, gated by a voltage divider, controls the potentiometer in transistorized switching circuits. The SCR acts as a gate to trigger the switching transistor only when the input signal reaches an amplitude that will switch the transistor rapidly.

B65-10237

BRUSHLESS DC MOTOR USES ELECTRON BEAM SWITCHING TUBE AS COMMUTATOR

STUDER, P. AUG. 1965

GSFC-345

Electron beam switching tube eliminates physical contact between rotor and stator in brushless dc motor. The tube and associated circuitry control the output of a dc source to sequentially energize the motor stator windings.

B65-10238

SOLID-STATE LASER TRANSMITTER IS AMPLITUDE MODULATED

BILDERBACK, R. AUG. 1965

MSC-121

Amplitude modulated laser transmitter affords radio frequencies unlimited bandwidth. The system, which is solid state and compact, uses a gallium arsenide diode that emits in the near infrared.

B65-10242

ELECTROMETER HAS AUTOMATIC ZERO BIAS CONTROL

INNOVATOR NOT GIVEN /APPLIED PHYSICS CORP./ AUG.

1965

GSFC-350

Zero biasing circuit in a vibrating reed type electrometer counterbalances residual potential. It charges a capacitor to the residual potential and connects that capacitor in series with the vibrating reed so that the voltages cancel. This enables the electrometer to read zero output potential in the absence of an input current.

B65-10243

NOVEL PROBE SIMPLIFIES ELECTRONIC COMPONENT TESTING

SYNER, W. F.

GSFC-342

Test probe, in conjunction with standard equipment, tests axial-lead electronic components in their original packages. The probe can be modified to test any electronic component with automatic or nonautomatic equipment.

B65-10244

LIGHTWEIGHT COAXIAL CABLE CONNECTOR REDUCES SIGNAL LOSS

BREJCHA, A. G., JR. AUG. 1965

JPL-720

Connectors with milled interface surfaces for perfect electrical contact eliminate secondary-emission discharge and low signal loss in rf coaxial cables. The connectors which contain alignment and centering components for proper

joint concentricity are used in communications systems designs.

B65-10247

SERVO CALORIMETER MEASURES MATERIAL HEATING RATE

GILMOUR, G. WILSON, J. H. /WESTINGHOUSE ELEC. CORP./ AUG. 1965

NU-0024

Servo calorimeter accurately measures the heating rate of a material exposed to nuclear radiation independently of the specific heat thermal conductivity of the material. The electrical power used is a direct measure of the nuclear heating rate.

B65-10249

MANUAL-FEED ADAPTER PERMITS MICROFILMING OF CONTINUOUS OSCILLOGRAPH OUTPUT

BENNETT, J. /WESTINGHOUSE ELEC. CORP./ AUG. 1965

NU-0029

A manual-feed adapter used with a microfilm recording unit permits continuous filming and reduces oscillograph output to manageable dimensions.

B65-10255

BORON TRIFLUORIDE NUCLEAR DETECTOR

PREAMPLIFIER USES SINGLE-CABLE CONNECTION

HECKELMAN, J. D. SHUMAKER, R. E. AUG. 1965

LEWIS-178

Preamplifier for a nuclear particle detector operates with a single interconnecting cable. Isolating and bypass networks permit this single cable operation.

B65-10257

INDUCTOR FLYBACK CHARACTERISTIC GIVES VOLTAGE REGULATOR FAST RESPONSE

SMITH, G. D. AUG. 1965

GSFC-361

Voltage regulator alternately connects an inductor in parallel and in series with the input voltage source. This flyback voltage regulator provides a regulated dc voltage to varying loads from a varying dc supply and gives fast response to load and supply changes.

B65-10258

GAPPED TOROID PROVIDES INFINITE RESOLUTION OF DELAY-LINE PICKUP

ROBINSON, G. B. AUG. 1965

GSFC-370

Gapped toroid magnetically coupled to a delay line provides continuous adjustment of the time delay line signal retrieval. A rotating screw moves the toroid pickup parallel to the delay line. This device can be used in signal detection devices and instrumentation equipment.

B65-10259

INCREASED JUNCTION LEAD INDUCTANCE BALLASTS HIGH-FREQUENCY TRANSISTORS

GILBERT, G. J. /RCA/ SEP. 1965

GSFC-387

Segmentation of transistor bonding stripes and the inherent inductance of individual leads provides ballast for even current distribution across the junction of a high-frequency transistor.

B65-10260

SIMPLE PULSE COUNTING CIRCUIT COMPUTES SUM OF SQUARES

SCHAEFER, D. H. SEP. 1965

GSFC-391

Pulse counting circuit with an extra chain of flip-flops, delay lines, and AND/GATES computes the sum of the squares of the pulse sequences. A pulse train and the sum of the squares of the pulses are simultaneously completed.

B65-10263

INDEXING DEVICE ENSURES PROPER MATING OF ELECTRICAL CONNECTORS

JENKINS, L. M. JENKINS, S. M. SIMMONS, W. H. SEP. 1965

MSC-155

Indexing splines with modified standard male and female connectors eliminates the possibility of

incorrect mating. Large stock quantities of differently indexed connectors are unnecessary since connectors from a single stock can be indexed as desired at installation time.

B65-10264

PLASTIC BAGS IN EVACUATED CHAMBER MAKE LIGHTWEIGHT GAS SAMPLING SYSTEM  
SHAFFERNOCKER, W. M. /GE/ SEP. 1965  
FRC-31

Portable, lightweight system collects the exhaust gas of an aircraft during flight for use in analyzing combustion efficiency. The system uses an evacuated chamber and plastic bags.

B65-10265

WELD LEAKS RAPIDLY AND SAFELY DETECTED  
INNOVATOR NOT GIVEN /BOEING CO./ SEP. 1965  
M-FS-362

Test method detects leaks that occur during hydrostatic pressure testing of welded joints in metal tanks. A strip of aluminum foil and a strip of water-soluble paper are placed over the weld. A voltage applied between the tank wall and the foil strip is monitored to detect a decrease in ohmic resistance caused by water leakage into the paper layer.

B65-10267

ELECTROMETER PREAMPLIFIER HAS DRIFT CORRECTION FEEDBACK  
LABARTHE, L. C. /LABKO SCI./ SEP. 1965  
JPL-SC-074

Negative feedback circuit corrects output drift in an electrometer. The negative feedback is used in the no signal state to maintain the output level at zero reference. Drift voltage storage in the signal on state is also used to provide a drift-free readout.

B65-10268

MULTIPLE TEST CHAMBER EXPOSES MATERIALS TO VARIOUS ENVIRONMENTS  
JOHNSTON, R. L. SEP. 1965  
MSC-179

Multiple compartment test chamber exposes several material specimens to various environmental conditions for prolonged periods. The specimens are individually mounted in chamber compartments, rotated to various positions, and measured through optical windows to determine progressive changes in the material properties.

B65-10269

SIMPLE DEVICE PRODUCES ACCELEROMETER CALIBRATION PULSE  
INNOVATOR NOT GIVEN /LOCKHEED MISSILES AND SPACE CO./ SEP. 1965  
M-FS-363

Shock-impulse exciter produces a remote checkout of the amplitude calibration and frequency response of a piezoelectric vibration accelerometer. The exciter employs a bimetal spring to apply a mechanical acceleration pulse of a known amplitude and frequency to the accelerometer.

B65-10271

COMPOSITE SEAL REDUCES ALKALINE BATTERY LEAKAGE  
CLATTERBUCK, C. H. PLITT, K. F. SEP. 1965  
GSFC-337

Composite seal consisting of rubber or plastic washers and a metal washer reduces alkaline battery leakage. Adhesive is applied to each washer interface, and the washers are held together mechanically.

B65-10273

ELECTROMECHANICAL FLOWMETER ACCURATELY MONITORS FLUID FLOW  
GRANT, D. J. SEP. 1965  
GSFC-357

Electromechanical flowmeter remotely and accurately monitors the flow rate and total volume of a transparent liquid discharged from a dispensing system. A dual dispensing tube system provides a relative reference level which permits compensation for temperature variations.

B65-10274

ELECTRONIC OHMMETER PROVIDES DIRECT DIGITAL OUTPUT  
SEMYAN, J. SEP. 1965  
GSFC-363

Self-balancing wheatstone bridge acts as all-electronic digital readout ohmmeter.

B65-10275

IMPROVED CIRCUIT MINIMIZES GENERATION OF PSEUDONOISE CHECK BITS  
ANDERSON, T. O. LUSBAUGH, W. A. SEP. 1965  
JPL-698

Computer switching network consists of parallel and series combinations of mod 2 adders using the minimum number of gating levels. This network minimizes the propagation time in which a sequence of pseudonoise check bits are generated.

B65-10276

ADDED DIODES INCREASE OUTPUT OF BALANCED MIXER CIRCUIT  
ROBINSON, G. B. SEP. 1965  
GSFC-354

Two diodes added to a conventional balanced mixer circuit increase the output signal level. The resulting half-wave carrier switch balanced modulator is used in radio equipment.

B65-10277

NONLINEAR FEEDBACK REDUCES ANALOG-TO-DIGITAL CONVERTER ERROR  
MUNOZ, R. M. SEP. 1965  
ARC-46

Nonlinear analog-to-digital converter measures the analog input level and continuously adjusts the digital readout scale sensitivity to effectively increase the accuracy. It is able to acquire more accurate low-level data.

B65-10278

MODIFIED DEVELOPER INCREASES LINE RESOLUTION IN PHOTSENSITIVE RESIST  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ SEP. 1965  
GSFC-386

Standard developer solution is mixed with dipropyl carbonate. This reduces swelling in the photosensitive resist and permits application of relatively thick films with minimal pinhole formation and increased line resolution.

B65-10279

INFLATABLE BLADDER PROVIDES ACCURATE CALIBRATION OF PRESSURE SWITCH  
SMITH, N. J. /BOEING CO./ SEP. 1965  
M-FS-367

Calibration of a pressure switch is accurately checked by a thin-walled circular bladder. It is placed in the pressure switch and applies force to the switch diaphragm when expanded by an external pressure source. The disturbance to the normal operation of the switch is minimal.

B65-10281

CIRCUIT MAINTAINS DIGITAL DECISION THRESHOLD AT PRESET LEVEL  
INNOVATOR NOT GIVEN /AVCO CORP./ SEP. 1965  
M-FS-331

Optimum decision-level circuit maintains the decision threshold at any preselected percentage of the input-signal amplitude. Communications equipment involving recognition of transmitted digital information can benefit from this circuit.

B65-10282

CONSTANT-CURRENT REGULATOR IMPROVES TUNNEL DIODE THRESHOLD-DETECTOR PERFORMANCE  
CANCRU, C. A. SEP. 1965  
GSFC-239

Grounded-base transistor is placed in a tunnel diode threshold detector circuit, and a bias voltage is applied to the tunnel diode. This provides the threshold detector with maximum voltage output and overload protection.

B65-10284

FIELD-EFFECT TRANSISTOR REPLACES BULKY TRANSFORMER IN ANALOG-GATE CIRCUIT



INNOVATOR NOT GIVEN /RADIATION, INC./ SEP. 1965  
GSFC-351

Metal-oxide semiconductor field-effect transistor /MOSFET/ analog-gate circuit adapts well to integrated circuits. It provides better system isolation than a transformer, while size and weight are appreciably reduced.

B65-10286  
UPPERCASE AND LOWERCASE COMPUTER PRINTOUT  
INCREASES READABILITY

HAND, W. W. /DOC., INC./ JONSBURG, M. B. SEP. 1965

HQ-12

Print chain of 120 characters facilitates production of computer printout in both uppercase and lowercase characters. Although the output speed is reduced, the use of the print chain increases the computer printout readability.

B65-10287  
PHOTORESISTANCE ANALOG MULTIPLIER HAS WIDE RANGE

HARTENSTEIN, R. G. SEP. 1965

GSFC-360

Photoactivated bridge facilitates equal performance of analog multipliers over a wide frequency range. The multiplier operates from direct current to an upper frequency limited by either the light source or the closed-loop amplifier.

B65-10289

BORON NITRIDE HOUSING COOLS TRANSISTORS

INNOVATOR NOT GIVEN /SPACE TECHNOL. LABS./ SEP. 1965 SEE ALSO B63-10033 AND B65-10186

WOO-079

Boron nitride ceramic heat sink cools transistors in rf transmitter and receiver circuits. Heat dissipated by the transistor is conducted by the boron nitride housing to the metal chassis on which it is mounted.

B65-10290

FM/CW SYSTEM MEASURES AIRCRAFT ATTITUDE

INNOVATOR NOT GIVEN /MELPAR/ SEP. 1965

M-FS-276

FM/CW radar system measures attitude of an approaching aircraft relative to a ground station. The FM/CW transmitter on board the aircraft transmits through two antennas to a ground-based receiver.

B65-10293

ELECTROSTATICALLY DRIVEN DYNAMIC CAPACITOR

EMPLOYS CAPACITIVE FEEDBACK

LONBORG, J. O. OCT. 1965

JPL-771

Three-part signal electrode provides capacitive feedback to an oscillator driven dynamic capacitor in an electrometer circuit.

B65-10298

TITANIUM DIAPHRAGM MAKES EXCELLENT AMPLITRON

CATHODE SUPPORT

TEICH, W. W. /RAYTHEON CO./ OCT. 1965

GSFC-394

Cathode support structure designed around a titanium diaphragm prevents radial misalignment between the cathode and anode in amplitrons. The titanium exhibits low thermal conductivity, tolerates lateral thermal expansion of the cathode, and is a poor primary and secondary emission medium.

B65-10299

ELECTROPNEUMATIC RHEOSTAT REGULATES HIGH

CURRENT

HAACKER, J. F. JEDLICKA, J. R. WAGONER, C. B.

OCT. 1965

ARC-44

Electropneumatic rheostat maintains a constant direct current in each of several high-power parallel loads, of variable resistance, across a single source. It provides current regulation at any preset value by dissipating the proper amount of energy thermally, and uses a column of mercury to vary the effective length of a resistance element.

B65-10300

IMPURITY DIFFUSION PROCESS FOR SILICON

SEMICONDUCTORS IS FAST AND PRECISE

MC LOUSKI, R. M. SKOUSA, G. W. /WESTINGHOUSE

ELEC. CORP./ OCT. 1965

GSFC-397

Impurity diffusion process produces precision silicon semiconductor junctions economically and fast. Oxide is deposited on a silicon wafer and a controlled concentration of impurity atoms in gaseous form is simultaneously introduced into the reaction.

B65-10301

REMOTE RAPIDLY VARYING PRESSURES ACCURATELY

MEASURED

INNOVATOR NOT GIVEN /GE/ OCT. 1965

FRC-28

Transmitting-damping tube with one end closed, the other open to a pressure source, has a pressure sensor connected to a port close to the pressure source. This accurately measures transient or rapidly varying fluid pressures.

B65-10304

IMPROVED STRAIN-WIRE FLOWMETER HAS FAST

RESPONSE TIME

DILLON, R. C. DUNBAR, W. R. OCT. 1965

LEWIS-241

Strain-sensitive resistance wires in a wheatstone bridge arrangement from the sensing element of a flowmeter. The change in resistance of the wires is measured as a function of stream velocity. Thus the electrical output is a measure of both rapidly varying and steady fluid-flow rates.

B65-10305

THIN-FILM RESISTORS USED IN FUNCTIONAL

ELECTRONIC BLOCKS

INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./

OCT. 1965

GSFC-380

Vapor-deposited thin-film resistors replace diffused resistors in R-C tank circuits in a solid state electronic block. This allows an optimum parallel capacitance to be obtained for circuit applications requiring a high resistance and a low capacitance.

B65-10306

OPAQUE MICROFICHE MASTHEAD PERMITS EASY

READING

LOWE, E. M. /DOC., INC./ OCT. 1965

HQ-7

White-pigmented backing applied to the reverse side of microfiche mastheads makes the area opaque and easily readable. This technique is of value for organizations involved in large volume information storage and retrieval.

B65-10307

FREQUENCY CORRECTION DEVICE USES DIGITAL

CIRCUITRY

SCHAEFER, D. OCT. 1965

GSFC-268

Signal acquisition and tracking system covering a wide range of frequencies uses a digital circuit to sample the frequency of an incoming signal and provide correction pulses to the voltage-controlled oscillator. The circuit can also sense the presence of a signal on any one of the input lines.

B65-10308

ELECTRONIC AMPERE-HOUR INTEGRATOR IS ACCURATE

TO ONE PERCENT

PAULKOVICH, J. OCT. 1965

GSFC-203

Electronic ampere-hour integrator is based on current-to-frequency conversion. It operates on low power and is accurate to one percent. This device can measure the ampere-hour capacity of batteries and can be adapted for other functions.

B65-10309

THERMOELECTRIC ELEMENTS DIFFUSION-BONDED TO

TUNGSTEN ELECTRODES

INNOVATOR NOT GIVEN /TYCO LABS./ OCT. 1965 SEE

ALSO B65-10220

## GSFC-346

Solid-state diffusion process bonds lead telluride and lead telluride-tin telluride thermoelectric elements to tungsten electrodes. The resulting bond is nonmagnetic and has high strength and low electrical and thermal resistance. This method is also used with tantalum electrodes.

## B65-10310

THRESHOLD DETECTOR PRODUCES NARROW PULSES AT HIGH REPETITION RATES

GARRAHAN, N. M. OCT. 1965

## GSFC-383

Solid state device generates fixed width output pulses from variable width input pulses in the nanosecond range. The circuit produces pulse repetition rates in the megacycle range and exhibits low power drain.

## B65-10311

PCM MAGNETIC TAPE SYSTEM EFFICIENTLY RECORDS AND REPRODUCES DATA

COLE, P. T. OCT. 1965

## GSFC-375

Split-phase PCM technique consists of data and clock signal recording and reproduction systems. This PCM magnetic tape system achieves a high packing density on the tape and provides a symmetrical reproduction of the recorded signal.

## B65-10313

PLANETARY CAMERA CONTROL IMPROVES MICROFICHE PRODUCTION

CHESTERTON, W. L. LEWIS, E. B. /DOC., INC./ OCT. 1965

## HQ-1 HQ-5

Microfiche is prepared using an automatic control system for a planetary camera. The system provides blank end-of-row exposures and signals card completion so the legend of the next card may be photographed.

## B65-10314

HYBRID CIRCUIT ACHIEVES PULSE REGENERATION WITH LOW POWER DRAIN

CANCRO, C. A. OCT. 1965

## GSFC-382

Hybrid tunnel diode-transistor circuit provides a solid-state, low power drain pulse regenerator, frequency limiter, or gated oscillator. When the feedback voltage exceeds the input voltage, the circuit functions as a pulse normalizer or a frequency limiter. If the circuit is direct coupled, it functions as a gated oscillator.

## B65-10315

MAGNETOMETER MEASURES ORTHOGONAL COMPONENTS OF MAGNETIC FIELDS

INNOVATOR NOT GIVEN /SPECTRA PHYS./ OCT. 1965

## GSFC-395

Driven magnetometer accurately measures the components of a low strength magnetic field in each of three mutually perpendicular directions. To accomplish this, it employs the principle of magnetic resonance in optically pumped rubidium vapor.

## B65-10317

INSTRUMENT PERFORMS NONDESTRUCTIVE CHEMICAL ANALYSIS, DATA CAN BE TELEMETERED

TURKEVICH, A. /CHICAGO UNIV./ OCT. 1965

## JPL-SC-078

Instrument automatically performs a nondestructive chemical analysis of surfaces and transmits the data in the form of electronic signals. It employs solid-state nuclear particle detectors with a charged nuclear particle source and an electronic pulse-height analyzer.

## B65-10318

REMOTE CONTROL ELECTRICAL SWITCHING SYSTEM HAS 1000-OUTPUT CAPABILITY

INNOVATOR NOT GIVEN /IBM/ OCT. 1965

## M-FS-380

Electromechanical remote control system has a capacity of 1000 individual on-off functions yet uses only seven pairs of telephone-type lines for interconnection. Installation and maintenance costs are decreased by using this system.

## B65-10320

RUGGED PRESSED DISK ELECTRODE HAS LOW CONTACT POTENTIAL

DAY, J. L. MOSIER, B. /INST. OF RES. AND INSTRUMENTATION/ OCT. 1965 SEE ALSO B64-10025

## MSC-158

Pressed-disk electrode with low contact potential monitors physiological processes. It consists of silver and silver chloride combined with bentonitic clay. The clay affords a surface that permits use over extended periods without contact deterioration.

## B65-10322

CAM-OPERATED LIMIT SWITCH FEATURES SAFE FUSE REPLACEMENT

WEBER, G. J. /MCDONNELL AIRCRAFT CORP./ OCT. 1965

## MSC-218

Two hermetically sealed, short travel, limit switches permit fuse replacement without danger of a spark or arcing. The switches are wired in parallel circuits and actuated by manually operated cams containing the circuit fuses.

## B65-10324

SELENIUM BOND DECREASES ON RESISTANCE OF LIGHT-ACTIVATED SWITCH

INNOVATOR NOT GIVEN /IBM/ NOV. 1965

## JPL-SC-101

Vitrified amorphous selenium bond decreases the ON resistance of a gallium arsenide-silicon light-activated, low-level switch. The switch is used under a pulse condition to prolong switch life and minimize errors due to heating, devitrification, and overdrawing.

## B65-10325

DIRECT FORCE-MEASURING TRANSDUCER USED IN BLOOD PRESSURE RESEARCH

EDGE, J. J. /STANFORD RES. INST./ NEWGARD, P. M. PRESSMAN, G. L. NOV. 1965

## ARC-53

Direct force-measuring transducer acts as an arterial tonometer, gives a direct readout to instrumentation, and is unaffected by ambient noise. It uses a semiconductor strain gauge which is deflected by pressure pulses in the artery. The deflection changes the resistance of the gauge and alters the voltage reading on the associated instrumentation.

## B65-10328

FEED-THROUGH CONNECTOR WITHSTANDS HIGH TEMPERATURES IN VACUUM ENVIRONMENT

KREISMAN, W. S. /GEOPHYS. CORP. OF AM./ NOV. 1965

## GSFC-442

Feed-through connector with sealing action augmented by any temperature increase can be used through the wall of a vacuum device. It retains vacuum integrity through successive cycles of high temperature.

## B65-10329

BAKING ENABLES MCLEOD GAUGE TO MEASURE IN ULTRAHIGH VACUUM RANGE

KREISMAN, W. S. /GEOPHYS. CORP. OF AM./ NOV. 1965

## GSFC-440

Accurate measurements in the ultrahigh vacuum range by a conventional McLeod gauge requires degassing of the gauge's glass walls. A closed system, in which mercury is forced into the gauge by gravity alone, and in which the gauge components are baked out for long periods, is used to achieve this degassing.

## B65-10333

COMMUNICATION SYSTEM USES MODULATED LASER BEAM

MINOTT, P. O. NOV. 1965

## GSFC-377

Electro-optical system is placed on a satellite to effect communications between two remote stations. The system employs an essentially passive, retrodirective, laser beam modulator-reflector.

## B65-10334

FREQUENCY DIVIDER IS FREE OF SPURIOUS OUTPUTS

MC DERMOND, D. NOV. 1965  
GSFC-308

Frequency divider provides sixteen output states free of spurious pulses from four input circuits. The input is binary coded, and a change of one in the input only changes the number of output states by one.

B65-10340

MINIATURE SERVO ACCELEROMETER IS FORCE-BALANCED

JOHNSTON, A. R. /CALIF. INST. RES. FOUND./ NOV. 1965  
JPL-155

Miniature servo accelerometer measures unusually small forces of torques. The pendulous mass of the accelerometer is suspended by fused quartz torsion fibers in an electromagnetically force-balanced environment. It is used in gravity surveys for exploring mineral deposits.

B65-10343

DELAYED RIPPLE COUNTER SIMPLIFIES SQUARE-ROOT COMPUTATION

CLIFF, R. NOV. 1965  
GSFC-398

Ripple subtract technique simplifies the logic circuitry required in a binary computing device to derive the square root of a number. Successively higher numbers are subtracted from a register containing the number out of which the square root is to be extracted. The last number subtracted will be the closest integer to the square root of the number.

B65-10345

VARIABLE WORD LENGTH ENCODER REDUCES TV BANDWIDTH REQUIREMENTS

SIVERTSON, W. E., JR. NOV. 1965  
LANGLEY-87

Adaptive variable resolution encoding technique provides an adaptive compression pseudo-random noise signal processor for reducing television bandwidth requirements. Complementary processors are required in both the transmitting and receiving systems. The pretransmission processor is analog-to-digital, while the postreception processor is digital-to-analog.

B65-10347

COMPACT SCR TRIGGER CIRCUIT FOR IGNITRON SWITCH OPERATES EFFICIENTLY

FOSTER, L. E. NOV. 1965  
M-FS-371

Trigger circuit with two series-connected SCR triggers an ignitron switch used to discharge high-energy capacitor banks. It does not require a warmup period and operates at relatively high efficiency.

B65-10349

FREQUENCY DISCRIMINATOR WITH BINARY OUTPUT ELIMINATES TUNED CIRCUITS

DE VELDE, E. /IBM/ NOV. 1965  
M-FS-376

Frequency discriminator has a binary output and permits microminiaturized packaging techniques. It uses a bandpass amplifier and standard logic elements that convert two input frequencies into two discrete logic pulses.

B65-10350

ZENER DIODE CONTROLS SWITCHING OF LARGE DIRECT CURRENTS

INNOVATOR NOT GIVEN /IBM/ NOV. 1965  
MSC-188

High-current zener diode is connected in series with the positive input terminal of a dc supply to block the flow of direct current until a high-frequency control signal is applied across the zener diode. This circuit controls the switching of large dc signals.

B65-10352

VIBRATING DIAPHRAGM MEASURES HIGH ELECTROSTATIC FIELD STRENGTHS

INNOVATOR NOT GIVEN /ELECTRO-OPT. SYSTEMS/ NOV. 1965  
MSC-189

Meter with flexible conductive diaphragm measures electrostatic charge density on a conducting surface in a vacuum. The diaphragm is supported from an insulated conductive support ring rigidly attached to the conductive surface whose electrostatic charge density is to be measured.

B65-10353

MULTIPHASE CLOCK-PULSE GENERATOR USES SIMPLIFIED CIRCUITRY

INNOVATOR NOT GIVEN /IBM/ NOV. 1965  
M-FS-297

Multiphase clock-pulse generator converts a simple pulse train into nonoverlapping clock pulses. The generator employs multistable circuits to minimize the number of electronic components.

B65-10355

SIMPLE CIRCUIT PERFORMS BINARY ADDITION AND SUBTRACTION

CLIFF, R. A. SCHAEFER, D. H. NOV. 1965  
GSFC-399

Ripple adder reduces the number of logic circuits required to perform binary addition and subtraction. The adder uses dual input and delayed output flip flops in one register. The contents of this register are summed with those of a standard register through conventional AND gates.

B65-10359

IMPROVED WIRE MEMORY MATRIX USES VERY LITTLE POWER

FEDDE, G. A. /SPERRY RAND CORP./ NOV. 1965  
JPL-SC-167

Thin-film, plated-wire memory matrix for computer applications requires little power yet has higher speed and four times greater storage capacity than ferrite-core memories of the same size.

B65-10361

HIGH-INTENSITY FLASHING BEACON POWERED BY MERCURY CELLS

INNOVATOR NOT GIVEN NOV. 1965  
LANGLEY-80

Pair of xenon flashlamps powered by mercury batteries in a transistorized circuit provides a flashing beacon with an effective intensity of a second-magnitude star at a distance of ten statute miles. This beacon is lightweight, long lasting and it withstands shock and vibration.

B65-10362

TEMPERATURE TRANSDUCER HAS HIGH OUTPUT, IS TIME STABLE

FOLLETT, W. H. /BALL BROTHERS RES. CORP./ NOV. 1965  
GSFC-446

Compact, lightweight temperature transducer requires no amplification of its output signal and is time stable. It uses the temperature-dependent characteristics of a silicon transistor to provide a zero-to-five-volt signal proportional to temperature.

B65-10363

REGENERATIVE FUEL CELL COMBINES HIGH EFFICIENCY WITH LOW COST

DOYLE, H. FRANK, H. STEPHENS, C. W. /ELECTRO-OPT. SYSTEMS/ DEC. 1965  
W00-090

Hydrogen/oxygen regenerative fuel cell stores electrical energy efficiently and inexpensively. The fuel cell has a high energy-to-weight ratio, and is adapted for a large number of cycles with deep discharge.

B65-10369

RESPIRATORY TRANSFER VALVE HAS FAIL-SAFE FEATURE

PUCCINELLI, A. A. SMITH, J. R., JR. DEC. 1965  
ARC-1

Quick-acting, remote controlled valve connects either one of two oxygen or air supplies to a breathing tube. The valve, which is fail-safe, incorporates a cammed piston arrangement that is driven by a remote controlled reversible rotary solenoid or reversible electric motor.

B65-10376

THREE-POSITION ROCKER SWITCH ACTUATOR HAS  
POSITIVE CENTERING  
BOGLEY, R. L. /N. AM. AVIATION/ DEC. 1965  
MSC-261

Three-position rocker switch actuator provides positive center positioning to inhibit possible override. Switch position is visually identified by rocker position, and functions can be shown on tabs and bars.

B65-10377

BINARY COUNTER USES FLUID LOGIC ELEMENTS  
INNOVATOR NOT GIVEN /RAND CORP./ DEC. 1965  
M-FS-323

Binary counter with two fluid flip-flops in each stage has an output taken from the output of the second flip-flop. The flip-flops each contain three fluid logic elements.

B65-10379

THREE-DIMENSIONAL WIRE-MESH CAPACITOR SYSTEM  
MEASURES FLUID DENSITY  
INNOVATOR NOT GIVEN /GARRETT CORP./ DEC. 1965  
WOO-194

Gaging system automatically measures the bulk density of a stored, electrically nonconductive fluid containing varying portions of liquid and vapor. The system employs a three-dimensional wire-mesh capacitor whose capacitance varies with the bulk density of the fluid dielectric medium between the capacitor plates.

B65-10380

DEVICE DETECTS UNBONDED AREAS IN PLASTIC  
LAMINATES  
INNOVATOR NOT GIVEN /DOUGLAS AIRCRAFT CO./ DEC. 1965  
WOO-206

Device generates an acoustic signal whose frequency changes disclose the presence of delaminated or unbonded areas in plastic laminates. A microphone makes the frequency change audible.

B65-10381

KEYED PLUGS AND SOCKETS PREVENT IMPROPER  
CONNECTIONS  
BUCKEY, D. L. LANKFORD, H. /MCDONNELL AIRCRAFT  
CORP./ DEC. 1965  
MSC-231

Plugs and sockets individually keyed so that no plug can be mated with other than its proper socket facilitates multiple connection in electrical systems.

B65-10382

PHOTOELECTRIC SYSTEM CONTINUOUSLY MONITORS  
LIQUID LEVEL  
INNOVATOR NOT GIVEN /BOEING CO./ DEC. 1965  
M-FS-417

Immersion probe presents a depth-sensitive optical transmission path between a light source and a photoelectric cell to continuously monitor the level of a transparent liquid in a tank. This system operates automatically, without moving parts, and provides output signals to a remote recorder.

B65-10387

SHRINKABLE SLEEVE ELIMINATES SHIELDING GAP  
IN RF CABLE  
INNOVATOR NOT GIVEN /GEN. DYN./CONVAIR/ DEC. 1965  
WOO-207

RF shielding gap between an RF cable and a multipin connector is eliminated by a sleeve assembly installed between the connector and the terminated portion of the shielding. The assembly is enclosed in a heat-shrinkable plastic sleeve which completes the continuous RF shield.

B65-10389

INSULATOR-HOLDER PROTECTS TRANSISTORS IN DENSE  
ELECTRONIC ASSEMBLIES  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
DEC. 1965  
MSC-214

Molded insulating spacer with one or more cavities is used as an insulated holder for mounting metal-case transistors in a chassis containing densely packed electronic components. The

transistors are mechanically supported on their bases and electrically isolated from each other by the holder.

B65-10392

NONCONTACTING VIBRATION TRANSDUCER HAS  
CONSTANT SENSITIVITY  
FLAGGE, B. DEC. 1965  
LANGLEY-99

Noncontacting transducer with constant sensitivity automatically measures the vibration amplitudes along the span of a vibrating structure of irregular contour. A system employing a feedback control positions the transducer at a constant height above the test surfaces. A differential transformer facilitates calibration and extends the amplitude range of the system.

B65-10396

ADHESIVE-BACKED TERMINAL BOARD ELIMINATES  
MOUNTING SCREWS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ DEC. 1965  
MSC-173

Low-profile terminal board is used in dense electronic circuits where mounting and working space is limited. The board has a thin layer of pressure-sensitive adhesive backing which eliminates the need for mounting screws.

B65-10399

BINARY COUNTER ACCUMULATES TIME BY  
COMPLEMENTARY PRESET  
MARRINER, G. E. /N. AM. AVIATION/ DEC. 1965  
MSC-242

Binary counter reduces the number of logic elements required to furnish electrical control functions. The counter is automatically preset to the complement of the desired time increments in milliseconds. An output pulse is produced each time it reaches its capacity.

B65-10400

ELECTRICALLY HEATED DIAPHRAGM ELIMINATES USE  
OF PYROTECHNICS  
MATHEWSON, R. C. /N. AM. AVIATION/ DEC. 1965  
MSC-241

Membrane-type diaphragm is used in systems where fluids are contained under pressure until a certain pressure threshold or point of time has been reached when the fluids are automatically released. The diaphragm is resistance heated until its strength is degraded to the point of rupture, thus releasing the contained fluids.

B66-10002

DUAL-VOLTAGE POWER SUPPLY HAS INCREASED  
EFFICIENCY  
STURMAN, J. C. JAN. 1966  
LEWIS-107A

Simple circuit provides two different dc output voltages from an ac source. It employs a full-wave rectifier connected to two passive branches from which the separate dc voltages are taken. The outputs have low ripple and good voltage regulation.

B66-10006

COMPUTER CIRCUIT CALCULATES CARDIAC OUTPUT  
MC CULLOUGH, C. E. /KAMAN AIRCRAFT CORP./ JAN. 1966  
MSC-274

Electronic circuitry automatically calculates cardiac output. This computer is used for basic research in physiology and as a diagnostic instrument by doctors.

B66-10012

THIN-FILM SEMICONDUCTOR RECTIFIER HAS IMPROVED  
PROPERTIES  
INNOVATOR NOT GIVEN /MELPAR/ JAN. 1966  
MSC-207

Cadmium selenide-zinc selenide film is used as a thin film semiconductor rectifier. The film is vapor-deposited in a controlled concentration gradient into a glass substrate to form the required junctions between vapor-deposited gold electrodes.

**B66-10013**  
**REACTION HEAT USED IN STATIC WATER REMOVAL**  
**FROM FUEL CELLS**

PLATNER, J. L. /ALLIS-CHALMERS MFG. CO./ JAN. 1966  
 M-FS-532

Reaction heat is used for removal of water formed at the hydrogen fuel electrode in a hydrogen-oxygen fuel cell. A portion of the heat inherent in the fuel cell current generation reaction is used to transfer excess water into water vapor and cause it to be exhausted from the cell by a porous vapor transport membrane adjoining a vapor cavity.

**B66-10015**  
**ELECTRODELESS DISCHARGE LAMP IS EASILY**  
**STARTED, HAS HIGH STABILITY**

BELL, W. E. BLOOM, A. L. /VARIAN ASSOCIATES/ JAN. 1966  
 WOO-030

Electrodeless discharge borosilicate glass lamp is used in various high-resolution optical systems. It is partially charged with krypton, contains small amounts of rubidium, and is enclosed in a hermetically sealed envelope that maintains the lamp at an optimum temperature during discharge. The lamp is quickly started by its excitation coil.

**B66-10021**  
**SPECIAL MOUNT IMPROVES REMOTE TRANSDUCER**  
**ACCURACY**

LAYTON, J. P. /PRINCETON UNIV./ JAN. 1966  
 LEWIS-269

Transducer-mounting device allows measurement of transient pressure in a hostile environment. The device provides free passage areas and a controlled environment for the measuring instrument.

**B66-10025**  
**CUPROUS SELENIDE AND SULFIDE FORM IMPROVED**  
**PHOTOVOLTAIC BARRIERS**

INNOVATOR NOT GIVEN /RCA/ JAN. 1966  
 WOO-212

Photovoltaic barriers formed by depositing a layer of polycrystalline cuprous sulfide or cuprous selenide on gallium arsenide are chemically and electrically stable. The stability of these barrier materials is significantly greater than that of cuprous iodide.

**B66-10026**  
**IMPROVED CARBON ELECTRODE REDUCES ARC**  
**SPUTTERING**

INNOVATOR NOT GIVEN /UNION CARBIDE CORP./ JAN. 1966  
 MSC-219

Carbon rod cores with a smaller proportion of rare earth compounds than in standard cores reduce arc sputtering in optical equipment. This core is produced without additional cost or equipment.

**B66-10028**  
**PORTABLE SELF-POWERED DEVICE DETECTS INTERNAL**  
**FLAWS IN TUBULAR STRUCTURES**

GILMOUR, G. /WESTINGHOUSE ELEC. CORP./ JAN. 1966  
 NU-0019

Portable probe and eddy-current-sensitive circuitry detects internal flaws or hard spot impurities in an electrically conductive tubular channel by recording the conductivity change at the defect point.

**B66-10031**  
**PRESSURE TRANSDUCERS DYNAMICALLY TESTED WITH**  
**SINUSOIDAL PRESSURE GENERATOR**

JONES, H. B., JR. /PRINCETON UNIV./ JAN. 1966  
 LEWIS-268

Sinusoidal pressure generator assembly dynamically tests and calibrates pressure transducers by using a chamber whose lowest resonant mode is above the audiofrequency range.

**B66-10034**  
**CIRCUIT EXHIBITS POWER EFFICIENCY GREATER**  
**THAN 75 PERCENT**

MANKOVITZ, R. J. /N. AM. AVIATION/ FEB. 1966

**MSC-254**

Variable duty cycle pulser increases circuit power efficiency by more than 75 percent when operating solenoid valves. The pulser provides a low-level holding current after a high-level current has actuated the solenoid valves.

**B66-10036**  
**FLOWMETER MEASURES LOW GAS-FLOW RATES**

WELLS, F. E. FEB. 1966  
 M-FS-215

Positive-displacement flowmeter measures low gas-flow rates by gauging the time required for a slug of mercury to pass between two reference levels in a tube of known volume.

**B66-10038**  
**CIRCUIT OPERATES AS SINE FUNCTION GENERATOR**  
**BOGART, T., JR. /N. AM. AVIATION/ FEB. 1966**  
**MSC-255**

Electronic circuit drives sine function generator using square wave and sawtooth sweep generators. The circuit replaces electromechanical driver and increases accuracy.

**B66-10039**  
**CONTROL SYSTEM MAINTAINS SELECTED LIQUID LEVEL**  
**BERGESON, R. L. SCHUCK, J. W. /HONEYWELL/ FEB. 1966**  
**M-FS-470**

Single-sensor control system maintains liquid hydrogen at a preselected desired level within a tank, regardless of boiloff. It calibrates output in percentage. Thus, when the fuel is at the desired level, the system output will indicate 100 percent regardless of what percent of tank capacity the fuel has reached.

**B66-10041**  
**COLD CATHODE IONIZATION GAUGE HAS RIGID METAL**  
**HOUSING**  
**HERZOG, R. KREISMAN, W. S. /GEOPHYS. CORP. OF**  
**AM./ FEB. 1966**  
**GSFC-445**

Cold cathode ionization gauge in a stainless steel housing accurately measures high pressures. The Penning effect is used with a high voltage discharge in the presence of a magnetic field for an ion current proportional to the gas pressure in the gauge.

**B66-10042**  
**VIBRATION TESTS ON VIDICONS MADE BY IMPROVED**  
**METHOD**  
**INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ FEB. 1966**  
**JPL-SC-115**

Sensitive method is used for checking the performance of vidicons in mechanical vibration tests. The image of the desired fine-detail test pattern is stored in the photosensitive surface of the vidicon while the system is free of mechanical vibration. Mechanical excitation is then applied, and its effects observed.

**B66-10046**  
**LAMP AUTOMATICALLY SWITCHES TO NEW FILAMENT**  
**ON BURNOUT**  
**INGLE, W. B. /N. AM. AVIATION/ FEB. 1966**  
**M-FS-498**

Lamp with primary and secondary filaments has a means for automatic switching to the secondary filament at primary filament burnout. Lamp failures and resultant expenses during oscillograph printing are appreciably reduced.

**B66-10048**  
**NONCONTACTING TRANSDUCER MEASURES SHAFT TORQUE**  
**INNOVATOR NOT GIVEN /N. AM. AVIATION/ FEB. 1966**  
**M-FS-474**

Transducer for measuring the output torque of a rotating shaft uses a magnetically permeable sleeve fitted over a section of the shaft which deflects axially in direct proportion to the output torque. A corresponding change in reluctance occurs in pickup coils mounted in close proximity to the sleeve. This change is measured by attached conventional circuitry.

B66-10050  
SINGLE CONNECTOR PROVIDES SAFETY FUSES FOR  
MULTIPLE LINES  
WEBER, G. J. /MCDONNELL AIRCRAFT./ FEB. 1966  
MSC-199

Fuse-bearing sleeve which is inserted between the male and female members of a multiple-line connector contains a safety fuse for each pin of the connector assembly. The sleeve is easily and quickly opened for fuse replacement.

B66-10051  
FERROELECTRIC BOLOMETER MEASURES RF ABSOLUTE  
POWER AT SUBMILLIMETER WAVELENGTHS  
COHN, M. RODGERS, J. D. /ADVANCED TECHNOL.  
CORP./ FEB. 1966  
GSFC-422

Two ferroelectric bolometer sensing elements measure low rf absolute power at millimeter and submillimeter wavelengths. The sensing elements are mounted in sections of waveguide and connected in series in a standard temperature compensating bridge circuit.

B66-10057  
MINIATURE BIOELECTRIC DEVICE ACCURATELY  
MEASURES AND TELEMETERS TEMPERATURE  
FRYER, T. B. FEB. 1966 SEE ALSO B64-10171  
ARC-52

Miniature micropower solid-state circuit measures and telemeters the body temperature of laboratory animals over periods up to two years. The circuit employs a thermistor as a temperature sensing element and an FM transmitter. It is constructed from conventional discrete components or integrated circuits.

B66-10062  
FORTRAN PROGRAM FLOWCHART IS AUTOMATICALLY  
PRODUCED  
CLARK, D. J. WILLIAMS, D. /GE/ FEB. 1966  
M-FS-369

Computer under control of the FLO-TRAN program automatically produces and updates flowcharts of Fortran program source decks fed to it. The flowcharts are produced on either 35mm film or paper.

B66-10064  
TRANSMISSION SYSTEM ISOLATES PRESSURE  
TRANSDUCER FROM SEVERE ENVIRONMENT  
INNOVATOR NOT GIVEN /SPACE-GEN. CORP./ FEB. 1966  
WOO-239

Pressure transmission system measures the pressure of a high temperature, chemically active fluid by isolating the pressure transducer from the process fluid without component disconnections.

B66-10066  
ANTENNA CONFIGURATIONS PROVIDE POLARIZATION  
DIVERSITY  
SCHUMACHER, C. N. /CUTLER HAMMER/ FEB. 1966  
GSFC-74

Compact back-to-back trapezoidal tooth log-periodic /TTLP/ antenna with frequency-independent characteristics is formed by reducing the angle between the two elements of a basic TTLP to zero. The back-to-back antenna, arranged in various configurations, provides monopulse operations in one or two planes and in various polarizations.

B66-10067  
AUXILIARY COIL CONTROLS TEMPERATURE OF RF  
INDUCTION HEATER  
INNOVATOR NOT GIVEN /GEN. DYN./ELECTRON./ FEB.  
1966  
GSFC-428

Auxiliary coil controls the temperature of an rf induction furnace that is powered by a relatively unstable rf generator. Manual or servoed adjustment of the relative position of the auxiliary coil, which is placed in close proximity to the rf coil, changes the looseness of the rf coil and hence the corresponding heating effect of its rf field.

B66-10068  
SENSOR DETECTS HYDROCARBON OIL CONTAMINANTS  
IN FLUID LINES  
ROTH, B. /N. AM. AVIATION/ FEB. 1966 SEE ALSO  
B63-10311  
M-FS-522

Sensor with ultraviolet light monitors and detects hydrocarbon oil contaminants present in fluid lines. The light causes the oil particles to fluoresce. This light emitted by the oil particle is detected by a photocell which is relatively insensitive to ultraviolet radiation.

B66-10082  
ROD AND DISH CATHODE IMPROVES PENNING-TYPE  
VACUUM GAUGE  
PEPPIN, G. B. /HUGHES AIRCRAFT CO./ MAR. 1966  
GSFC-447

Improved penning-type ionization gauge provides range and sensitivity required to measure gas pressure below .01 torr under high vacuum conditions. The gauge uses a highly conductive cathode composed of two disks of high magnetic permeability separated by a rod of low magnetic permeability.

B66-10084  
REFRACTORY COATING PROTECTS INTRICATE GRAPHITE  
ELEMENTS FROM HIGH-TEMPERATURE HYDROGEN  
FERRIS, J. R. PATTERSON, R. L. STEFFEN, R. J.  
VOGEL, C. E. /WESTINGHOUSE ASTRONUCL. LAB./  
MAR. 1966  
NU-0027

Refractory coating protects graphite heater elements operating at high temperature in a hydrogen atmosphere. The coating is formed by painting the graphite elements with a composition containing powdered tungsten, and heat-treating it.

B66-10085  
SEISMOMETER DESIGNED FOR REMOTE OPERATION IN  
RANDOM ORIENTATION  
LEHNER, F. E. /CALIF. INST. OF TECH./ MAR. 1966  
JPL-320

Portable seismometer mounted in a rugged housing can be placed in inaccessible locations and operate efficiently in other than a vertically upright position. The instrument housing contains an amplifier, transmitter, and antenna to relay measurement data to a receiving station.

B66-10088  
GELATIN COATED ELECTRODES ALLOW PROLONGED  
BIOELECTRONIC MEASUREMENTS  
INNOVATOR NOT GIVEN /INST. OF RES. AND  
INSTRUMENTATION/ MAR. 1966 SEE ALSO B64-10025,  
B65-10015, AND B65-10320  
MSC-153

Silver electrodes treated with an anodizing electrolyte containing gelatin are used for long term monitoring of bioelectronic potentials in humans. The electrodes do not interact with perspiration, cause skin irritation, or promote the growth of bacteria.

B66-10089  
AUTOMATIC GAIN CONTROL CIRCUIT HANDLES WIDE  
INPUT RANGE  
BLACK, S. H. /SPERRY GYROSCOPE CO./ MAR. 1966  
MSC-166

Automatic gain control circuit for a radio receiver handles a wide range of input signal levels without overloading the output stage. The transistorized circuit maintains a relatively constant output by varying attenuation of the input signal.

B66-10091  
VAPOR GROWN SILICON DIOXIDE IMPROVES  
TRANSISTOR BASE-COLLECTOR JUNCTIONS  
CARLEY, D. R. /RCA/ DUCLOS, R. A. MAR. 1966  
GSFC-389

Vapor grown silicon dioxide layer protects base-collector junction in silicon planar transistors during the emitter diffusion process. This oxide fills in any imperfections that exist in the thermally grown oxide layer and is of greater thickness than that layer. This process is used

to deposit protective silicon dioxide coatings on optical surfaces.

**B66-10094**  
SYSTEM PROPORTIONS FLUID-FLOW IN RESPONSE  
TO DEMAND SIGNALS  
INNOVATOR NOT GIVEN /CURTISS-WRIGHT CORP./  
GSFC-457

Control system provides proportioned fluid flow rates in response to demand signals. It compares a digital signal, representing a flow demand, with a reference signal to yield a control voltage to one or more solenoid valves connected to orifices of a predetermined size.

**B66-10097**  
COMPUTER PROGRAM SIMPLIFIES SELECTION OF  
STRUCTURAL STEEL COLUMNS  
VISSING, G. S. MAR. 1966  
NU-0044

Computer program rapidly selects appropriate size steel columns and base plates for construction of multistory structures. The program produces a printed record containing the size of a section required at a particular elevation, the stress produced by the loads, and the allowable stresses for that section.

**B66-10099**  
CAPACITIVE SYSTEM DETECTS AND LOCATES FLUID  
LEAKS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1966  
M-FS-478

Electronic monitoring system automatically detects and locates minute leaks in seams of large fluid storage tanks and pipelines covered with thermal insulation. The system uses a capacitive tape-sensing element that is adhesively bonded over seams where fluid leaks are likely to occur.

**B66-10101**  
RING COUNTER CIRCUIT SWITCHES MULTIPHASE  
MOTOR DIRECTION OF ROTATION  
FAIRBANKS, A. F. /SPACE TECH. LABS./ MAR. 1966  
JPL-SC-166

Solid state three-phase counter circuit reverses the direction of rotation of a multiphase motor without changing the phase wiring of the supply current source.

**B66-10103**  
MOUNT MAKES LIQUID NITROGEN-COOLED GAMMA RAY  
DETECTOR PORTABLE  
FESSLER, T. E. MAR. 1966  
LEWIS-259

Liquid nitrogen-cooled gamma ray detector system is made portable by attaching the detector to a fixture which provides a good thermal conductive path between the detector and the liquid nitrogen in a Dewar flask and a low heat leak path between the detector and the external environment.

**B66-10105**  
ANGULAR ACCELERATION MEASURED BY DEFLECTION  
IN SENSING RING  
RICHARD, R. R. MAR. 1966  
MSC-250

Small, lightweight angular accelerometer performs reliably when subjected to harsh temperature and vibration environments. The device uses strain gauges to measure the amount of deflection in a metal ring caused by movement of inertial masses mounted through the ring. Range of the instrument is varied by varying the value of inertial masses.

**B66-10106**  
LOW-POWER RING COUNTER DRIVES HIGH-LEVEL  
LOADS  
INNOVATOR NOT GIVEN /SPERRY RAND/ MAR. 1966  
GSFC-431

Ring counter dissipates very low power in standby conditions, yet drives high-current loads on a low duty-factor basis. Complementary transistors are used so that in one selected stage both transistors are conducting while the transistors of the other stage are cut off.

**B66-10109**  
CHARGED PROBES, BOURDON TUBES MAINTAIN  
CRYOGENIC LIQUID LEVEL  
KREJSA, M. J. MAY 1966  
LEWIS-261

Automatic liquid nitrogen dispensing system maintains the fluid level in a nitrogen cold trap. The system uses gas-filled probes which drive bourdon tube gauges equipped with microswitches that, through a relay, control a solenoid valve in the liquid nitrogen line.

**B66-10112**  
NEW TELEVISION CAMERA ELIMINATES VIDICON TUBE  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
MAY 1966  
M-FS-472

Small, lightweight camera systems use solid state imaging devices in the form of phototransistor mosaic sensors instead of vidicon tubes for light sensing and image conversion. The digital logic circuits scan the sensor mosaic at 60 frames per second to produce pictures composed of a series of dots rather than lines.

**B66-10113**  
IMPROVED CHOPPER CIRCUIT USES PARALLEL  
TRANSISTORS  
INNOVATOR NOT GIVEN /IBM/ MAR. 1966  
M-FS-468

Parallel transistor chopper circuit operates with one transistor in the forward mode and the other in the inverse mode. By using this method, it acts as a single, symmetrical, bidirectional transistor, and reduces and stabilizes the offset voltage.

**B66-10126**  
VARIABLE-CAPACITANCE TACHOMETER ELIMINATES  
TROUBLESOME MAGNETIC FIELDS  
INNOVATOR NOT GIVEN /BENDIX CORP./ MAR. 1966  
GSFC-435

Dual variable-capacitance tachometer measures angular speed and sense of rotation without magnetic components. Thus it eliminates magnetic flux interference with associated instrumentation in an electromechanical system.

**B66-10127**  
APPARATUS MEASURES THERMAL CONDUCTIVITY OF  
HONEYCOMB-CORE PANELS  
MAR. 1966  
LANGLEY-202

Overall thermal conductivity of honeycomb-core panels at elevated temperatures is measured by an apparatus with a heater assembly and a calibrated heat-rate transducer. The apparatus has space between the heater and transducer for insertion of a test panel and insulation.

**B66-10128**  
OPTICAL GYRO PICKOFF OPERATES AT CRYOGENIC  
TEMPERATURES  
INNOVATOR NOT GIVEN /GE/ MAR. 1966  
M-FS-407

Two-axis pickoff for cryogenic gyros uses solid-state light sources and sensors. This compact system operates efficiently at cryogenic temperatures.

**B66-10129**  
DIGITALLY CONTROLLED PULSE-LEVEL DISCRIMINATOR  
OPERATES OVER WIDE VOLTAGE RANGE  
CANCRO, C. A. MAR. 1966  
GSFC-324

Low power drain discriminator circuit generates an output pulse when an input pulse exceeds a discrete digitally controlled threshold voltage. The discriminator operates over a wide linear or nonlinear range of threshold levels. It uses several amplifier stages ahead of a fixed-reference threshold detector.

**B66-10130**  
MATERIALS PHYSICALLY TESTED IN VARIABLE-  
ENVIRONMENT CHAMBER  
KNOELL, A. C. MAR. 1966  
JNL-789

Controlled environment chamber for physical tests

of crushable materials encloses both the test specimen and the devices for performing the tests. The chamber may be stepped through a range of changing environment.

**B66-10133**  
OMNIDIRECTIONAL ANTENNAS TRANSMIT AND  
RECEIVE OVER LARGE BANDWIDTH  
WOODWARD, O. M., JR. /RCA/ MAR. 1966  
GSFC-436

For exchanging wideband signals between two distant ground stations, low-gain antennas with wide angular coverage and circular polarization are mounted on a single mast extending from a satellite. The transmitting antenna has two decoupled ports or inputs for eliminating switching problems when using two transmitters on different frequencies.

**B66-10134**  
HIGH TEMPERATURE THERMOCOUPLE OPERATES  
IN REDUCTION ATMOSPHERE  
HOFF, R. G. /AEROJET-GEN. CORP./ MAR. 1966  
NU-0046

Thermocouple continuously measures a flowing gas up to 4500 degrees F in a hazardous environment. The thermocouple combines rhenium and tungsten in the probe, housing, and swaged extension lead. The wires extend continuously from the cold junction to the probe tip to eliminate errors from secondary thermocouple effects.

**B66-10141**  
OPTICALLY DRIVEN SWITCH TURN-OFF TIME REDUCED  
BY OPAQUE COATINGS  
INNOVATOR NOT GIVEN /IBM/ APR. 1966  
JPL-SC-107

Turn-off response time of an optically driven switch is reduced by placing an opaque covering over the passivating silicon dioxide members. The coating prevents photon absorption so that carriers are not trapped or stored on the base region, thus shortening turn-off time.

**B66-10142**  
DIFFUSION TECHNIQUE STABILIZES RESISTOR  
VALUES  
GALLAGHER, R. C. GIULIANO, M. N. /WESTINGHOUSE  
ELEC. CORP./ APR. 1966  
MSC-205

Reduction of the contact resistance stabilizes the values, over a broad temperature range, of resistors used in linear integrated circuits. This reduction is accomplished by P-plus diffusion under the alloyed aluminum contacts.

**B66-10144**  
MOUNTING IMPROVES HEAT-SINK CONTACT WITH  
BERYLLIA WASHER  
INNOVATOR NOT GIVEN /COLLINS RADIO CO./ APR.  
1966 SEE ALSO B63-10033  
MSC-194

To conduct heat away from electrical components that must be electrically insulated from a metal heat sink, a metal washer and a coil spring are placed between one end of the electrical component and the beryllia washer mounted on the heat sink. The thermal paths are formed by the component lead and base, the metal and beryllia washers, and the compressed spring.

**B66-10147**  
POLYMER DEFORMATION GAUGE MEASURES THICKNESS  
CHANGE IN TENSILE TESTS  
BROYLES, H. F. BROYLES, H. H. APR. 1966  
JPL-745

Lightweight deformation gauge attached to a polymer specimen determines the thickness changes undergone by the specimen during the testing of its tensile and elongation properties. Mechanical noise from outside sources is dampened when the assembly is hung on a light rubber band.

**B66-10148**  
TESTER PERIODICALLY REGISTERS DC AMPLIFIER  
CHARACTERISTICS  
CREE, D. WENZEL, G. E. APR. 1966  
MSC-190

Motor-driven switcher-recorder periodically

registers the zero drift and gain drift signals of a dc amplifier subjected to changes in environment. A time coding method is used since several measurements are shared on a single recorder trace.

**B66-10158**  
SWITCHING MECHANISM SENSES ANGULAR  
ACCELERATION  
INNOVATOR NOT GIVEN /BALL BROS. RES. CORP./  
APR. 1966  
GSFC-462

Switching mechanism actuates an electrical circuit when a predetermined angular acceleration and displacement are reached. A rotor in the mechanism overcomes the restraint of a magnetic detent when the case in which the detent is mounted reaches the predetermined angular acceleration.

**B66-10159**  
IMPROVED SYSTEM MEASURES OUTPUT ENERGY OF  
PYROTECHNIC DEVICES  
SHORTLY, E. M. /N. AM. AVIATION/ APR. 1966  
WOO-256

System for measuring the output energy of pyrotechnic devices discharges the reaction products into a test chamber. It measures the radiant heat output from a pinhole aperture as well as internal pressure changes on a common time base.

**B66-10160**  
ELECTROPNEUMATIC TRANSDUCER AUTOMATICALLY  
LIMITS MOTOR CURRENT  
LOVITT, T. F. APR. 1966  
LEWIS-253

Pneumatic controller regulates the load on a centrifugal freon compressor in a water cooling system, thus limiting the current input to an electric motor driving it. An electromechanical transducer monitoring the motor input current sends out air signals which indicate changes in the current to the pneumatic controller.

**B66-10161**  
TRANSDUCER MEASURES FORCE IN VACUUM  
ENVIRONMENT  
GLENN, D. C. APR. 1966  
LEWIS-218

Transducer assembly measures force in a vacuum environment. The assembly consists of a standard capacitance probe and a torque beam. This transducer can be used in high-pressure as well as in low-pressure environments for static and dynamic force measurements.

**B66-10162**  
FIXTURE AIDS SOLDERING OF ELECTRONIC  
COMPONENTS ON CIRCUIT BOARD  
RUSS, M. H. APR. 1966  
ARC-56

Spring clamp fixture holds small electronic components in a desired position while they are being soldered on a circuit board. The spring clamp is clipped on the edge of the circuit board and an adjustable spring-steel boom holds components against the board. The felt pad at the end of the boom is replaced with different attachments for other holding tasks.

**B66-10163**  
TWO-LIGHT CIRCUIT CONTINUOUSLY MONITORS AC  
GROUND, PHASE, AND NEUTRAL WIRES  
MEE, R. W. /N. AM. AVIATION/ APR. 1966  
MSC-356

Two-transformer, two-lamp circuit monitors the continuity of ac ground, neutral, and phase wires. The circuit gives different visual indications if any one of the three lines should become open circuited.

**B66-10164**  
FATIGUE TESTER ACHIEVES TRUE AXIAL MOTION  
THROUGH FLEX PLATES AND BARS  
HENGSTENBERG, T. F. /WESTINGHOUSE ASTRONUCLEAR  
LAB./ KURINKO, C. D. APR. 1966  
NU-0021

Lever load-amplifying fatigue testing machine with



a load cycle frequency of 100 to 900 cycles per minute applies the load through true axial motion. Pivot friction and bearing wear are eliminated by replacing these parts with flex plates and bars.

monitoring by automatic checkout equipment or telemetry systems. It employs a solid state circuit in a housing rigidly attached to a thermistor probe.

B66-10170

SCANNING PHOTOMETER SYSTEM AUTOMATICALLY DETERMINES ATMOSPHERIC LAYER HEIGHT  
WOLFF, M. /MASS. INST. OF TECH./ APR. 1966  
MSC-245

Two photometers, placed a given distance apart, determine the height of nonuniform luminous layers in a synchronous manner. Photometer outputs are correlated by a simple analog correlation computer to automatically give the luminous layer height. This system is used to determine visibility ceilings at airports.

B66-10177

BINARY FLUID AMPLIFIER SOLVES STABILITY AND LOAD PROBLEMS  
LARKIN, B. D. READER, T. D. /GIANNINI CONTROLS CORP./ MAY 1966  
ERC-15

Digital fluid amplifier has load intensity, high stability, and operates at low Reynolds numbers. It contains specially designed nozzles to provide uniform exit-velocity profiles and to ensure jets of low turbulence.

B66-10179

COMPLEMENTARY MONOSTABLE CIRCUITS ACHIEVE LOW POWER DRAIN AND HIGH RELIABILITY  
KLEINBERG, L. L. LAVIGNE, R. C. MAY 1966  
GSFC-433

Two-transistor multivibrator has minimum power dissipation and maximum reliability. It minimizes the use of components that are subject to environmental changes or other unpredictable behavior.

B66-10180

THIN-FILM GAGE MEASURES LOW HEAT-TRANSFER RATES  
SPITZER, C. R. MAY 1966  
LANGLEY 205

Low heat-transfer gauge facilitates determination of the transition between laminar and turbulent conditions, in the boundary layer surrounding slender and moderately slender cones under test in a hypersonic blowdown helium tunnel. The gauge consists of a thin layer of vacuum-evaporated platinum on a heat resistant glass substrate contoured to fit model surfaces.

B66-10182

SUBMINIATURIZED GAS CHROMATOGRAPH GIVES FAST, EFFICIENT ANALYSIS  
WILHITE, W. F. MAY 1966  
JPL-735 JPL-736 JPL-737 JPL-740

Space oriented, lightweight, subminiaturized gas chromatograph analyzes gas samples in a few seconds with a carrier gas flow of one milliliter per second. In extraterrestrial exploration, the system could be used with a mass spectrometer for detection of life-supporting compounds.

B66-10192

COATING PERMITS USE OF STRAIN GAGE IN WATER AND LIQUID HYDROGEN  
BERVEN, B. B. /N. AM. AVIATION/ MAY 1966  
M-FS-594

Strain gauge installation covered with a three-layer coating of commercial materials makes measurements in water and liquid hydrogen. It consists of a selected foil strain gauge bonded with a modified commercial heat-curing epoxy cement. The outer protective layer of the gauge installation may develop cracks when immersed in liquid hydrogen.

B66-10193

SOLID STATE THERMOSTAT HAS INTEGRAL PROBE AND CIRCUITRY  
INNOVATOR NOT GIVEN /METRO PHYS., INC./ MAY 1966  
M-FS-434

Compact, reliable thermostat provides a temperature readout signal and a continuous temperature-control output for temperature

B66-10198

DEVICE WITHOUT ELECTRICAL CONNECTIONS IN TANK MEASURES LIQUID LEVEL  
SHENKMAN, J. S. /V. K. C. AEROJET-GEN. CORP./ MAY 1966  
WOD-235

Vertical static float in a tank measures the liquid level without the use of electrical connections in the tank. The float transmits the buoyant force of the liquid to an external force transducer. It is insensitive to tank pressure and temperature changes.

B66-10200

APPARATUS PRESENTS VISUAL DISPLAY OF SEMICONDUCTOR SURFACE CHARACTERISTICS  
SUMMERS, R. A. MAY 1966  
JPL-665

Apparatus provides a representation of the physicochemical condition of the surface layers of a semiconductor. It is based on the principle that the surface layers of a semiconductor will conduct an electric current when exposed to a beam of light.

B66-10203

SOLDERING IRON TEMPERATURE IS AUTOMATICALLY REDUCED  
LUM, J. Y. MAY 1966  
ARC-57

Hinged cradle-microswitch arrangement maintains a soldering iron at less than peak temperature when not in use. The microswitch introduces a voltage reducing element into the soldering iron power circuit when the iron is placed on the cradle. The iron, when removed from the cradle, returns to operating temperature in 15 to 30 seconds.

B66-10205

WIDE-RANGE INSTRUMENT MONITORS FLOW RATES OF CHEMICALLY ACTIVE FLUIDS  
INNOVATOR NOT GIVEN /SPACELABS/ MAY 1966  
MSC-186

In-like transducers system measures flow rate of chemically active propellant fluids. The system uses one low-flow transducer and one high-flow transducer. Each consists of separate heater and temperature-sensing elements.

B66-10220

ULTRASONIC RECORDING SCANNER USED FOR NONDESTRUCTIVE WELD INSPECTION  
INNOVATOR NOT GIVEN /BOEING CO./ MAY 1966 SEE ALSO B66-10178  
M-FS-284

Portable ultrasonic recording scanner is used for nondestructive inspection of welds. It is adaptable to continuous operation in one direction while maintaining oscillatory motion at a right angle to this direction. The scanning speed and oscillation frequency are independently adjustable.

B66-10223

MULTICOLOR STROBOSCOPE PINPOINTS RESONANCES IN VIBRATING COMPONENTS  
INNOVATOR NOT GIVEN /CALIF. INST. RES. FOUND./ MAY 1966  
JPL-0033

Stroboscopic system, which uses three different colored lights, rapidly scans a multicomponent assembly and provides a visual indication of resonant components. The lights are pulsed at the same flash frequency but at different phases.

B66-10224

FET COMPARATOR DETECTS ANALOG SIGNAL LEVELS WITHOUT LOADING ANALOG DEVICE  
WALLACE, H. L. /GE/ MAY 1966  
M-FS-503

FET comparator circuit detects discrete analog computer output levels without excessively loading the output amplifier of the computer. An FET common source amplifier is coupled by a

differential amplifier to a bistable transistor flip-flop. This circuit provides a digital output for analog voltages above or below a predetermined level.

**B66-10225**  
SINGLE-CRYSTAL SEMICONDUCTOR FILMS GROWN ON FOREIGN SUBSTRATES

VOHL, P. /RCA/ MAY 1966  
WOO-076

Intermediate alloy formed between foreign substrates and semiconductor material enable the growth of single crystal semiconductor films on the alloy layer. The melted film must not ball up on the surface of the substrate and neither chemically react nor alloy with the intermediate alloy formed on the substrate.

**B66-10232**  
ELECTRONIC PHASE-LOCKED-LOOP SPEED CONTROL SYSTEM IS STABLE

STONE, F. A. /RAYMOND ENG. LAB./ JUN. 1966  
JPL-SC-084

Phase locked-loop circuit is used for playback motors in digital tape recorders where the reproducer output remains in exact synchronism with an external reference clock over extended periods. It removes the motor dynamics from the control loop so that the loop is stable without damping.

**B66-10245**  
RUGGED MICROELECTRONIC MODULE PACKAGE SUPPORTS CIRCUITRY ON HEAT SINK

JOHNSON, A. L. /MINNEAPOLIS-HONEYWELL REGULATOR CO./ JUN. 1966  
MSC-81A

Rugged module package for thin film hybrid microcircuits incorporated a rigid, thermally conductive support structure, which serves as a heat sink, and a lead wire block in which T-shaped electrical connectors are potted. It protects the circuitry from shock and vibration loads, dissipates internal heat, and simplifies electrical connections between adjacent modules.

**B66-10251**  
POLARIZING KEYS PREVENT MISMATCH OF CONNECTOR PLUGS AND RECEPTACLES

CHIAPUZZO, A. /N. AM. AVIATION/ JUN. 1966  
MSC-443

Keying prevents mismatching of plugs and receptacles in connector patching of instrumentation involving several thousand leads. Each receptacle and plug contains three polarizing keys that must mate in a complementary mode before the connector pins and sockets will engage.

**B66-10260**  
MULTIPLE TEMPERATURES SAMPLED USING ONLY ONE REFERENCE JUNCTION

COPE, G. W. JUN. 1966  
GSFC-485

In a multitemperature sampling system where the reference thermocouples are a distance from the test thermocouples, an intermediate thermal junction block is placed between the sets of thermocouples permitting switching between a single reference and the test thermocouples. This reduces the amount of cabling, reference thermocouples, and cost of the sampling system.

**B66-10261**  
SIMPLIFIED CIRCUIT CORRECTS FAULTS IN PARALLEL BINARY INFORMATION CHANNELS

GOLDBERG, J. /STANFORD RES. INST./ JUN. 1966  
SEE ALSO B65-10025  
JPL-SC-090

Corrective circuit prevents the appearance of erroneous output signals from the possible failure of any single-channel element interconnected in parallel binary information channels. The circuit is simplified and economical because it does not use redundant channels.

**B66-10264**  
BINARY SEQUENCE DETECTOR USES MINIMUM NUMBER OF DECISION ELEMENTS

PERLMAN, M. JUN. 1966  
JPL-673

Detector of an n bit binary sequence code within a serial binary data system assigns states to memory elements of a code sequence detector by employing the same order of states for the sequence detector as that of the sequence generator when the linear recursion relationship employed by the sequence generator is given.

**B66-10270**  
MAGNETICALLY OPERATED LIMIT SWITCH HAS IMPROVED RELIABILITY, MINIMIZES ARCING

STEINER, R. /N. AM. AVIATION/ JUN. 1966  
MSC-422

Limit switch for reliable, low-travel, snap action with negligible arcing uses an electrically nonconductive permanent magnet consisting of a ferrimagnetic ceramic and ferromagnetic pole shoes which form a magnetic and electrically conductive circuit with a ferrous-metal armature.

**B66-10271**  
PN ACQUISITION DEMODULATOR ACHIEVES AUTOMATIC SYNCHRONIZATION OF A TELEMETRY CHANNEL

COUVILLON, L. JUN. 1966  
JPL-612

Data demodulator for automatic sync acquisition provides an automatic means for obtaining initial word and bit synchronization in a pulse-code-modulated/phase-shift-keyed digital communications system.

**B66-10272**  
EXCLUSIVE-OR LOGIC CIRCUIT HAS USEFUL PROPERTIES

BATTE, W. G. JUN. 1966  
LANGLEY-214

Single, simple exclusive-or logic connective eliminates excessive hardware and the number of interconnections between logic modules. This circuit performs the necessary switching for the exclusive-or operation and amplifies, restores, and inverts the signal.

**B66-10274**  
BRAZE ALLOYS USED AS TEMPERATURE INDICATORS

RICE, R. E. /AEROJET-GEN. CORP./ SHURLEY, L. A. JUN. 1966  
NU-0063

Patches of braze alloys having known fusion are applied to portions of a metal surface where temperature indicators are required. This method is used to measure temperatures over the range of 175 degrees to 2100 degrees fahrenheit where it is not feasible to employ conventional temperature detectors.

**B66-10280**  
STRAIN GAUGE NETWORK DISTINGUISHES BETWEEN THERMAL AND MECHANICAL DEFORMATIONS

CEPOLLINA, F. J. JUN. 1966  
GSFC-478

Strain gauge network measures the thermal coefficient of linear expansion of composite metal structures. The network consists of a test gauge and two dummy gauges arranged to distinguish thermally induced deformation from mechanical strain.

**B66-10282**  
SIMPLE CIRCUIT PROVIDES RELIABLE MULTIPLE SIGNAL AVERAGE AND REJECT CAPABILITY

OPENSHAW, R. L. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0069

Summation average and reject circuit based on diode clamping allows detection of individual functional deviations in a multiple signal system without shutting down the entire system.

**B66-10286**  
VACUUM TEST FIXTURE IMPROVES LEAKAGE RATES MEASUREMENTS

MAIER, H. /GRUMMAN AIRCRAFT CORP./ JUN. 1966  
MSC-271

Cylindrical chamber, consisting of two matching halves, forms a vacuum test fixture for measuring leakage rates of individual connections, brazed joints, and entrance ports used in closed fluid flow line systems. Once the chamber has been sufficiently evacuated, atmospheric pressure holds the two halves together.

B66-10287

DETECTION SYSTEM ENSURES POSITIVE ALARM

ACTIVATION IN DIGITAL MESSAGE LOSS

BOKROS, P. BURSTEIN, A. HEWITT, E. D. /RCA/

JUN. 1966

W00-208

Lost Word Detection System /LOWDS/ provides special identification for each error detection message transmitted from receiver to transmitter. The message is identified as an original message or an n-times retransmitted message so the receiver can detect where a retransmission request was not fulfilled and activate an alarm.

B66-10291

LARGE CAPACITOR PERFORMS AS A DISTRIBUTED

PARAMETER PULSE LINE

GOODING, T. J. /GEN. DYN./ASTRONAUTICS/ JUL.

1966

LEWIS-176

Capacitor of extended foil construction performs as a distributed parameter pulse line in which current, amplitude, and period are readily controlled. The capacitor is used as the energy storage element in a pulsed plasma accelerator.

B66-10292

CIRCUIT PROTECTS REGULATED POWER SUPPLY

AGAINST OVERLOAD CURRENT

AIRTH, H. B. /WESTINGHOUSE ELEC. CORP./ JUL.

1966

GSFC-453

Sensing circuit in which a tunnel diode controls a series regulator transistor protects a low voltage transistorized dc regulator from damage by excessive load currents. When a fault occurs, the faulty circuit is limited to a preset percentage of the current when limiting first occurs.

B66-10293

DAMPING TECHNIQUE GIVES ACCELEROMETER FLAT

FREQUENCY RESPONSE

WING, T. /GULTON IND./ JUL. 1966

M-FS-471

Piezoelectric accelerometer uses a viscous damping technique to achieve a flat frequency response over a wide frequency range in high acoustic environments. This eliminates the electrical overload on associated electronics and loss of useful data caused by oscillations of the accelerometer.

B66-10295

SUBSTITUTING TRANSISTOR FOR DIODE IMPROVES

RECTIFYING MEANS

MULLER, R. M. JUL. 1966

GSFC-474

Unusual transistor connection that substitutes for a silicon diode and allows significantly higher repetition rates without increasing power loss rectifies an alternating current. Operation speed is improved by a factor of 10 or more when a given diode is replaced by this transistor circuit.

B66-10300

COMPUTER PROGRAM DETERMINES GAS FLOW RATES IN

PIPING SYSTEMS

FRANKE, R. /BOEING CO./ JUL. 1966

M-FS-443

Computer program calculates the steady state flow characteristics of an ideal compressible gas in a complex piping system. The program calculates the stagnation and total temperature, static and total pressure, loss factor, and forces on each element in the piping system.

B66-10306

INSTRUMENT CALCULATES MOMENTS OF INERTIA OF  
COMPLEX PLANE FIGURES

MYERS, W. J. /N. AM. AVIATION/ JUL. 1966

MSC-628

Instrument consisting of a narrow field scanner coupled with a simple preprogrammed computer calculates distributive-area properties of complex or irregular plane figures representing cross sections of structural members. The calculator obtains the properties quickly and with a high degree of accuracy.

B66-10308

MICROPHONE MULTIPLEX SYSTEM PROVIDES MULTIPLE

OUTLETS FROM SINGLE SOURCE

LAUVER, R. E. AUG. 1966

GSFC-426

Microphone multiplex system accepts an audio signal from a single source and provides any number of low impedance outputs at microphone level with complete isolation between output channels. Any input or output may be converted to high impedance by eliminating the associated transformer.

B66-10309

HIGH-PERFORMANCE RC BANDPASS FILTER IS

ADAPTED TO MINIATURIZED CONSTRUCTION

JUL. 1966

ARC-60

Miniaturized bandpass filter with RC networks is suitable for use in integrated circuits. The circuit consists of three stages of amplification with additional resistive and capacitive components to obtain the desired characteristics. The advantages of the active RC filter network are the reduction in size and weight and elimination of magnetic materials.

B66-10315

SYSTEM LOCATES RANDOMLY PLACED REMOTE OBJECTS

LOVELADY, R. W. MC FALL, J. C., JR. JUL. 1966

LANGLEY-209

System to locate objects submerged underwater uses active/passive sonar techniques in which a transmitter is attached to the object to be recovered and a receiver is used for search. The system is rugged, has a long term operating life, and furnishes a precise bearing on the object.

B66-10320

SOLVENT RESIDUE CONTENT MEASURED BY LIGHT

SCATTERING TECHNIQUE

SALKOWSKI, M. J. WERLE, D. K. /IIT RES. INST./

JUL. 1966

M-FS-850

Photometric analyzer measures NVR /nonvolatile residue/ in trichloroethylene and other organic solvents. The analyzer converts the liquid solvent to aerosol and passes it between an optically focused light beam and a photodetector that is connected to standard amplifying and readout equipment.

B66-10324

INSTRUMENT TRANSMITS VANISHING POINT TO

ILLUSTRATION POINT

ALVAREZ, M. M. /N. AM. AVIATION/ JUL. 1966

MSC-267A

Instrument transmits the vanishing point of an illustration to a point on the illustration on a diminishing scale that also serves as a straightedge.

B66-10331

CIRCUIT PROVIDES ACCURATE FOUR-QUADRANT

MULTIPLICATION

MC GOWAN, G. F. /MARTIN-MARIETTA CORP./ JUL.

1966

W00-272

Solid state circuit provides four-quadrant multiplication at frequencies ranging from dc to 100 cps using pulse-width and -height multiplication techniques. The circuit consumes little power and has an accuracy of approximately one percent.

B66-10341

ULTRASONIC EMISSION METHOD ENABLES TESTING OF

ADHESIVE BONDS

FRANK, L. SCHMITZ, G. /GEN. AM. TRANSPORTATION

CORP./ AUG. 1966

M-FS-799

Detection of acoustic energy emitted by adhesive bonds subjected to tensile stresses at frequencies above sixteen kilocycles per second is used as a method for determining bond strength. This method is used in measuring adhesive bond strengths on metal honeycomb core panels.

B66-10344

PHASE INVERTER PROVIDES VARIABLE REFERENCE

PUSH-PULL OUTPUT

INNOVATOR NOT GIVEN /RCA/ AUG. 1966

HQ-23

Dual-transistor difference amplifier provides a push-pull output referenced to a dc potential which can be varied without affecting the signal levels. The amplifier is coupled with a feedback circuit which can vary the operating points of the transistors by equal amounts to provide the variable reference potentials.

B66-10347

DUST PARTICLE INJECTOR FOR HYPERVELOCITY

ACCELERATORS PROVIDES HIGH CHARGE-TO-MASS

RATIO

BERG, O. E. AUG. 1966

GSFC-509

Injector imparts a high charge-to-mass ratio to microparticles and injects them into an electrostatic accelerator so that the particles are accelerated to meteoric speeds. It employs relatively large masses in the anode and cathode structures with a relatively wide separation, thus permitting a large increase in the allowable injection voltages.

B66-10349

ELECTRICALLY CONDUCTIVE FIBERS THERMALLY

ISOLATE TEMPERATURE SENSOR

DE WAARD, R. NORTON, B. /BARNES ENG. CO./ AUG.

1966

GSFC-456

Mounting assembly provides thermal isolation and an electrical path for an unbacked thermal sensor. The sensor is suspended in the center of a plastic mounting ring from four plastic fibers, two of which are coated with an electrically conductive material and connected to electrically conductive coatings on the ring.

B66-10350

TRANSISTOR CIRCUIT INCREASES RANGE OF

LOGARITHMIC CURRENT AMPLIFIER

GILMOUR, G. /WESTINGHOUSE ASTRONUCL. LAB./ AUG.

1966

NU-0018

Circuit increases the range of a logarithmic current amplifier by combining a commercially available amplifier with a silicon epitaxial transistor. A temperature compensating network is provided for the transistor.

B66-10351

FUNCTION GENERATOR ELIMINATES NECESSITY

OF SERIES SUMMATION

CALLAN, J. D. MC CALL, A. J. MEAD, D. /HUGHES

AIRCRAFT CO./ AUG. 1966

GSFC-214

Diode generator using four building-block circuits produces complex waveforms without the necessity of series summation. This highly specialized method of producing complex waveforms requires less power than present methods and uses simpler circuitry.

B66-10353

ACCELERATION-COMPENSATED PRESSURE TRANSDUCER

HAS FAST RESPONSE

INNOVATOR NOT GIVEN /CORNELL AERON. LAB./ AUG.

1966

LANGLEY-113

Flush-diaphragm transducer accurately measures small dynamic pressures when it is subjected to high accelerations and severe temperature environments. The transducer uses piezoelectric crystals for measuring the pressure and balancing out acceleration forces.

B66-10355

BRUSHLESS DC MOTOR HAS HIGH EFFICIENCY, LONG

LIFE

STUDER, P. A. AUG. 1966

GSFC-181

Brushless dc motor operates as a commutator in a vacuum environment with high efficiency and long life. Because of its excellent response time, it can be used in the servomechanism field.

B66-10356

\*\*SNIFFER\*\* USED AS PORTABLE HYDROGEN LEAK

DETECTOR

DAYAN, V. H. ROMMEL, M. A. /N. AM. AVIATION/

AUG. 1966

M-FS-846 M-FS-806

Sniffer type portable monitor detects hydrogen in air, oxygen, nitrogen, or helium. It indicates the presence of hydrogen in contact with activated palladium black by a change in color of a thermochromic paint, and indicates the quantity of hydrogen by a sensor probe and continuous readout.

B66-10359

DEVICE SERVES AS HINGE AND ELECTRICAL

CONNECTOR FOR CIRCUIT BOARDS

BETHEL, P. G. HARRIS, G. G. /CHRYSLER CORP./

AUG. 1966

M-FS-743

Hinge makes both sides of electrical circuit boards readily accessible for component checkout and servicing. The hinge permits mounting of two circuit boards and incorporates connectors to maintain continuous electrical contact between the components on both boards.

B66-10361

NEW COMPUTER SYSTEM SIMPLIFIES PROGRAMMING OF

MATHEMATICAL EQUATIONS

REINFELDS, J. SEITZ, R. N. WOOD, L. H. AUG.

1966

M-FS-441

Automatic Mathematical Translator /AMSTRAN/ permits scientists or engineers to enter mathematical equations in their natural mathematical format and to obtain an immediate graphical display of the solution. This automatic-programming, on-line, multiterminal computer system allows experienced programmers to solve nonroutine problems.

B66-10362

AUTOMATED DRAFTING SYSTEM USES COMPUTER

TECHNIQUES

MILLENSON, D. H. /N. AM. AVIATION/ AUG. 1966

M-FS-788

Automated drafting system produces schematic and block diagrams from the design engineers freehand sketches. This system codes conventional drafting symbols and their coordinate locations on standard size drawings for entry on tapes that are used to drive a high speed photocomposition machine.

B66-10363

INFRARED TELEVISION USED TO DETECT HYDROGEN

FIRES

PROFFITT, R. T. /N. AM. AVIATION/ AUG. 1966

M-FS-654

Standard, commercially available closed circuit television system detects hydrogen fires in test facilities. It sees in the infrared and displays on a standard cathode ray monitor screen.

B66-10368

HYDROGEN FIRE DETECTION SYSTEM FEATURES SHARP

DISCRIMINATION

BRIGHT, C. S. /N. AM. AVIATION/ AUG. 1966

M-FS-643

Hydrogen fire detection system discovers fires by detecting the flickering ultraviolet radiation emitted by the OH molecule, a short-lived intermediate combustion product found in hydrogen-air flames. In a space application, the system discriminates against false signals from sunlight and rocket engine exhaust plume radiation.

B66-10374  
PNEUMATIC BINARY ENCODER REPLACES MULTIPLE  
SOLENOID SYSTEM  
INNOVATOR NOT GIVEN /WESTON HYDRAULICS/ AUG. 1966  
M-FS-665

Pneumatic binary encoder replaces solenoid system in the pilot stage of a digital actuator. The encoder operates in flip-flop manner to valve gas at either high or low pressures. By rotating the disk in a pinion-to-encoding gear ratio, six to eight adder circuits may be operated from single encoder.

B66-10376  
EFFICIENT DC TO DC CONVERTER ELIMINATES  
LARGE STRAY MAGNETIC FIELDS  
TUMS, E. O. /CHICAGO UNIV./ AUG. 1966  
GSFC-463

Two-core nonsaturating dc to dc converter provides high switching efficiency without producing large stray magnetic fields. It uses one core to provide positive feedback and the combination of the two cores for the transformer.

B66-10377  
SINGLE CHANNEL PULSE-HEIGHT ANALYZER OPERATES  
IN SUBNANOSECOND RANGE  
AUG. 1966 SEE ALSO NASA-TN-D-2673  
LEWIS-267

Single-channel pulse-height analyzer measures nuclear state lifetimes shorter than one nanosecond. The customary logic arrangement is reversed to reduce timing errors.

B66-10379  
HUMAN TRANSFER FUNCTIONS USED TO PREDICT  
SYSTEM PERFORMANCE PARAMETERS  
AUG. 1966 SEE ALSO NASA-TN-D-1952, NASA-TN-D-2177, NASA-TN-D-2394, AND NASA-TN-D-2569  
LANGLEY-203

Automatic, parameter-tracking, model-matching technique compares the responses of a human operator with those of an analog computer model of a human operator to predict and analyze the performance of mechanical or electromechanical systems prior to construction. Transfer functions represent the input-output relation of an operator controlling a closed-loop system.

B66-10382  
FEEDBACK LOOP COMPENSATES FOR RECTIFIER  
NONLINEARITY  
INNOVATOR NOT GIVEN /SPERRY GYROSCOPE CO./ AUG. 1966  
M-FS-384

Signal processing circuit with two negative feedback loops rectifies two sinusoidal signals which are 180 degrees out of phase and produces a single full-wave rectified output signal. Each feedback loop incorporates a feedback rectifier to compensate for the nonlinearity of the circuit.

B66-10386  
PARALLEL LINE RASTER ELIMINATES AMBIGUITIES IN  
READING TIMING OF PULSES LESS THAN 500  
MICROSECONDS APART  
HORNE, A. P. SEP. 1966  
JPL-805

Parallel horizontal line raster is used for precision timing of events occurring less than 500 microseconds apart for observation of hypervelocity phenomena. The raster uses a staircase vertical deflection and eliminates ambiguities in reading timing of pulses close to the end of each line.

B66-10389  
SYSTEM MONITORS DISCRETE COMPUTER INPUTS  
BURNS, J. J. /RCA/ AUG. 1966  
M-FS-1021

Computer system monitors inputs from checkout devices. The comparing, addressing, and controlling functions are performed in the I/O unit. This leaves the computer main frame free to handle memory, access priority, and interrupt instructions.

B66-10391  
JUNCTION CONNECTORS PERMIT STRATEGIC

PLACEMENT OF TELEVISION CAMERAS  
KEMPSON, A., JR. SEP. 1966  
KSC-66-22

Cable run circuit with switching junction connectors at strategic locations enables television cameras to be plugged in with minimum effort wherever needed. Crimp-type contacts for mating connections reduce installation time and require a lesser level of technician skill than do soldered and potted connections.

B66-10392  
INDUCTIVE SYSTEM DETECTS LEVEL OF CONDUCTING  
FLUIDS  
ROESKE, P. W. AUG. 1966  
LEWIS-322

Inductive system monitors the liquid level of a conductive fluid that is at a high temperature in a fully closed opaque container. The system is useful in any high temperature liquid-metal system. It shows fast response and is relatively insensitive to temperature fluctuations.

B66-10393  
COMPOSITE FILTER STEEPENS REJECTION SLOPES IN  
MICROWAVE APPLICATION  
INNOVATOR NOT GIVEN /DORNE AND MARGOLIN/ AUG. 1966  
GSFC-480

Composite filter is used to obtain sharp rejection slopes in microwave transmission by filtering techniques. It consists of a bandpass filter to shape the passband and a bandreject filter on each edge of the bandpass filter to steepen the rejection slopes.

B66-10394  
HIGH PRESSURE CRYOGENIC LIQUID FLOW SIGHT  
ASSEMBLY PROVIDES STREAMLINED FLOW FOR EASY  
OBSERVATION  
HOBART, H. E. MINKIN, H. L. AUG. 1966  
LEWIS-310

Window assembly facilitates observation of cryogenic liquids flowing through a smooth pipe at pressures up to several hundred pounds per square inch. This high-pressure cryogenic observation assembly which houses a thin wall glass pipe held within a steel retainer can accommodate fluids under a wide range of pressures and temperatures.

B66-10396  
SOLID STATE DETECTORS MONITOR RELAY CONTACTS  
QUINN, J. D. SEPT. 1966  
JPL-785

Hand carried, solid state, 18-channel detector system constantly monitors contact conditions in relays. The system is relatively insensitive to external noise and is powered by standard 110 volt ac.

B66-10397  
MINIMUM PERMISSIBLE LEAKAGE RESISTANCE  
ESTABLISHED FOR INSTRUMENTATION SYSTEMS  
PERRIN, J. L. /N. AM. AVIATION/ SEP. 1966  
M-FS-848

Mathematical formulas are used to determine if, and to what extent, an instrumentation system that has been exposed to the elements should be dried out to restore minimum permissible leakage resistance to ground. Formulas are also derived and used for an intermediate number of systems that are exposed to moisture penetration.

B66-10401  
DIELECTROMETER DESIGN PERMITS MEASUREMENT IN  
VACUUM UNDER IRRADIATION  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ SEP. 1966  
M-FS-359

Dielectrometer permits measurement of dielectric constant and dielectric losses in a vacuum environment exposed to radiation. It is not necessary to remove the sample from the chamber during testing.

B66-10404  
NEW COMPUTER PROGRAM SOLVES WIDE VARIETY OF  
HEAT FLOW PROBLEMS  
ALMOND, J. C. /BOEING CO./ SEP. 1966

M-FS-421

Boeing Engineering Thermal Analyzer /BETA/ computer program uses numerical methods to provide accurate heat transfer solutions to a wide variety of heat flow problems. The program solves steady-state and transient problems in almost any situation that can be represented by a resistance-capacitance network.

B66-10407

DIRECTION INDICATOR SYSTEM DOES NOT REQUIRE COMPLICATED OPTICS

MILDICE, J. W. /GEN. DYN./CONVAIR/ SEP. 1966  
WOO-305

Direction indicator which aligns a system relative to a light source uses two photocells as light sensors to form a set. Each set indicates one direction. This indicator has no moving parts and provides very fine vernier acquisition.

B66-10409

MODULAR POROUS PLATE SUBLIMATOR /MPPS/  
REQUIRES ONLY WATER SUPPLY FOR COOLANT

RATHBUN, R. J. /IBM/ SEP. 1966  
M-FS-1374

Modular porous plate sublimators, provided for each location where heat must be dissipated, conserve the battery power of a space vehicle by eliminating the coolant pump. The sublimator requires only a water supply for coolant.

B66-10412

LEAK LOCATOR FOR VACUUM JACKETED PIPELINES  
ELIMINATES NEED FOR REMOVAL OF OUTER JACKET

WELLS, G. H. /N. AM. AVIATION/ SEP. 1966  
M-FS-888

Device for locating leaks in a vacuum-jacketed liquid-hydrogen transfer line consists of two Mylar discs, a source of nitrogen and helium gas, and a mass spectrometer. The outer jacket of the pipeline does not need to be removed for the locator to be used.

B66-10413

ANALOG SOLAR SYSTEM MODEL RELATES CELESTIAL  
BODIES SPATIALLY

BAERG, H. R. SEP. 1966  
JPL-195

Portable analog planetarium indicates the relative time and space angular locations of the Sun and planets. Distance measuring scales, angular direction indicators, and typical probe trajectories are included.

B66-10414

ELECTRICALLY CONTROLLED OPTICAL LATCH AND  
SWITCH REQUIRES LESS CURRENT

PIECZONKA, W. A. ROY, M. M. YEH, T. H. /IBM/  
SEP. 1966  
JPL-SC-111 JPL-SC-112

Electrically controlled optical latch consists of a sensitive phototransistor and a solid-state light source. This design requires less current to activate an optically activated switch than in prior art.

B66-10419

METAL OXIDE SILICON /MOS/ TRANSISTORS  
PROTECTED FROM DESTRUCTIVE DAMAGE BY WIRE  
DEVICE

DEBOO, G. J. DEVINE, E. J. SEP. 1966  
ARC-65

Loop of flexible, small diameter, nickel wire protects metal oxide silicon /MOS/ transistors from a damaging electrostatic potential. The wire is attached to a music-wire spring, slipped over the MOS transistor case, and released so the spring tensions the wire loop around all the transistor leads, shorting them together. This allows handling without danger of damage.

B66-10420

ELECTRONIC BIDIRECTIONAL VALVE CIRCUIT  
PREVENTS CROSSOVER DISTORTION AND THRESHOLD  
EFFECT

KERNICK, A. /WESTINGHOUSE ELEC. CORP./ SEP. 1966  
MSC-193

Four-terminal network forms a bidirectional valve which will switch or alternate an ac signal

without crossover distortion or threshold effect. In this network, an isolated control signal is sufficient for circuit turn-on.

B66-10423

AN INVESTIGATION OF PHASE-LOCK LOOP SWEPT-  
FREQUENCY SYNCHRONIZATION

DYE, R. A. /LOCKHEED MISSILES AND SPACE CO./  
SEP. 1966  
M-FS-656

Rapid synchronization of phase-locked oscillators is best achieved by the swept-frequency acquisition technique, wherein the Voltage-Controlled Oscillator /VCO/ is linearly swept through the uncertainty band. The theoretically predicted sweep rates of this technique and the observed experimental results differ by less than seven percent.

B66-10426

COMPUTER SIMULATION PROGRAM IS ADAPTABLE TO  
INDUSTRIAL PROCESSES

SCHULTZ, F. E. /GE/ OCT. 1966  
LEWIS-240

The Reaction Kinetics Ablation Program /REKAP/, developed to simulate ablation of various materials, provides mathematical formulations for computer programs which can simulate certain industrial processes. The programs are based on the use of nonsymmetrical difference equations that are employed to solve complex partial differential equation systems.

B66-10427

ELECTRICAL CABLING WITHSTANDS SEVERE  
ENVIRONMENTAL CONDITIONS

HATHAWAY, J. D. /N. AM. AVIATION/ SEP. 1966  
M-FS-1585

Multiconductor electrical cables retain their circuit integrity and remain flexible and abrasion resistant in severe environmental conditions of heat, vibration, and water.

B66-10429

VIDEO SIGNAL PROCESSING SYSTEM USES GATED  
CURRENT MODE SWITCHES TO PERFORM HIGH SPEED  
MULTIPLICATION AND DIGITAL-TO-ANALOG  
CONVERSION

GILLILAND, M. G. ROUGELOT, R. S. SCHUMAKER,  
R. A. /GE/ OCT. 1966  
MSC-781

Video signal processor uses special-purpose integrated circuits with nonsaturating current mode switching to accept texture and color information from a digital computer in a visual spaceflight simulator and to combine these, for display on color CRT with analog information concerning fading.

B66-10430

SOLID-STATE SWITCH INCREASES SWITCHING SPEED

MC GOWAN, G. F. /MARTIN CO./ OCT. 1966  
WOO-298

Solid state switch for commutating capacitors in an RC commutated network increases switching speed and extends the filtering or commutating frequency spectrum well into the kilocycle region. The switch is equivalent to the standard Double-Pole Double-Throw /DPDT/ relay and is driven from digital micrologic circuits.

B66-10431

CONTROL CIRCUIT MAINTAINS UNITY POWER FACTOR  
OF REACTIVE LOAD

KRAMER, M. MARTINAGE, L. H. /IBM/ OCT. 1966  
MSC-192

Circuit including feedback control elements automatically corrects the power factor of a reactive load. It maintains power supply efficiency where negative load reactance changes and varies by providing corrective error signals to the control windings of a power supply transformer.

B66-10432

REMOTE PREAMPLIFIER CIRCUIT MAINTAINS STABILITY  
STABILITY OVER WIDE TEMPERATURE RANGE

MAC NAUGHTON, R. G. /VARIAN ASSOCIATES/ OCT. 1966

WOO-278

Circuit remains stable over a wide temperature range while preamplifying light signals falling on a photocell and transmitting them through a transmission line to a remote amplifier. The circuit preamplifier consists of a grounded emitter npn stage followed by a pnp emitter.

B66-10433

LINEAR SIGNAL NOISE SUMMER ACCURATELY

DETERMINES AND CONTROLS S/N RATIO

SUNDY, J. L. /WESTINGHOUSE ELEC. CORP./ OCT. 1966

JPL-SC-152

Linear signal noise summer precisely controls the relative power levels of signal and noise, and mixes them linearly in accurately known ratios. The S/N ratio accuracy and stability are greatly improved by this technique and are attained simultaneously.

B66-10436

SHAFT ENCODER PRESENTS DIGITAL OUTPUT

HILLIS, D. A. /HUGHES AIRCRAFT CO./ OCT. 1966

JPL-SC-191

Circuits that include compensation circuitry time a capacitance relative to a reference voltage so that a digital presentation occurs that is representative of the positional condition of the mechanical shaft being monitored. This circuitry may be employed in multiples to furnish binary encoding of a number of rotating devices simultaneously.

B66-10437

SINGLE-SIDEBAND MODULATOR ACCURATELY

REPRODUCES PHASE INFORMATION IN 2-MC SIGNALS

STRENGLEIN, H. F. /SPERRY MICROWAVE ELECTRON. CO./ OCT. 1966

M-FS-664

Phase-locked oscillator system employing solid state components acts as a single-sideband modulator to accurately reproduce phase information in 2-mc signals. This system is useful in telemetry, aircraft communications and position-finding stations, and VHF test circuitry.

B66-10438

DENSITOMETER SYSTEM FOR LIQUID HYDROGEN HAS

HIGH ACCURACY, FAST RESPONSE

INNOVATOR NOT GIVEN /FRANKLIN GNO CORP./ OCT. 1966

M-FS-909

Developmental densitometer system for cryogenic liquids uses two balanced ionization chambers containing xenon gas, with X-rays as the radiation source. The X-rays are heavily filtered with a lead shield to make the energy spectrum much less dependent on the voltage applied to the X-ray tube.

B66-10439

ION CHAMBERS SIMPLIFY ABSOLUTE INTENSITY

MEASUREMENTS IN THE VACUUM ULTRAVIOLET

SAMPSON, J. A. R. /GEOPHYS. CORP. OF AM./ OCT. 1966

ERC-10

Single or double ion chamber technique measures absolute radiation intensities in the extreme vacuum ultraviolet region of the spectrum. The ion chambers use rare gases as the ion carrier. Photon absorbed by the gas creates one ion pair so a measure of these is a measure of the number of incident photons.

B66-10440

PHOTOELECTRIC SCANNER MAKES DETAILED WORK

FUNCTION MAPS OF METAL SURFACE

RASOR, N. S. /THERMO ELECTRON ENG. CORP./ OCT. 1966

JPL-SC-176

Photoelectric scanning device maps the work function of a metal surface by scanning it with a light spot and measuring the resulting photocurrent. The device is capable of use over a range of surface temperatures.

B66-10441

STANDARD ARC WELDERS PROVIDE HIGH AMPERAGE

DIRECT CURRENT SOURCE

BEASLEY, W. D. BROOKS, J. D. OCT. 1966

LANGLEY-267 LANGLEY-268

Standard arc welders or power supplies are hooked up in parallel or series connections to obtain an adequate supply of current or voltage for various purposes. This method provides maximum flexibility in a wide range of voltages and currents.

B66-10442

AN IMPROVED METHOD FOR TESTING PERFORMANCE OF

VIDICONS DURING VIBRATION

CORSON, B. R. /HUGHES AIRCRAFT CO./ OCT. 1966

JPL-SC-113

Vidicon electron beam modulation is used for checking the performance of vidicons in mechanical vibration tests. The vidicon electron beam is modulated with an external signal during the \*\*write\*\* period thereby storing the image on the vidicon face.

B66-10444

THERMIONIC SCANNER PINPOINTS WORK FUNCTION

OF EMITTER SURFACES

RASOR, N. S. /THERMO ELECTRON ENG. CORP./ OCT. 1966

JPL-SC-177

In the electron tube testing, a thermionic scanner makes accurate spatial resolution measurements of the metallic surface work functions of emitters. The scanner determines the emitter function and its local departures from the mean value on a point-by-point basis for display on an oscilloscope.

B66-10447

SEMICONDUCTORS CAN BE TESTED WITHOUT

REMOVING THEM FROM CIRCUITRY

ALLEN, B. C. /N. AM. AVIATION/ NOV. 1966

M-FS-1163

Oscilloscope, with specially developed test circuitry, quickly checks semiconductors without removing them from the circuitry. For transistors, approximate gain and linearity, as well as pnp or npn determinations are made. When testing diodes, open or short circuits, and reverse polarity show up plainly.

B66-10449

BASIC SUPPRESSION TECHNIQUES ARE EVALUATED

DAWIRS, H. N. /RECON, INC./ OCT. 1966

M-FS-867

Investigation of standard suppression methods facilitates switching of inductively loaded circuits which causes interference in adjacent electronic equipment. The data are reduced to tabular form and rapid selection of components by the designer can be made without lengthy calculations or trial and error manipulations.

B66-10452

RECTILINEAR ACCELEROMETER POSSESSES SELF-

CALIBRATION FEATURE

HENDERSON, R. B. /SAUNDERS ASSOC., INC./ OCT. 1966

M-FS-1480

Rectilinear accelerometer operates from an ac source with a phase-sensitive ac voltage output proportional to the applied accelerations. The unit includes an independent circuit for self-test which provides a sensor output simulating an acceleration applied to the sensitive axis of the accelerometer.

B66-10456

PULSE GENERATOR USING TRANSISTORS AND SILICON

CONTROLLED RECTIFIERS PRODUCES HIGH CURRENT

PULSES WITH FAST RISE AND FALL TIMES

WOOLFSON, M. G. /WESTINGHOUSE ELEC. CORP./ OCT. 1966

MSC-405

Electrical pulse generator uses power transistors and silicon controlled rectifiers for producing a high current pulse having fast rise and fall times. At quiescent conditions, the standby power consumption of the circuit is equal to zero.

B66-10461

MODIFIED THERMOCOUPLE IS EFFECTIVE FROM  
MINUS 250 DEG TO 5000 DEG F  
MOEN, W. K. /N. AM. AVIATION/ NOV. 1966  
MSC-420

Modified, commercially available thermocouple which measures the temperature of a spacecraft heat shield, is capable of continuous measurement in the range of minus 250 deg to 5000 deg F. The modified thermocouples may be used inside metal treating furnaces in high temperature technology, and in certain corrosive environments.

B66-10462

INSTRUMENT AUTOMATICALLY SELECTS PEAK  
ACCELERATION SIGNAL FROM SEVERAL  
ACCELEROMETERS  
CHAPMAN, C. P. OCT. 1966  
JPL-816

Solid state circuit selects the highest of several ac accelerometer signals and gates this signal to an output amplifier, preserving all the frequency information in the peak signal. If the amplitudes of the accelerometer signals change with time, the circuit will continually switch to the highest signal, rejecting the smaller signals.

B66-10465

SOLID STATE CIRCUIT SWITCHES AC LOAD  
CHAPMAN, C. P. RUPNIK, D. R. OCT. 1966  
JPL-798

Differential amplifier circuit switches ac signals with peak amplitudes greater than 5 volts. This solid state circuit biases a switching transistor on and off by a 0.1 to 5.0 dc control voltage.

B66-10466

STUDY COMPARES METHODS FOR THE NUMERICAL  
SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS  
INNOVATOR NOT GIVEN /GEORGIA INST. OF TECHNOL./  
OCT. 1966 SEE ALSO NASA-CR-61060  
M-FS-830

Study compares the use of five different methods for the computer solution of the restricted three-body problem. It describes the implementation of each method on a Burroughs B-5000 computer and in terms of speed and accuracy.

B66-10469

BIPOLAR CURRENT DRIVER FOR MEMORY CIRCUITS  
CHONG, C. F. NELSON, C. A. /SPERRY RAND CORP./  
NOV. 1966  
GSFC-213

Circuit which logically determines the state of a flip-flop and amplifies the current from a clock pulse provides a bipolar driving current to a memory circuit, the polarity of which is determined by the state of a flip-flop. This principle may be applied to various memory driving circuits where power dissipation must be minimized.

B66-10476

DEVICE TO COLOR MODULATE A STATIONARY LIGHT  
BEAM GIVES HIGH INTENSITY  
GANTZ, W. A. /CALIF. UNIV./ DEC. 1966  
HQ-44

Signal controlled system color modulates a beam of light while also providing high intensity and a stationary beam, either collimated or focused. The color modulation acquired by the presented system can be compatible with any color film by employing color filters formed to provide a color wedge having a color distribution compatible with the film's color sensitivity.

B66-10478

PLUG-IN CONNECTOR SOCKET ACCEPTS COAXIAL  
CABLE END  
MITCHELL, D. VAN LOON, J. NOV. 1966  
ARG-9

Connector which includes a spring-loaded contact to receive a protruding center conductor and an internal collet to clamp against a collar attached to a woven outer conductor, is used as a receptacle for the end of a coaxial cable. This plug-in connector socket is used successfully with remote manipulators.

B66-10480

SIMPLE, ONE TRANSISTOR CIRCUIT BOOSTS PULSE  
AMPLITUDE  
KEON, T. MATCHETT, M. W. /CUTLER HAMMER/ OCT.  
1966  
GSFC-501

Simple circuit that uses a single transistor to accomplish capacitor storage followed by common-base switching supplies a pulse voltage, higher than that normally available from emitter-follower circuits, to drive a 100-watt transmitter.

B66-10481

MODIFIED MCLEOD PRESSURE GAGE ELIMINATES  
MEASUREMENT ERRORS  
KELLS, M. C. NOV. 1966  
ARC-62

Modification of a McLeod gauge eliminates errors in measuring absolute pressure of gases in the vacuum range. A valve which is internal to the gauge and is magnetically actuated is positioned between the mercury reservoir and the sample gas chamber.

B66-10482

AUTOMATIC CRYOGENIC LIQUID LEVEL CONTROLLER  
IS SAFE FOR USE NEAR COMBUSTIBLE SUBSTANCES  
KREJSA, M. OCT. 1966  
LEWIS-195

Automatic mechanical liquid level controller that is independent of any external power sources is used with safety in the presence of combustibles. A gas filled capillary tube which leads from a pressurized chamber, is inserted into the cryogenic liquid reservoir and becomes a liquid level sensing element or probe.

B66-10486

SOLID STATE CIRCUIT CONTROLS DIRECTION, SPEED,  
AND BRAKING OF DC MOTOR  
HANNA, M. F. OCT. 1966  
JPL-757

Full-wave bridge rectifier circuit controls the direction, speed, and braking of a dc motor. Gating in the circuit of Silicon Controlled Rectifiers /SCR's/ controls output polarity and braking is provided by an SCR that is gated to short circuit the reverse voltage generated by reversal of motor rotation.

B66-10488

SPIRAL SPRING/STRAIN GAGE COMBINATION  
ACCURATELY MEASURES SHOCK INDUCED DEFLECTION  
BERVEN, B. R. WALKER, R. R. /N. AM. AVIATION/  
OCT. 1966  
MSC-789

Spiral springs equipped with strain gauges which are hard-wired to readout instrumentation, measure deflection between two relatively inaccessible surface in a drop test that causes them to close to near flatness. This technique has been successfully used on Apollo drop tests to measure deflection between aft bulkhead and heatshield.

B66-10490

SOLENOID MAGNETIC FIELDS CALCULATED FROM  
SUPERPOSED SEMI-INFINITE SOLENOIDS  
BROWN, G. V. FLAX, L. NOV. 1966 SEE ALSO  
NASA-TN-D-2494  
LEWIS-184

Calculation of a thick solenoid coil's magnetic field components is made by a superposition of the fields produced by four solenoids of infinite length and zero inner radius. The field produced by this semi-infinite solenoid is dependent on only two variables, the radial and axial field point coordinates.

B66-10491

MINIATURE CAPACITIVE ACCELEROMETER IS  
ESPECIALLY APPLICABLE TO TELEMETRY  
COON, G. W. HARRISON, D. R. NOV. 1966 SEE ALSO  
B63-10429  
ARC-72

Capacitive accelerometer design enables the construction of highly miniaturized instruments having full-scale ranges from 1 g to several hundred g. This accelerometer is applicable to



telemetry and can be tailored to cover any of a large number of acceleration ranges and frequency responses.

B66-10492

CIRCUIT PREVENTS OVERCHARGING OF SECONDARY CELL BATTERIES

HENNIGAN, T. J. POTTER, N. H. SIZEMORE, K. O. NOV. 1966  
GSFC-454

Circuit prevents battery cell overcharging by detecting and reducing the charging voltage to the open-circuit voltage of the battery when this current falls to a predetermined value. The voltage control depends on the fact that the charging current falls significantly when the battery nears its fully charged state.

B66-10493

STUDY SHOWS EFFECT OF SURFACE PREPARATIONS ON IMPROVING THERMIONIC EMISSION

VAN SOMEREN, L. /THERMO ELECTRON ENG. CORP./ NOV. 1966

JPL-SC-140

Specimen thermionic emitters were electropolished and electroetched to study the effect of surface preparations on improving thermionic emission. The best technique found was to electropolish the annealed rhenium surface and then electroetch it. The effect of electroetching was to remove other crystal planes faster than basal planes.

B66-10494

OPTICAL MONITOR PANEL PROVIDES FLEXIBLE TEST PANEL CONFIGURATIONS

GRIFFIN, F. D. NOV. 1966

KSC-66-18

Optical monitor panel projects a chosen panel configuration upon a translucent screen by using a master projector and appropriate slide to project panel board nomenclature and a series of smaller individual projectors to superimpose monitor indicators upon the projected panel board.

B66-10496

COMPUTER PROGRAM PERFORMS FLOW ANALYSIS THROUGH TURBINES

KATSANIS, T. NOV. 1966 SEE ALSO NASA-TN-D-2546 AND NASA-TN-D-2809

LEWIS-236

Computer program based on an equation for the velocity gradient along an arbitrary quasi-orthogonal analyzes flow through a turbomachine. The program obtains meridional solutions for a hub-to-shroud analysis and blade-to-blade analysis at the hub, mean, and shroud surfaces in a single computer run.

B66-10497

HIGH VOLTAGE POTENTIAL DIVIDER CALIBRATED BY SIMPLE DEVICE

LEWIS, R. N. NOV. 1966

ARG-83

Resistance bridge device incorporates a potentiometer, switches, and a null detector to calibrate high potential dividers under high voltage operation conditions. Calibration can be performed with this device in less than 1 minute at an accuracy of 0.001 percent.

B66-10500

DIGITAL SYSTEM PROVIDES SUPERREGULATION OF NANOSECOND AMPLIFIER-DISCRIMINATOR CIRCUIT

FORGES, K. G. NOV. 1966

ARG-61

Feedback system employing a digital logic comparator to detect and correct amplifier drift provides stable gain characteristics for nanosecond amplifiers used in counting applications. Additional anticoincidence logic enables application of the regulation circuit to the amplifier and discriminator while they are mounted in an operable circuit.

B66-10501

ELECTRONIC CIRCUIT DELIVERS PULSE OF HIGH INTERVAL STABILITY

FISHER, B. /N. AM. AVIATION/ NOV. 1966

MSC-673

Circuit generates a pulse of high interval stability with a complexity level considerably below systems of comparable stability. This circuit is being used as a linear frequency discriminator in the signal conditioner of the Apollo command module.

B66-10502

POINT-SOURCE LIGHT SENSOR CIRCUIT IS INSENSITIVE TO BACKGROUND LIGHT

DAVIS, E. S. NOV. 1966

JPL-778

Circuit incorporating a bisynchronous demodulator for an electro-optical star-tracking sensor provides a signal proportional to star intensity without interference from background light in the field of view. The system works best on a sharply focused star image and requires a 50 percent duty cycle.

B66-10503

COMPUTER PROGRAM DETERMINES PERFORMANCE EFFICIENCY OF REMOTE MEASURING SYSTEMS

MEREWETHER, E. K. /N. AM. AVIATION/ NOV. 1966

M-FS-1137

Computer programs control and evaluate instrumentation system performance for numerous rocket engine test facilities and prescribe calibration and maintenance techniques to maintain the systems within process specifications. Similar programs can be written for other test equipment in an industry such as the petrochemical industry.

B66-10504

SUBROUTINE ALLOWS EASY COMPUTATION IN EXTENDED PRECISION ARITHMETIC

BERGGREN, R. L. GYSBERS, J. C. /N. AM. AVIATION/ NOV. 1966

M-FS-1136

Subroutine called NPREC allows relatively simple computation of very large numbers or very small fractions with extreme accuracy. This subroutine handles numbers that consist of 35 binary bits /1 word/ for the exponent and 70 bits /2 words/ for the fraction.

B66-10505

SOLID STATE ANNUNCIATOR FACILITATES COMPLEX SYSTEM TROUBLESHOOTING

HOFFER, H. P. /N. AM. AVIATION/ NOV. 1966

M-FS-1258

Solid state annunciator monitors up to 60 parameters for a dc voltage change from zero to 28 volts in the testing of complex systems. This annunciator is presently being used for testing of the complex J-2 rocket engine.

B66-10506

COMPUTER PROGRAM DETERMINES INVENTORY SIZE

KASPAR, H. /N. AM. AVIATION/ NOV. 1966

M-FS-1135

Fortran IV computer program calculates optimum size of a small inventory of relatively complex or expensive items. This program can be used in situations where the initial cost of purchase is large or when there is a need for a balanced inventory, on a short production run.

B66-10509

PULSE STRETCHER HAS IMPROVED DYNAMIC RANGE AND LINEARITY

LARSEN, R. N. NOV. 1966

ARG-82

Current-switching pulse stretcher overcomes the diode nonlinearity and capacitive feedthrough of voltage switching diode-capacitor stretchers and lengthens nanosecond pulses so that their amplitude may be determined and extends the dynamic range of the pulse stretcher. The rise time of the output pulse in response to a step function is approximately 5 nanoseconds.

B66-10510

LOW LEVEL ACCELEROMETER TEST METHODS ARE INVESTIGATED

NELSON, R. H., JR. PLOURDE, H. S. /DYN. RES. CORP./ NOV. 1966

M-FS-908

Problems associated with testing accelerometers to an accuracy where the standard error is less than .000001 g are centered around the elimination of uncertainties in the acceleration input to the accelerometer. By placing a test rig in free fall, the uncertainty in the earth's gravity field can be eliminated.

**B66-10511**  
COMPUTER ROUTINE ADDS PLOTTING CAPABILITIES  
TO EXISTING PROGRAMS  
HARRIS, J. C. LINNEKIN, J. S. /LITTON IND. /  
NOV. 1966  
GSFC-490

PLOTAN, a generalized plot analysis routine written for the IBM 7094 computer minimizes the difficulties in adding plot capabilities to large existing programs. PLOTAN is used in conjunction with a binary tape writing routine and has the ability to plot any variable on the intermediate binary tape as a function of any other.

**B66-10512**  
NIXIE TUBE DISPLAY UNIT EMPLOYS TIME-SHARED  
LOGIC  
GRAY, J. NOV. 1966  
ARG-117

Cathodes of display tubes wired in parallel achieve input switching simplification of a Nixie tube display system. Use of time-shared logic energizes the appropriate anode and inhibits all unnecessary cathodes.

**B66-10516**  
DIGITAL SYSTEM DETECTS BINARY CODE PATTERNS  
CONTAINING ERRORS  
MULLER, R. M. THARPE, H. M., JR. NOV. 1966  
GSFC-541

System of square loop magnetic cores associated with code input registers react to input code patterns by reference to a group of control cores in such a manner that errors are canceled and patterns containing errors are accepted for amplification and processing. This technique improves reception capabilities in PCM telemetry systems.

**B66-10518**  
ANTENNA SIMULATOR PERMITS PREINSTALLATION  
SYSTEM CHECKOUT  
ELIA, A. D. SCHMIDT, R. F. NOV. 1966  
GSFC-522

Antenna simulator provides for evaluation checkout of corporate feeds, monopulse sum-and-difference networks, etc. in a shielded environment prior to system checkout on an antenna pattern range. This technique is useful wherever simulation of monopulse antenna element characteristics is desired for checkout of ancillary equipment in a controlled environment.

**B66-10520**  
PYROMETRY HANDBOOK DESCRIBES PRACTICAL  
ASPECTS OF SURFACE TEMPERATURE MEASUREMENTS  
OF OPAQUE MATERIALS  
BRANSTETTER, J. R. BUCHELE, D. R. NOV. 1966 SEE  
ALSO NASA-TN-D-3604  
LEWIS-349

Handbook contains extensive reference literature and results from pertinent experiments to provide a collection of applied technology and reference sources for engineers and technicians. Fundamental equations of radiation, off-design corrections, characteristics of pyrometers, and calibration apparatus and techniques are discussed.

**B66-10521**  
FLOWMETER MEASURES FLOW RATES OF HIGH  
TEMPERATURE FLUIDS  
VARY, A. NOV. 1966  
LEWIS-328

Flowmeter in which flow rate is determined by measuring the position and thus the displacement of an internal float acted upon by the flowing fluid determines the flow rates of various liquid metals at elevated temperatures. Viscous forces cause the float to move from its mounted position, affording several means for measuring this motion

and the flow rate.

**B66-10524**  
STUDY OF VORTEX VALVE FOR MEDIUM  
TEMPERATURE SOLID PROPELLANTS  
HOLT, W. D. RIVARD, J. G. /BENDIX CORP./ DEC.  
1966  
LANGLEY-204

Fluid state vortex valve secondary injection control system shows considerable promise for future application to solid propellant rocket engine thrust vector control. The single axis injection system tested would be capable of providing secondary injection thrust vector control using 2000 deg F gas.

**B66-10525**  
COMPUTER PROGRAM PERFORMS STATISTICAL  
ANALYSIS FOR RANDOM PROCESSES  
NEWBERRY, M. H. NOV. 1966 SEE ALSO  
NASA-TM-X-53359  
M-FS-723

Random Vibration Analysis Program /RAVAN/ performs statistical analysis on a number of phenomena associated with flight and captive tests, but can also be used in analyzing data from many other random processes.

**B66-10526**  
IMPROVED DESIGN PROVIDES FASTER RESPONSE  
TIME IN PHOTOMULTIPLIER  
INNOVATOR NOT GIVEN /HALLICRAFTERS CO./ NOV. 1966  
GSFC-451

Dynamic crossed-field electron multiplying /DCFEM/ light demodulator avoids the normal response time limitations inherent in static field devices, by using time varying crossed electric and static magnetic fields to eliminate the transit time spread that affects electrons as they proceed along the secondary emission stages of the tube.

**B66-10529**  
COMPUTER PROGRAM SEARCHES CHARACTERISTIC  
DATA OF DIODES AND TRANSISTORS  
INNOVATOR NOT GIVEN /BOOZ-ALLEN APPL. RES. CORP./  
NOV. 1966  
GSFC-493

Semiconductor information storage and retrieval system provides a comprehensive, accurate, and ready reference to characteristic data of diodes and transistors. The system can be used to supply a complete listing of technical component information necessary for circuit designers, reliability engineers, and quality assurance personnel.

**B66-10531**  
HEAT FLUX SENSOR DESIGN REDUCES EXTRANEEOUS  
SOURCE EFFECTS  
CROFTS, E. D. ROBINSON, G. P. /MCDONNELL  
AIRCRAFT CORP./ NOV. 1966  
MSC-400

Heat flux sensor isolates the sensor and its transmitting thermocouple from undesirable heat sources by incorporating a radiator section that forms a radiation shield between mounting cup and sensor. Bonding of the thermocouple cable to the underside of the radiator provides a conductive path to dissipate extraneous heat that might otherwise reach the sensor.

**B66-10533**  
METHOD PERMITS MECHANICAL AND ELECTRICAL  
CHECKOUT OF PIEZOELECTRIC TRANSDUCERS WHILE  
INSTALLED IN A SYSTEM  
JENKINS, R. S. ROGALLO, V. L. NOV. 1966 SEE  
ALSO B66-10534  
ARC-73

Known dc voltage is applied and then removed suddenly in a method to permit checkout of the mechanical and electrical condition of piezoelectric transducers of the cantilever beam type, while installed in a system.

**B66-10534**  
MINIATURE PIEZOELECTRIC TRIAXIAL  
ACCELEROMETER MEASURES CRANIAL ACCELERATIONS  
DE BOO, G. J. ROGALLO, V. L. NOV. 1966 SEE ALSO

B64-10004 AND B66-10533

ARC-71

Tiny triaxial accelerometer whose sensing elements are piezoelectric ceramic beams measures human cranial accelerations when a subject is exposed to a centrifuge or other simulators of g environments. This device could be considered for application in dental, medical, and automotive safety research.

B66-10536

HELMET SYSTEM BROADCASTS  
ELECTROENCEPHALOGRAMS OF WEARERWESTBROOK, R. M. ZUCCARO, J. J. NOV. 1966 SEE  
ALSO B65-10203

ARC-70

EGG monitoring system consisting of nonirritating sponge-type electrodes, amplifiers, and a battery-powered wireless transmitter, all mounted in the subject's helmet obtains electroencephalograms /EEG's/ of pilots and astronauts performing tasks under stress. After a quick initial fitting, the helmet can be removed and replaced without further adjustment.

B66-10539

COMPUTER PROGRAMS PERFORM SPECTRAL  
ANALYSES OF UP TO SEVEN TIME SERIESBYARS, B. J. DUBMAN, M. R. /N. AM. AVIATION/  
NOV. 1966

M-FS-1133 M-FS-1134

Computer programs perform statistical spectral analysis of up seven time series. These programs should have applicability to a variety of engineering systems in the fields of geophysics, physiology, acoustics, and structural analysis.

B66-10541

COMPUTER USED TO PROGRAM NUMERICALLY  
CONTROLLED MILLING MACHINE

HARRIS, T. C. /GE/ NOV. 1966

M-FS-1608

Computer program automatically directs a numerically controlled milling machine through a series of cutting and trimming actions. It accepts engineering data points, passes smooth curve segments through the points, breaks the resulting curves into a series of closely spaced points, and transforms these points into the form required by the mechanism.

B66-10542

PREREGULATOR FEEDBACK CIRCUIT UTILIZES  
LIGHT ACTUATED SWITCH

HAYSER, T. P. /IBM/ NOV. 1966

M-FS-1180

Preregulator feedback circuit employing a Light Actuated Switch /LAS/ provides a simple and efficient feedback device in a power supply preregulator which maintains dc isolation between input and output grounds. The LAS consists of a diode pn junction infrared source close to, but electrically isolated from, a photodetector.

B66-10543

HIGH-RELUCTANCE ROTOR RINGS IMPROVE  
HOMOPOLAR GENERATOR PERFORMANCE

MUSSET, E. E. NOV. 1966

ARG-104

Nonmagnetic metal rings imbedded in a homopolar generator rotor normal to its axis keep the induction flux entering the rotor in a radial path. Use of the rings permits optimum rotor design for any given set of operating requirements and simplifies the task of predicting the operation characteristics of the generator.

B66-10544

ULTRASONIC QUALITY INSPECTION OF BONDED  
HONEYCOMB ASSEMBLIES IS AUTOMATED

KAMMERER, C. C. /N. AM. AVIATION/ NOV. 1966

MSC-859

Inspection system for bonded honeycomb assemblies is accurate, fast, and automated. The ultrasonic system consists of inner and outer transducer positioning assemblies with suitable motor controls, a centerless turntable assembly, water squirter assemblies, and an inspection program completely encoded on tape suitable for use on a

high speed computer.

B66-10548

SECURITY WARNING SYSTEM MONITORS UP TO  
FIFTEEN REMOTE AREAS SIMULTANEOUSLY

FUSCO, R. C. /RCA/ NOV. 1966

KSC-66-39

Security warning system consisting of 15 television cameras is capable of monitoring several remote or unoccupied areas simultaneously. The system uses a commutator and decommutator, allowing time-multiplexed video transmission. This security system could be used in industrial and retail establishments.

B66-10549

MINIATURE ELECTROMETER PREAMPLIFIER  
EFFECTIVELY COMPENSATES FOR INPUT

CAPACITANCE

BURROUS, C. N. DE BOO, G. J. NOV. 1966

ARC-69

Negative capacitance preamplifier using a dual MOS /Metal Oxide Silicon/ transistor in conjunction with bipolar transistors is used with intracellular microelectrodes in recording bioelectric potentials. Applications would include use as a pickup plate video amplifier in storage tube tests and for pH and ionization chamber measurements.

B66-10552

NONELECTROLYTIC TANTALUM CAPACITORS DEVELOPED  
INNOVATOR NOT GIVEN /CORNELL-DUBILER ELEC. CORP./

NOV. 1966

M-FS-1546

Large area, nonelectrolytic tantalum foil capacitor has capacitance of approximately 1 microfarad and is capable of operating at 125 deg C at 150 volts with an insulation resistance of at least 1 megohm. In tests at a potential of 100 volts, capacitors remained stable through a temperature range from 25 deg to 125 deg C

B66-10553

COMPUTER PROGRAMS CALCULATE POTENTIAL AND  
CHARGE DISTRIBUTIONS IN A PLASMA

JEFFERIES, N. P. PRINCE, D. C. /GE/ NOV. 1966

M-FS-871

Computer program determines the potential and charge distributions between two electrodes in a plasma. Solutions of the Vlasov equations for plane, cylindrical, and spherical geometries is determined and density distributions are found for each of these configurations over a range of conditions.

B66-10555

A FAST-NEUTRON SPECTROMETER OF ADVANCED  
DESIGNMOLER, R. B. PRESTON, C. C. /IIT RES. INST./  
NOV. 1966

M-FS-1664

Fast neutron spectrometer combines helium filled proportional counters with solid-state detectors to achieve the properties of high efficiency, good resolution, rapid response, and effective gamma-ray rejection.

B66-10556

SIMPLIFIED FIXTURE PERMITS PRECISION  
ALIGNMENT OF AN OPTICAL TARGET

MAGURA, P. /IBM/ NOV. 1966

M-FS-1181

Optical target holder is permanently placed for instrument sighting, yet is adjustable and easily aligned.

B66-10557

TRISPHERE SPARK GAP ACTUATES OVERVOLTAGE  
RELAY

CAMACHO, S. L. DEC. 1966

ARC-68

Trisphere spark gap and high voltage relay provides a positive, fast response, high current capacity device that will sense an overvoltage condition and remove power from the circuit before insulation breakdown. When an overvoltage occurs, the spark gap breaks down and conducts an actuating current to the relay which removes power

from the circuit.

B66-10559  
ONE-COUNT MEMORY CIRCUIT PREVENTS MACHINE  
MODE INTERACTION  
DE FOREST, B. DEC. 1966  
ARG-90

One-count memory logic circuit used with electromechanical counter-printer machines operates in either count or print mode. The circuit advances the counter when the machine is in the count mode and provides storage for the count pulse when the machine is in the print mode.

B66-10561  
PULSE TECHNIQUE PROVIDES MORE ACCURATE  
CHECKOUT OF EXPLODING BRIDGE WIRE DEVICE  
PETRICK, J. R. /GE/ DEC. 1966  
HQ-62

Exploding Bridge Wire /EBW/ is treated as a transmission line system and pulse reflection techniques are used for checking the electrical integrity of an EBW cartridge. A step voltage is propagated into the system and the reflected voltage waves are monitored.

B66-10563  
COLLECTOR/COLLECTOR GUARD RING BALANCING  
CIRCUIT ELIMINATES EDGE EFFECTS  
LIEB, D. P. /THERMO ELECTRON ENG. CORP./ DEC. 1966  
JPL-SC-143

Circuit in which an emitter is maintained opposite a concentric collector and guard structure is achieved by matching the temperature and potential of the guard with that of the collector over the operating range. This control system is capable of handling up to 100 amperes in the guard circuit and 200 amperes in the collectors circuit.

B66-10564  
PHOTOCELL SHADOWING TECHNIQUE IMPROVES LIGHT  
SOURCE DETECTOR  
CARPENTER, D. G. HOOPER, G. E. DEC. 1966  
JPL-809

Lightweight, compact modular system that includes an acquisition photodiode is used as a light source tracking detector that exhibits minimum scale factor change with increased light source angle. Photocells of various types, responsive to other portions of the spectrum, could be used to acquire and track infrared, ultraviolet, and other source fluxes.

B66-10566  
COMPUTATIONAL PROCEDURE FOR FINITE DIFFERENCE  
SOLUTION OF ONE-DIMENSIONAL HEAT CONDUCTION  
PROBLEMS REDUCES COMPUTER TIME  
IDA, H. T. /N. AM. AVIATION/ NOV. 1966  
MSC-1120

Computational procedure reduces the numerical effort whenever the method of finite differences is used to solve ablation problems for which the surface recession is large relative to the initial slab thickness. The number of numerical operations required for a given maximum space mesh size is reduced.

B66-10568  
MONITORING CIRCUIT ACCURATELY MEASURES  
MOVEMENT OF SOLENOID VALVE  
GILLET, J. D. /N. AM. AVIATION/ DEC. 1966  
M-FS-1829

Solenoid operated valve in a control system powered by direct current issued to accurately measure the valve travel. This system is currently in operation with a 28-vdc power system used for control of fluids in liquid rocket motor test facilities.

B66-10569  
DEVICE ACCURATELY MEASURES AND RECORDS LOW  
GAS-FLOW RATES  
BRANUM, L. W. /N. AM. AVIATION/ DEC. 1966  
M-FS-1077

Free-floating piston in a vertical column accurately measures and records low gas-flow rates. The system may be calibrated, using an adjustable flow-rate gas supply, a low pressure

gauge, and a sequence recorder. From the calibration rates, a nomograph may be made for easy reduction. Temperature correction may be added for further accuracy.

B66-10574  
NONDESTRUCTIVE TEST METHOD ACCURATELY SORTS  
MIXED BOLTS  
DEZEIH, C. J. DEC. 1966  
M-FS-1426

Neutron activation analysis method sorts copper plated steel bolts from nickel plated steel bolts. Copper and nickel plated steel bolt specimens of the same configuration are irradiated with thermal neutrons in a test reactor for a short time. After thermal neutron irradiation, the bolts are analyzed using scintillation energy readout equipment.

B66-10576  
A CONTINUOUSLY OPERATING SOURCE OF VACUUM  
ULTRAVIOLET BELOW 500 ANGSTROM  
INNOVATOR NOT GIVEN /SPACE SCI. INC./ DEC. 1966  
GSFC-545

Duo plasmatron type source of ultraviolet radiation operates in the wavelength region below 500 angstrom. Since the spectra produced are determined almost completely by the gas injected, and because the source operates continuously, this arrangement is beneficial in the development and calibration of filters and detectors within discrete wavelength ranges.

B66-10577  
ULTRASONIC WATER COLUMN PROBE SPEEDS UP  
TESTING OF WELDS  
HOOP, J. M. MC DONALD, J. A. /GE/ DEC. 1966  
HQ-58

Ultrasonic device consisting of a coaxial rod and transducer enclosed in a cylindrical probe which is filled with deionized or distilled water speeds up the testing of welds. Rubber diaphragm is molded to produce the desired test beam angle.

B66-10579  
AN ORTHONORMALIZATION PROCEDURE FOR  
MULTIVARIABLE FUNCTION APPROXIMATION  
INGRAM, H. L. DEC. 1966  
M-FS-1313

Where a function of several variables is given numerically in tabular form, an orthonormalization technique allows an approximation of the numerical data to be determined in a convenient functional form. In this technique, the speed and accuracy of coefficient computation are much improved.

B66-10580  
RESISTOR MONITORS TRANSFER OF LIQUID HELIUM  
HESKETH, W. D. DEC. 1966  
LANGLEY-229

Large resistance change of a carbon resistor at the liquid helium temperature distinguishes between the transfer of liquid helium and gaseous helium into a closed dewar. The resistor should be physically as small as possible to reduce the heat load to the helium.

B66-10581  
DETECTOR MEASURES POWER IN 50 TO 30,000 GHZ  
RADIATION BAND  
ARAMS, F. R. WANG, M. T. /AIRBORNE INSTR. LAB./ DEC. 1966  
ERC-26

Broadband power detector assembly measures electromagnetic radiation in the 50 to 30,000 GHz band. The assembly includes a matched pair of detectors which incorporate thin-film radiation absorbers. The detector is effective with either coherent or incoherent radiation.

B66-10584  
OPTICAL SUPERHETERODYNE RECEIVER USES LASER  
FOR LOCAL OSCILLATOR  
LUCY, R. F. /SYLVANIA ELECTRON. SYSTEMS/ DEC. 1966  
M-FS-1605

Optical superheterodyne receiver uses a laser coupled to a frequency translator to supply both the incident signal and local oscillator signal

and thus permit reception of amplitude modulated video bandwidth signals through the atmosphere. This receiver is useful in scientific propagation experiments, tracking experiments, and communication experiments.

input signal is interrupted or removed. The circuit uses MOSFET /Metal Oxide Semiconductor Field Effect Transistor/ devices as voltage-controlled switches, triggered by an external voltage-sensing device.

**B66-10590**  
STUDY MADE OF APPLICATION OF STEREOSCOPIC  
DISPLAY SYSTEM TO ANALOG COMPUTER SIMULATION  
KENNEL, H. F. DEC. 1966 NASA-CR-61116  
M-FS-1263

Stereoscopic visual display system provides both a qualitative and measurable presentation for functions of several variables. A primary application of such a display system is in analog computer simulation of sets of differential equations.

**B66-10591**  
ELECTRONIC CIRCUIT PROVIDES ACCURATE  
SENSING AND CONTROL OF DC VOLTAGE  
LOFTUS, W. D. /WESTINGHOUSE ASTRONUCL. LAB./  
DEC. 1966  
NU-0089

Electronic circuit used relay coil to sense and control dc voltage. The control relay is driven by a switching transistor that is biased to cutoff for all input up to slightly less than the threshold level.

**B66-10592**  
SENSORS MEASURE SURFACE ABLATION RATE OF  
REENTRY VEHICLE HEAT SHIELD  
RUSSEL, J. M., III DEC. 1966 SEE ALSO  
NASA-TN-D-3686  
LANGLEY-287

Sensors measure surface erosion rate of ablating material in reentry vehicle heat shield. Each sensor, which is placed at precise depths in the heat shield is activated when the ablator surface erodes to the location of a sensing point. Sensor depth and activation time determine ablator surface erosion rate.

**B66-10598**  
DESIGN CONCEPT FOR PRESSURE SWITCH  
CALIBRATOR  
SLINGERLAND, M. G. /GE/ DEC. 1966  
HQ-36

Calibrator and switch design enables pressure switches to operate under 150 g shock loads. The design employs a saturated liquid-to-vapor phase transition at constant pressure to produce a known force independent of displacement over a usable range.

**B66-10599**  
PRESSURE PROBE COMPENSATES FOR DIMENSIONAL  
TOLERANCE VARIATIONS  
BIRNER, R. A. /AEROJET-GEN. CORP./ DEC. 1966  
LEWIS-302

Flexible, compressible spring-loaded pressure probe measures the static pressure between the rotor stages on an axial-flow fuel pump. This probe is used in installation where a drilled static pressure tap or a rigid impulse tube cannot be used. Its parameters must be specially determined for each installation.

**B66-10600**  
HIGH FREQUENCY WIDE-BAND TRANSFORMER USES  
COAX TO ACHIEVE HIGH TURN RATIO AND FLAT  
RESPONSE  
DE PARRY, T. DEC. 1966  
ARG-107

Center-tap push-pull transformer with toroidal core helically wound with a single coaxial cable creates a high frequency wideband transformer. This transformer has a high-turn ratio, a high coupling coefficient, and a flat broadband response.

**B66-10603**  
MOSFET ANALOG MEMORY CIRCUIT ACHIEVES LONG  
DURATION SIGNAL STORAGE  
INNOVATOR NOT GIVEN /IBM/ DEC. 1966  
M-FS-860

Memory circuit maintains the signal voltage at the output of an analog signal amplifier when the

**B66-10605**  
ELECTRICAL CONTINUITY SCANNER FACILITATES  
IDENTIFICATION OF WIRES FOR SOLDERING TO  
CONNECTORS

BOULTON, H. C. DICLEMENTE, R. A. /N. AM.  
AVIATION/ DEC. 1966  
MSC-626

Electrical continuity scanner automatically scans 50 wires in 2 seconds to correlate all wires in a circuit with their respective known ends. Modifications made to the basic plan provide circuitry for scanning up to 250 wires.

**B66-10606**  
A RADIOMETER-PYROMETER  
DEC. 1966 NASA-TN-D-2405  
LEWIS-284

Radiometer-pyrometer measures the spectral absorption, emission, and temperature of gases. The major problems involved in spectroradiometric measurements are nonuniform spectral sensitivity, nonlinearity, poor absolute accuracy, wide range of intensities, and wide range of wavelengths.

**B66-10607**  
DEVELOPMENTAL INSTRUMENT SUPPLIES ACCURATE  
ATTITUDE AND ATTITUDE-RATE DATA  
INNOVATOR NOT GIVEN /BOLT, BERANEK, AND NEWAN,  
INC./ DEC. 1966  
HQ-57

Three orthogonal-plane projection provides accuracy of readout of both attitude and attitude-rate information in an easily interpreted, uncluttered arrangement where blind navigation of a moving body is involved. The longitudinal length of the projection is constant, and independent of the pitch and roll attitudes of the moving body.

**B66-10612**  
RESISTANCE THERMOMETER HAS LINEAR  
RESISTANCE-TEMPERATURE COEFFICIENT AT LOW  
TEMPERATURES  
KUZYK, W. /GEN. DYN./ DEC. 1966  
WOO-190

Resistance thermometer incorporating a germanium resistance element with a platinum resistance element in a Wheatstone bridge circuit has a linear temperature-resistance coefficient over a range from approximately minus 140 deg C to approximately minus 253 deg C.

**B66-10614**  
STUDY OF THEORY AND APPLICATION OF LONG  
DURATION HEAT FLUX TRANSDUCERS  
HEAMAN, J. P. ROBERTSON, S. J. /HEAT TECHNOL.  
LAB./ DEC. 1966  
M-FS-1265

Theory and application of transducers used to measure heat flux in tests of more than one second duration.

**B66-10617**  
IMPROVED MEMORY WORD LINE CONFIGURATION  
ALLOWS HIGH STORAGE DENSITY  
INNOVATOR NOT GIVEN /UNIVAC/ DEC. 1966  
GSFC-559

Plated wire memory word drive line allows high storage density, good plated wire transmission and a simplified memory plane configuration. A half-turn word drive line with a magnetic keeper is used. The ground plane provides the return path for both the word current and the plated wire transmission line.

**B66-10619**  
COMPUTER PROGRAM SIMPLIFIES TRANSIENT AND  
STEADY-STATE TEMPERATURE PREDICTION FOR  
COMPLEX BODY SHAPES  
GIEBLER, K. N. /N. AM. AVIATION/ DEC. 1966  
MSC-989

Computer program evaluates heat transfer modes and calculates either the transient or steady-state

temperature distributions throughout an object of complex shape when heat sources are applied to specified points on the object. It uses an electrothermal model to simulate the conductance, heat capacity, and temperature potential of the object.

**B66-10621**  
CONNECTOR ACTS AS QUICK COUPLING IN COAXIAL  
CABLE APPLICATION  
BREJCHA, A. G., JR. DEC. 1966  
JPL-803

Quick-coupling connector whose inner shells are threaded to the cable ends and whose outer shells have tracks that register in channels machined in the inner shells are rotated 45 deg to effect a locking of the coupling. This connector faithfully reproduces excellent electrical characteristics no matter how frequently assembled and disassembled.

**B66-10622**  
POINT-SOURCE DETECTION SYSTEM REJECTS  
SPATIALLY EXTENDED RADIATION SOURCES  
MAXWELL, R. F., JR. /WESTINGHOUSE ELEC. CORP./  
DEC. 1966  
GSFC-486

System employing digital space correlation to suppress false target signals in a point-target tracking device is a reliable method for discriminating a distant target from false targets in the field of view of an infrared detection system or tracking device.

**B66-10623**  
THERMOCOUPLES ELECTRICALLY CHECKED WHILE  
CONNECTED TO DATA SYSTEM  
INNOVATOR NOT GIVEN /REP. AVIATION CORP./ DEC.  
1966  
LANGLEY-182

Constant current source is connected across the input of the millivolt measuring system to monitor the electrical continuity and resistance of multiple thermocouple installations without disconnecting them from a data system. This technique monitored gauge thermocouple leads during the assembly and preflight testing of the Project Fire reentry packages.

**B66-10624**  
MINIATURE TELEMETRY SYSTEM ACCURATELY  
MEASURES PRESSURE  
FRYER, T. B. DEC. 1966 SEE ALSO B64-10171 AND  
B66-10057  
ARC-74

Miniature, low power, telemetry system that can be used with commercially available strain gauge pressure transducers accurately measures pressure with a small implantable pressure cell and transmitter. The system has been used to date only with pressure transducers, but the circuit is equally applicable to any measurement using a strain gauge sensor.

**B66-10625**  
COMPACT MICROWAVE MIXER HAS HIGH CONVERSION  
EFFICIENCY  
PENQUE, N. J. ROSEN, H. A. /HUGHES AIRCRAFT CO./  
DEC. 1966  
GSFC-197

Compact, lightweight microwave mixer has a relatively high conversion efficiency and power output. The mixer employs a pair of back-to-back voltage-variable capacitors in a stripline network.

**B66-10629**  
PRECISION CW LASER AUTOMATIC TRACKING  
SYSTEM INVESTIGATED  
LANG, K. T. LUCY, R. F. MC GANN, E. J. PETERS,  
C. J. /SYLVANIA ELECTRON. SYSTEMS/ DEC. 1966  
M-FS-1606

Precision laser tracker capable of tracking a low acceleration target to an accuracy of about 20 microradians rms is being constructed and tested. This laser tracking has the advantage of discriminating against other optical sources and the capability of simultaneously measuring range.

**B66-10632**  
ACCURATE DEPTH CONTROL PROVIDED FOR  
THERMOCOUPLE JUNCTION LOCATIONS  
RICHARDSON, N. R. DEC. 1966 SEE ALSO NASA-TN-364  
LANGLEY-289

Flight reentry experiments define the total heating on a large blunt-nosed body by means of imbedded thermocouples. The thermocouples, installed in a beryllium layered forebody, were designed to provide minimum feasible disturbance of local heat flow with accurate depth control of the thermocouple junction locations.

**B66-10636**  
AUTOMATIC SYSTEM DETERMINES MOMENTS OF  
INERTIA OF ASYMMETRICAL OBJECTS  
INNOVATOR NOT GIVEN /SPACO, INC./ DEC. 1966  
M-FS-1769

Automatic system rapidly and accurately determines moments and products of inertia of asymmetrical objects. The system combines a torsional pendulum arrangement and a precision rate table with simplified analog computers to determine the desired quantities directly, without the need for additional calculations.

**B66-10637**  
INSTRUMENT ACCURATELY MEASURES SMALL  
TEMPERATURE CHANGES ON TEST SURFACE  
HARVEY, W. D. MILLER, H. B. DEC. 1966 SEE ALSO  
NASA-TN-D-2846  
LANGLEY-174

Calorimeter apparatus accurately measures very small temperature rises on a test surface subjected to aerodynamic heating. A continuous thin sheet of a sensing material is attached to a base support plate through which a series of holes of known diameter have been drilled for attaching thermocouples to the material.

**B66-10640**  
VOLUME-RATIO CALIBRATION SYSTEM FOR VACUUM  
GAGES  
DEC. 1966 SEE ALSO NASA-TN-D-3100  
LEWIS-303

Volume-ratio calibration system consists of a gas source, high pressure gauge, small volume tank, large volume chamber, plus appropriate piping, valves, and vacuum source. This system used in conjunction with commercial vacuum gauges evaluates its ability to accurately produce desired pressures in the .000001 to .01 torr range.

**B66-10644**  
THREE-AXIS ATTITUDE AND DIRECTION REFERENCE  
INSTRUMENT HAS ONLY ONE MOVING PART  
BOSSLER, F. B. /BELL AEROSPACE CORP./ DEC. 1966  
M-FS-1819

Lunar vehicle instrument combines the functions of attitude reference, direction reference, and display in a unit having only one moving part. The device, using bubble levels and a calibrated dial, is used as a sextant prior to takeoff, and as a backup navigation system during flight.

**B66-10645**  
CONCEPT FOR USING LASER BEAMS TO MEASURE  
ELECTRON DENSITY IN PLASMAS  
LONGO, S. E. /BOEING CO./ DEC. 1966  
M-FS-965

Concept is proposed for using laser beams as a means of measuring electron density at various points in flame or plasma exhausts. Measurement of the electron density is obtained by detecting reflected waves in the plasma that were activated by the laser.

**B66-10650**  
MAGNETORESISTOR MONITORS RELAY PERFORMANCE  
KREBS, D. Q. /BOEING CO./ DEC. 1966  
M-FS-1754

Magnetoresistor monitors the action of relays without disturbing circuit parameters or degrading relay performance. The magnetoresistor measures the relay magnetic flux produced under transient conditions to establish the characteristic signature of the relay.

B66-10653

THERMOCOUPLES EASILY INSTALLED IN HARD-TO-GET-TO PLACES

GUENTHER, F. G. /N. AM. AVIATION/ DEC. 1966

M-FS-1946

Thermocouple wires attached to charged capacitors are inserted in a drilled hole. An electric charge fuses the thermocouple wires to the host material. This method has shown excellent results in fusing nichrome, chromel, Inconel, and stainless steel wires to nickel, beryllium, iron, steel, Inconel, and stainless steel.

B66-10658

DIGITAL FREQUENCY COUNTER PERMITS READOUT WITHOUT DISTURBING COUNTING PROCESS

WINKELSTEIN, R. DEC. 1966

JPL-906

Digital frequency counter system enables readout accurately at one-second intervals without interrupting or disturbing the counting process. The system incorporates a master counter and a slave counter with novel logic interconnections. The counter can be readily adapted to provide frequency readouts at 0.1 second intervals.

B66-10659

LOGIC CIRCUITRY USED TO AUTOMATICALLY TEST SHIELDED CABLES

DIBB, G. /GE/ DEC. 1966

HQ-60

Automatic cable tester checks multiple shielded conductors assembly cable connections. The tester uses logic circuitry to sequentially test all conductors and their shields to reveal any connection error in a GO-NO GO test.

B66-10661

STUDY OF FAST RESPONSE THERMOCOUPLE MEASUREMENT OF TEMPERATURES IN CRYOGENIC GASES

BIELAWSKI, T. LOWRIE, A. R. ROBINSON, C. C. /BEECH AIRCRAFT CORP./ DEC. 1966

M-FS-1659

Thermocouples fabricated from uninsulated small diameter wire have fast reproducible response times. The thermocouple is thermally isolated from its supports by making the leads of sufficient length so that the heat conduction down the leads is small and assuming that the leads adjacent to the junction are subjected to the same thermal conditions.

B66-10664

PACKAGING OF ELECTRONIC MODULES

KATZIN, L. DEC. 1966

JPL-601

Study of design approaches that are taken toward optimizing the packaging of electronic modules with respect to size, shape, component orientation, interconnections, and structural support. The study does not present a solution to specific packaging problems, but rather the factors to be considered to achieve optimum packaging designs.

B66-10668

PHOTOGRAPHIC METHOD MEASURES PARTICLE SIZE AND VELOCITY IN FLUID STREAM

DICKERSON, R. A. /N. AM. AVIATION/ DEC. 1966

M-FS-1536

Method employing a nonframing motion picture camera, a continuous front light source, and a strobe light determines the size and velocity of small particles in nonturbulent fluid streams. This method is used in the study of the motion of solid and liquid particles in research and industrial fluid flow systems.

B66-10669

GAS LEAK DETECTOR IS SIMPLE AND INEXPENSIVE

MITCHELL, D. K. /BOEING CO./ DEC. 1966

M-FS-1206

Pressure sensor monitors small gas leaks in piping and pressure vessels. A combination of a paper ribbon and adhesive plastic tape is used to cover the area to be monitored and the pressure sensor is placed over a hole in the tape and paper.

B66-10670

COMPUTER PROGRAM DETERMINES CHEMICAL COMPOSITION OF PHYSICAL SYSTEM AT EQUILIBRIUM

KWONG, S. S. /N. AM. AVIATION/ DEC. 1966

MSC-1119

Fortran IV digital computer program calculates equilibrium composition of complex, multiphase chemical systems. This is a free energy minimization method with solution of the problem reduced to mathematical operations, without concern for the chemistry involved. Also certain thermodynamic properties are determined as byproducts of the main calculations.

B66-10671

COMPUTER PROGRAM DETERMINES CHEMICAL EQUILIBRIA IN COMPLEX SYSTEMS

GORDON, S. ZELEZNIK, F. J. DEC. 1966 SEE ALSO

NASA-TN-D-1454

LEWIS-281

Computer program numerically solves nonlinear algebraic equations for chemical equilibrium based on iteration equations independent of choice of components. This program calculates theoretical performance for frozen and equilibrium composition during expansion, Chapman-Jouguet flame properties, studies combustion and designs hardware.

B66-10675

GAGE ACCURATELY CONTROLS FORCE FOR PLACING CHIPS ON SUBSTRATES

BENZIE, W. P. /IBM/ DEC. 1966

M-FS-1941

Device is developed to control the force used in manually placing chips on substrates. It controls the compression load between 2 small members at loads as low as 25 grams by means of a force control gauge that is preset by varying the spring deflection.

B66-10679

BLACKBODY CAVITY RADIOMETER HAS RAPID RESPONSE

HALEY, F. C. DEC. 1966

JPL-521

Fast response, spectrally linear standard detector in the form of a blackbody cavity radiometer calibrates rapidly responding photodetectors against a calibrated standard detector. A power amplifier with maximum available gain reduces error signal without stability loss. It may be used as a blackbody radiator by manipulation of the bridge variable arm.

B66-10680

SLIDE RULE-TYPE COLOR CHART PREDICTS REPRODUCED PHOTO TONES

GRIFFIN, J. D. /N. AM. AVIATION/ DEC. 1966

MSC-1227

Slide rule-type color chart determines the final reproduced gray tones in the production of briefing charts that are photographed in black and white. The chart shows both the color by drafting paint manufacturer's name and mixture number, and the gray tone resulting from black and white photographic reproduction.

B66-10685

PROCESS REDUCES SECONDARY RESONANT EMISSION IN ELECTRONIC COMPONENTS

ERPENBACH, H. DEC. 1966

JPL-934

Process reduces secondary electron emission in coaxial connector and in waveguides in the atmosphere. The assembly is placed in a vacuum chamber and is gradually vented to the atmosphere. It is exposed to high voltage, argon gas, and a hydrocarbon gas during the process.

B66-10687

STUDY OF HOT WIRE TECHNIQUES IN LOW DENSITY FLOWS WITH HIGH TURBULENCE LEVELS

HANSON, A. R. KRAUSE, F. R. LARSON, R. E. DEC. 1966

M-FS-1269

Prediction of heat, mass, species, and momentum fluxes in a space vehicle and aerodynamic noise

production by supersonic jet and rocket exhausts requires a predictability of the associated turbulence fields. The hot wire is a technique that will allow an experimental determination of turbulent properties.

B66-10689

LOW INPUT VOLTAGE CONVERTER/REGULATOR  
MINIMIZES EXTERNAL DISTURBANCES  
INNOVATOR NOT GIVEN /HONEYWELL/ DEC. 1966  
GSFC-527

Low-input voltage converter/regulator constructed in a coaxial configuration minimizes external magnetic field disturbance, suppresses radio noise interference, and provides excellent heat transfer from power transistors. It converts the output of fuel and solar cells, thermionic diodes, thermoelectric generators, and electrochemical batteries to a 28 vdc output.

B66-10690

EQUIVALENT CIRCUIT FOR A FIELD EFFECT  
TRANSISTOR ESTABLISHED FOR COMPUTER  
SIMULATION  
MING, L. J. /IBM/ DEC. 1966  
M-FS-1752

Equivalent circuit for the field effect transistor made up of circuit elements can be simulated by existing computer programs.

B66-10691

SOLID-STATE RECOVERABLE FUSE FUNCTIONS AS  
CIRCUIT BREAKER  
THOMAS, E. F., JR. DEC. 1966  
GSFC-560

Molded, conductive-epoxy recoverable fuse protects electronic circuits during overload conditions, and then permits them to continue to function immediately after the overload condition is removed. It has low resistance at ambient temperature, and high resistance at an elevated temperature.

B66-10692

HERMETICALLY SEALED CELLS PROTECTED FROM  
INTERNAL GAS PRESSURE  
CARSON, W. N. /GE/ DEC. 1966  
GSFC-555

Manufacturing process prevents damage to hermetically sealed nickel-cadmium secondary cells by buildup of gas pressure during overcharging and reversed charging conditions. The cells are manufactured with less charge capacity in the positive electrode than in the negative electrode, and two additional electrodes are added.

B66-10696

LOW RATE FLOW SWITCH CAN BE USED FOR GAS OR  
LIQUID  
BATES, E. T., JR. DEC. 1966  
JPL-879

Flow switch operable at low flow rates is used for detecting the flow of a water coolant in a vacuum deposition apparatus. This switch utilizes one or more reed switches which are actuated by a sliding magnet.

B66-10699

MONITORING SYSTEM DETERMINES AMPLITUDE AND  
TIME OF VIBRATION CHANNEL PEAKS  
ANDERSON, T. O. DEC. 1966  
JPL-879

Adaptive scheme advocated in this innovation will reduce processing time and is applicable to environmental testing and to space- or aircraft-borne vibration monitoring devices requiring a large number of channels.

B66-10706

LOGARITHMIC CURRENT SIMULATOR GENERATES  
ELECTRICAL CURRENTS ACCURATELY BETWEEN 10 TO  
THE MINUS 11 AMPERE TO 10 TO THE MINUS 3  
AMPERE  
WILSON, J. /WESTINGHOUSE ASTRONUCL. LAB./ DEC.  
1966  
NU-0087

Current generator accurately simulates electric currents in the range of .0000000001 ampere to 01. ampere. Compensation networks have been devised

to improve the accuracy at the lower current levels.

B66-10709

THERMOCOUPLE-FLEXIBLE CABLE CONNECTOR  
INSULATOR IS HIGHLY RELIABLE  
GRACEY, C. M. /AEROJET-GEN. CORP./ DEC. 1966  
NU-0082

Plastic /polycarbonate/ insulator improves thermocouple reliability in test operations. The insulator is molded in half sections, assembled mechanically and eliminates electrical shorting.

## 02 PHYSICAL SCIENCES (ENERGY SOURCES)

B63-10260

SOLAR-ANGLE SENSOR HAS NO MOVING PARTS  
EXNER, D. W., JR. MEISENHOLDER, G. W. SCHMIDT,  
L. F. MAY 1964  
JPL-418

To measure the direction of the sun over a spherical field of view, a cube-shaped solar sensor with a photocell on each side is used. The outputs from the six cells are fed into a computer for determining the position of the sun relative to an orthogonal coordinate system.

B63-10344

COOLING METHOD PROLONGS LIFE OF HOT-WIRE  
TRANSDUCER  
BALDWIN, L. V. SANDBORN, V. A. JUN. 1964  
LEWIS-41

To cool a hot-wire transducer, the two ends of the wire are supported on thermally and electrically conductive rods, surrounded by a fluid cooling medium. By keeping the supporting rods at a substantially constant temperature, the probe is prevented from overheating.

B63-10346

NEW METHOD USED TO FABRICATE LIGHT-WEIGHT HEAT  
EXCHANGER FOR ROCKET MOTOR  
BAEHR, E. F. MAR. 1964  
LEWIS-43

A grooved capstrip, to straddle the metal edges of regenerative cooling channels, increases the strength and heat transfer characteristics of lightweight motor cases. This capstrip is so designed as to form a firm joint between the channels that form the rocket casing wall.

B63-10421

MIRROR DEVICE ALIGNS MACHINE SURFACE PERPEN-  
DICULAR TO SIGHT LINES  
KISSLER, H. R. /RCA/ MAY 1964  
WOO-5

A sight alignment device is used to align two machines so that an axis of the first machine is parallel to a flat surface on the second. This sighting device depends on the reflection of a light beam from the surface to be aligned.

B65-10036

IONIZATION VACUUM GAGE STARTS QUICKLY, IS  
UNAFFECTED BY SPURIOUS CURRENTS  
GARWOOD, D. C. FEB. 1965  
JPL-304

Ionization vacuum gauge with a switch-operated starting device and a microammeter begins functioning quickly in a high vacuum. The microammeter is also protected by its circuit design from spurious currents.

B65-10046

WIDE-APERTURE SOLAR ENERGY COLLECTOR IS LIGHT  
IN WEIGHT  
INNOVATOR NOT GIVEN /BECKMAN INSTRUMENTS/ FEB.  
1965  
JPL-SC-055

By mounting the Fresnel lens in eight steps above three paraboloidal reflector rings of epoxy resin with aluminized surfaces, a light weight, wide-aperture solar energy collector is devised.

B65-10071

SIMPLE OPTICAL SYSTEM USED TO ALIGN



**SPECTROGRAPH**

EXTON, R. J. MAR. 1965  
LANGLEY-92

Optically fast, portable spectrograph incorporates auxiliary optics in a boresight technique to use the zero order of the grating for visual alignment. This device obtains moderately resolved spectra of a multitude of light sources.

B65-10081

**MAGNETIC FIELD TEST COILS ARE TEMPERATURE COMPENSATED**

INNOVATOR NOT GIVEN /SPECTRA PHYS./ APR. 1965  
GSFC-294

Magnetic field test coils with auxiliary winding wound opposite to main coil winding eliminates changes in field configurations due to temperature changes. The auxiliary coil is made with aluminum wire.

B65-10082

**MULTIPLE ELEMENT SOFT X-RAY SOURCE PRODUCES WIDE RANGE OF RADIATION**

CARUSO, A. J. NEUPERT, W. M. MAR. 1965  
GSFC-286

A rotating mount with target elements positioned independently for direct electron bombardment produces soft X-ray radiation with a wide range of characteristics. The device may be used to study solar radiation from a satellite.

B65-10084

**MODIFIED CONTOUR PROJECTOR MAKES EXCELLENT CONTOUR DENSITOMETER**

EXTON, R. J. MAR. 1965  
LANGLEY-93

Thin glass beam splitter, densitometer head, and densitometer electronics are incorporated in a standard contour projector. The density contour of small areas of photographic film can be read. This instrument can be used as a research tool in process engineering.

B65-10100

**ROTATING FILTERS PERMIT WIDE RANGE OF OPTICAL PYROMETRY**

EXTON, R. J. SIVITER, J. H., JR. STRASS, H. K. APR. 1965  
LANGLEY-33

Gear-driven dual filter disks of graduated density vary linearly with respect to rotation, allowing a wide range of photographic pyrometry. This technique is applicable in metallurgy, glass, plastics and refractory research, and crystallography.

B65-10122

**MICROWAVE TECHNIQUE MEASURES PLASMA CHARACTERISTICS**

LEONARD, W. F. APR. 1965  
LANGLEY-134

Plasma electron density and temperature distribution is measured by passing a high frequency millimeter wave through plasma. Variations in density and temperature are determined by measuring insertion loss as the plasma travels between the microwave transmitting and receiving antennas

B65-10129

**APPARATUS PERMITS FLEXURE TESTING OF SPECIMENS AT CRYOGENIC TEMPERATURES**

DENABURG, C. R. REECE, O. Y. MAY 1965  
M-FS-257

Cryostat with support structure for test specimen allows flexure fatigue testing of honeycomb composite sandwich structures at cryogenic temperatures. The cryostat consists of a cryogen container enclosing two pairs of yokes which support two rotating end clamps.

B65-10132

**SIMPLE CIRCUIT POSITIONS FILM FRAMES IN PROJECTOR**

SILVER, R. H. MAY 1965  
JPL-508

Individual frames on a photographic film strip in a projector are automatically positioned by a simple circuit. The circuit uses a photodiode

that senses frame registry position and a relay that stops the film-advance motor to suspend the film at point of registry.

B65-10133

**PROBE MEASURES CHARACTERISTICS OF HOT GAS STREAM**

INNOVATOR NOT GIVEN /PLASMADYNE CORP./ MAY 1965  
M-FS-240

Shielded, tubular flow calorimeter operated by valve position measures characteristics of a hot gas stream of unknown composition. Measurements of mass flow density and total heat content per unit mass, total heat content per unit mass only, and pitot pressure are made.

B65-10157

**INTERNAL COOLING INCREASES RANGE OF IMMERSION-TYPE TEMPERATURE PROBE**

LANZO, C. D. JUN. 1965  
LEWIS-171

Temperature probe used in a high temperature, high velocity gas stream consists of cooled outer shell and a cooled platinum sensing tube with iron constantan thermocouples.

B65-10171

**FRESNEL ZONE PLATE FORMS IMAGES AT WAVELENGTHS BELOW 1000 ANGSTROMS**

INNOVATOR NOT GIVEN /SMITHSONIAN INST./ JUN. 1965  
GSFC-231

Fresnel zone plate with openings replacing the usual transparent rings produces images in a vacuum ultraviolet. The plate is made by etching and electrodeposition.

B65-10186

**ELECTRONIC MODULES EASILY SEPARATED FROM HEAT SINK**

INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ JUN. 1965 SEE ALSO B63-10033  
MSC-142

Metal heat sink and electronic modules bonded to a thermal bridge can be easily cleaved for removal of the modules for replacement or repair. A thin film of grease between a fluorocarbon polymer film on the metal heat sink and an adhesive film on the modules acts as the cleavage plane.

B65-10188

**REFRACTORY METAL SHIELDING /INSULATION/ INCREASES OPERATING RANGE OF INDUCTION FURNACE**

EBIHARA, B. T. JUN. 1965  
LEWIS-202

Thermal radiation shield contains escaping heat from an induction furnace. The shield consists of a sheet of refractory metal foil and a loosely packed mat of refractory metal fibers in a concentric pattern. This shielding technique can be used for high temperature ovens, high temperature fluid lines, and chemical reaction vessels.

B65-10211

**LIGHT RAY MODULATION CONTROLS OPTICAL SYSTEM ALIGNMENT**

INNOVATOR NOT GIVEN /KOLLSMAN INSTR. CORP./ JUL. 1965  
GSFC-171

Light ray modulator maintains focus in optical system subject to severe thermal gradients, vibration and shock. The modulated signals drive a servo system that aligns the system optics.

B65-10224

**HEATER DECOMPOSES OIL BACKSTREAMING FROM HIGH-VACUUM PUMPS**

SHAPIRO, H. AUG. 1965  
GSFC-356

Heater placed between an oil diffusion pump and a vacuum chamber prevents backstreaming of oil molecules into the work area of the chamber. It breaks the oil molecules into basic constituents that can be pumped away.

B65-10239

**ION PUMP PROVIDES INCREASED VACUUM PUMPING SPEED**

INNOVATOR NOT GIVEN /GEOPHYS. CORP. OF AM./ AUG.

1965

NEO-13

Multiple-cell ion pumps with increased vacuum pumping speed are used for producing ultrahigh vacuums in vacuum tubes and mass spectrometers. The pump has eight cathode-anode magnetron cells arranged in a cylinder which increase the surface area of the cathode.

B65-10240

INSULATION ACCELERATES RATE OF COOLING WITH CRYOGENIC FLUID

ALLEN, L. D. AUG. 1965

MSC-161

Thermal insulating material increases the rate of heat transfer from the interior of a chamber to a liquid nitrogen-filled metal jacket. A thin film of the material is bonded to the surface of the metal wall facing the liquid nitrogen.

B65-10252

DISTANT OBJECTS DETECTED VISUALLY WITH OPTICAL FILTERS

INNOVATOR NOT GIVEN AUG. 1965

LANGLEY-166

Fluorescent coating aids visual daylight detection and identification of distant objects. An object appears as a blinking light when the area is alternately scanned with transmitting and obscuring filters. This method can be effective in search and rescue operations.

B65-10253

OIL-DAMPED MERCURY POOL MAKES PRECISE OPTICAL ALIGNMENT TOOL

THEKAEKARA, M. P. AUG. 1965

GSFC-353

Mercury pool with a cover layer of high viscosity oil provides a reference reflector for precise alignment of optical instruments. The cover layer effectively damps any ripples in the mercury from support structure vibrations.

B65-10272

INFRARED SHIELD FACILITATES OPTICAL PYROMETER MEASUREMENTS

EICHENBRENNER, F. F. ILLG, W. SEP. 1965

LANGLEY-133

Water-cooled shield facilitates optical pyrometer high temperature measurements of small sheet metal specimens subjected to tensile stress in fatigue tests. The shield excludes direct or reflected radiation from one face of the specimen and permits viewing of the infrared radiation only.

B65-10280

ELECTRON BOMBARDMENT IMPROVES VACUUM CHAMBER EFFICIENCY

PRZYBYSZEWSKI, J. SWIKER, M. A. WATSON, J. SEP. 1965

LEWIS-160

Bombardment of vacuum chamber walls by an electron gun within the chamber achieves greater efficiency with less cost. The ultimate vacuum reached using the gun is greater than the system design level.

B65-10283

ELECTRON-BEAM DEFLECTION CONTROLLED BY DIGITAL SIGNALS

CRESSEY, J. R. SEP. 1965

GSFC-385

Electron-beam deflection in electronic image converters is controlled by a tapped magnetic deflection yoke and a series of current generators. The generators supply equal current to each tap through digitally controlled switches, thereby increasing the inherent accuracy of the system.

B65-10291

SPIRALED CHANNELS IMPROVE HEAT TRANSFER BETWEEN FLUIDS

HIGA, W. WIEBE, E. R. OCT. 1965

JPL-694

Spiral flow channels increase heat transfer between two fluids in a countercurrent heat exchanger of given volume. The heat exchanger is constructed by connecting a spiraled bellows-

shaped ducting between two concentric cylindrical tubes.

B65-10292

INTERFEROMETER CONSTRUCTION ASSURES PARALLELISM OF CRITICAL COMPONENTS

CONNES, P. OCT. 1965

JPL-704

Interferometer with rigidly mounted components assures parallelism of critical components. The interferometer is constructed for effective operation even if the total instrument is subjected to mechanical stress.

B65-10295

UNIQUE CONSTRUCTION MAKES INTERFEROMETER INSENSITIVE TO MECHANICAL STRESSES

BEER, R. OCT. 1965

JPL-725

Michelson-type interferometer with a cat-eye reflector operates effectively even in the presence of random mechanical stresses. A cubical beamsplitter with dichroic surfaces permits operation in infrared or visible light.

B65-10296

COAXIAL CAPACITOR USED TO DETERMINE FLUID DENSITY

ATKISSON, E. A. OCT. 1965

LEWIS-232

Sensing device measures directly the density of compressible fluid existing simultaneously in both liquid and gaseous phases. The device is comprised of a capacitor connected as one leg of a bridge circuit, a power source, and an indicator calibrated to indicate density as a direct measurement.

B65-10297

SUPERCONDUCTOR SHIELDS TEST CHAMBER FROM AMBIENT MAGNETIC FIELDS

HILDEBRANDT, A. F. OCT. 1965

JPL-627

Shielding a test chamber for magnetic components enables it to maintain a constant, low magnetic field. The chamber is shielded from ambient magnetic fields by a lead foil cylinder maintained in a superconducting state by liquid helium.

B65-10330

WEDGE IMMERSED THERMISTOR BOLOMETER MEASURES INFRARED RADIATION

DREYFUS, M. G. /BARNES ENG. CO/. NOV. 1965

GSFC-443

Wedge immersed-thermistor bolometer measures infrared radiation in the atmosphere. The thermistor flakes are immersed by optical contact on a wedge-shaped germanium lens whose narrow dimension is clamped between two complementary wedge-shaped germanium blocks bonded with a suitable adhesive.

B65-10331

CLOSED FLUID SYSTEM WITHOUT MOVING PARTS CONTROLS TEMPERATURE

STENGER, F. J. NOV. 1965

LEWIS-222

Closed fluid system maintains a constant temperature in an insulated region without the use of any moving parts. Within the system, the energy for thermodynamic cycling of two-phase heat transfer fluid and a hydraulic fluid is entirely supplied by the heat generated in the thermally insulated region.

B65-10356

SEGMENTED ELECTRODE INCREASES OPERATING PRESSURE OF MHD ACCELERATOR

INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ NOV. 1965

LANGLEY-95

Circumferentially segmented-ring electrode replaces the solid-ring electrode in a basic magnetohydrodynamic /MHD/ accelerator. This produces diffuse discharges at pressures as high as 100 atmospheres.

B65-10368

VACUUM CHAMBER PROVIDES IMPROVED INSULATION

- AND SUPPORT FOR CRYOSTAT  
INNOVATOR NOT GIVEN /GE/ DEC. 1965  
M-FS-415  
Taut wires in an evacuated cylinder minimize heat transfer through the walls and junctions of a liquid-helium-filled cryostat by suspending the cryostat.
- B65-10373  
MODIFIED PROCEDURE SPEEDS CAMERA COPY LAYOUT FOR OFFSET PRINTING  
SMITH, L. F. DEC. 1965  
GSFC-424  
Projecting a grid pattern on a steel layout board facilitates the alignment of camera copy for photo-offset reproduction. Small flat bar magnets fasten the copy to the board.
- B65-10395  
OPTICAL OUTPUT ENHANCES FLOWMETER ACCURACY  
WOLPIN, E. G. /N. AM. AVIATION/ DEC. 1965  
M-FS-482  
Magnetic flowmeter with a direct-coupled optical output increases accuracy and operates independently of other system inputs. The design includes simple external adjustment and signal amplitude control.
- B66-10004  
COPPER FOIL PROVIDES UNIFORM HEAT SINK PATH  
PHILLIPS, I. E., JR. SCHREIHANS, F. A. /N. AM. AVIATION/ JAN. 1966  
MSC-262  
Thermal path prevents voids and discontinuities which make heat sinks in electronic equipment inefficient. The thermal path combines the high thermal conductivity of copper with the resiliency of silicone rubber.
- B66-10008  
AUTOMATIC FLUID SEPARATOR SUPPLIES OWN DRIVING POWER  
DECKER, M. S. MAJNERI, L. A. SPULGIS, I. S. /MIDLAND-ROSS CORP./ JAN. 1966  
WOO-085  
Centrifugal separator suspended in the fuel tank of a space vehicle selects and vents gas vapor at zero gravity. Escaping vapor is used to drive an expander turbine that is magnetically coupled to the separator.
- B66-10010  
OPTICAL PROJECTORS SIMULATE HUMAN EYES TO ESTABLISH OPERATOR'S FIELD OF VIEW  
BEAM, R. A. /N. AM. AVIATION/ JAN. 1966  
WOO-250  
Device projects visual pattern limits of the field of view of an operator as his eyes are directed at a given point on a control panel. The device, which consists of two projectors, provides instant evaluation of visual ability at any point on a panel.
- B66-10016  
SINGLE PROJECTOR ACCOMMODATES SLIDES OF DIFFERENT SIZE AND FORMAT  
GATES, G. M. JAN. 1966  
GSFC-439  
Projector with two adjustable external units accommodates slides of different size and format. One external unit is the holder for different size slides and includes mounting means for appropriate condensing lens and heat filters. The other unit is a turret lens assembly. The machine is easily adaptable to rear-screen and front-screen projection over various distances.
- B66-10017  
PTFE-ALUMINUM FILMS SERVE AS NEUTRAL DENSITY FILTERS  
BURKS, H. D. JAN. 1966  
LANGLEY-189  
Polytetrafluoroethylene (PTFE) films coated with aluminum films act as neutral density filters in the wavelength range 0.3 to 2.1 microns. These filters are effective in the calibration of photometric systems.
- B66-10045  
COMPLEMENTARY SYSTEM VAPORIZES SUBCOOLED LIQUID, IMPROVES TRANSFORMER EFFICIENCY  
KETAILY, E. C. /N. AM. AVIATION/ FEB. 1966  
M-FS-550  
Complementary system converts subcooled liquid hydrogen or nitrogen to gas. The inherent induction heat losses of an electrical transformer are used in the vaporizing process. Transformer efficiency is improved in the process.
- B66-10058  
CALORIMETER ACCURATELY MEASURES THERMAL RADIATION ENERGY  
ANDERSON, W. W., JR. MILLER, H. B. SWEET, G. E. FEB. 1966  
LANGLEY-173  
Calorimeter accurately measures steady-state and transient, low-level thermal radiation energy. The calorimeter uses a compensating shield between the sensor and the calorimeter mount to intercept sensor heat losses and to provide a reference for determining a correction factor.
- B66-10060  
THIN CARBON FILM SERVES AS UV BANDPASS FILTER  
INNOVATOR NOT GIVEN /GEOPHYS. CORP. OF AM./ FEB. 1966  
ERC-8  
Thin carbon film deposited on a 70 percent transparent screen provides a filter for narrow-band detectors in the extreme ultraviolet. The filter also suppresses scattered light and light of unwanted orders in vacuum spectrographs.
- B66-10072  
BEAM SPLITTER USED IN DUAL FILMING TECHNIQUE  
ZELDIN, S. /N. AM. AVIATION/ FEB. 1966  
M-FS-501  
Tubular tee is intersected at its junction by a reflecting/transmitting mirror angled to provide two images of an object for simultaneous photographing from two positions. This method is used when space and focal conditions are limited.
- B66-10075  
SPECIMEN HOLDER DESIGN IMPROVES ACCURACY OF X-RAY POWDER ANALYSIS  
MACK, M. /N. AM. PHILLIPS CORP./ FEB. 1966  
JPL-SC-165  
Specimen holder for X-ray diffraction analysis presents the specimen to the incident X-rays in a curvature. This permits the use of an X-ray beam having a larger divergence angle, the beam intensity is increased, and the statistical accuracy of analysis is improved.
- B66-10079  
HIGH-PRESSURE, LOW TEMPERATURE ELECTRICAL CONNECTOR MAKES NO-LEAK SEAL  
WEAKLEY, J. F. /N. AM. AVIATION/ MAR. 1966  
MSC-276  
Flow control of cryogenic liquids is achieved through use of an electrical feed-through connector with a solenoid-type valve. To prevent gas leakage, the connector is designed and structured so that extremely high pressure and low temperatures contribute to its sealing properties.
- B66-10086  
SCREEN OF CYLINDRICAL LENSES PRODUCES STEREOSCOPIC TELEVISION PICTURES  
NORK, C. L. /SPACO, INC./ MAR. 1966  
M-FS-273  
Stereoscopic television pictures are produced by placing a colorless, transparent screen of adjacent parallel cylindrical lenses before a raster from two synchronized TV cameras. Alternate frames from alternate cameras are displayed. The viewer's sensory perception fuses the two images into one three-dimensional picture.
- B66-10095  
ULTRAVIOLET PHOTOGRAPHIC PYROMETER USED IN ROCKET EXHAUST ANALYSIS  
LEVIN, B. P. /N. AM. AVIATION/ MAR. 1966  
M-FS-499  
Ultraviolet photographic pyrometer investigates the role of carbon as a thermal radiator and

determines the geometry, location, and progress of afterburning phenomena in the exhaust plume of rocket engines using liquid oxygen/RP-1 as propellant.

B66-10096  
INEXPENSIVE INFRARED SOURCE IMPROVISED FROM FLASHLIGHT  
INNOVATOR NOT GIVEN /FAIRCHILD HILLER CORP./  
MAR. 1966  
M-FS-494

Inexpensive hand-held source of infrared energy is provided by a flashlight bulb coated with a paint which filters out the visible light emitted by the bulb and transmits only infrared radiation. This device can be used for checking infrared sensors and for experimental purposes.

B66-10098  
NEW ENERGY STORAGE CONCEPT USES TAPES  
GRUBER, A. KAFESJIAN, R. R. /MONSANTO RES. CORP./ MAR. 1966  
LEWIS-239

Energy storage system uses movable permeable tapes with cathode and electrolyte material that is drawn across an anode to produce electric power. The system features long shelf life, high efficiency, and flexible operation.

B66-10108  
PLASTIC SCINTILLATOR CONVERTS STANDARD PHOTOMULTIPLIER TO ULTRAVIOLET RANGE  
INNOVATOR NOT GIVEN /GEOPHYS. CORP. OF AM./ MAR. 1966  
ERC-9

Commercially available plastic scintillators are attached to the glass windows of standard photomultiplier tubes for detection of ultraviolet radiation.

B66-10114  
HIGHLY SENSITIVE SOLIDS MASS SPECTROMETER USES INERT-GAS ION SOURCE  
INNOVATOR NOT GIVEN /GEOPHYS. CORP. OF AM./ MAR. 1966  
ERC-11

Mass spectrometer provides a recorded analysis of solid material surfaces and bulk. A beam of high-energy inert-gas ions bombards the surface atoms of a sample and converts a percentage into an ionized vapor. The mass spectrum analyzer separates the vapor ionic constituents by mass-to-charge ratio.

B66-10121  
COMPOUND IMPROVES THERMAL INTERFACE BETWEEN THERMOCOUPLE AND SENSED SURFACE  
KALLIN, I. N. /WESTINGHOUSE ASTRONUCLEAR LAB/  
MAR. 1966  
NU-0028

Thermocouples and brittle materials are joined without welding by an epoxy resin cement mixer with a conducting material. This mixture does not form thermal barriers at cryogenic temperatures.

B66-10122  
NIOBIUM THIN FILMS ARE SUPERCONDUCTIVE IN STRONG MAGNETIC FIELDS AT LOW TEMPERATURES  
CLOUGH, P. J. /NATL. RES. CORP./ FOWLER, P.  
MAR. 1966  
JPL-SC-174

Niobium film superconductor carries high currents in strong magnetic fields. The thin niobium film is formed on an inert substrate through evaporation in a vacuum environment. Control of temperature and vacuum results in rejection of gaseous impurities so that the film is of a very high purity.

B66-10143  
SEXTANT MEASURES SPACECRAFT ALTITUDE WITHOUT GRAVITATIONAL REFERENCE  
INNOVATOR NOT GIVEN /GEONAUTICS, INC./ APR. 1966  
MSC-200

Horizon-sensing sextant measures the altitude of an orbiting spacecraft without gravitational reference by optically measuring the dip angle to the horizon along a line of sight in each of two

planes. The sextant scans over a relatively limited field of view.

B66-10153  
ARGON PURGE GAS COOLED BY CHILL BOX  
SPIRO, L. W. /N. AM. AVIATION/ APR. 1966  
M-FS-560

Cooling argon purge gas by routing it through a shop-fabricated chill box reduces charring of tungsten inert gas torch head components. The argon gas is in a cooled state as it enters the torch and prevents buildup of char caused by the high concentrations of heat in the weld area during welding operations.

B66-10156  
CIRCULAR, EXPLOSION-PROOF LAMP PROVIDES UNIFORM ILLUMINATION  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ APR. 1966  
MSC-382

Circular explosion-proof fluorescent lamp is fitted around a TV camera lens to provide shadowless illumination with a low radiant heat flux. The lamp is mounted in a transparent acrylic housing sealed with clear silicone rubber.

B66-10157  
CRYOGENIC LIQUID TRANSFER SYSTEM REDUCES RESIDUAL BOILOFF  
HEGLAND, D. E. APR. 1966 2 P  
LEWIS-274

System for transferring cryogenic liquids to a dewar prevents boiloff of residual liquid by venting the boiloff to the atmosphere during the transfer tube cooling period. The system is most useful with liquids having very small heat vaporization.

B66-10173  
OFFSET LENSES AND VERSATILITY TO PHOTOTYPESETTING MACHINE  
JAMES, A. M. /DOCUMENTATION, INC./ APR. 1966  
HQ-9

Offset lenses facilitate the composition of inputs of other than straight baseline characters on the Photon phototypesetting machine. A number of lenses in the turret are mounted in an offset pattern that causes characters projected through them to fall on the photographic paper in the magazine above and below the baseline.

B66-10178  
FATIGUE CRACKS DETECTED AND MEASURED WITHOUT TEST INTERRUPTION  
FRECHE, J. C. KLIMA, S. J. LESCO, D. J. MAY 1966  
LEWIS-266

Ultrasonic flaw detector records cracks in materials undergoing fatigue tests, without interfering with test progress. The detector contains modified transducers clamped to the specimens, and an oscillograph readout.

B66-10181  
ALUMINUM DOPING IMPROVES SILICON SOLAR CELLS  
MAY 1966 SEE ALSO NASA-TN-D-2711  
LEWIS-206

Aluminum doped silicon solar cells with resistivities in the 10- to 20-ohm centimeter range have broad spectral response, high efficiency and long lifetimes in nuclear radiation environments. Production advantages include low material rejection and increased production yields, and close tolerance control.

B66-10183  
INSULATION FOR CRYOGENIC TANKS HAS REDUCED THICKNESS AND WEIGHT  
DUMIRE, P. E. MIDDLETON, R. L. SCHELL, J. T. STUCKEY, J. M. MAY 1966 SEE ALSO NASA-SP-5030  
M-FS-326

Dual seal insulation, consisting of an inner layer of sealed-cell Mylar honeycomb core and an outer helium purge channel of fiberglass-reinforced phenolic honeycomb core, is used as a thin, lightweight insulation for external surfaces of cryogenic-propellant tanks.

B66-10186  
RADIATION USED TO TEMPERATURE COMPENSATE  
SEMICONDUCTOR STRAIN GAGES  
GROSS, C. MAY 1966  
LANGLEY-207

Exposure to high energy electron radiation reduces the temperature coefficients of resistance and gauge factor of a range of resistivities of n- and p-type semiconductor silicon strain gauges. After irradiation, the gauges are heated to a high temperature for a 24-hour period to stabilize their temperature coefficients.

B66-10187  
RUBBER-COATED BELLOWS IMPROVES VIBRATION  
DAMPING IN VACUUM LINES  
HEGLAND, D. E. SMITH, R. J. MAY 1966  
LEWIS-273

Compact vibration damping systems, consisting of rubber-coated metal bellows with a sliding O-ring connector, are used in vacuum lines. The device presents a metallic surface to the vacuum system and combines flexibility with the necessary stiffness. It protects against physical damage, reduces fatigue failure, and provides easy mating of nonparallel lines.

B66-10199  
MOUNT ENABLES PRECISION ADJUSTMENT OF  
OPTICAL-INSTRUMENTATION MIRROR  
INNOVATOR NOT GIVEN /MASS. INST. OF TECH./ MAY 1966  
MSC-184

Mirror mount assembly allows the plane of a mirror to be adjusted through small angles about two orthogonal axes. The assembly, which has a mirror mount with two independently adjustable flexure joints, allows independent precise adjustment of the mirror mount with respect to each axis.

B66-10231  
SOLAR CELL SUBMODULE DESIGN FACILITATES  
ASSEMBLY OF LIGHTWEIGHT ARRAYS  
YASUI, R. K. MAY 1966  
JPL-728

Solar cell submodules with bus bars that leave tabs along one end of the submodule and wires with raised portions along the other end are assembled by interlocking the tabs and wires of adjacent submodules. This structural design is lightweight and reliable and requires no metallic substructure.

B66-10257  
FREON PROVIDES HEAT TRANSFER FOR SOLID CO<sub>2</sub>  
CALIBRATION STANDARD  
INNOVATOR NOT GIVEN /LEEDS AND NORTHROP CO./ JUN. 1966  
M-FS-644

Acetone and Freon as liquid heat transfer mediums bring a dry ice bath to, and keep it at, the temperature required when using solid carbon dioxide as a calibration standard. Although acetone gives better results, Freon TF is preferred since acetone reacts violently in the presence of liquid oxygen.

B66-10263  
OPTICAL DEVICE ENABLES SMALL DETECTOR TO SEE  
LARGE FIELD OF VIEW  
ARNDT, J. H. /TRW SPACE TECHNOL. LABS./ JUN. 1966  
WOO-253

Optical device images the sun on a mask that transmits it or prevents its transmission to a photodetector behind the mask depending on image position on the mask. The device uses a pinhole as the image former to provide a large field of view and diffraction-limited resolution.

B66-10268  
HIGH-SPEED FURNACE USES INFRARED RADIATION  
FOR CONTROLLED BRAZING  
ECKLES, P. N. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0047

Furnace produces controlled heat for brazing and heat treating metals over a wide range of temperatures by using a near-infrared heat source

positioned at one focus of an ellipsoidal reflector mounted below a cylindrical quartz chamber. This furnace maintains a pure atmosphere, has rapid heatup and cooldown, and permits visual observation.

B66-10289  
ULTRASONIC HAND TOOL ALLOWS CONVENIENT  
SCANNING OF SPOT WELDS  
MITCHELL, D. K. /BOEING CO./ JUL. 1966  
M-FS-539

Small, portable, electrically powered hand tool, coupled with auxiliary ultrasonic equipment, allows convenient scanning of spot welds for discontinuities.

B66-10290  
MODIFIED MCLEOD GAGE RECORDS AUTOMATICALLY  
FAETH, P. A. JUL. 1966  
LEWIS-290

Modified McLeod gauge records pressure measurements automatically. The measurements can be programmed in advance by means of an automatic timer.

B66-10307  
COMMERCIAL FILM PRODUCES POSITIVE X-RAY PHOTO  
IN TEN SECONDS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUL. 1966  
M-FS-521

Type 52 Polaroid Land Film Packet provides a rapid, inexpensive method of producing positive X-ray photographs of various objects.

B66-10316  
LEGIBILITY OF ELECTROLUMINESCENT INSTRUMENT  
PANELS INVESTIGATED  
MC LEAN, M. V. MILLER, G. E. /N. AM. AVIATION/ AUG. 1966  
MSC-494 MSC-496 MSC-501 MSC-505

Legibility studies of several EL /electroluminescent/ displays correlate reading time and accuracy with number size, stroke/width ratio, indicia size, pointer width, contrast, ambient illumination, and color background and contrast. Human factor criteria established on non-EL displays may not apply to EL displays.

B66-10325  
BIMETALLIC DEVICES HELP MAINTAIN CONSTANT  
SEALING FORCES DOWN TO CRYOGENIC TEMPERATURES  
DE BOSKEY, W. R. /MELPAR/ JUL. 1966  
M-FS-800

Tantalum washers compensate for different thermal coefficients of expansion between stainless steel and an aluminum O-ring. The washers have sufficient thickness to maintain a vacuum seal from room to cryogenic temperatures.

B66-10348  
INEXPENSIVE INSULATION IS EFFECTIVE FOR  
CRYOGENIC TRANSFER LINES  
LINDGREN, A. R. /N. AM. AVIATION/ AUG. 1966  
MSC-618

Matting cover thermally insulates cryogenic-liquid transfer pipelines. The matting consists of layers of commercially available fiberglass tape in which the fibers are randomly oriented in parallel planes.

B66-10372  
SPECIAL TREATMENT REDUCES HELIUM PERMEATION OF  
GLASS IN VACUUM SYSTEMS  
BRYANT, P. J. GOSSELIN, C. M. /MIDWEST RES. INST./ AUG. 1966  
HQ-25

Internal surfaces of the glass component of a vacuum system are exposed to cesium in gaseous form to reduce helium permeation. The cesium gas is derived from decomposition of cesium nitrate through heating. Several minutes of exposure of the internal surfaces of the glass vessel are sufficient to complete the treatment.

B66-10388  
AUXILIARY TITANIUM SUBLIMATION PUMP PRODUCES  
ULTRAHIGH /10 TO THE MINUS 11 TORR/ VACUUM  
OUTLAW, R. A. SEP. 1966  
LANGLEY-212

Sublimated titanium as a gettering agent in conjunction with a turbine-type pump provides a two-step procedure for obtaining an ultrahigh vacuum of 10 to the minus 11 torr. The pump alone evacuates the chamber to a pressure of 10 to the minus 9 torr. The residual gas is removed by the gettering agent at a pumping speed of 15 liters per second per square inch.

B66-10435

# CHEMICAL REGENERATION OF EMITTER SURFACE INCREASES THERMIONIC DIODE LIFE

BREITWIESER, R. OCT. 1966 SEE NASA-TN-D-1877

LEWIS-17

Chemical regeneration of sublimated emitter electrode increases the operating efficiency and life of thermionic diodes. A gas which forms chemical compounds with the sublimated emitter material is introduced into the space between the emitter and the collector. The compounds migrate to the emitter where they decompose and redeposit the emitter material.

B66-10474

# GAS PRESSURE FEEDS FILM INTO CAMERA AT HIGH SPEED

KEIGHNER, P. J. NOV. 1966

ARG-97

Blast of gas blows a loop of unexposed film as a wave across a vacuum platen to feed film smoothly into a camera so that 2 successive lengths can be exposed within 50 milliseconds. This technique can be readily applied to multiple aperture cameras as well as to various types of films.

B66-10483

# UNIFORM REFLECTIVE FILMS DEPOSITED ON LARGE SURFACES

NOV. 1966 SEE ALSO NASA-TN-D-3357

GSFC-507

Specially designed baffle which intercepts varying amounts of the vapor stream from an evaporant source, vacuum deposits films of uniform thickness on large substrates, using a single small area evaporation source. A mirror coated by this method will have a reflectance as high as 82 percent at 1216 angstroms with a variation of only plus/minus 2 percent over the surface.

B66-10499

# CRYOGENIC COOLING REDUCES HIGH VOLTAGE ARCING BETWEEN ELECTRODES OPERATING IN A VACUUM

DE GEETER, D. J. NOV. 1966

ARG-109

Cooling to a temperature of approximately liquid nitrogen or lower, reduces arcing, or high voltage breakdown, between two closely spaced electrodes operating in a vacuum. This cooling technique can be applied to electrodes having other than hemispherical shapes.

B66-10507

# PANELS ILLUMINATED BY EDGE-LIGHTED LENS TECHNIQUE

HAAG, G. E. HORSFALL, R. B. /N. AM. AVIATION/ NOV. 1966

MSC-871

Electroluminescent lamps used to edge-light a specially ground lens provide nonglare, reduced eye strain panel illumination. There is no noticeable falloff in brightness along the lens edge. Light intensity diminishes toward the lens center. A slight halo, observed along the lens edge, has no detrimental effect.

B66-10508

# EXPERIMENTAL INVESTIGATION OF MEGAWATT DC ARC HEATING OF NITROGEN

BOLDMAN, D. R. CAMPBELL, J. P. DEC. 1966

LEWIS-313

Four types of arc heaters, each with the capability of providing arc power levels in excess of 1 megawatt in nitrogen, were tested over a range of power levels and nitrogen flow rates to determine their value as heaters for hypersonic tunnels. The data derived should be useful in the design of high energy heaters for various industrial processes.

B66-10532

# LIGHT-INTENSITY MODULATOR WITHSTANDS HIGH HEAT FLUXES

MAPLES, H. G. STRASS, H. K. NOV. 1966

MSC-246

Mechanism modulates and controls the intensity of luminous radiation in light beams associated with high-intensity heat flux. This modulator incorporating two fluid-cooled, externally grooved, contracting metal cylinders which when rotated about their longitudinal axes present a circular aperture of varying size depending on the degree of rotation.

B66-10547

# HIGH INTENSITY RADIATION HEAT SOURCE IS CAPABLE OF SUSTAINED OPERATION

GEIDEMAN, W. A. MULLER, K. /TEXRON ELECTRONICS/ NOV. 1966

ARC-61

Water cooled, high intensity radiation source rated at 125 kw, with an efficiency of 31 to 34 percent is used in the evaluation of ablative materials under simulated conditions of high velocity entry into planetary atmospheres. The source operates repeatedly at maximum power for periods of 10 to 20 minutes.

B66-10554

# CALCULATION OF INFRARED SPECTRAL TRANSMITTANCES OF INHOMOGENEOUS GASES

HUFFAKER, R. M. DEC. 1966

M-FS-1563

Calculation of spectral transmittance for a particular inhomogeneous gas path is made by combining known data on gases at constant temperature, pressure, and concentration. The spectral transmittances of the inhomogeneous plume gases is needed to calculate the heat radiated from the exhaust plume to the rocket base of a multiple engine rocket.

B66-10560

# LASER MEASURING SYSTEM ACCURATELY LOCATES POINT COORDINATES ON PHOTOGRAPH

DOEDE, J. H. LINDENMEYER, C. W. VONDEROHE, R. H. DEC. 1966

ARG-74

Laser activated ultraprecision ranging apparatus interfaced with a computer determines point coordinates on a photograph. A helium-neon gas CW laser provides collimated light for a null balancing optical system. This system has no mechanical connection between the ranging apparatus and the photograph.

B66-10565

# MIXER CONDITIONS TEMPERATURE OF LIQUIFIED GAS STREAMS

TALMOR, E. /N. AM. AVIATION/ DEC. 1966

M-FS-1784

Room temperature gaseous hydrogen mixed with liquified hydrogen in a venturi produces a two-phased liquid hydrogen stream at a stable temperature. This technique is useful in a laboratory testing where presently, temperature control is maintained by a calibrated heat leak that results in considerable expenditure of cryogenic refrigerants.

B66-10583

# NEON ISOTOPES CANCEL ERRORS IN GAS LASER

MACEK, W. M. OLTHUIS, R. W. SCHNEIDER, J. R. /SPERRY GYROSCOPE CO./ DEC. 1966

M-FS-1476

Neon isotopes cancel frequency pushing errors arising from unequal gain in the two contracirculating beams of a helium-neon filled discharge tube used in a ring laser.

B66-10596

# OPTICAL AUTOMATIC GAIN CHANNEL

MRUS, G. ZUKOWSKY, W. /PERKIN-ELMER CORP./ DEC. 1966

M-FS-1550

Automatic gain control /AGC/ channel automatically compensates for gain changes in the azimuth error channel due to time varying optical sight degrading effects. This system is useful

in remote television monitors, automatic navigation systems, and surveying and mapping instrumentation.

B66-10602

EXPOSURE VALUE /EV/ SYSTEM EXPANDED TO INCLUDE FILTER FACTORS AND TRANSMITTANCE  
LINDSEY, W. F. DEC. 1966  
JPL-190

Application of the exposure value system requires that the system be extended to high brightness level, and expanded to include filter factors. A minimum of four photographic factors are involved in the evaluation of an exposure which when determined from tables of 1-stop interval could introduce noticeable error.

B66-10615

FEED-THRU FLANGE IS USEFUL IN VACUUM APPLICATIONS TO CRYOGENIC TEMPERATURES  
YAGER, S. P. DEC. 1966  
JPL-846

Feed-thru flange seals inner and outer walls of high vacuum test chambers. It is used in vacuum applications at both cryogenic and higher than cryogenic temperatures. A damaged flange can still be used for partial vacuum, noncryogenic applications in conjunction with an appropriate rubber seal.

B66-10630

TECHNIQUE FOR MEASURING ABSORPTANCE AND EMITTANCE BY USING CYCLIC INCIDENT RADIATION  
JACK, J. R. DEC. 1966 SEE ALSO NASA-TM-X-52193  
LEWIS-321

Cyclic radiation technique has been developed for determining absorptance and emittance of metal surfaces. Using this technique both absorptance and emittance can be determined from one set of data, and variable and controlled temperature levels are possible.

B66-10638

TWIN HELIX SYSTEM PRODUCES FAST SCAN IN INFRARED DETECTOR  
VANZETTI, R. /N. AM. AVIATION/ DEC. 1966  
M-FS-1598

Two rotating wheels in orthogonal relationship with helicoidal reflecting surfaces mounted on their outer rims achieve a linear speed without normal time loss in their return motion. The pitch of the helicoidal surfaces equals the displacement that the mirrors must traverse.

B66-10652

ROCKET ENGINE VIBRATION ACCURATELY MEASURED BY PHOTOGRAPHY  
CRAIG, K. A. /N. AM. AVIATION/ DEC. 1966  
M-FS-1916

High speed instrumentation camera focused on a partially masked light bulb which is securely mounted to the test fixture permits measurement of engine performance parameters when usual electronic vibration instrumentation is unavailable. Vibration is recorded as a light trace deviating from the light rays photographed in the static hardware condition.

B66-10654

CRYOGENIC FLUID SAMPLING DEVICE PERMITS TESTING UNDER HAZARDOUS CONDITIONS  
MITCHELL, J. A. /N. AM. AVIATION/ DEC. 1966  
M-FS-1927

Remotely controlled sampling device obtains timed sample of flowing cryogenic liquid propellants in remote or hazardous testing conditions. The device consists of a calibrated container, a dewar, a solenoid valve, a pressure gauge, and a manual bleed valve.

B66-10657

SIMPLE TECHNIQUE DETERMINES AC PROPERTIES OF HARD SUPERCONDUCTIVE MATERIALS  
HARPER, C. M. HECHT, R. /RCA/ DEC. 1966  
M-FS-1818

Critical current density of a neodymium-titanium alloy samples is analyzed from magnetization curves to determine the ac properties of hard semiconductive materials. A complete family of

magnetization curves is obtained, each curve representing performance at a different temperature.

B66-10660

PROCESS PRODUCES ACCURATE REGISTRY BETWEEN CIRCUIT BOARD PRINTS  
INNOVATOR NOT GIVEN /BENDIX CORP./ DEC. 1966  
LANGLEY-288

Tapes and quick-mount circles of contrasting colors aid in obtaining precise registry between the two circuits of two-sided printed circuit boards. The tapes and circles are mounted on opposite sides of transparent plastic film to define the conductive path and feed-through hole locations.

B66-10682

PRIMARY CELLS UTILIZE HALOGEN-ORGANIC CHARGE TRANSFER COMPLEX  
GUTHMANN, F. HERMANN, A. M. REMBAUM, A. DEC. 1966  
JPL-926

Electrochemical cells with solid state components, employ charge transfer complexes or donor-acceptor complexes in which the donor component is an organic compound and the acceptor component is a halogen. A minor proportion of graphite added to these compositions helps reduce the resistivity.

B66-10693

LASER DOPPLER FLOWMETER MEASURES GAS VELOCITY  
FOREMAN, W. /BROWN ENG. CORP./ HUFFAKER, R. M. DEC. 1966  
M-FS-1747

Utilizing the large magnitudes of Doppler shifts obtainable from a CW gas laser local velocity vectors are measured by using the visible light from the laser. This technique is applicable for the measurement of velocity of any moving surface.

B66-10700

PROBLEM OF OSCILLATING CONE IN SUPERSONIC FLOW IS SOLVED BY SMALL PERTURBATION TECHNIQUES  
PAO, T.-H. /MIT/ DEC. 1966  
M-FS-869

Small perturbation technique solves the problem of an oscillating cone in supersonic flow. The logic of the program is straightforward, as reflected in the actual instructions for solving the problem.

## 03 MATERIALS (CHEMISTRY)

B63-10004

REFERENCE BLACK BODY IS COMPACT, CONVENIENT TO USE  
DINEFF, J. NEEL, C. B. APR. 1964  
ARC-3

To replace the classical hollow sphere, a compact reference black body has been constructed from stacked razor blades. Treated with a deposit of black oxide on the surfaces or notches between the upper edges of the blades, the device is useful over a wide range of incident angles.

B63-10207

THERMALLY CONDUCTIVE METAL WOOL-SILICONE RUBBER MATERIAL CAN BE USED AS SHOCK AND VIBRATION DAMPER  
HOUGH, W. W. APR. 1964  
JPL-321

Bronze wool pads, impregnated with silicon rubber, meet the requirement for a thermally conductive, shock and vibration absorbing material. They serve as spacers in equipment mounting and are resistant to high temperatures.

B63-10234

FILTER FOR HIGH-PRESSURE GASES HAS EASY TAKE-DOWN, ASSEMBLY  
MAC GLASHAN, W. F. FEB. 1964  
JPL-373

A small metal filter body, for use in tubing supplying sterilization gases, has an inlet end that can be unscrewed. Inside, the high pressure filter is supported on both sides and sealed by an O-ring. Design facilitates assembly and disassembly of parts.

B63-10235  
CRYOGENIC FILTER METHOD PRODUCES SUPER-PURE  
HELIUM AND HELIUM ISOTOPES  
HILDEBRANDT, A. F. MAR. 1964  
JPL-374

To purify helium, it is cooled in a low pressure environment until it becomes superfluid. The liquid helium is then filtered through iron oxide particles. Heating, cooling and filtering processes continue until the purified liquid helium is heated to a gas.

B63-10263  
FRESNEL CUP REFLECTOR DIRECTS MAXIMUM ENERGY  
FROM LIGHT SOURCE  
LAUE, E. G. YOUNGBERG, C. L. MAY 1964  
JPL-424

To minimize shielding and overheating, a composite Fresnel cup reflector design directs the maximum energy from a light source. It consists of a uniformly ellipsoidal end surface and an extension comprising a series of confocal ellipsoidal and concentric spherical surfaces.

B63-10311  
OIL-SMEARED MODELS AID WIND TUNNEL  
MEASUREMENTS  
KATZOFF, S. LOVING, D. K. 1 APR. 1964 /SEE  
NASA-MEMO-3-17-59L/  
LANGLEY-4

For visualizing flow characteristics in wind tunnel tests, model surfaces are smeared with any common petroleum-base oils. These fluoresce under ultraviolet light and the flow patterns are readily visualized.

B63-10318  
QUICK-HARDENING PROBLEMS ARE ELIMINATED WITH  
SPRAY GUN MODIFICATION WHICH MIXES RESIN AND  
ACCELERATOR LIQUIDS DURING APPLICATION  
JOHNSON, O. W. MAR. 1964 /SEE U.S. PATENT NO.  
2,930,532/  
LANGLEY-6A

A modified spray gun, with separate containers for resin and additive components, solves the problems of quick hardening and nozzle clogging. At application, separate atomizers spray the liquids in front of the nozzle face where they blend.

B63-10337  
GALLIUM USEFUL BEARING LUBRICANT IN HIGH-  
VACUUM ENVIRONMENT  
BUCKLEY, D. H. MAY 1964 /SEE U.S. PATENT NO.  
3,072,574/  
LEWIS-12

Solid gallium is used as a lubricant on bearings made of compatible materials. Such lubricants perform well in a high vacuum and under low temperature.

B63-10345  
APPARATUS FACILITATES HIGH-TEMPERATURE TENSILE  
TESTING IN VACUUM  
SIKORA, P. F. JUN. 1964  
LEWIS-42

An apparatus for heating refractory materials to high temperatures during tensile testing includes a water-cooled stainless steel vacuum chamber. This contains a resistance heater consisting of a slit tube of tantalum or tungsten to enclose the tensile test rod.

B63-10351  
NEW COBALT ALLOYS HAVE HIGH-TEMPERATURE  
STRENGTH AND LONG LIFE IN VACUUM ENVIRONMENTS  
ASHBROOK, R. L. FRECHE, J. C. KLIMA, S. J. MAR.  
1964  
LEWIS-47

Cobalt refractory metal alloys combine sheet formability with high temperature strength and low material loss in vacuum.

B63-10365  
LOW-COST INSULATION SYSTEM FOR CRYOSTATS  
ELIMINATES NEED FOR A VACUUM  
CALVERT, H. F. MAY 1964  
LEWIS-64

In order to eliminate the hazard caused by residual air trapped between the concentric shells of a cryostat, these annular spaces are pressurized with helium gas. This system is more economical than the use of powdered insulation maintained at low vacuums.

B63-10378  
LIQUID-LEVEL METER HAS NO MOVING PARTS  
ESCUE, W. T. /BENDIX CORP./ JUN. 1964  
M-FS-3

An electro-optical system, without moving parts, reliably indicates liquid levels at cryogenic temperatures. Glass prisms, which act as liquid level probes inside the tank, extend from optically aligned photoelectric assemblies mounted on the outside.

B63-10389  
LIGHTWEIGHT MAGNESIUM-LITHIUM ALLOYS SHOW  
PROMISE  
ADAMS, W. T. CATALDO, C. E. JUN. 1964  
M-FS-17

Evaluation tests show that magnesium-lithium alloys are lighter and more ductile than other magnesium alloys. They are being used for packaging, housings, containers, etc., where light weight is more important than strength.

B63-10424  
VARIABLE LIGHT SOURCE WITH A MILLION-TO-ONE  
INTENSITY RATIO  
SNOW, W. B. /SPACE TECHNOL. LAB./ MAY 1964  
JPL-WO0-008

A wide range, variable intensity light source of constant color characteristics has been developed for testing and calibrating photomultiplier tubes. A light attenuator first diffuses light from a constant source, then permits variable attenuation through a series of chambers and adjustable apertures.

B63-10429  
WELDED PRESSURE TRANSDUCER MADE AS SMALL AS  
1/8TH-INCH IN DIAMETER  
COON, G. W. MAR. 1964 /SEE U.S. PATENT NO.  
3,027,769/  
ARC-11

A special spot welding technique is used to make miniature capacitance transducers for placing in a wind tunnel model. Rugged and relatively low in cost, they have a flat response up to one-third of the resonant frequency.

B63-10453  
MOLYBDENUM DISULFIDE MIXTURES MAKE EFFECTIVE  
HIGH-VACUUM LUBRICANTS  
INNOVATOR NOT GIVEN /MIDWEST RES. INST./ NOV.  
1964  
M-FS-54

Five different mixtures of molybdenum disulfide are found to be effective bearing lubricants when tested at very low pressures and high temperatures.

B63-10476  
CESIUM IODIDE CRYSTALS FUSED TO VACUUM TUBE  
FACEPLATES  
FLECK, H. G. /ELECTRO-MECHANICAL RES. INC./ MAY  
1964  
GSFC-67

A cesium iodide crystal is fused to the lithium fluoride faceplate of a photon scintillator image tube. The conventional silver chloride solder is then used to attach the faceplate to the metal support.

B63-10479  
IMPROVED MOLYBDENUM DISULFIDE-SILVER MOTOR  
BRUSHES HAVE EXTENDED LIFE  
HORTON, J. C. KING, H. M. MAY 1964  
M-FS-64

Motor brushes of proper quantities of molybdenum disulfide and copper or silver are manufactured by



sintering techniques. Graphite molds are used. These brushes operate satisfactorily for long periods in normal atmosphere or in a high-vacuum environment.

B63-10481

REFRACTORY CERAMIC HAS WIDE USAGE, LOW FABRICATION COST

INNOVATOR NOT GIVEN /GEORGIA INST. OF TECH./ APR. 1964

M-FS-67

Particulate, fused amorphous silica is formed into complex shapes by casting in plaster molds. High temperature firing is not required. This ceramic is resistant to thermal shock and exhibits good strength properties.

B63-10528

VARIABLE-TRANSPARENCY WALL REGULATES TEMPERATURES OF STRUCTURES

OSULLIVAN, W. J., JR. JUN. 1964

LANGLEY-25

An effective temperature regulating wall consists of one layer /e.g., one of the paraffins/ relatively opaque to thermal radiation in the solid state and transparent to it in the molten state and placed between two transparent layers. A mirror coating is applied to back layer.

B63-10546

TEST DEVICE PREVENTS MOLECULAR BOUNCE-BACK

HARDGROVE, W. F. SHAPIRO, H. JULY 1964

GSFC-82

A test device, which consists of six pyramidal reflectors joined together, acts as a baffle to impede the free path of the molecule to the test item by interposing a slanted surface which imparts an angular vector to the molecule and bounces it back to the chamber wall.

B63-10557

RAPID HELIUM-AIR ANALYZER CAN MEASURE OTHER BINARY GAS MIXTURES

MELFI, L. T. WOOD, G. M. YEAGER, P. R. FEB. 1964

LANGLEY-16

An instrument comprised of an ionization pressure gauge and a diaphragm pressure gauge consisting of strain gauges to make a four-arm bridge, and a ratio meter is constructed for analyzing gas mixtures. The ratio of the outputs of the two gauges is proportional to the mixture composition.

B63-10562

GATE VALVE WITH CERAMIC-COATED BASE OPERATES AT HIGH TEMPERATURES

BRASS, A. JUL. 1964

ARC-23

A copper base insert coated with a layer of aluminum oxide ceramic prevents frictional binding between the gate and base surfaces of a gate valve which are subject to rapid sliding action and high temperatures.

B63-10612

METALS PLATED ON FLUOROCARBON POLYMERS

FORD, H. KRASINSKY, J. B. VANGO, S. P. OCT. 1964

JPL-544

Electroplating lead on fluorocarbon polymer parts is accomplished by etching the parts to be plated with sodium, followed by successive depositions of silver and lead from ultrasonically agitated plating solutions. Metals other than lead may be electroplated on the silvered parts.

B64-10068

MECHANICAL PROPERTIES OF PLASTICS PREDETERMINED BY EMPIRICAL METHOD

LOHR, J. J. PARKER, J. A. JUL. 1964

ARC-28

To predetermine the mechanical properties of rigid plastics as a function of plasticizer content and composition, a set of equations has been empirically derived. These relate strain rate, yield stress, temperature, and weight fraction of the plasticizer.

B64-10099

REFRACTORY THERMAL INSULATION FOR SMOOTH METAL SURFACES

INNOVATOR NOT GIVEN /GOODYEAR AEROSPACE CORP./ OCT. 1964

M-FS-160

To protect rocket metal surfaces from engine-exhaust heat, a refractory thermal insulation mixture, which adheres to smooth metals, has been developed. Insulation protection over a wide temperature range can be controlled by thickness of the applied mixture.

B64-10113

ELASTOMERS BONDED TO METAL SURFACES SEAL ELECTROCHEMICAL CELLS

SHERFEY, J. M. AUG. 1964

GSFC-168

A leakproof seal secondary cell containing alkaline electrolytes was developed by bonding an alkali-resistant elastomer, such as neoprene, to metal contact surfaces. Test results of several different elastomers strongly indicate the feasibility of this sealing method.

B64-10116

LEAD OXIDE CERAMIC MAKES EXCELLENT HIGH-TEMPERATURE LUBRICANT

JOHNSON, R. L. SLINNEY, H. E. AUG. 1964

LEWIS-144

A dry lubricant coating in ceramic form consisting of 95 percent lead monoxide and 5 percent silicon dioxide withstood a temperature of 1200 deg F, with a bearing operating at various atmospheric pressures. From this testing, there was no galling or metal transfer of the bearing.

B64-10138

NOVEL SHOCK ABSORBER FEATURES VARYING YIELD STRENGTHS

GEIER, D. J. JUL. 1964

MSC-63A

A shock absorbent webbing of partially drawn synthetic strands is arranged in sections of varying density related to the varying mass of the human body. This is contoured to protect the body at points of contact, when subjected to large acceleration or deceleration forces.

B64-10142

STRINGENT CLEANING TECHNIQUE ASSURES RELIABLE EPOXY BOND

INNOVATOR NOT GIVEN /RCA/ JUN. 1964

GSFC-161

For reliable aluminum bonding to withstand stress, the mating surfaces are carefully cleaned, etched, rinsed and dried. An epoxy and hardener designed for metal-to-metal bonding is then used for a rigid assembly.

B64-10151

PLASTIC FILMS FOR REFLECTIVE SURFACES

REPRODUCED FROM MASTERS

INNOVATOR NOT GIVEN /MINNEAPOLIS HONEYWELL/ OCT. 1964

GSFC-188

Accurate reproduction in plastic of the surface of the optical master to which a reflective finish may be applied is done by using backing from any suitable material to which cured plastic will adhere tightly. Plastics used for reflectors should be of the thermosetting or catalytically hardened type.

B64-10166

FILLER DEVICE FOR HANDLING HOT CORROSIVE MATERIALS

INNOVATOR NOT GIVEN /PRATT AND WHITNEY AIRCRAFT/ OCT. 1964

MSC-85

A bellows-type bag with its own heating element is developed for safe handling and injection of hot corrosive liquids into modules.

B64-10206

SOLDER FLUX LEAVES CORROSION-RESISTANT COATING ON METAL

BAUMAN, A. J. OCT. 1964

JPL-611

A soldering flux consisting of perfluoro-octanoic acid hydrazine provides a corrosion resistant film on metal surface, particularly copper. It is ineffective for soldering aluminum.

B64-10270

PRESSURE MOLDING OF POWDERED MATERIALS  
IMPROVED BY RUBBER MOLD INSERT  
INNOVATOR NOT GIVEN /ELECTRO-OPTICAL SYSTEMS  
CORP./ NOV. 1964  
WOO-100

Pressure molding tungsten microspheres is accomplished by applying hydraulic pressure to a silicone rubber mold insert with several barrel shaped chambers which is placed in a steel die cavity. This technique eliminates castings containing shear fractures.

B64-10282

FINE-MESH SCREEN MADE BY SIMPLIFIED METHOD  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ DEC. 1964  
WOO-104

Strong fine-mesh screens are fabricated by a method involving uniform distribution of fine ferromagnetic particles on a nonmagnetic plate. Such screens are commonly used for grids in electron tubes and ion devices.

B64-10319

GAS DIFFUSION CELL REMOVES CARBON DIOXIDE FROM  
OCCUPIED AIRTIGHT ENCLOSURES  
INNOVATOR NOT GIVEN /IOWA U./ DEC. 1964  
MSC-118

A small, lightweight permeable cell package separates and removes carbon dioxide from respiratory regenerative while chemically inert in the presence of carbon dioxide so that only adsorption takes place.

B65-10004

SCREENING TECHNIQUE MAKES RELIABLE BOND AT  
ROOM TEMPERATURE  
INNOVATOR NOT GIVEN /IBM/ JAN. 1965  
M-FS-227

Stainless-steel screen used to lay room temperature curing epoxy adhesive permits reliable bonding of electronic circuits boards. This technique would be useful with thin-walled structures that warp during conventional bonding operations.

B65-10015

IMPROVED CONDUCTIVE PASTE SECURES BIOMEDICAL  
ELECTRODES  
INNOVATOR NOT GIVEN /BAYLOR UNIV./ JAN. 1965 SEE  
ALSO B64-10025  
MSC-107

Nontoxic paste consisting of a dispersion of graphite or silver granules in a mixture of polyvinylpyrrolidone and diluted glycerol secures biomedical electrodes to human skin. Silver paste has a high electrical conductivity and forms a bond between metal and moist or dry skin.

B65-10016

ADHESIVE FOR VACUUM ENVIRONMENTS RESISTS SHOCK  
AND VIBRATION  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
FEB. 1965  
MSC-56

A mixture of a polyamide, an epoxy resin, and fine silica or glass microballoons provides an adhesive which is flexible, resistant to shock and vibration, and has improved heat-transfer characteristics.

B65-10024

FLUID PRESSURE USED TO TEST TURBOPUMP BEARINGS  
INNOVATOR NOT GIVEN /AEROJET-GEN. CORP./ FEB. 1965  
NU-0001

Testing of turbopump bearings operating in an intense radiation field is accomplished by the use of a fluid bearing tester providing radial and axial loading.

B65-10032

WIRE WINDING INCREASES LIFETIME OF OXIDE-

## COATED CATHODES

KERSLAKE, W. VARGO, D. FEB. 1965 SEE ALSO AIAA  
PAPER-64-683  
LEWIS-154

Refractory-metal heater base wound with a thin refractory metal wire increases the longevity of oxide-coated cathodes. The wire-wound unit is impregnated with the required thickness of metal oxide. This cathode is useful in magneto-hydrodynamic systems and in electron tubes.

B65-10034

GAGE MEASURES ELECTRICAL CONNECTOR PIN  
RETENTION FORCE  
INNOVATOR NOT GIVEN /RCA/ FEB. 1965  
JPL-SC-071

The retention force of a female connector pin is measured by observing the action of a calibrated spring in a gauge consisting of housing, a plunger terminating in a male subminiature connector pin and the tension spring.

B65-10043

MOUTHPIECE ADAPTER FOR PIPETTES PROTECTS MOUTH  
FROM HARMFUL LIQUIDS  
MC SMITH, D. G. FEB. 1965  
LANGLEY-47

To prevent the laboratory technicians mouth from contacting harmful liquids, a device with a hermetically sealed elastic bellows is attached to a standard pipette.

B65-10044

FLEXIBLE CURTAIN SHIELDS EQUIPMENT FROM  
INTENSE HEAT FLUXES  
INNOVATOR NOT GIVEN /ARROWHEAD PROD./ MAR. 1965  
M-FS-48

Flexible, high strength curtain made of fiberglass-silicone elastomer laminate provides thermal shielding for equipment.

B65-10065

SPHERICAL MODEL PROVIDES VISUAL AID FOR  
CUBIC CRYSTAL STUDY  
BACIGALUPI, R. J. SPAKOWSKI, A. E. MAR. 1965  
LEWIS-108

Transparent sphere of polymethylmethacrylate with major zones and poles of cubic crystals is used to make crystallographic visualizations and to interpret Laue X-ray diffraction of single cubic crystals.

B65-10083

DIDYMIUM COMPOUND IMPROVES NICKEL-CADMIUM  
CELL  
INNOVATOR NOT GIVEN /GE/ MAR. 1965  
GSFC-295

Nickel electrodes impregnated with an additive solution of didymium hydrate and nitric acid mixed with nickel nitrate increases ampere-hour capacity of cells and does not affect the voltage characteristics.

B65-10088

FIBERGLASS PARTS CURED DURING FILAMENT WINDING  
ELIMINATES OVEN, SAVES TIME  
CARMODY, R. J. APR. 1965  
M-FS-14

Resistance wire layer is introduced during winding of the fiberglass filaments with simultaneous heating. Emission of heat from the wire layer cures second fiberglass layer.

B65-10092

LIGHTWEIGHT ALUMINUM CASTING ALLOY IS USEFUL  
AT CRYOGENIC TEMPERATURES  
APR. 1965  
M-FS-267

M-45, a lightweight, high purity aluminum casting alloy has superior tensile properties for use at cryogenic temperatures.

B65-10095

CARBON-ARC ROD HOLDER HAS LONG LIFE, REDUCES  
ARC SPLATTER  
INNOVATOR NOT GIVEN /RCA/ APR. 1965 1965  
MSC-144

Carbon-arc rod holder with front end of beryllium oxide, a high electrical resistor and good thermal

conductor, prevents nonuniform burning of the positive carbon rod and corrosion of the rod holder. Useful in optical instrument light sources.

B65-10106  
MINIATURE BEARINGS LUBRICATED BY SONIC DISPERSION METHOD  
INNOVATOR NOT GIVEN /LITTON IND./ APR. 1965  
M-FS-202

Evenly distributing a monomolecular film over the balls and tracks of miniature precision ball bearings by sonic dispersion results in precise lubrication which prevents lubricant bleed out to adjacent components. Varying the lubricant-to-solvent ratio of the mixture causes varying lubricant coating thicknesses.

B65-10107  
CRACK DETECTION METHOD IS SAFE IN PRESENCE OF LIQUID OXYGEN  
INNOVATOR NOT GIVEN /BOEING CO./ APR. 1965  
M-FS-236

Visual flaw detection method for metals utilizes color precipitate. This method can be used safely in the presence of liquid oxygen.

B65-10117  
DOUBLE GLOVES REDUCE CONTAMINATION OF DRY BOX ATMOSPHERE  
HERBELL, T. P. QUANTINETZ, M. REINHARDT, G. APR. 1965  
LEWIS-211

Pair of encased low permeability hand gloves between which an inert gas circulates reduces dry box contamination. This innovation is applicable to dry boxes using radioactive and alkali metal compounds, submicron powders, and liquid metals.

B65-10136  
VAPOR PRESSURE MEASURED WITH INFLATABLE PLASTIC BAG  
INNOVATOR NOT GIVEN /GEOPHYS. CORP. OF AM./ MAY 1965  
GSFC-281

Deflated plastic bag in a vacuum chamber measures initial low vapor pressures of materials. The bag captures the test sample vapors and visual observation of the vapor-inflated bag under increasing external pressures yields pertinent data.

B65-10140  
GALVANIC CORROSION REDUCED IN ALUMINUM FABRICATIONS  
INNOVATOR NOT GIVEN MAY 1965  
M-FS-272

Titanium alloy fasteners dipped in zinc chromate primer are installed while wet in protective coated aluminum panels to reduce galvanic corrosion. Moisture-tight seals at fastener points are also provided.

B65-10156  
INORGANIC PAINT IS DURABLE, FIREPROOF, EASY TO APPLY  
SCHUTT, J. B. JUN. 1965  
GSFC-366

Inorganic paint with a water-potassium silicate base is impervious to water. It is also fireproof and adheres to various surfaces exposed to wide temperature fluctuations.

B65-10162  
ELECTROLESS NICKEL RESIST USED IN ALKALI-ETCHING OF ALUMINUM  
INNOVATOR NOT GIVEN /SCHJELDAHL /G. T./ CO./ JUN. 1965  
GSFC-284

Electroless nickel resist is unaffected by caustic soda applied as a milling or etching agent on aluminum.

B65-10164  
IRRADIATION IMPROVES PROPERTIES OF AN AROMATIC POLYESTER  
BELL, V. L., JR. JUN. 1965  
LANGLEY-115

Aromatic polyester, PEN-2,6, is improved through

cross-linking effected by radiation. Polymer retains properties of high tensile strength and toughness and stability at high temperatures.

B65-10167  
REFRACTORY OXIDES EVALUATED FOR HIGH-TEMPERATURE USE  
JUN. 1965  
LANGLEY-121

Partially calcia-stabilized zirconia used for insulation and heat-storage in high temperature /3000 deg to 4000 deg F/ cyclically operated pebble bed air heater.

B65-10172  
ALUMINUM ALLOYS PROTECTED AGAINST STRESS-CORROSION CRACKING  
INNOVATOR NOT GIVEN /ALCOA RES. LABS./ JUN. 1965  
M-FS-235

Topcoat of epoxy-polyamide paint is effective protection for aluminum alloys against stress corrosion cracking. The paint can be used on unprimed surfaces.

B65-10173  
PEEL RESISTANCE OF ADHESIVE BONDS ACCURATELY MEASURED  
INNOVATOR NOT GIVEN /RCA/ JUN. 1965  
GSFC-320

Strength of adhesive bond between layers of laminated material is tested by peel force to the facing with a tensile testing machine. Testing jig has stainless steel rollers which constrain material to move horizontally while maintaining free end of facing at constant 90 deg angle.

B65-10175  
TANTALUM CATHODE IMPROVES ELECTRON-BEAM EVAPORATION OF TANTALUM  
INNOVATOR NOT GIVEN /ELECTRO- OPTICAL SYSTEMS/ JUN. 1965  
JPL-W00-021

Tantalum cathode is used in assembly for electron beam evaporation of tantalum onto a substrate. The cathode and anode are made of pure tantalum rather than tungsten to prevent contamination of the tantalum film deposited on the substrate.

B65-10179  
REUSABLE NEOPRENE JACKET PROTECTS PARTS FOR CHEMICAL MILLING  
INNOVATOR NOT GIVEN /RYAN AERONAUTICAL CO./ JUN. 1965  
W00-071

Reusable neoprene jacket is used to prepare metal part or panel for chemical milling. Jacket covers back and upper rim of part and is sealed before the masking solution is applied to surface to be milled. This reduces amount of masking material required for milling identical parts and increases production.

B65-10189  
TESTING DEVICE SUBJECTS ELASTIC MATERIALS TO BIAXIAL DEFORMATIONS  
BECKER, G. W. JUN. 1965  
JPL-616

Testing device stretches elastic materials biaxially over large deformation ranges and varies strain ratios in two perpendicular directions. The device is used in conjunction with a tensile testing machine, which holds the specimen and permits control over the direction and magnitude of the stresses applied.

B65-10190  
IR-TRANSMISSION GLASSES FORMED FROM OXIDES OF BISMUTH AND TELLURIUM  
ULRICH, D. R. JUN. 1965  
M-FS-279

Bismuth trioxide-tellurium dioxide glasses have improved infrared transmission characteristics.

B65-10214  
EMERGENCY SOLAR STILL DESALTS SEAWATER  
INNOVATOR NOT GIVEN /MELPAR/ JUL. 1965  
MSC-135

Solar energy apparatus distills seawater into fresh water. The inflatable buoyant still

produces two pints of drinking water a day.

B65-10217

THIN TRANSPARENT FILMS FORMED FROM POWDERED

GLASS

INNOVATOR NOT GIVEN /HOFFMAN ELECTRON./ JUL. 1965  
GSFC-352

Glass film less than five mils thick is formed from powdered glass dispersed in an organic liquid, deposited on a substrate, and fused into place. The thin films can be cut and shaped for contact lenses, optical filters and insulating layers.

B65-10220

THORIATED NICKEL BONDED BY SOLID-STATE

DIFFUSION METHOD

BALES, T. T. MANNING, R. C., JR. AUG. 1965  
LANGLEY-116

Solid-state diffusion bonding in an inert-gas atmosphere forms high-strength joints between butting or overlapping surfaces of thoriated nickel. This method eliminates inert-phase agglomeration.

B65-10250

COATING METHOD ENABLES LOW-TEMPERATURE

BRAZING OF STAINLESS STEEL

SEAMAN, F. D. /WESTINGHOUSE ELEC. CO./ AUG. 1965  
NU-0030

Gold coated stainless steel tubes containing insulated electrical conductors are brazed at a low temperature to a copper coated stainless steel sealing block with a gold-copper eutectic. This produces an effective seal without using flux or damaging the electrical conductors.

B65-10261

BORON CARBIDE WHISKERS PRODUCED BY VAPOR

DEPOSITION

INNOVATOR NOT GIVEN /GE/ SEP. 1965  
HQ-24

Boron carbide whiskers have an excellent combination of properties for use as a reinforcement material. They are produced by vaporizing boron carbide powder and condensing the vapors on a substrate. Certain catalysts promote the growth rate and size of the whiskers.

B65-10270

CERAMIC MATERIALS PURIFIED BY EXPERIMENTAL

METHOD

INNOVATOR NOT GIVEN /IIT RES. INST./ SEP. 1965

LEWIS-225

Crystalline ceramic materials are purified for use as high-temperature electrical insulators. Any impurities migrate to the cathode when a dc voltage is applied across the material while it is heated in an inert gas atmosphere.

B65-10288

ORGANIC REACTANTS RAPIDLY PRODUCE PLASTIC FOAM

LOOK, G. F. SEP. 1965 SEE ALSO B65-10090

LANGLEY-37

Adding trichlorofluoromethane to polyether resin accelerates the reaction between the resin and toluene diisocyanate. This accelerated reaction instantaneously produces a plastic foam of low density and uniform porosity needed to provide buoyancy for flotation recovery of instrument packages dropped into the sea from spacecraft.

B65-10294

ADHERENT PROTECTIVE COATINGS PLATED ON

MAGNESIUM-LITHIUM ALLOY

INNOVATOR NOT GIVEN /IBM/ OCT. 1965 SEE ALSO

B63-10389

M-FS-365

Zinc is plated on a magnesium-lithium alloy by using a modification of the standard zinc-plate immersion bath. Further protection is given the alloy by applying a light plating of copper on the zinc plating. Other metals are plated on the copper by using conventional plating baths.

B65-10302

BURNISHING TECHNIQUE IMPROVES LUBRICATION OF

THREADED FASTENERS

GRUPER, J. L. /LOCKHEED MISSILES AND SPACE CO./

OCT. 1965

LEWIS-217

Burnishing a molydisulfide coating into the thread surfaces of fasteners eliminates the need for binders and vehicles which ensure coverage and retention of the lubricant during fastening. The coating may be applied by any convenient method.

B65-10303

NICKEL SOLUTION PREPARED FOR PRECISION

ELECTROFORMING

INNOVATOR NOT GIVEN /ELECTRO-OPTICAL SYSTEMS/

OCT. 1965

WOO-070

Lightweight, precision optical reflectors are made by electroforming nickel onto masters. Steps for the plating bath preparation, process- control testing, and bath composition adjustments are prescribed to avoid internal stresses and maintain dimensional accuracy of the electrodeposited metal.

B65-10316

REMOVABLE WELL IN REACTION FLASK FACILITATES

CARBON DIOXIDE COLLECTION

INNOVATOR NOT GIVEN OCT. 1965

ARC-47

Removable plastic well with a flange that seats on the rim of an Erlenmeyer screwcap flask aids quantitative collection of carbon dioxide liberated in the flask. The well can be removed without danger of cross-contamination. It can collect other gases using appropriate absorbents.

B65-10321

PLATED NICKEL WIRE MESH MAKES SUPERIOR

CATALYST BED

SILL, M. /BELL AEROSYSTEMS CO./ OCT. 1965

MSC-216

Porous nickel mesh screen catalyst bed produces gas evolution in hydrogen peroxide thrust chambers used for attitude control of space vehicles. The nickel wire mesh disks in the catalyst bed are plated in rugose form with a silver-gold coating.

B65-10335

MAGNETIC FLUID READILY CONTROLLED IN ZERO

GRAVITY ENVIRONMENT

PAPELL, S. S. NOV. 1965

LEWIS-126

Colloid composed of finely ground iron oxide in a fluid such as heptane, is controlled and directed magnetically in a zero gravity environment. It will not separate on standing for long periods or after exposure to magnetic or centrifugal forces. Because of its low density and low viscosity, it is easily pumped.

B65-10336

ANODIZATION PROCESS PRODUCES OPAQUE,

REFLECTIVE COATINGS ON ALUMINUM

INNOVATOR NOT GIVEN /LOCKHEED MISSILES AND SPACE CO./ NOV. 1965

M-FS-348

Opaque, reflective coatings are produced on aluminum articles by an anodizing process wherein the anodizing bath contains an aqueous dispersion of finely divided insoluble inorganic compounds. These particles appear as uniformly distributed occlusions in the anodic deposit on the aluminum.

B65-10337

SPECIAL COATINGS CONTROL TEMPERATURE OF

STRUCTURES

FULK, M. M. MAYER, R. W. /BALL BROTHERS RES.

CORP./ NOV. 1965

GSFC-444

Special coatings in the form of paints that exhibit controlled ratios of sunlight absorptivity to grey-body emissivity control the temperature of structures in space flight. These finishes exhibit good resistance to ultraviolet radiation and do not discolor.

B65-10341

LIGHTWEIGHT HINGED BELLOWS RESTRAINT HAS

HIGH LOAD CAPACITY

IMUS, E. E. /N. AM. AVIATION/ NOV. 1965

WOO-151

High angular stresses in fluid-handling ducts are accommodated by a lightweight hinged bellows restraint. This device transmits angular stress to points close to the axis center and spreads it over a rigid configuration.

B65-10344

SOLUBLE UNDERCOATING FACILITATES REMOVAL OF FOAMED-IN-PLACE INSULATION

DUNCAN, A. C. HILL, C. L., JR. NOV. 1965  
LEWIS-193

Foamed-in-place insulation can be removed and reused by coating the surface with a soluble peel coat before applying the foam mixture. Removal of the insulation is effected by slitting it and pouring a solvent in the slit to dissolve the peel coat. The insulation can then be stripped off intact.

B65-10354

PIGMENTED COATING RESISTS THERMAL SHOCK

HARADA, Y. /IIT RES. INST./ RECHTER, H. L. NOV. 1965

JPL-SC-083

Coating pigment composed of zinc oxide and potassium silicate resists the effects of thermal shock and long exposure to direct sunlight.

B65-10357

AIR-CURED CERAMIC COATING INSULATES AGAINST HIGH HEAT FLUXES

SEITZINGER, V. F. NOV. 1965

M-FS-150

Reflective insulating ceramic coating protects supporting structures in area adjacent to rocket engines from the intense heat fluxes in the rocket exhaust plumes.

B65-10364

POROUS GLASS MAKES EFFECTIVE SUBSTRATE FOR OZONE-SENSING REAGENT

INNOVATOR NOT GIVEN /PARAMETRICS/ DEC. 1965

GSFC-368

Porous-glass substrate is used for absorption of a dye used in measuring the concentration of atmospheric ozone at high altitudes. This measurement is based on the chemiluminescence produced in the reaction between ozone and the dye, rhodamine B. The porous glass provides a large interstitial surface area which promotes this reaction.

B65-10366

UNIQUE GEAR DESIGN PROVIDES SELF-LUBRICATION

WINIARSKI, F. J. /SPACE TECHNOL. LAB./ DEC. 1965

JPL-SC-079

Composite gear configuration provides a reliable automatic means for replenishing gear mechanism lubricants that dissipate in the harsh environment of space. The center or hub section of the gear consists of a porous, oil-impregnated material, and the outer or toothed section has radially drilled passages to cause the oil to gradually flow to the gear teeth surfaces.

B65-10372

WIRE BUNDLE FORMED INTO GRIDS WITH MINUTE INTERSTICES

TODD, H. H. /ELECTRO-OPT. SYSTEMS/ DEC. 1965

WOO-089

Deforming the ends of a bundle of closely packed parallel wires to restrict the interstices to substantially uniform and minute dimensions produces grids or filters for ion engines. Porous metal structures made by this process are also used as fuel cell electrodes, diffusion membranes, and catalysts.

B65-10374

PLASTIC PLUS STAINLESS-STEEL FIBERS MAKE RESILIENT, IMPERMEABLE MATERIAL

SMIRRA, J. R. /THOMPSON RAMO WOOLDRIDGE/ DEC. 1965

WOO-246

Plastic material combined with stainless-steel fibers and molded under heat and pressure into a desired configuration is both soft enough to deform under a load and resilient enough to return to its original shape when the load is removed.

B65-10384

PROBE SAMPLES COMPONENTS OF ROCKET ENGINE EXHAUST

SCHUMACHER, P. E. /N. AM. AVIATION/ DEC. 1965

M-FS-485

Water-cooled, cantilevered probe samples the exhaust plume of rocket engines to recover particles for examination. The probe withstands the stresses of a rocket exhaust plume environment for a sufficient period to obtain a useful sample of the exhaust components.

B65-10390

TEST STRIPS DETECT DIFFERENT CO<sub>2</sub> CONCENTRATIONS IN CLOSED COMPARTMENTS

INNOVATOR NOT GIVEN /MELPAR/ DEC. 1965

MSC-210

Four different test strips, using crystal violet for one pair of strips and basic fuchsin as a dye for the second pair, give unambiguous colorimetric indications of four different concentrations of carbon dioxide in the atmosphere of a closed compartment. Tetraethylene pentamine is used as a dye decoloring agent.

B65-10397

NEW BRAZING ALLOY ELIMINATES METAL-STRESS CRACKING

HUSCHLER, E., JR. /N. AM. AVIATION/

ROEDER, E. R. DEC. 1965

WOO-249

Silver 15 zinc brazing alloy avoids the liquid-metal stress cracking of base metals when applied to 347, 316, and 410 stainless steels and certain other alloys.

B65-10398

NICKEL/TIN COATING PROTECTS THREADED FASTENERS IN CORROSIVE ENVIRONMENT

CHARLES, J. VEEDER, L. /N. AM. AVIATION/ DEC. 1965

MSC-253

Threaded fasteners used in corrosive environments are plated with electroless nickel and electroplated, over the nickel, with tin. This provides a corrosion-resistant coating for the fasteners.

B66-10005

FLUORIDE COATINGS MAKE EFFECTIVE LUBRICANTS IN MOLTEN SODIUM ENVIRONMENT

JAN. 1966 SEE ALSO NASA-TN-D-2348

LEWIS-229

Coating bearing surfaces with calcium fluoride-barium fluoride film provides effective lubrication against sliding friction in molten sodium and other severe environments at high and low temperatures.

B66-10009

COILED SHEET METAL STRIP OPENS INTO TUBULAR CONFIGURATION

PARK, J. J. JAN. 1966 SEE ALSO B64-10011

GSFC-425

Copper alloy is converted into a spring material that can be rolled into a compact coil which will spontaneously open to form a tube in the long direction of the strip. The copper alloy is passed through a furnace at a prescribed temperature while restraining the strip in the desired tubular configuration.

B66-10024

ALUMINIZED FIBER GLASS INSULATION CONFORMS TO CURVED SURFACES

INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966

M-FS-477

Layers of fiber glass with outer reflective films of vacuum-deposited aluminum or other reflective metal, provide thermal insulation which conforms to curved surfaces. This insulation has good potential for cryogenic systems.

B66-10027

FLEXIBLE PROTECTIVE COATINGS MADE FROM SILICON-NITROGEN MATERIALS

INNOVATOR NOT GIVEN /SOUTHERN RES. INST./ JAN. 1966

M-FS-528

Flexible protective coatings formed from either of two polymers endure high temperatures for long periods. One polymer is a byproduct in hexaphenylcyclotrisilazane preparation, the other is obtained by heating bis/methylamino-/diphenylsilane.

B66-10029

EPOXY BLANKET PROTECTS MILLED PART DURING EXPLOSIVE FORMING  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
M-FS-307

Epoxy blanket protects chemically milled or machined sections of large, complex structural parts during explosive forming. The blanket uniformly covers all exposed surfaces and fills any voids to support and protect the entire part.

B66-10033

ELECTRON BEAM SEALS OUTER SURFACES OF POROUS BODIES  
HERZ, W. H. /KULITE TUNGSTEN CO./ KURTZ, A. D.  
KURTZ, R. A. FEB. 1966  
M-FS-562

Porous tungsten plugs provide even airflow for frictionless bearings used in air bearing supported gyros. The plugs have their outer cylindrical surface sealed by an electron beam process to ensure unidirectional airflow through their exit ends.

B66-10037

PROCESS REDUCES PORE DIAMETERS TO PRODUCE SUPERIOR FILTERS  
TODD, H. H. /ELECTRO-OPT. SYSTEMS/ FEB. 1966  
W00-093

Porous metal structure with very small pore diameters is produced by heating the structure in oxygen for an oxidized surface layer, cooling it, and heating it in hydrogen to deoxidize the oxidized portion. Such structures are superior catalyst beds and filters.

B66-10043

POLYMER FILM EXHIBITS THERMAL AND RADIATION STABILITY  
BELL, V. L., JR. FEB. 1966  
LANGLEY-100

Aromatic/heterocyclic polymers /Pyrrones/ have the ability to absorb large quantities of photolytic, thermal and radiolytic energies while retaining their useful properties. They are prepared from the room temperature reaction of tetraamines and tetraacids.

B66-10044

PROTECTIVE COATING WITHSTANDS HIGH TEMPERATURE IN OXIDIZING ATMOSPHERE  
MELLOR, C. H. /FENWAL, INC./ FEB. 1966  
M-FS-529

Protective coating containing a plasma arc sprayed mixture of hafnium oxide and zirconium diboride will withstand high temperatures in an oxygen rich atmosphere. Used on a homogeneous tungsten thermocouple, it does not flake or crack on subsequent cooling and reheating, and does not degrade the thermocouple response time.

B66-10053

SPRAY-ON TECHNIQUE SIMPLIFIES FABRICATION OF COMPLEX THERMAL INSULATION BLANKET  
BOND, W. E. G. RAYMOND, R. /N. AM. AVIATION/ FEB. 1966  
M-FS-497

Spray-on process constructs molds used in forming sections of thermal insulation blankets. The process simplifies the fabrication of blankets by eliminating much of the equipment formerly required and decreasing the time involved.

B66-10070

REFLECTIVE INSULATOR LAYERS SEPARATED BY BONDED SILICA BEADS  
ZUVER, N. T., JR. /GRUMMAN AIRCRAFT CORP./ FEB. 1966  
MSC-215

Nonconductive silica beads are bonded to metallic reflecting insulation sheets prior to fabrication of multilayer reflectors. This eliminates the

need for separate nonconductive sheets and simplifies the fabrication process.

B66-10081

POLYTETRAFLUOROETHYLENE LUBRICATES BALL BEARINGS IN VACUUM ENVIRONMENT  
INNOVATOR NOT GIVEN /BENDIX CORP./ MAR. 1966  
SEE ALSO NASA-SP-5014  
M-FS-379

Polytetrafluoroethylene /PTFE/ balls are interspersed among steel ball bearings to provide a dry lubricant in a high vacuum environment. The steel balls are lubricated by the film worn off the PTFE balls.

B66-10083

CRYOSTAT MODIFIED TO AID ROTATING BEAM FATIGUE TEST  
DURHAM, T. F. /N. AM. AVIATION/ MAR. 1966  
M-FS-435

Modified stainless steel dewar aids rotating beam fatigue test in a cryogenic environment. The dewar is modified to receive extended specimen supporting members through specially designed rotary seals. The test set can be fully enclosed and pressurized with an inert gas to make the system explosion proof.

B66-10087

SOLID-FILM LUBRICANT IS EFFECTIVE AT HIGH TEMPERATURES IN VACUUM  
SLINEY, H. E. MAR. 1966 SEE ALSO B63-10453 AND B63-10562  
LEWIS-228

Calcium fluoride with a suitable inorganic binder forms a stable solid-film lubricant when fused to the surface to be lubricated. It is effective in environments at elevated temperatures and gas pressures ranging from atmospheric to high vacuum. It is not stable in reducing atmospheres.

B66-10098

RADIOACTIVE TRACER SYSTEM DETECTS OIL CONTAMINANTS IN FLUID LINES  
ROTH, B. /N. AM. AVIATION/ MAR. 1966  
M-FS-512

Radioactive tracer system continuously detects and monitors lubricating oil contamination in high pressure fluid lines.

B66-10104

VAPOR CONDENSATION PROCESS PRODUCES SLURRY OF MAGNESIUM PARTICLES IN LIQUID HYDROCARBONS  
PROK, G. M. WALSH, T. J. WITZKE, W. R. MAR. 1966  
LEWIS-263

Vapor condensation apparatus produces a physically stable, homogeneous slurry of finely divided magnesium and liquid hydrocarbons. The magnesium is vaporized and the resultant vapor is cooled rapidly with a liquid hydrocarbon spray, which also serves as the dispersing medium for the condensed magnesium particles.

B66-10110

ETCHING PROCESS MILLS PH 14-8 MO ALLOY STEEL TO PRECISE TOLERANCES  
CHIPMAN, B. L. /N. AM. AVIATION/ MULLAND, P. W. MAY 1966  
MSC-270

Chemical milling process, which combines an aqua regia etchant with a sulfonate wetting agent, produces finishes on PH 14-8 molybdenum alloy steel to precise tolerances. This process permits precision removal of excess metal from the steel in annealed and/or aged conditions.

B66-10111

STORAGE-STABLE FOAMABLE POLYURETHANE IS ACTIVATED BY HEAT  
INNOVATOR NOT GIVEN /GOODYEAR AEROSPACE CORP./ MAY 1966  
LANGLEY-187

Polyurethane foamable mixture remains inert in storage unit activated to produce a rapid foaming reaction. The storage-stable foamable composition is spread as a paste on the surface of an expandable structure and, when heated, yields a rigid open-cell polyurethane foam that is

systems in vacuum tubes. Chromium oxide is applied either as a surface layer or as a doping material. The new coatings eliminate the high-temperature migration problems of carbon surface treatments.

**B66-10230**  
ELECTRIC ARC HEATER IS SELF STARTING  
BROWN, R. D. MAY 1966  
LANGLEY-208

Remote method initiates an electric arc over a large range of gaps between two water-cooled electrodes of an arc-heated wind tunnel without disassembling the arc unit. This type of starting system can be used on both three-phase ac arc heaters and dc arc heaters.

**B66-10234**  
STANDARDS FOR ELECTRON PROBE MICROANALYSIS OF SILICATES PREPARED BY CONVENIENT METHOD  
WALTER, L. S. JUN. 1966  
GSFC-469

Standard compositions suitable for electron probe microanalysis of various silicates are prepared by coprecipitation of specified salts with colloidal silica to form a gel which is decomposed into a powdered oxide mixture and compressed into thin pellets. These pellets of predetermined standard are compared with a silicate sample to determine its composition.

**B66-10256**  
DRY FILM LUBRICANT IS EFFECTIVE AT EXTREME LOADS  
INNOVATOR NOT GIVEN /MIDWEST RES. INST./ JUN. 1966 SEE ALSO NASA-TM-X-53331  
M-FS-628

Dry film lubricant protects low speed sliding surfaces under extreme loading. The lubricant in an inorganic binder is applied to substrates with sufficient hardness to prevent surface deformation in the applicable load range.

**B66-10259**  
SUBSTITUTED SILANE-DIOL POLYMERS HAVE IMPROVED THERMAL STABILITY  
BYRD, J. D. CURRY, J. E. JUN. 1966  
M-FS-469

Organosilicon polymers were synthesized to produce improved physical and chemical properties, including high thermal stability. Of the polymers produced, poly(4, 4 prime-bisoxabi-phenylene/diphenylsilane, formed from bis(anilino/diphenylsilane and p, p prime-biphenol, was found to have the most desirable properties.

**B66-10273**  
BORON-DEOXIDIZED COPPER WITHSTANDS BRAZING TEMPERATURES  
SCHMIDT, E. H. /N. AM. AVIATION/ JUN. 1966  
M-FS-762

Boron-deoxidized high-conductivity copper is used for fabrication of heat transfer components that are brazed in a hydrogen atmosphere. This copper has high strength and ductility at elevated temperatures and does not exhibit massive intergranular failure.

**B66-10281**  
VAPOR DIFFUSION ELECTRODE IMPROVES FUEL CELL OPERATION  
SMITH, J. D. /MONSANTO RES. CORP./ JUN. 1966  
LEWIS-187

Vapor diffusion type fuel cell electrode presents a nonwetting barrier to the liquid feedstocks so they may contact the electrolyte only in the vapor state. Thus, it effects feedstock mixing with the electrolyte at the electrolyte/catalyst interface but prevents feedstock decomposition and catalyst poisoning from liquid mingling.

**B66-10288**  
IMPROVED THERMAL INSULATION MATERIALS MADE OF FOAMED REFRACTORY OXIDES  
MOUNTVALA, A. J. NAKAMURA, H. H. RECHTER, H. L. /IIT RES. INST./ JUN. 1966 SEE ALSO B65-10357  
M-FS-735

Foamed refractory oxides provide lightweight,

reflective thermal insulation materials. The materials have a low bulk density and high thermal shock resistance.

**B66-10296**  
APPARATUS ENABLES ACCURATE DETERMINATION OF ALKALI OXIDES IN ALKALI METALS  
DUPRAW, W. A. GAHN, R. F. GRAAB, J. W. MAPLE, W. E. ROSENBLUM, L. JUL. 1966  
LEWIS-256

Evacuated apparatus determines the alkali oxide content of an alkali metal by separating the metal from the oxide by amalgamation with mercury. The apparatus prevents oxygen and moisture from inadvertently entering the system during the sampling and analytical procedure.

**B66-10298**  
ULTRASONIC CLEANING RESTORES DEPTH-TYPE FILTERS  
INNOVATOR NOT GIVEN /LITTLE /ARTHUR D./ INC./ JUL. 1966  
M-FS-540

Cleaning process uses a nonionic surfactant and ultrasonic agitation to restore depth-type fibrous filters to maximum effectiveness.

**B66-10299**  
ELECTROLYTIC ETCHING PROCESS PROVIDES EFFECTIVE BONDING SURFACE ON STAINLESS STEEL  
INNOVATOR NOT GIVEN /RCA/ JUL. 1966  
GSFC-484

Electrolytic etching process prepares surfaces of a stainless steel shell for reliable, high strength adhesive bonding to dielectric materials. The process uses a 25 percent aqueous solution of phosphoric acid.

**B66-10305**  
SIMPLE, NONDESTRUCTIVE TEST IDENTIFIES METALS  
DODDS, D. J. /N. AM. AVIATION/ JUL. 1966  
MSC-525

Rapid, nondestructive test for identifying metals measures the characteristic potential difference produced by galvanic reaction between a reference electrode and the test metal. A drop of water is used as an electrolyte.

**B66-10312**  
CHEMICAL MILLING SOLUTION PRODUCES SMOOTH SURFACE FINISH ON ALUMINUM  
LORENZEN, H. C. /N. AM. AVIATION/ JUL. 1966  
MSC-549

Elementary sulfur mixed into a solution of caustic soda and salts produces an etchant which will chemically mill end-grain surfaces on aluminum plate. This composition results in the least amount of thickness variation and pitting.

**B66-10313**  
SEA DYE MARKER PROVIDES VISIBILITY FOR 20 HOURS  
DE LAAT, F. /N. AM. AVIATION/ JUL. 1966  
MSC-714

Sea dye marker block releases a visible slick which lasts at least twelve hours. The dye marker uses a fluorescent dye in a heat cured binder which, when immersed in seawater, releases the dye at a controlled rate.

**B66-10322**  
VALVE SEAT PORES SEALED WITH THERMOSETTING MONOMER  
OLMORE, A. B. /N. AM. AVIATION/ JUL. 1966  
M-FS-900

Hard anodic coating provides a smooth wear-resistant valve seating surface on a cast aluminum alloy valve body. Vacuum impregnation with a thermosetting monomer, diallyl phthalate, seals the pores on the coating to prevent galvanic corrosion.

**B66-10327**  
INFLATABLE HOLDING FIXTURE PERMITS X-RAYS TO BE TAKEN OF INNER WELD AREAS  
HENDRICKSON, D. R. SPENCE, T. M. /N. AM. AVIATION/ JUL. 1966  
M-FS-856

self-bondable to the substrate.

B66-10119

SMALL, HIGH-INTENSITY FLASHER PERMITS  
CONTINUOUS CLOSE-IN PHOTOGRAPHY  
PASCALE, C. /PRINCETON UNIV./ MAR. 1966  
NU-0043

Compact, high-intensity spark-flash unit is used as a light source for continuous rapid photography. The spark-breakdown flash source is enclosed in polymethylmethacrylate and incorporates a parabolic reflector.

B66-10120

OXYGEN-HYDROGEN TORCH IS A SMALL-SCALE  
STEAM GENERATOR  
MASKELL, C. E. /AEROJET-GEN. CORP./ MAR. 1966  
NU-0042

Standard oxygen-hydrogen torch generates steam for corrosion-rate analysis of various metals. The steam is generated through local combustion inside a test chamber under constant temperature and pressure control.

B66-10131

SURFACTANT FOR DYE-PENETRANT INSPECTION IS  
INSENSITIVE TO LIQUID OXYGEN  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1966  
M-FS-475

LOX insensitive solvent is blended into a mixture of commercially available surfactants to clean metal surfaces which are to be investigated by the dye-penetrant method. The surfactant mixture is applied before and after application of the dye.

B66-10138

BISMUTH ALLOY POTTING SEALS ALUMINUM CONNECTOR  
IN CRYOGENIC APPLICATION  
FLOWER, J. F. /DOUGLAS AIRCRAFT CO./ STAFFORD,  
R. L. APR. 1966  
WOO-260

Bismuth alloy potting seals feedthrough electrical connector for instrumentation within a pressurized vessel filled with cryogenic liquids. The seal combines the transformation of high-bismuth content alloys with the thermal contraction of an external aluminum tube.

B66-10139

HOT-WIRE DETECTOR FOR CHEMICALLY ACTIVE  
MATERIALS USED IN GAS CHROMATOGRAPHY  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ APR. 1966  
MSC-269

Hot-filament detector analyzes chemically active materials used in gas chromatography. The detector reacts chemically with the effluent vapors in the gas chromatographic apparatus to change the electrical resistance of the filament as a function of the effluent composition. Due to the changes produced by chemical action on the filament, the system is often calibrated.

B66-10140

CORROSION OF METAL SAMPLES RAPIDLY MEASURED  
MASKELL, C. E. /AEROJET-GEN. CORP./ APR. 1966  
NU-0041

Corrosion of a large number of metal samples that have been exposed to controlled environment is accurately and rapidly measured. Wire samples of the metal are embedded in clear plastic and sectioned for microexamination. Unexposed wire can be included in the matrix as a reference.

B66-10165

GALLIUM ALLOY FILMS INVESTIGATED FOR USE  
AS BOUNDARY LUBRICANTS  
APR. 1966 SEE ALSO NASA-TN-D-2721 AND B63-10337  
LEWIS-245

Gallium alloyed with other low melting point metals has excellent lubricant properties of fluidity and low vapor pressure for high temperature or vacuum environments. The addition of other soft metals reduces the corrosivity and formation of undesirable alloys normally found with gallium.

B66-10166

DISPENSER LEAK-TESTS AND STERILIZES RUBBER  
GLOVES

INNOVATOR NOT GIVEN /N. AM. AVIATION/ APR. 1966  
MSC-285

Portable vacuum-operated apparatus leak-tests and sterilizes rubber gloves. The gloves are fitted to the hands directly from the apparatus without external handling.

B66-10185

IMPROVED ADHESIVE FOR CRYOGENIC APPLICATIONS  
CURES AT ROOM TEMPERATURE  
KLINGER, H. J. SMITH, M. B. /TELECOMPUTING  
CORP./ MAY 1966  
WOO-132

Adhesive cured at room temperature provides an effective adhesive bond over the range from room temperature down to the temperature of liquid hydrogen. The adhesive consists of one part of 200-mesh powdered nylon filler to two parts of an epoxy-polyamine resin.

B66-10194

SILAZANE POLYMERS SHOW PROMISE FOR HIGH-  
TEMPERATURE APPLICATION  
JUN. 1966 SEE ALSO NASA-SP-5030  
M-FS-466

Several silazane intermediate compounds and polymers have been prepared which are potentially useful as high temperature coatings and elastomers. These silazane polymers exhibit stability in a temperature range of 300 to 400 degrees C.

B66-10196

FIBERS OF NEWLY DEVELOPED REFRACTORY CERAMICS  
PRODUCED BY IMPROVED PROCESS  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ MAY  
1966  
WOO-169

Rods of refractory ceramic material and glasses having relatively high fusion temperatures and tensile strengths are converted to fiber by subjecting these rods to alternate fusion and gas-jet bursts. The refractory, high-tensile-strength fibers produced are combined with suitable binder to produce heat-resistant fabrics and rigid structures.

B66-10207

WHITE PRIMER PERMITS A CORROSION-RESISTANT  
COATING OF MINIMUM WEIGHT  
ALBRECHT, R. H. JENSEN, D. P. SCHNAKE, P.  
/SHERWIN WILLIAMS CO./ MAY 1966  
M-FS-304

White primer for coating 2219 aluminum alloy supplies a base for a top coating of enamel. A formulation of pigments and vehicle results in a primer with high corrosion resistance and minimum film thickness.

B66-10221

SUBMICRON METAL POWDERS PRODUCED BY BALL  
MILLING WITH GRINDING AIDS  
QUATINETZ, M. SCHAFER, R. J. MAY 1966 SEE ALSO  
NASA-TN-D-879  
LEWIS-188

In ball milling metal powders to submicron size, various salts are more effective as grinding aids than conventional surfactants. Absolute ethyl alcohol is used as the grinding liquid.

B66-10222

NICKEL-BASE SUPERALLOYS DEVELOPED FOR HIGH-  
TEMPERATURE APPLICATIONS  
FRECHE, J. C. MAY 1966 SEE ALSO  
NASA-HEMO-4-13-59E, NASA-TN-D-260,  
NASA-TN-D-1531, AND NASA-TN-D-2495  
LEWIS-226

Class of nickel-base superalloys containing varying percentages of alloying elements have good workability and high strength at elevated temperatures /1500 to 2200 degrees F/.

B66-10227

CHROMIUM OXIDE COATINGS IMPROVE THERMAL  
EMISSION OF ALUMINA  
UPSHAW, V. /HUGHES AIRCRAFT CO./ MAY 1966  
WOO-263

Chromium oxide coatings improve thermal radiation characteristics of alumina-coated heater-cathode



Inflatable rubber gland positions and holds X-ray film in positive contact with inner weld areas of manifold torus assemblies for verifying the weld quality. The gland is constructed to conform to the inside diameter of the manifold torus.

B66-10340

DEVICE REMOVES HYDROGEN GAS FROM ENCLOSED SPACES

CARSON, W. N. /GE/ JUL. 1966  
GSFC-495

Hydrogen-oxidant galvanic cell removes small amounts of hydrogen gas continually released from equipment, such as vented silver-zinc batteries, in enclosed compartments where air venting is not feasible. These cells are used in satellite compartments.

B66-10358

ELECTROCHEMICAL MILLING REMOVES BURRS AND SOLDER FROM TUBING ENDS

HINSHAW, J. O. /N. AM. AVIATION/ AUG. 1966  
M-FS-714

Electrochemical milling removes burrs and solder from the cut ends of stainless steel capillary tubing. An electrolyte consisting primarily of a solution of sulfuric and phosphoric acids is used.

B66-10373

BEARING ALLOYS WITH HEXAGONAL CRYSTAL STRUCTURES PROVIDE IMPROVED FRICTION AND WEAR CHARACTERISTICS

BUCKLEY, D. H. JOHNSON, R. L. AUG. 1966 SEE  
ALSO NASA-TN-D-2523, NASA-TN-D-2524,  
NASA-TN-D-2671, NASA-TN-D-3235  
LEWIS-320

Bearings of titanium, cobalt, and other hexagonal crystal alloys are used in vacuum and high temperature environments. These temperature-stabilized alloys have reduced friction and wear characteristics and therefore have potential use in aircraft seals, hydraulic equipment, and artificial human joints.

B66-10380

SUBMICRON HOLES IN THIN FILMS INCREASE SAMPLING RANGE OF MASS SPECTROMETERS

WILLENS, R. H. /CONSOLIDATED SYSTEMS/ AUG. 1966

JPL-SC-097

Gold film is vapor deposited onto a glass slide containing submicron latex spheres which are removed, leaving submicron holes in the film. These thin-film apertures allow accurate mass spectrometer sampling of gas mixtures at pressures on the order of 100 torr.

B66-10387

SELF-SUPPORTED ALUMINUM THIN FILMS PRODUCED BY VACUUM DEPOSITION PROCESS

NEFF, J. E. TIMME, R. W. SEP. 1966  
ARC-58

Self-supported aluminum thin film is produced by vacuum depositing the film on a polyvinyl formal resin film and then removing the resin by radiant heating in the vacuum. The aluminum film can be used as soon as the resin is eliminated.

B66-10395

COMPOSITE GASKETS ARE COMPATIBLE WITH LIQUID OXYGEN, RESIST COMPRESSION SET

GOSNELL, R. B. /WHITTAKER CORP./ SEP. 1966

M-FS-455

Gaskets fabricated by laminating fluorocarbon polymers with fiber glass cloth have a low compression set. Their flexibility is not subject to drastic changes at the temperature of liquid oxygen with which they are used. The fabrication process is controlled so that the fibers are not impregnated with the polymer.

B66-10398

THIN-FILM FERRITES VAPOR DEPOSITED BY ONE-STEP PROCESS IN VACUUM

HACKSKAYLO, M. /MELPAR/ SEP. 1966  
MSC-259

Thin-film ferrites are formed by vapor deposition

of a mixture of powdered ferrites and powdered boron oxide at controlled temperatures in a vacuum chamber. These films are used in memory devices for computers and as thin-film inductors in communications and telemetry systems.

B66-10400

SYSTEM FOR ETCHING THICK ALUMINUM LAYERS MINIMIZES BRIDGING AND UNDERCUTTING

INNOVATOR NOT GIVEN /BENDIX CORP./ SEP. 1966  
M-FS-1366

Four step photoresist process for etching thick aluminum layers for semiconductor device contacts produces uniform contact surfaces, eliminates bridging, minimizes undercutting, and may be used on various materials of any thickness.

B66-10421

COPPER WIRE PLATED WITH NICKEL AND SILVER RESISTS CORROSION

INNOVATOR NOT GIVEN /N. AM. AVIATION/ SEP. 1966  
M-FS-761

Copper wire for electrical harnesses, when plated with both nickel and silver, resists galvanic corrosion and high temperatures while maintaining electrical properties and solderability.

B66-10445

WELDABLE ALUMINUM ALLOY HAS IMPROVED MECHANICAL PROPERTIES

WESTERLUND, R. W. /ALCOA RES. LABS./ OCT. 1966  
M-FS-295

Weldable aluminum alloy has good resistance to stress-corrosion cracking, shows unchanged strength and formability after storage at room temperature, and can be pre-aged, stretched, and aged. Since toxic fumes of cadmium oxide are evolved when the new alloy is welded, adequate ventilation must be provided.

B66-10448

THERMAL STRESS-RELIEF TREATMENTS FOR 2219 ALUMINUM ALLOY ARE EVALUATED

INNOVATOR NOT GIVEN /BOEING CO./ OCT. 1966  
M-FS-1213

Evaluation of three thermal stress relief treatments for 2219 aluminum alloy in terms of their effect on residual stress, mechanical properties, and stress corrosion resistance. The treatments are post aging and stress relieving fullscale and subscale parts formed in the aged T81 condition, and aging subscale parts formed in the unaged T31 condition.

B66-10451

REUSABLE CHELATING RESINS CONCENTRATE METAL IONS FROM HIGHLY DILUTE SOLUTIONS

BAUMAN, A. J. WEETAL, H. H. WELIKY, N. OCT. 1966

JPL-758

Column chromatographic method uses new metal chelating resins for recovering heavy-metal ions from highly dilute solutions. The absorbed heavy-metal cations may be removed from the chelating resins by acid or base washes. The resins are reusable after the washes are completed.

B66-10453

THERMOPLASTIC RUBBERLIKE MATERIAL PRODUCED AT LOW COST

HENDEL, F. J. OCT. 1966  
JPL-793

Thermoplastic rubberlike material is prepared by blending a copolymer of ethylene and vinyl acetate with asphalt and a petroleum distillate. This low cost material is easily molded or extruded and is compatible with a variety of fillers.

B66-10454

GAGE OF 6.5 PER CENT SI-FE SHEET IS CHEMICALLY REDUCED

GOLDMAN, A. PAVLOVIC, D. M. /WESTINGHOUSE ELEC. CORP./ OCT. 1966

MSC-537

Chemical milling process aids the production of 6.5 per cent silicon-iron soft magnetic-alloy sheets to very thin gauges. Following conventional rolling to safe gauge limits, the

material is chemically reduced to the desired gauge.

**B66-10458**  
HEAT TREATMENT STABILIZES WELDED ALUMINUM  
JIG AND TOOL STRUCTURES  
MEHNERT, R. S. /N. AM. AVIATION/ OCT. 1966  
MSC-800

Heat treatment processes, applied after welding but before machining, imparts above normal stability to welded aluminum jigs and tool structures. Weight saving will not be realized in these tools if rigidity equal to that of a comparable steel tool is required.

**B66-10467**  
XENON FORMS STABLE COMPOUND WITH FLUORINE  
CLAASSEN, H. H. MALM, J. G. SELIG, H. H. OCT. 1966  
ARG-4

Experiments show that xenon and fluorine combine readily at 400 deg C to form xenon tetrafluoride, which is colorless, crystalline, chemically stable and solid at room temperature. This process can be used for the separation of xenon from mixtures with other noble gases.

**B66-10475**  
BORATE GLASS EFFICIENTLY TRANSMITS  
ULTRAVIOLET LIGHT  
BISHAY, A. NOV. 1966  
ARG-91

Borate glass has high ultraviolet transmissibility characteristics. Applications for the borate glass include germicidal lamps, window glass, and optical instruments.

**B66-10479**  
ELECTROLESS NICKEL PLATING ON STAINLESS  
STEELS AND ALUMINUM  
INNOVATOR NOT GIVEN /GE/ NOV. 1966  
GSFC-533

Procedures for applying an adherent electroless nickel plating on 303 SE, 304, and 17-7 PH stainless steels, and 7075 aluminum alloy was developed. When heat treated, the electroless nickel plating provides a hard surface coating on a high strength, corrosion resistant substrate.

**B66-10487**  
ADHESIVE FOR POLYESTER FILMS CURES AT ROOM  
TEMPERATURE, HAS HIGH INITIAL TACK  
CHRISTIAN, C. M. FUST, G. W. WELCHEL, C. J.  
/THIOLKOL CHEM. CORP./ NOV. 1966  
M-FS-938

Quick room-temperature-cure adhesive bonds polyester-insulated flat electrical cables to metal surfaces and various other substrates. The bond strength of the adhesive may be considerably increased by first applying a commercially available polyamide primer to the polyester film.

**B66-10517**  
COLD TRAP INCREASES SENSITIVITY OF GAS  
CHROMATOGRAPH  
GARRARD, G. G. WESLEY, R. D. /N. AM. AVIATION/  
DEC. 1966  
M-FS-1617

Cold trap concentrates oxygen and argon to determine trace amounts /as low as 0.1 ppm/ in helium by gas chromatography.

**B66-10519**  
BRAZE ALLOY HOLDS BONDING STRENGTH OVER WIDE  
TEMPERATURE RANGE  
INNOVATOR NOT GIVEN /AEROJET-GEN. CORP./ NOV. 1966  
LEWIS-337

Copper-based quaternary alloys of the solid solution type is used for vacuum furnace brazing of large stainless steel components at a maximum temperature of 1975 deg F. The alloy has high bonding strength and good ductility over a temperature range extending from the cryogenic region to approximately 800 deg F.

**B66-10527**  
CRUCIBLE CAST FROM BERYLLIUM OXIDE AND  
REFRACTORY CEMENT IS IMPERVIOUS TO FLUX

**AND MOLTEN METAL**  
JASTRZEBSKI, Z. D. NOV. 1966  
ARG-22

Crucible from a mixture of a beryllium oxide aggregate and hydraulic refractory cement, and coated with an impervious refractory oxide will not deteriorate in the presence of fused salt-molten metal mixtures such as uranium-magnesium-zinc-halide salt systems. Vessels cast by this process are used in the flux reduction of oxides of thorium and uranium.

**B66-10528**  
LOWER-COST TUNGSTEN-RHENIUM ALLOYS  
KLOPP, W. D. RAFFO, P. L. WITZKE, W. R. DEC. 1966  
LEWIS-332

Tungsten-rhenium alloys with a substantially more dilute rhenium content have ductilities and other mechanical properties which compare favorably with the tungsten-rhenium alloys having much higher concentrations of the costly rhenium.

**B66-10535**  
PROCESS YIELDS CO-Fe ALLOYS WITH SUPERIOR  
HIGH TEMPERATURE MAGNETIC PROPERTIES  
BARRANGER, J. P. NOV. 1966  
LEWIS-333

Cobalt-iron alloys containing from 7.0 to 9.3 percent iron prepared from ultrapure cobalt and iron have the highest curie point of all known magnetically soft materials. Their high permeability, low hysteresis loss, good saturation induction, and squareloop characteristics recommend them for use in power transformers and rotating machinery.

**B66-10538**  
TUNGSTEN INSULATED SUSCEPTOR CUP FOR HIGH  
TEMPERATURE INDUCTION FURNACE ELIMINATES  
CONTAMINATION  
GERINGER, H. J. NOV. 1966  
LEWIS-283

METILUR /Materials Experimental Tungsten Induction Laboratory Unit Replacement/ is an improved, unitized design of a susceptor cup and shielding that uses only one type of construction material /tungsten/ which eliminates contamination. Cycling runs can be accomplished with METILUR.

**B66-10540**  
SILVER-BASE TERNARY ALLOY PROVES SUPERIOR  
FOR SLIP RING LEAD WIRES  
ERNST, R. H. WILLIAMS, D. N. NOV. 1966  
M-FS-1540

Slip ring lead wires composed of ternary alloys of silver, have high electrical conductivity, a tensile strength of at least 30,000 psi, high ductility, and are solderable and weldable. An unexpected advantage of these alloys is their resistance to discoloration on heating in air.

**B66-10551**  
NEW TUNGSTEN ALLOY HAS HIGH STRENGTH  
AT ELEVATED TEMPERATURES  
DEC. 1966 SEE ALSO NASA-TN-D-3248  
LEWIS-336

Tungsten-hafnium-carbon alloy has tensile strengths of 88,200 psi at 3000 deg F and 62,500 psi at 3500 deg F. Possible industrial applications for this alloy would include electrical components such as switches and spark plugs, die materials for die casting steels, and heating elements.

**B66-10558**  
TANTALUM ALLOYS RESIST CREEP DEFORMATION AT  
ELEVATED TEMPERATURES  
BUCKMAN, R. W., JR. /WESTINGHOUSE ELEC. CORP./  
DEC. 1966  
LEWIS-350

Dispersion-strengthened tantalum-base alloys possess high strength and good resistance to creep deformation at elevated temperatures in high vacuum environments. They also have ease of fabrication, good weldability, and corrosion resistance to molten alkali metals.

B66-10572

TUNGSTEN FIBER-REINFORCED COPPER COMPOSITES  
FORM HIGH STRENGTH ELECTRICAL  
CONDUCTORS

MC DANELS, D. L. SIGNORELLI, R. A. DEC. 1966  
SEE ALSO NASA-TN-D-3590  
LEWIS-338

Tungsten fiber-reinforced copper composites have tensile strength, yield strength, and modulus of elasticity proportional to fiber content. The composites form high strength electrical conductors.

B66-10578

SPRAYABLE BIREFRINGENT COATING ENABLES  
STRAIN MEASUREMENTS ON LARGE SURFACES  
HUMPHREY, F. T. MC GEE, W. M. /LOCKHEED AIRCRAFT  
CORP./ DEC. 1966  
M-FS-1484

Birefringent coating for strain measurements on large surfaces contains constituents that can be premixed and sprayed as a single component with conventional paint spray equipment. Elevated temperatures are not required for spraying or curing of the coating material which has long pot life.

B66-10586

GAS CHROMATOGRAPHIC COLUMN ENABLES ANALYSIS  
OF PROPELLANT HYDRAZINES  
WELZ, E. A., JR. /N. AM. AVIATION/ DEC. 1966  
MSC-1161

Stainless steel column is used in gas chromatographic analysis of propellant-grade hydrazine. The column has also been found effective for the separation of other amines and alcohols and nitriles.

B66-10594

USE OF STEEL AND TANTALUM APPARATUS FOR  
MOLTEN CD-MG-ZN ALLOYS  
BENNETT, G. A. BURRIS, L., JR. KYLE, M. L.  
NELSON, P. A. DEC. 1966  
ARG-199 ARG-200

Steel and tantalum apparatus contains various ternary alloys of cadmium, zinc, and magnesium used in pyrochemical processes for the recovery of uranium-base reactor fuels. These materials exhibit good corrosion resistance at the high temperatures necessary for fuel separation in liquid metal-molten salt solvents.

B66-10609

FILM COATING PERMITS LOW-FORCE SCRIBING  
WILLING, R. /N. AM. AVIATION/ DEC. 1966  
MSC-990

Film coating requires low scribing force, is relatively unaffected by aging, and gives off a soft, fine scribe residue containing a proven lubricant.

B66-10616

HEAT-TREATMENT OF METAL PARTS FACILITATED  
BY SAND EMBEDMENT  
BRISCOE, C. C. KELLEY, R. C. /BOEING CO./ DEC.  
1966  
M-FS-1543

Embedding metal parts of complex shape in sand contained in a steel box prevents strains and warping during heat treatment. The sand not only provides a simple, inexpensive support for the parts but also ensures more uniform distribution of heat to the parts.

B66-10631

SILVER-PALLADIUM BRAZE ALLOY RECOVERED FROM  
MASKING MATERIALS  
CIERNIAK, R. COLMAN, G. DECARLO, F. /N. AM.  
AVIATION/ DEC. 1966  
M-FS-1845

Method for recovering powdered silver-palladium braze alloy from an acrylic spray binder and rubber masking adhesive used in spray brazing is devised. The process involves agitation and dissolution of masking materials and recovery of suspended precious metal particles on a filter.

B66-10639

PROCESS FOR PREPARING DISPERSIONS OF

ALKALI METALS

LANDEL, R. F. REMBAUM, A. /JPL/  
JPL-734

Finely divided particles of alkali metals are produced by combining alkali metals with certain aromatic compounds in selected solvents to form low-temperature soluble complexes from which the pure alkali metals precipitate quantitatively when the solutions are warmed. All operations must be carried out in an inert gas atmosphere.

B66-10643

COMBUSTION CHAMBER STRUTS CAN BE EFFECTIVELY  
TRANSPIRATION COOLED  
PALMER, G. H. /N. AM. AVIATION/ DEC. 1966  
M-FS-1830

Vapor-deposited sintering technique increases the feasible temperature range of transpiration-cooled structural members in combustion chambers. This technique produces a porous mass of refractory metal wires around a combustion chamber structural member. This mass acts as a transpiration-cooled surface for a thick-walled tube.

B66-10646

PROCESS PRODUCES CHLORINATED AROMATIC  
ISOCYANATE IN HIGH YIELD  
TRISCHLER, F. /WHITTAKER CORP./ DEC. 1966  
M-FS-1658

Tetrachloreterephthaloyl chloride reacts with sodium azide in an atmosphere of nitrogen to form a high yield of tetrachloro-p-phenylene diisocyanate. The chlorinated diisocyanate should have application as an intermediate in the preparation of polyurethane foams. The high halogen content would impart added flame resistance to these foams.

B66-10651

INTERGRANULAR METAL PHASE INCREASES THERMAL  
SHOCK RESISTANCE OF CERAMIC COATING  
CARPENTER, H. W. /N. AM. AVIATION/ DEC. 1966  
M-FS-1862 M-FS-1865

Dispersed copper phase increases the thermal shock resistance of a plasma-arc-sprayed coating of zirconia used as a heat barrier on a metal substrate. A small amount of copper is deposited on the granules of the zirconia powder before arc-spraying the resultant powder composite onto the substrate.

B66-10666

WIRE MATERIAL REDUCES COMPRESSOR BLADE  
VIBRATION  
JOHNSON, R. L. DEC. 1966  
LEWIS-357

Wire material /Inconel/ having high friction and low wear characteristics, reduces vibratory stress and prevents compressor blade failure.

B66-10673

\*\*COLD\*\* SOLID PROPELLANT MOTOR HAS STOP-  
RESTART CAPABILITY  
HENDEL, F. J. DEC. 1966  
JPL-836

Solid propellant rocket is kept and fired at low temperatures in launch vehicles or spacecraft. The motor is capable of developing a specific impulse comparable to that of liquid propellant motors, is started, stopped, and restarted, and is stored in space without solar radiation causing hot spots on the motor casing.

B66-10681

THIN PLASTIC SHEET ELIMINATES NEED FOR  
EXPENSIVE PLATING  
STREMEL, R. L. /N. AM. AVIATION/ DEC. 1966  
M-FS-1896

Gasket of a commercially available plastic material is interposed between the mating surfaces in axial joints where a hard and a soft metal are in intimate contact under stress conditions. This eliminates the fretting problem and is quicker and less expensive than the plating process.

B66-10684

IMPROVED METHOD OF EDGE COATING FLAT RIBBON

WIRE  
INNOVATOR NOT GIVEN /SCHJELDAHL CO. /G.T.// DEC.  
1966  
M-FS-902

Method to coat the edges of flat ribbon wire is devised by using enamel with modified flow properties due to addition of 2 to 4 percent silicon. Conventional coating proceeds several edge coatings to minimize oxidation and additional conventional coats are applied after edge coating to build up thickness.

B66-10701  
TRACE LEVELS OF METALLIC CORROSION IN WATER  
DETERMINED BY EMISSION SPECTROGRAPHY  
SNELL, H. H. /N. AM. AVIATION/ DEC. 1966  
MSC-1193

Emission spectrographic method determines trace amounts of inorganic impurities in potable water. The capability of this innovation should arouse considerable interest among plant biologists, chemists working in organic synthesis, and pathologists.

B66-10705  
GLASS FORMULATION HAS HIGH COEFFICIENT OF  
THERMAL EXPANSION  
DAVIS, E. K. SEIDEL, J. /WESTINGHOUSE ASTRONUCL.  
LAB./ DEC. 1966 SEE ALSO B66-10704  
NU-0084

Glass formulation has a high coefficient of thermal expansion. The glass makes a good hermetic seal for the end of a stainless steel or copper tube such as a sheath of an instrumentation cable.

B66-10710  
RADIOACTIVE METHOD ENABLES DETERMINATION OF  
SURFACE AREAS RAPIDLY AND ACCURATELY  
ROESMER, J. ROLL, J. A. RYMER, G. T. SUNDAY, J.  
/WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1966  
NU-0088

Radioactive krypton adsorption technique is used to determine the surface area of more than one sample of material simultaneously.

## 04 LIFE SCIENCES

B63-10003  
NEW LOW-LEVEL A-C AMPLIFIER PROVIDES ADJUST-  
ABLE NOISE CANCELLATION AND AUTOMATIC TEMPERA-  
TURE COMPENSATION  
SMITH, J. R., JR. MAR. 1964  
ARC-2

A circuit utilizing a transistorized differential amplifier is developed for biomedical use. This low voltage operating circuit provides adjustable cancellation at the input for unbalanced noise signals, and automatic temperature compensation is accomplished by a single active element across the input-output ends.

B64-10025  
IMPROVED ELECTRODE GIVES HIGH-QUALITY  
BIOLOGICAL RECORDINGS  
DAY, J. L. LIPPITT, M. W. MAY 1964  
MSC-17

To obtain high quality waveforms from a subject engaged in physical activity, an improved electrode assembly has been devised. This consists of a cup containing an electrically conductive paste and a silver electrode. The paste maintains contact between the skin and the plate.

B64-10108  
DEVICE INDUCES LUNGS TO MAINTAIN KNOWN  
CONSTANT PRESSURE  
LIPPITT, M. W. REED, J. H. JUL. 1964  
MSC-50

This device requires the use of thoracic muscles to maintain prescribed air pressure in the lungs for brief periods. It consists of a clear plastic hollow cylinder fitted with a mouthpiece, a spring-loaded piston, and a small vent for escaping air when exhalation into the mouthpiece

displaces the piston.

B64-10146  
TECHNIQUE SIMULATES EFFECT OF REDUCED GRAVITY  
HEWES, D. E. SPADY, A. A. JR. JUN. 1964  
LANGLEY-44

To simulate the effects of lunar gravity, an arrangement of near-vertical cables has been devised. These suspend the test subject perpendicular to an inclined walkway to give the effect of reduced gravitational pull.

B65-10332  
TEST MONKEYS ANESTHETIZED BY ROUTINE PROCEDURE  
INNOVATOR NOT GIVEN /SPACE/DEFENSE CORP./ NOV.  
1965  
HQ-18

Test monkeys are safely anesthetized for five minutes by confining them for less than six minutes in enclosures containing a controlled volume of ether. Thus the monkeys can be properly and safely positioned on test couches and fitted with electrodes or other devices prior to physiological tests.

B66-10049  
IMPROVED ELECTRODE PASTE PROVIDES RELIABLE  
MEASUREMENT OF GALVANIC SKIN RESPONSE  
DAY, J. L. FEB. 1966 SEE ALSO B64-10025 AND  
B65-10015  
MSC-146

High-conductivity electrode paste is used in obtaining accurate skin resistance or skin potential measurements. The paste is isotonic to perspiration, is nonirritating and nonsensitizing, and has an extended shelf life.

B66-10117  
MICROORGANISMS DETECTED BY ENZYME-CATALYZED  
REACTION  
VANGO, S. P. WEETALL, H. H. WELIKY, N. MAR.  
1966  
JPL-782

Enzymes detect the presence of microorganisms in soils. The enzyme lysozyme is used to release the enzyme catalase from the microorganisms in a soil sample. The catalase catalyzes the decomposition of added hydrogen peroxide to produce oxygen which is detected manometrically. The partial pressure of the oxygen serves as an index of the sample's bacteria content.

B66-10118  
INTEGRAL SKIN ELECTRODE FOR  
ELECTROCARDIOGRAPHY IS EXPENDABLE  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1966  
MSC-299

Inexpensive, expendable skin electrode for use in electrocardiography combines an electrical contact, conductive paste, and a skin-attachment adhesive. Application of the electrode requires only degreasing of the skin area.

B66-10154  
PHONOCARDIOGRAPH SYSTEM MONITORS HEART SOUNDS  
INNOVATOR NOT GIVEN /BECKMAN INSTR., INC./ APR.  
1966  
MSC-185

Phonocardiograph system monitors the mechanical activity of the heart in extreme environments. It uses a piezoelectric-crystal microphone with an integral preamplifier, and a signal conditioner having special frequency characteristics. The output signals can be recorded on tape, presented aurally, or transmitted telemetrically to a remote station.

B66-10184  
SELF-INFLATING LIFEVEST STORES IN SMALL  
PACKAGE  
RADNOFSKY, M. I. MAY 1966  
MSC-5A

Emergency lifevest is inflated with carbon dioxide from a self-contained cartridge in 10 seconds. When deflated, it fits into a package occupying less than 20 cubic inches and weighing less than one pound.

B66-10252

SEMICONDUCTOR FORMS BIOMEDICAL RADIATION PROBE  
BURNS, F. P. FRIEDERICKS, J. E. /SOLID STATE  
RADIATION, INC./ JUN. 1966

MSC-320

Semiconductor radiation dosimeter in the form of a slender probe is easily inserted into body tissue. The probe has a signal-to-noise ratio that is acceptable to recording equipment and provides realistic measurements of the spatial and energy distributions of radiant electrons and protons.

B66-10314

PHONOCARDIOGRAPH MICROPHONE IS RUGGED AND  
MOISTUREPROOF

YOUNG, W. J. JUL. 1966

MSC-212

Microphone used as a phonocardiograph transducer monitors small amplitude audio signals in the presence of large shock loads and high humidity. It contains a lead zirconate-lead titanate piezoelectric plate encapsulated in a flexible polyurethane resin. The resin is contained in a sealed nylon case having a diameter of less than one inch.

B66-10406

PLANT RESPIROMETER ENABLES HIGH RESOLUTION  
OF OXYGEN CONSUMPTION RATES

FOSTER, D. L. /SPACE DEFENSE CORP./ SEP. 1966

HQ-47

Plant respirometer permits high resolution of relatively small changes in the rate of oxygen consumed by plant organisms undergoing oxidative metabolism in a nonphotosynthetic state. The two stage supply and monitoring system operates by a differential pressure transducer and provides a calibrated output by digital or analog signals.

B66-10468

RADON GAS, USEFUL FOR MEDICAL PURPOSES,  
SAFELY FIXED IN QUARTZ

FIELDS, P. R. MOSHE, H. Z. STEIN, L. NOV. 1966

ARG-2

Radon gas is enclosed in quartz or glass ampules by subjecting the gas sealed at a low pressure in the ampules to an ionization process. This process is useful for preparing fixed radon sources for radiological treatment of malignancies, without the danger of releasing radioactive gases.

B66-10515

APPARATUS ENABLES AUTOMATIC MICROANALYSIS OF  
BODY FLUIDS

SOFFEN, G. A. STUART, J. L. NOV. 1966

JPL-962

Apparatus will automatically and quantitatively determine body fluid constituents which are amenable to analysis by fluorometry or colorimetry. The results of tests are displayed as percentages of full scale deflection on a strip-chart recorder. The apparatus can also be adapted for microanalysis of various other fluids.

B66-10647

MODIFIED ALGESIMETER PROVIDES ACCURATE  
DEPTH MEASUREMENTS

TURNER, D. P. /N. AM. AVIATION/ DEC. 1966

MSC-616

Algesimeter which incorporates a standard sensory needle with a sensitive micrometer, measures needle point depth penetration in pain tolerance research. This algesimeter provides an inexpensive, precise instrument with assured validity of recordings in those biomedical areas with a requirement for repeated pain detection or ascertaining pain sensitivity.

B66-10649

SPRAY-ON ELECTRODES ENABLE EKG MONITORING  
OF PHYSICALLY ACTIVE SUBJECTS

DEC. 1966 SEE ALSO NASA-TN-D-3414

FRC-36

Easily applied EKG electrodes monitor the heart signals of human subjects engaged in various physical exercises. The electrodes are formed from an air drying, electrically conductive cement mixture that can be applied to the skin by means

of a modified commercially available spray gun.

## 05 MECHANICAL

B63-10007

HIGH PURITY ELECTROFORMING YIELDS SUPERIOR  
METAL MODELS

HAEFELI, R. M. HOUSTON, J. P. JAN. 1964

ARC-6

Ultrasonic electroforming has proven successful in making high purity metal models for heat transfer studies. This process provides smooth, pit-free models.

B63-10008

VACUUM FORMING OF THERMOPLASTIC SHEET RESULTS  
IN LOW-COST INVESTMENT CASTING PATTERNS

CLARKE, A. E., JR. MAR. 1964

ARC-7

Vacuum forming of a sheet of thermoplastic material around a mandrel conforming to the shape of the finished object provides a pattern for an investment mold. The thickness of the metal part is determined by the thickness of the plastic pattern.

B63-10009

CHAIN FRICTION SYSTEM GIVES POSITIVE, REVERS-  
IBLE DRIVE

DAVIDSEN, J. S. APR. 1964

ARC-8

By cementing a strip of an elastomer to the smooth metal rim of the pulley and neoprene covered idlers providing suitable tension to the chain around the pulley, a positive reversible drive is accomplished more quietly and with less vibration.

B63-10023

V-SLOTTED SCREW HEAD AND MATCHING DRIVING TOOL  
FACILITATE INSERTION AND REMOVAL OF SCREW  
FASTENERS

HANDLEY, M. G. JAN. 1964

FRC-16

A V-slotted designed screw and a screwdriver with a V-shaped tang facilitate driving the screw into difficult locations and minimize axial forces thus avoiding damage to the screw.

B63-10123

ELASTIC ORIFICE AUTOMATICALLY REGULATES GAS  
BEARINGS

BATSCH, F. LAUB, J. L. JUN. 1964

JPL-135

An elastic, pressure-sensitive orifice is used to automatically regulate the rate of gas flow into bearings under varying loads. Formed of a molded elastomer, tests show these orifices increase the stability of gas bearings.

B63-10139

METHOD OF WELDING JOINT IN CLOSED VESSEL  
IMPROVES QUALITY OF SEAM

FREEMAN, R. LEVOE, C. MAY 1964

JPL-170

To facilitate welding of closed vessels, a metal backup strip is used at the junction inside the vessel. After welding from the outside, this strip is dissolved by a chemically reactive solvent poured through a filler hole into the vessel.

B63-10141

VENTED PISTON SEAL PREVENTS FLUID LEAKAGE  
BETWEEN TWO CHAMBERS

MAC GLASHAN, W. F. MORRISON, R. DEC. 1964

JPL-179

To prevent fluid leakage around piston seals separating two fluids under differential pressure, a venting system has been devised. Two methods may be used for venting seals through internal passages to an external low-pressure area, O-ring or split-ring seals.

B63-10143

COINCIDENT SWITCH CLOSING REDUCES ERROR IN  
MOTOR-DRIVEN TIMER

RICH, S. DEC. 1964  
JPL-182

To cut the lag-lead in motor-driven timing devices, the timing circuit has been extended to include a second switch. This is actuated in time with the first but driven directly at a speed  $x$  times faster than the first.

B63-10170  
HIGH-PRESSURE REGULATING SYSTEM PREVENTS  
PRESSURE SURGES

KELLER, G. F. MAC GLASHAN, W. F. JUN. 1964 /SEE  
U.S. PATENT NO. 3,105,515/  
JPL-231

Gas flow is controlled by means of a pressure regulating system which prevents pressure surges. A high-pressure fluid source, a spring-loaded fluid-damped regulator valve, an accumulator, a conventional normally closed command valve, and a control valve are the main components.

B63-10198  
DEVICE TRANSMITS ROTARY MOTION THROUGH HERMET-  
ICALLY SEALED WALL  
PORTER, R. N. APR. 1964  
JPL-303

A wobble plate, metal bellows, and two shafts, assembled in a four-section housing, make it possible to transmit rotary motion through a hermetically sealed wall. In operation a rotational torque is developed by the wobble plate.

B63-10200  
APPARATUS OF SMALL SIZE CAN BE EXTENDED INTO  
LONG, RIGID BOOM  
MILLER, J. V. MAY 1964  
JPL-305

Three metal sheets, having prenotched edges, are interlocked as they are unrolled from three feed rollers, which form a triangle. The apparatus is relatively small, and the sheets can be erected into a rigid triangular boom of considerable length.

B63-10226  
SELF SEALING DISCONNECT FOR TUBING FORMS METAL  
SEAL AFTER BREAKAWAY  
GERNANDT, H. H. JAN. 1964  
JPL-354

Disconnect fittings form a positive metal seal when the fill tube pulls against a metal sleeve when disconnected by force. A specially designed sleeve surrounds the fill tube. O-rings in the shoulder of the sleeve and near the outer end of the fill tube seal against leakage.

B63-10228  
PACKLESS VALVE WITH ALL-METAL SEAL HANDLES  
WIDE TEMPERATURE, PRESSURE RANGE  
MAC GLASHAN, W. F. MAR. 1964  
JPL-361

A durable line valve utilizes stacked metal disks to seal off an inlet port. No packing or shaft sealing is needed, and the valve operates satisfactory over a wide temperature and pressure range.

B63-10236  
LIGHTWEIGHT UNIVERSAL JOINT TRANSMITS BOTH  
TORQUE AND THRUST  
BAMFORD, R. M. JAN. 1964  
JPL-375

A lightweight universal joint uses a thin steel flexure plate to transmit torque and a steel rod to transmit thrust. Both the plate and rod are independently mounted and can act individually.

B63-10237  
SUPERCOLD TECHNIQUE DUPLICATES MAGNETIC FIELD  
IN SECOND SUPERCONDUCTOR  
HILDEBRANDT, A. F. NOV. 1964  
JPL-376

A superconductor cylinder, charged with a high magnetic field, can be used to create a similar field in a larger cylinder. The uncharged cylinder is precooled, lowered into a helium dewar system, and fitted around the cylinder with the magnetic field. Magnetic flux lines pass through

the two cylinders.

B63-10240  
SLEEVE AND CUTTER SIMPLIFY DISCONNECTING  
WELDED JOINT IN TUBING  
PERKINS, G. S. APR. 1964  
JPL-384

To test equipment, welded tubing joints may have to be disconnected and rewelded. To eliminate rewelding, a nonstandard welding sleeve permits the tubing to be welded and then disconnected by a specially designed sleeve cutter. Use of this tool assures that only the sleeve is cut.

B63-10241  
VEITCH DIAGRAM PLOTTER SIMPLIFIES BOOLEAN  
FUNCTIONS  
RUBIN, D. K. APR. 1964  
JPL-385

This device for simplifying the plotting of a veitch diagram consists of several overlays for blocking out the unwanted squares. This method of plotting the various input combinations to a computer is used in conjunction with the boolean functions.

B63-10247  
NEW PACKAGE FOR BELLEVILLE SPRING PERMITS RATE  
CHANGE, EASY DISASSEMBLY  
MAC GLASHAN, W. F. MAR. 1964  
JPL-392

A spring package, with grooves to hold the spring washers at the inner and outer edges, reduces hysteresis to a minimum. Three-segment retainers permit easy disassembly so that the spring rate can be changed.

B63-10251  
HELICAL TUBE SEPARATES NITROGEN GAS FROM  
LIQUID NITROGEN  
STEPHENS, J. B. JUN. 1964  
JPL-398

To prevent a boiloff problem, liquid nitrogen flowing from a storage tank to a container, is separated into liquid and gaseous components. This is accomplished by centrifugal and venting action, using a section of perforated helical aluminum tubing.

B63-10289  
FRICTIONAL WEDGE SHOCK MOUNT IS INEXPENSIVE,  
HAS GOOD DAMPING CHARACTERISTICS  
TENER, W. M. MAY 1964  
JPL-IT-1001

A wedge-shaped shock mount uses rubber for energy absorption, and the frictional characteristics of ordinary brake material for damping.

B63-10291  
SPECIAL PLIERS CONNECT HOSE CONTAINING LIQUID  
UNDER PRESSURE  
BLAYDES, R. A. MAR. 1964  
JPL-IT-1003

For speed and safety in handling disconnect fittings on a hose carrying liquid under pressure, special pliers have been constructed. A gear and rack mechanism is combined with two or more wide-opening U-shaped jaws which are placed over the quick-disconnect fittings.

B63-10292  
HEAVY-DUTY STAPLE REMOVER OPERATED BY HAND  
MORRISON, T. RENNER, R. MAR. 1964  
JPL-IT-1004

To remove staples from thick reports, a rooter, bending hook and post are incorporated into a heavy duty hand tool. This makes possible one-step extraction of long staples.

B63-10304  
BREAK-UP OF METAL TUBE MAKES ONE-TIME SHOCK  
ABSORBER, BARS REBOUND  
HATHAWAY, M. MC GEHEE, J. R. ZAVADA, E. FEB.  
1964 /SEE NASA-TN-D-1477/  
LANGLEY-1A

A frangible metal tube has the capability to dissipate the energy generated when a vehicle lands with excessive velocity. The tube is so placed that, at impact, it is forced against a die

and, as it fragments, energy is absorbed.

**B63-10340**  
CRYOPUMPING OF HYDROGEN IN VACUUM CHAMBERS IS  
AIDED BY CATALYTIC OXIDATION OF HYDROGEN  
CHILDS, J. H. GROBMAN, J. RAYLE, W. JUN. 1964  
/SEE NASA-TN-D-863/  
LEWIS-15

Vacuum test facilities are required for high speed cryopumping of gaseous hydrogen at low pressures. One method involves the catalytic oxidation of hydrogen and condensation of the resulting water on a liquid nitrogen-cooled surface.

**B63-10341**  
DESIGN OF VALVE PERMITS SEALING EVEN IF THE  
STEM IS MISALIGNED  
SCHMIDT, H. W. JAN. 1964  
LEWIS-38

A conical-walled valve plug is designed to seal against a recessed spherical valve seat. This insures proper sealing during numerous seating cycles even though the valve stem is misaligned or forced out of its proper axis.

**B63-10354**  
RAPID BILLET LOADER AIDS EXTRUSION OF REFRAC-  
TORY METALS  
DOLINSHEK, A. F. HERMAN, L. E. APR. 1964  
LEWIS-50

A combination gravity and manually powered rapid billet loader reduces the time required for transferring hot metal billets from a heating furnace to an extrusion press. Positioned between the furnace and extrusion press, this loader is a simple slide-delivery device.

**B63-10367**  
CONNECTOR FOR VACUUM-JACKETED LINES CUTS  
TUBING SYSTEM COST  
CALVERT, H. F. MAY 1964  
LEWIS-66

A low-cost fitting, fabricated from standard connectors, is used for disconnecting flow lines in cryogenic systems. Utilizing vacuum-jacketed lines made from two sizes of tubing welded at the ends, the connectors are stronger and setup time is reduced.

**B63-10368**  
COMPOSITE, VACUUM-JACKETED TUBING REPLACES  
BELLOWS IN CRYOGENIC SYSTEMS  
CALVERT, H. F. JUN. 1964  
LEWIS-67

For reliability control of high pressure cryogenic systems, one or more 90 degree elbow expansion devices are substituted for the metal bellows normally used. The device consists of a conducting tube inside a support tube, with the space between the tubes evacuated for insulation.

**B63-10376**  
NOVEL CLAMPS ALIGN LARGE ROCKET CASES,  
ELIMINATE BACK-UP BARS  
FRANKLIN, W. J. MARTIN, N. C. JAN. 1964  
M-FS-1

Welding clamps, placed inside and outside a rocket case, hold it in proper alignment during tungsten inert gas welding. These metal blocks, connected by a stainless steel band, eliminate the need for backup bars.

**B63-10384**  
VACUUM-TYPE BACKUP BAR SPEEDS WELD REPAIRS  
CARMODY, R. J. AUG. 1964  
M-FS-12

A backup bar designed to use both vacuum and air pressure provides a method of sealing the weld root of a faulty section of seam weld. With slight redesign, the bar can be made sufficiently flexible to fit any large cylindrical surface.

**B63-10385**  
FLEXIBLE HONEYCOMB STRUCTURE CAN BEND TO FIT  
COMPOUND CURVES  
CARMODY, R. J. APR. 1964  
M-FS-13

For flexibility in forming a curved surface, a honeycomb configuration using multiple pleats has

proved superior to the usual core structures. The partial pleats formed in individual cell walls permit movements to and from the central axis without tearing.

**B63-10387**  
PORTABLE FLOORING PROTECTS FINISHED SURFACES,  
IS EASILY MOVED  
CARMODY, R. J. MAR. 1964  
M-FS-15

To protect curved, finished surface and provide support for workmen, portable flooring has been made from rigid plastic foam blocks, faced with aluminum strips. Held together by nylon webbing, the flooring can be rolled up for easy carrying.

**B63-10420**  
SIMPLE MECHANISM COMBINES POSITIVE LOCKING AND  
QUICK-RELEASE FEATURES  
CLAYTON, L. B. /HUGHES AIRCRAFT CO./ FEB. 1964  
WOO-4

For secure locking and quick release of two objects, this device uses a spring-loaded slotted bolt, locked in position by two retainer arms. When these retainer arms are freed from contact, the bolt is ejected and the objects released.

**B63-10431**  
HIGH-TEMPERATURE, HIGH-PRESSURE SPHERICAL  
SEGMENT VALVE PROVIDES QUICK OPENING  
GIOVANNETTI, A. HIMMELRIGHT, R. MEYER, K.  
NITTA, H. APR. 1964  
ARC-13

A hollow spherical segment valve with an eccentric permits non-rubbing closure and provides a means for gas-cooling the seal. The design allows quick opening at high temperatures and discharge pressures.

**B63-10435**  
PORTABLE DISPLAY PANELING HAS WIDE USE, EASY  
TAKE DOWN AND ASSEMBLY  
DEVOTO, H. J., JR. MAR. 1964  
ARC-17

Design for a modular display panel is based on a cross-shaped corner connector and wooden lattice bars. The bars are fitted into the arms of the metal connector and a pocket slot holds a modular-size panel.

**B63-10442**  
KINETIC-ENERGY ABSORBER EMPLOYS FRICTIONAL  
FORCE BETWEEN MATING CYLINDERS  
CONRAD, E. W. MAY 1964  
LEWIS-75

A kinetic energy absorbing device uses a series of coaxial, mating cylindrical surfaces. These surfaces have high frictional resistance to relative motion when axial impact forces are applied. The device is designed for safe deceleration of vehicles impacting on landing surfaces.

**B63-10489**  
FINE-PARTICLE FILTER PREVENTS DAMAGE TO VACUUM  
PUMPS  
HARLAMERT, P., JR. APR. 1964  
LEWIS-106

A filter system for mechanical pumps is designed with a baffle assembly that rotates in a circulating oil bath which traps destructive particles. This prevents severe damage to the pump and is serviceable for long periods before it requires cleaning.

**B63-10497**  
INTEGRAL COOLANT CHANNELS SIMPLY MADE BY MELT-  
OUT METHOD  
ESCHER, W. J. D. JUN. 1964  
M-FS-91

A melt-out method of constructing strong, pressure-tight fluid coolant channels for chambers is accomplished by cementing pins to the surface and by depositing a melt-out material on the surface followed by two layers of epoxy-resin impregnated glass fibers. The structure is heated to melt out the low-melting alloy.

B63-10502  
FLUID-PRESSURE METER CAN BE CALIBRATED WITHOUT  
REMOVAL FROM FLOW LINE  
MELTON, D. E. MAR. 1964  
M-FS-98

The construction of a fluid pressure meter with two inlet ports, flexible diaphragms and a pressure-responsive transducer is described. One port can be connected to the line and the other to a source of standard pressures for calibration.

B63-10517  
MINIATURE OXYGEN-HYDROGEN CUTTING TORCH  
CONSTRUCTED FROM HYPODERMIC NEEDLE  
SHLICHTA, P. APR. 1964  
JPL-545

A miniature cutting torch consisting of a main body member, upon which the hydrogen and oxygen containers are mounted, valves for controlling gas flow, and a hypodermic needle that acts as a mixing tube and flame tip is constructed.

B63-10519  
TOOL FACILITATES SEALING OF METAL FILL TUBES  
COOLEY, H. H., JR. /UNITED AIRCRAFT CORP./ JUL. 1964  
MSC-24

A hand tool is designed for sealing metal fill tubes containing corrosive or inflammable liquids without the use of heat or open flame. The tool aligns the fill tube into which a tapered sealing pin is dropped and driven below the neck of tube.

B63-10526  
BUILT-IN TEMPLATES SPEED UP PROCESS FOR MAKING  
ACCURATE MODELS  
INNOVATOR NOT GIVEN FEB. 1964  
LANGLEY-23

From accurate scale drawings of a model, photographic negatives of the cross sections are printed on thin sheets of aluminum. These cross-section images are cut out and mounted, and mahogany blocks placed between them. The wood can be worked down using the aluminum as a built-in template.

B63-10530  
NEW ANEMOMETER HAS FAST RESPONSE, MEASURES  
DYNAMIC PRESSURE DIRECTLY  
LYNCH, J. W. REED, W. H., III OCT. 1964  
LANGLEY-28

A simple anemometer having a fast response to high frequency wind fluctuations by direct measurement of two drag-force components in orthogonal planes is described. It may be used to determine wind profiles to extensive heights and would be helpful in takeoff and landing of light planes.

B63-10547  
ELLIPSOIDAL OPTICAL REFLECTORS REPRODUCED BY  
ELECTROFORMING  
HUNGERFORD, W. J. LARMER, J. W. LEVINSOHN, M. OCT. 1964  
GSFC-92

An accurately dimensioned convex ellipsoidal surface, which will become a master after polishing, is fabricated from 316L stainless steel. When polishing of the master is completed, it is suspended in a modified watt bath for electroforming of nickel reflectors.

B63-10556  
LATHE CONVERTED FOR GRINDING ASPHERIC SURFACES  
LARMER, J. W. LEVINSOHN, M. MC CRAW, D. PESSAGNO, E. H. TAUB, F. J. JUL. 1964  
GSFC-115

A standard overarm tracing lathe converted by the addition of an independently driven diamond grinding wheel is used for grinding aspheric surfaces. The motion of the wheel is controlled by the lathe air tracer following the template which produces the desired aspheric profile.

B63-10558  
NEW METHOD FORMS BOND LINE FREE OF VOIDS  
KING, C. B. OCT. 1964  
LANGLEY-20

A new bonding method using vacuum, pressure and heat, which produces a bond line free of voids, is

described. This method is very successful in bonding ablation shields to a magnesium structural component in simulated reentry tests involving great heat and air turbulence.

B63-10560  
CAMERA SHUTTER IS ACTUATED BY ELECTRIC SIGNAL  
NEFF, J. E. NOV. 1964  
ARC-20

A rotary solenoid energized by an electric signal opens a camera shutter and when the solenoid is de-energized a spring closes it. By the use of a microswitch, the shutter may be opened and closed in one continuous, rapid operation when the solenoid is actuated.

B63-10564  
A TECHNIQUE FOR MAKING ANIMAL RESTRAINTS  
CLARKE, A. E., JR. REITMAN, J. SEP. 1964  
ARC-25

A contoured shell for restraining animals is made by thermoforming plastic over the anesthetized, frozen specimen. It may be vented, or pieces may be cut out to facilitate working in localized areas.

B63-10568  
PLASTIC MOLDS REDUCE COST OF ENCAPSULATING  
ELECTRIC CABLE CONNECTORS  
KNOTT, D. NOV. 1964  
M-FS-69

Resin casting of the aluminum master pattern forms a plastic mold for encapsulating a cable connector. An elastomer is injected into the mold and cured. The mold is disassembled leaving an elastomeric encapsulation around the connector.

B63-10571  
SELF-BALANCING BEAM PERMITS SAFE, EASY LOAD  
HANDLING UNDER OVERHANG  
EDWARDS, G. H. MAR. 1964  
M-FS-84

The use of a self-balancing I-beam with a counterweight and motor simplifies moving heavy loads that are inaccessible for cranes. The beam cannot be overloaded, as the counterweight will not balance the load, and thus acts as an automatic safety device.

B63-10590  
STAINLESS-STEEL ELBOWS FORMED BY SPIN FORGING  
INNOVATOR NOT GIVEN /CHANCE-VOUGHT CORP./ DEC. 1964  
M-FS-122

Large seamless austenitic stainless steel elbows are fabricated by spin forging /rotary shear forming/. A specially designed spin forging tool for mounting on a hydrosin machine has been built for this purpose.

B64-10001  
NEW INFLATABLE LIFERAFT IS NONTIPPABLE  
RADNOFSKY, M. I. SHEWMAKE, G. A. MAR. 1964 /SEE  
NASA-TN-D-1083/  
MSC-4A

A one-seamed lightweight life raft has three underwater ballast buckets as stabilizers. Nontippable, it can be compactly packaged and inflated with carbon dioxide.

B64-10006  
SPEED-SENSING DEVICE AIDS CRANE OPERATORS  
INNOVATOR NOT GIVEN OCT. 1964  
WS-4

So that crane operators can judge payload movements accurately, a friction-driven multilobed cam device energizes a buzzer and indicator lamp in the crane cab. The signal frequency of this speed sensor has a sensitivity to hoist movement of 1/8 inch.

B64-10011  
METAL STRIP FORMS 21 FOOT BOOM, ROLLS UP FOR  
COMPACT STORAGE  
INNOVATOR NOT GIVEN /CANADIAN COMMERCIAL CORP./ MAY 1964  
GSFC-151

An extensible boom, carrying three separate electric conductor tapes, can be rolled into a compact storage drum. The tape is curved in cross



section so that the boom automatically forms a tube as it is extended.

instruments are needed.

**B64-10014**  
GUIDE FOR EXTRUSION DIES ELIMINATES  
STRAIGHTENING OPERATION  
GYORGAK, C. A. HOOVER, R. J. NOV. 1964  
LEWIS-152

To prevent distortion of extruded metal, a guidance assembly is aligned with the die. As the metal emerges from the extrusion dies, it passes directly into the receiver and straightening tube system, and the completed extrusion is withdrawn.

**B64-10015**  
COMFORTABLE, LIGHTWEIGHT SAFETY HELMET HOLDS  
RADIO TRANSMITTER, RECEIVER  
ATLAS, N. D. /N. AM. AVIATION, INC./ MAY 1964  
MSC-53

For two-way radio communication where safety gear is required, a lightweight helmet with few protrusions has been designed. The electronics components and power supply are mounted between the inner and outer shells, and resilient padding is used for the lining.

**B64-10021**  
PRESSURE TRANSDUCER 3/8-INCH IN SIZE CAN BE  
FAIRED INTO SURFACE  
SCHAFER, R. J. /N. AM. AVIATION, INC./ MAY 1964  
WOO-065

To measure fluid pressure with minimum disturbance to fluid flow, a miniature pressure transducer can be imbedded and faired into the test surface. Incorporated in the design are piezoresistive elements, mounted on a diaphragm, which transform pressure strains into an electrical signal.

**B64-10028**  
QUICK-ACTING CLUTCH DISENGAGES IDLE DRIVE  
MOTOR  
STARK, K. W. AUG. 1964  
GSFC-143

Positive-drive, no drag, over-running clutch is developed to conserve power of idle motor in a low-power system using multiple drive motors. This device is useful where a number of shaft speeds are required with frequent shifting.

**B64-10031**  
MULTIPLE PORT PRESSURE SCANNER VALVE FEATURES  
GREATER ACCURACY, QUICKER DATA  
VINCENT, E. R. SEP. 1964  
JPL-555

A fast, accurate, multipressure measuring system, which employs a multiple port pressure scanning valve that connects a pressure transducer to many pressures, is described.

**B64-10050**  
MODIFIED GAS BEARING IS ADJUSTABLE TO OPTIMUM  
STIFFNESS RATIO  
EVANS, J. L. AUG. 1964  
M-FS-145

Inexpensive and rapid-adjustments of the radial-to-axial stiffness ratio of a spherical gas bearing are achieved by a series of gas passages in the equatorial plane of the sphere which feed into orifices that can be readily changed in size.

**B64-10058**  
INSULATED WELD TOOLING PERMITS UNIFORM, HIGH-  
QUALITY WELD  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ AUG. 1964  
MSC-42

The application of a ceramic material coating to all surfaces contacting parts to be welded permits greater weld strength than the conventional weld tooling method.

**B64-10066**  
ENCAPSULATION PROCESS STERILIZES AND PRESERVES  
SURGICAL INSTRUMENTS  
MONTGOMERY, L. C. MORELLI, F. A. JUL. 1964  
JPL-484

Ethylene oxide is blended with an organic polymer to form a sterile material for encapsulating surgical instruments. The material does not bond to metal and can be easily removed when the

**B64-10069**  
METAL-BENDING BRAKE FACILITATES LIGHTWEIGHT,  
CLOSE-TOLERANCE FABRICATION  
ERCOLINE, A. L. WILTON, K. B. OCT. 1964  
ARC-29

A lightweight, metal bending brake ensures very accurate bends. Features of the brake that adapt it for making complex reverse bends to close tolerances are a pronounced relief or cutaway of the underside of the bodyplate combined with modification in the leaf design and its suspension.

**B64-10084**  
MOLDED ELASTOMER PROVIDES COMPACT FERRITE-CORE  
HOLDER, SIMPLIFIES ASSEMBLY  
HAYDEN, R. R. NOV. 1964  
JPL-584

A ferrite-core holder, fabricated by casting an elastomer in a simple mold, simplifies the assembly of modular matrix units for computers. Use of the device permits the core leads to be multiply threaded and soldered to terminals, without requiring intermediate terminals.

**B64-10119**  
BUCKLE JOINS WEB STRAPS QUICKLY, ADJUSTS  
EASILY  
WILKINSON, J. E. /CHANCE VOUGHT CORP./ JUN. 1964  
LANGLEY-21

To join web straps used to hoist heavy loads, a novel buckle permits two straps to be quickly joined and held by the combined forces of strap load tension and friction.

**B64-10121**  
ELECTRONIC ASSEMBLY RACK PANELS SNAP ON AND  
OFF  
BAILEY, J. W. JUN. 1964  
GSFC-59

Snap fasteners on each side of an electronic assembly rack blank panel give quick access to the interior. Guide pins extending from the inside face easily slip into standard screw holes on the frame and provide additional support.

**B64-10124**  
ATTACHMENT CONVERTS MICROSCOPE TO POINT SOURCE  
AUTOCOLLIMATOR  
SHLICHTA, P. J. JUL. 1964  
JPL-499

A low-power microscope or telescope provides a simple means of autocollimation. This is done by fitting the instrument with a light source to permit alignment from a reflecting surface normal to the optic axis of the instrument.

**B64-10130**  
BEARING TRANSMITS ROTARY AND AXIAL MOTION  
DOW, N. F. PETERS, R. W. SEP. 1964  
LANGLEY-27

A low friction, two-component bearing comprised of a pair of ball-bearing races for transmitting rotary motion and an inner series of ball bearing assemblies for transmitting axial motion is described and should be useful in mechanisms such as stress-strain testing machines.

**B64-10141**  
PNEUMATIC POWER IS TRANSMITTED THROUGH AIR  
BEARING  
JOHNSON, H. I. WOBIG, O. A. JUL. 1964  
MSC-8

A more efficient method for supplying high pressure air to an air bearing and pneumatic equipment mounted on it has been developed. The system uses a conventional air bearing and an air-supported sphere with a central passage. High pressure air is channeled through it into the pneumatic equipment on the sphere.

**B64-10145**  
FLEXIBLE FASTENER ALLOWS THERMAL EXPANSION  
CRUMPLER, W. B. JUN. 1964  
LANGLEY-40

A flexible fastener permits thermal expansion of model skin sections which are rigidly attached to

supporting structures in wind tunnel tests. The device uses a modified ball joint contact between the fastener and a skin section.

B64-10164  
UPSETTING BUTT EDGE INCREASES WELD-JOINT STRENGTH  
VESCO, D. OCT. 1964  
M-FS-175

Mechanical upsetting /a mode of cold forging/ of butt edges to be welded is accomplished by the use of hydraulic rams and pressure rollers. The mechanical upsetting increases the thickness of the material in the heat-affected zone and compensates for the lower specific strength per unit thickness common to this area.

B64-10170  
BALL BEARING USED IN DESIGN OF RUGGED FLOW-METER  
MINKIN, H. L. JAN. 1965  
LEWIS-159

A volumetric flowmeter which has a small magnet imbedded in the outer perimeter of the turbine wheel or in the bearing permits measurement of liquid flow rates in the presence of wide ranges and violent surges.

B64-10178  
MACHINE TESTS CREASE DURABILITY OF SHEET MATERIALS  
JONES, L. K. STANFORD, H. B. NOV. 1964  
JPL-604

To test the crease resistance of sheet materials, the mid-section is folded over crease-control blades. One end is clamped to a motor-driven eccentric, the other to a spring, and durability is measured by the cycles required to produce failure.

B64-10185  
THREADING HOOK FACILITATES SAFE RECOVERY OF HEAVY LOADS  
ARTHUR, J. S. WILLIAMS, D. C. OCT. 1964  
MSC-46

A C-shaped threading hook and shuttle mounted on a spring-loaded driving rod located inside the long-handled pole are developed for recovering massive loads afloat in the sea.

B64-10188  
BLADE VALVE ISOLATES COMPARTMENT IN PIPE, OPENS TO ALLOW FREE FLOW  
IMUS, R. NOV. 1964  
JPL-585

Two thin blades are incorporated into a valve which, when closed, form a sealed compartment in the shock-tube portion of a pipeline. When forced open by an actuator, gas flows through the system.

B64-10211  
MICROMACHINING PRODUCES OPTICAL APERTURES TO MICRON DIMENSIONS  
WALCH, A. J. OCT. 1964  
GSFC-206

A micron dimensioned rectangular optical aperture is formed under a high-powered toolmaker's microscope by laying two knife-edged blocks over the miniature knife-edged hole in the base.

B64-10223  
TWO-PART VALVE ACTS AS QUICK COUPLING  
MAC GLASHAN, W. F., JR. NOV. 1964  
JPL-478

A two-part valve simplifies the problem of filling large tanks from smaller ones. One part acts as a check valve and remains integral to the recipient system, while the other part is integral to the donor system.

B64-10249  
INSTRUMENT ADJUSTMENT KNOB LOCKS TO PREVENT ACCIDENTAL MALADJUSTMENT  
INNOVATOR NOT GIVEN /LEAR SIEGLER CORP./ NOV. 1964  
M-FS-190

A device, incorporating a collar with a hexagonal opening which fits snugly over a hexagonal nut used to engage instrument panel components, keeps

the adjustment knob locked. A quick release mechanism frees the knob for rotational adjustment.

B64-10272  
VISCIOUS-PENDULUM DAMPER SUPPRESSES STRUCTURAL VIBRATIONS  
REED, W. H., III NOV. 1964  
LANGLEY-45

The viscous pendulum damper consists of a cylinder containing round trays on which round lead slugs rest. When assembled, the container is filled with a viscous liquid and attached, with axis vertical, to the structure. The device permits varying the damping of structural vibrations.

B64-10274  
VEHICLE WALKS ON VARIED TERRAIN, CAN ASSIST HANDICAPPED PERSONS  
INNOVATOR NOT GIVEN NOV. 1964  
WOO-005 WOO-005

A battery-powered motorized vehicle with three pairs of legs connected to push rods and a series of linkages is constructed for traversing varied terrains. Two cams connected to the drive mechanism control the motion of the legs. The basic design may be adapted for use with motorized wheelchairs.

B64-10277  
APPARATUS ALTERS POSITION OF OBJECTS TO FACILITATE DEMAGNETIZATION  
RINARD, G. WATSON, J. D. NOV. 1964  
GSFC-234

An apparatus consisting of pulleys, a drive shaft and an inner compartment, in which components to be demagnetized are mounted, is constructed. Due to the speed ratio of the three frames, every point on a component in the inner compartment is cycled through an optimum locus in the demagnetization field.

B64-10278  
SENSITIVE LOW-PRESSURE RELIEF VALVE HAS POSITIVE SEATING AGAINST LEAKAGE  
INNOVATOR NOT GIVEN /N. AM. AVIATION INC./ NOV. 1964  
WOO-041

A pilot-operated relief valve which provides positive seating against leakage in cryogenic systems is described. The principal advantage is that the pilot poppet is unaffected by variations in control pressures in the pilot cavity, and results in a more accurate sensing of inlet pressure conditions.

B64-10284  
APPARATUS MEASURES VERY SMALL THRUSTS  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ NOV. 1964  
WOO-048

Measurement of very small thrusts of an ion engine are made by mounting the engine on a platform supported by leaf springs which are loaded to have a zero spring constant. Measuring apparatus includes an inductive sensor, servo amplifier, and a counterthrust feedback system.

B64-10306  
COMPRESSED GAS SYSTEM OPERATES SEMITRAILER BRAKES DURING WINCHING OPERATION  
TUPPER, W. E. DEC. 1964  
JPL-0036

To move van-type semi-trailers into and out of confined spaces, an auxiliary braking system is mounted on a standard dolly converter. Compressed nitrogen is used to actuate the brakes which are used in conjunction with a power winch.

B64-10327  
CONNECTOR SEALS FLUID LINES AT CRYOGENIC TEMPERATURES AND HIGH VACUUMS  
KITTS, W. T. PLATT, P. K. JAN. 1965  
GSFC-253

A connector that will serve as a seal for fluids at cryogenic temperatures and in high vacuums was constructed by installing a metal disk between two sets of mating serrations to form two sealing surfaces. Compression on both sealing surfaces is

ensured by spring action of the disk.

**B64-10348**  
SAFETY RESTRAINER PREVENTS WHIPPING OF  
RUPTURED HIGH-PRESSURE HOSE  
THOMPSON, W. E. DEC. 1964  
LEWIS-99

The braid at each end of a standard electric cable puller is modified to reinforce high pressure, flexible, fluid transfer hoses. This safety device acts as a restraint if the line ruptures.

**B64-10406**  
POLYCHART CONTOUR PLOTTER ENABLES DATA EXTRA-  
POLATION FROM MULTIPLE PLOTTING CHARTS  
SWINDALL, P. M. WISE, T. E. JUL. 1964  
M-FS-37

A polychart contour plotter is used to reduce the data from all 19 antenna pattern charts to a one-chart form.

**B65-10003**  
ILLUMINATED DISPLAY PANEL IS EASILY CHANGED  
INNOVATOR NOT GIVEN /IBM/ JAN. 1965  
MSC-108

Photographic negative placed between two plastic sheets and back-lighted in selected areas prepares illuminated multicolored display panels. The device is inexpensive, easily changed, and quickly fabricated.

**B65-10007**  
THERMOCOMPRESSION BONDING PRODUCES EFFICIENT  
SURFACE-BARRIER DIODE  
INNOVATOR NOT GIVEN /IBM/ JAN. 1965  
JPL-SC-066

Thermocompression bonding of a gold wire to a gallium-arsenide wafer produces a quality surface barrier diode with fast recovery times. The properties of this combination may be useful in semiconductor devices.

**B65-10008**  
SHOCK ABSORBER PROTECTS MOTIVE COMPONENTS  
AGAINST OVERLOADS  
INNOVATOR NOT GIVEN /DOUGLAS AIRCRAFT CO./ JAN. 1965  
WOO-092

Shock absorber with an output shaft, hollow gear, and a pair of springs forming a resilient driving connection between shaft and gear, operates when abnormally high torques are applied. This simple durable frictional device is valuable in rotating mechanisms subject to sudden overloads.

**B65-10009**  
FORMING BLOCKS SPEED PRODUCTION OF STRAIN GAUGE  
GRIDS  
BONN, J. L. GARDNER, D. E. FEB. 1965  
LEWIS-182

A tool is designed which facilitates the forming of wire grids used in manufacturing strain gauge grids. Flattening the grid wire by a cold working process produces a stabilized grid which can be readily handled for storage or shipment.

**B65-10014**  
USE OF TEAR RING PERMITS REPAIR OF SEALED  
MODULE CIRCUITRY  
INNOVATOR NOT GIVEN /IBM/ JAN. 1965  
M-FS-210

Improved packaging technique for modulator electronic circuitry utilizes a tear ring which may be removed for repair and resealed. The tear ring is put over the container and header to which the electronic circuit assembly has been attached.

**B65-10017**  
EXPLOSIVES ACTUATE NONMAGNETIC INDEXING DEVICE  
BAUERNSCHUB, J. P., JR. JAN. 1965  
GSFC-237

Nonmagnetic explosive-actuated indexing device creates magnetic field that can be tolerated by a sensor.

**B65-10019**  
WIDE-ANGLE SENSOR MEASURES RADIANT HEAT ENERGY  
IN CORROSIVE ATMOSPHERES  
INNOVATOR NOT GIVEN /BOEING CO./ JAN. 1965 SEE

ALSO B63-10004  
M-FS-228

Ellipsoidal cavity device measures radiant heat energy over wide incident angles in corrosive atmospheres. The instrument consists of a cavity in copper heat sink sealed with sapphire window to protect thermocouple.

**B65-10020**  
OPTICAL ARRANGEMENT INCREASES USEFUL LIGHT  
OUTPUT OF SEMICONDUCTOR DIODES  
INNOVATOR NOT GIVEN /IBM/ JAN. 1965 SEE ALSO  
B64-10297  
JPL-SC-064

Useful light output of semiconductor diodes increased by incorporating the diode in an integral reflector and lens assembly. This reduces normal reflection losses between the diode and the air.

**B65-10021**  
PICKUP DEVICE READS PRESSURES FROM PORTS IN  
ROTATING MECHANISMS  
JANAS, B. JAN. 1965 SEE ALSO B64-10031  
LEWIS-158

Indexing pickup monitors fluid pressures from ports at various angles on high or low speed rotating mechanisms in operation. By a simple axial movement of a takeoff connector, angle changing takes place. This device can be adapted for electric current monitoring.

**B65-10022**  
KNOB LINKAGE PERMITS ONE-HAND CONTROL OF  
SEVERAL OPERATIONS  
CODDING, G. C. LAVENDER, C. E. JAN. 1965  
MSC-30

Electromechanical device with single knob provides one-hand control of numerous electrical or mechanical functions. The principle of this design may have application to remote-control switching devices.

**B65-10027**  
FLUID-PRESSURE MEASUREMENT APPARATUS USES  
SHORT-LENGTH MANOMETER TUBES  
SATHER, B. I. MAR. 1965  
LEWIS-28

System of short length U-tube manometers with a proportionally divided reference pressure measures high fluid pressures.

**B65-10029**  
SEISMIC TRANSDUCER MEASURES SMALL HORIZONTAL  
DISPLACEMENTS  
GREENWOOD, T. L. MAR. 1965  
M-FS-81

Pendular seismic transducer mounted on base plate measures small horizontal displacements of structures subjected to vibration where no fixed reference point is available. Enclosure of transducer in transparent plastic case prevents air currents from disturbing the pendulum balance.

**B65-10031**  
SPRING LOADED BEADED CABLE MAKES EFFICIENT  
WIRE PULLER  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ FEB. 1965  
1965  
WOO-108

An efficient wire puller consists of a steel probe with a hole in one end fastened to a steel cable which is strung with metal beads compressed by spring loaded ferrules. This device allows cables to be pulled or forced around bends and elbows in pipes or tubes.

**B65-10035**  
OCEANBORNE TRANSPONDER PLATFORM HAS GOOD  
STABILITY  
INNOVATOR NOT GIVEN /IBM/ FEB. 1965  
M-FS-171

Determination of space vehicle range and orbit is aided by a stable subsurface oceanic transponder. This device consists of a buoy held below the surface by a three-point system of anchors and mooring lines with an above surface antenna.

B65-10037

IMPROVED HOLDER PROTECTS CRYSTAL DURING HIGH ACCELERATION AND IMPACT

LE VAY, K. H. FEB. 1965

JPL-463

A plastic holder, which retains a crystal blank with standard silvered contacts sandwiched between two copper contacts, protects the crystal against vibration during high acceleration and impact.

B65-10038

FASTENER PROVIDES COOLING AND COMPENSATES FOR THERMAL EXPANSION

INNOVATOR NOT GIVEN /AEROJET-GEN. CORP./ FEB. 1965

NU-0003

A fastener composed of a concentric bellows welded to two plates forming an annular cavity provides cooling and thermal expansion compensation in a high temperature environment.

B65-10039

NONRESONANT SUPPORT FACILITATES VIBRATION TESTING OF STRUCTURES

INNOVATOR NOT GIVEN /BOEING CO./ FEB. 1965

M-FS-224

An essentially frictionless four-point support system which utilizes bearings and pistons and allows for determination of vibration frequencies of large structures. Retardation of vertical or horizontal motion is due to the viscous damping by the hydrostatic pressure of the oil or by adjustment of the gas volume in the accumulator.

B65-10040

VALVE DESIGNED WITH ELASTIC SEAT

MAC GLASHAN, W. F., JR. FEB. 1965

JPL-442

Absolute valve closure is accomplished by a machined valve with an axially annular channel which changes the outlet passage into a thin tubular elastic seat member with a retainer backup ring. The elasticity of the seat provides tight conformity to ball irregularity.

B65-10042

FLEXURE SUPPORT SYSTEM PROTECTS THERMALLY AND DYNAMICALLY LOADED MODELS

CRUMPLER, W. B. FEB. 1965

LANGLEY-39

The design of an eight legged flexure support system which permits differential thermal expansion of thin skinned models subjected to high temperatures is done by setting the length-wise axes of the supporting legs approximately normal to the line of absolute motion of the model supported.

B65-10049

SCREW LOCKING CUPS QUICKLY AND NEATLY CRIMPED

INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./

FEB. 1965

NU-0009

A tool consisting of a positioning pin which is engaged in the screw and depressed until the tool body contacts the locking cup permits quick and neat crimping.

B65-10053

SEAL ALLOWS BLIND ASSEMBLY AND THERMAL EXPANSION OF COMPONENTS

INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./

FEB. 1965

NU-0005

The design of a seal consisting of two concentric cylinders with outer and inner threaded elements attached to each side of the system interface withstands large temperature changes and allows for blind assembly.

B65-10060

NEW ALLOY BRAZES TITANIUM TO STAINLESS STEEL

INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1965

1965

MSC-102

Brazing alloy of palladium, silver and silicon is used in brazing titanium to stainless steel without embrittling metals at the brazed interfaces.

B65-10063

CERAMIC-COATED BOAT IS CHEMICALLY INERT, PROVIDES GOOD HEAT TRANSFER

SPITZER, C. R. MAR. 1965

LANGLEY-90

Refractory metal foil sprayed with ceramic coating serves as evaporating boat for inorganic materials. The high thermal conductivity of this boat makes it useful with ohmic heaters.

B65-10064

DEVICE MEASURES CURVED SURFACE FINISH ON GEAR TEETH

INNOVATOR NOT GIVEN /GE/ MAR. 1965

WOO-112

Measurement of the curved surface finish on gear teeth is made by a device used in conjunction with a conventional profilometer.

B65-10070

SIMPLE SCALE INTERPOLATOR FACILITATES READING OF GRAPHS

FETTERMAN, D. E., JR. MAR. 1965

LANGLEY-88

Simple transparent overlay with interpolation scale facilitates accurate, rapid reading of graph coordinate points. This device can be used for enlarging drawings and locating points on perspective drawings.

B65-10074

NITROGEN DIOXIDE PRODUCED BY SELF-SUSTAINED PYROLYSIS OF NITROUS OXIDE

SABOL, A. P. MAR. 1965

LANGLEY-32

Apparatus is developed for achieving continuous self-sustaining pyrolysis reaction in the production of nitrogen dioxide from nitrous oxide. The process becomes self-sustaining because of the exothermic reaction and the regenerative heating of the gases in the pyrolysis chamber.

B65-10075

TENSION IS SERVO CONTROLLED IN FILM ADVANCE SYSTEM

INNOVATOR NOT GIVEN /AM. OPT. CO./ MAR. 1965

LANGLEY-54

Servocontrol device feeds film into a roller system. Two linear potentiometers connected to spring loaded tension rollers furnish servo input signal. Can be used in any continuous material transport system.

B65-10077

NEW COUPLING COMPENSATES FOR SHAFT MISALIGNMENT

INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./

MAR. 1965

NU-0013

Coupling of splined shafts with slight misalignment is accomplished by means of a crown spline and sleeve arrangement.

B65-10078

FABRICATION METHOD PRODUCES HIGH-GRADE ALUMINA CRUCIBLES

PALMOUR, H. MAR. 1965

M-FS-216

Alumina-binder mixture, which has been dry pressed in a die using a mating punch, forms crucibles of various configurations and after firing results in a ceramic structure for use in diffusion experiments.

B65-10090

COMPACT ASSEMBLY GENERATES PLASTIC FOAM, INFLATES FLOTATION BAG

INNOVATOR NOT GIVEN APR. 1965

LANGLEY-96

Device for generating plastic foam consists of an elastomeric bag and two containers with liquid resin and a liquid catalyst. When the walls of the containers are ruptured the liquids come into contact producing foam which inflates the elastomeric bag.

B65-10094

CUTTER AND STRIPPER REDUCES COAXIAL CABLE CONNECTION TIME

THOMPSON, F. E. APR. 1965  
ARC-40

Consisting of three pivoted members, this hand cutter and stripper positions to cut shielding and insulation at the right distance and depth. Coaxial cable is prepared quickly and accurately for connector attachment.

B65-10098  
CONTACT STRESSES CALCULATED FOR MINIATURE SLIP RINGS

ALBRIGHT, F. G. DOMEREST, K. E. HORTON, J. C. APR. 1965  
M-FS-280

Using mathematical formulations to plot the graphs of the contact preload versus the Hertzian load, calculations of unit loading of the preloaded brushes on slip rings can be made. This optimizes the design of contact brushes and miniature slip rings.

B65-10099  
SLIT FEEDS REDUCE UNBALANCED TORQUES IN GAS-LUBRICATED BEARINGS

BATSCH, F. F. LAUB, J. H. APR. 1965 SEE ALSO  
B63-10123 AND B64-10050  
JPL-264

Gas-lubricated journal bearing with narrow radial slits forming circular gas-feed passages regulates gas flow in precision instruments. Asymmetrical flow pattern and unbalanced torques are prevented.

B65-10101  
JIG AND FIXTURE AID FABRICATION OF TUNGSTEN RIVETS  
CHATTIN, J. H. APR. 1965  
LEWIS-185

Jig and fixture that holds several lengths of tungsten rods produces rivets simply and inexpensively. The apparatus allows sufficient tungsten to be exposed for heating and forging into a rivet head.

B65-10104  
LEAF-SPRING SUSPENSION PROVIDES ACCURATE PARALLEL DISPLACEMENTS  
MC CREARY, R. A. APR. 1965  
JPL-480

Leaf-spring suspension device with the springs symmetrically mounted on suspension frames provides accurate parallel displacements of loads over short linear distances.

B65-10109  
ROCK BIT REQUIRES NO FLUSHING MEDIUM TO MAINTAIN DRILLING SPEED  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ APR. 1965  
JPL-WOO-031

Steel drill bit having terraces of teeth intersected by spiral grooves with teeth permits the boring of small holes through rock with low power. The cuttings are stored in a chamber behind the cutting head. Could be used as sampling device.

B65-10110  
MAGNETS POSITION X-RAY FILM FOR WELD INSPECTION  
WAGNER, R. P. APR. 1965  
M-FS-253

Film-positioning device uses magnets to hold X-ray film for weld inspection in nonferrous structures, such as tanks, where access to interior points is difficult.

B65-10111  
PROBE TESTS MICROWELD STRENGTH  
INNOVATOR NOT GIVEN /DOUGLAS AIRCRAFT CO./ APR. 1965  
WOO-118

Probe is developed to test strength of soldered, brazed or microwelded joints. It consists of a spring which may be adjusted to the desired test pressure by means of a threaded probe head, and an indicator lamp. Device may be used for electronic equipment testing.

B65-10113  
SHOCK MOUNT ISOLATES PRESSURE TRANSDUCERS FROM VIBRATION  
ROGERO, R. S., JR. APR. 1965  
JPL-631

Pressure transducer is isolated from shock and vibration forces by a pressure-compensated shock mount. Silicone elastomer O-rings within the shock mount serve as shock and vibration-damping pads.

B65-10114  
AVERAGING PROBE REDUCES STATIC-PRESSURE SENSING ERRORS  
RITCHIE, V. S. APR. 1965  
LANGLEY-36

Averaging the high and low pressure admitted to a plenum through circumferentially spaced orifices provides a probe that accurately senses the free-stream static pressure on an aerodynamic surface. This surface does not have a preferred angle of inclination to the direction of the airstream cross flow.

B65-10115  
INERT GAS SPRAYING DEVICE AIDS IN REPAIR OF HAZARDOUS SYSTEMS  
TELEHA, S. APR. 1965  
LEWIS-8B

Inert gas spraying device aids in safely making mechanical repairs to a cryogenic fluid system without prior emptying of the system. This method can be applied to any natural or bottled gas system and with modifications to gasoline transports.

B65-10116  
LOW-COST TOOL MINIMIZES DAMAGE TO O-RINGS DURING INSTALLATION  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ APR. 1965  
MSC-140

Tapered cylindrical tool enables O-ring installation over threaded fasteners without seal damage.

B65-10121  
FLOW CONTROL VALVE IS INDEPENDENT OF PRESSURE DROP  
INNOVATOR NOT GIVEN /THIOLKOL CHEM. CORP./ APR. 1965  
JPL-WOO-039

Remote control of fluid flow in a low-power system is established by a flow control valve with a flapper and nozzle flow control. Constant rates are maintained despite fluctuating pressure across the valve.

B65-10126  
COLLAPSIBLE TRUSS STRUCTURE IS AUTOMATICALLY EXPANDABLE  
INNOVATOR NOT GIVEN /GE/ MAY 1965  
GSFC-265

Coil springs wound with maximum initial tension in a three-truss, closed loop structure form a collapsible truss structure. The truss automatically expands and provides excellent rigidity and close dimensional tolerance when expanded.

B65-10130  
COLLAR POSITIONS STRIP STOCK USED TO FORM COIL ON MANDREL  
BLAZE, C. J. MAY 1965  
JPL-198

Guide collar fastened to a mandrel helps form a coil of strip sheet metal stock. The collar maintains the strip stock in its proper position during winding of each turn of the coil.

B65-10131  
APPARATUS FACILITATES PRESSURE-TESTING OF METAL TUBING  
GYORGAK, C. A. MAY 1965  
LEWIS-174

Burst-testing of refractory metal tubing is conducted in an apparatus in which tubular specimens are firmly gripped and test pressures and temperatures are applied. Porosity, flaw, and fatigue-stress rupture are also tested.

B65-10134  
HIGH PERMEABILITY SEMICONDUCTORS PERMIT  
CLOSE-TOLERANCE SOLDERING  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ MAY  
1965  
GSFC-319

High permeability semiconductors concentrate magnetic field energy in small areas to allow soldering of small components. This device can be used in microminiature parts in thin-film fabrication.

B65-10135  
COILED SPRING MAKES SELF-LOCKING DEVICE FOR  
THREADED FASTENERS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAY 1965  
1965  
MSC-149

Coiled spring device provides both easy self-locking and disassembly for screw-threaded fasteners. When the fastener turns in one direction the spring grips one of the fastener threads and releases when the fastener turns in the opposite direction.

B65-10141  
INTEGRAL RIBS FORMED IN METAL PANELS BY COLD-  
PRESS EXTRUSION  
BRADIE, P. R. SCHUERER, P. H. MAY 1965  
M-FS-230

Metal panels with integral ribs are formed by the cold-press extrusion method without material loss. Integral ribs in aluminum-alloy panels are formed by this process.

B65-10144  
LIGHTWEIGHT LOAD SUPPORT SERVES AS VIBRATION  
DAMPER  
LAYMAN, W. E. MAY 1965  
JPL-061

Omnidirectional antennas and solar panels can be supported by a thin-walled tubular strut. Silicon grease is used as the vibration-damping medium and a coil spring supports static loads.

B65-10147  
IMPROVED FLUID CONTROL VALVE EXTENDS DIAPHRAGM  
LIFE  
MAC GLASHAN, W. F. MAY 1965  
JPL-345

Wear resistance of flexible diaphragms in fluid control valves is increased by incorporating a soft rubber washer at the bottom of the piston, a flexible buffer between the diaphragm and the valve seat, and a fluid feedback arrangement. The stress and wear of components at the valve seat are minimized.

B65-10148  
BIDIRECTIONAL TORQUE FILTER ELIMINATES  
BACKLASH  
BAKER, R. VEILETTE, L. WILLIAMS, S. MAY 1965  
GSFC-335

Two elastic springs connecting a hub and two spur gears absorb bidirectional step torque differentials and provide antibacklash characteristics between input and output shafts. This device is used in precise control systems.

B65-10149  
CANTILEVER SPRINGS MAINTAIN TENSION IN  
THERMALLY EXPANDED WIRES  
TERSELIC, R. A. MAY 1965  
LEWIS-136

Two deflected cantilever springs strung with wire provide force displacement compensation to maintain tension in the wires as they undergo thermal expansion. This method of maintaining tension in thermally expanded wires is used in electric space heaters and residential heat exchangers.

B65-10150  
METAL BELLOWS CUSTOM-FABRICATED FROM TUBING  
INNOVATOR NOT GIVEN MAY. 1965  
LEWIS-192

Mandrel assembly mounted in a lathe chuck is used with a forming wheel to roll-form bellows from standard sheet metal tubing. Spacers and mandrels

of various sizes custom-fabricate bellows of any desired dimensions.

B65-10153  
TITANIUM TREATMENT IMPROVES BRAZED JOINTS  
INNOVATOR NOT GIVEN /MIT/ MAY 1965  
MSC-127

Pretreating metal with a thin coating of pure titanium improves the wettability and flow of brazing alloys. This can be used in the manufacturing of aviation and aerospace components where high strength-to-weight ratio must be achieved.

B65-10154  
SYSTEM MEASURES UNIDIRECTIONAL FORCES,  
EXCLUDES EXTRANEEOUS FORCES  
BEHRENDT, D. R. HEGLAND, D. E. MAY 1965  
LEWIS-170

System measures unidirectional force without interference from other directional forces. The measuring apparatus is mounted so that it only moves vertically and is constrained from horizontal and rotational movement. This system can be used to accurately measure small forces in one direction, or as an analytic balance.

B65-10160  
LOW-COST SEAL COMPENSATES FOR SURFACE  
IRREGULARITIES  
INNOVATOR NOT GIVEN /AEROJET-GEN. CORP./ JUN.  
1965  
NU-0016

Seal assembly consisting of a steel V-ring and a perforated tubular fluorocarbon polymer O-ring provides a barrier to gaseous and liquid hydrogen under high pressure.

B65-10163  
DEVICE DISCONNECTS SEVERAL COUPLINGS  
SIMULTANEOUSLY  
KORSYTHE, A. K. JUN. 1965  
JPL-226

Actuator assembly disconnects electric cable and fluid-line coupling from a rocket. The disconnector incorporates interconnected hydraulic cylinders which effect an equal and simultaneous displacement of pistons upon admission of compressed air through a solenoid control valve.

B65-10166  
SPICE PLATE DESIGN ASSURES STRUCTURAL  
SEPARATION BY MILD EXPLOSIVE  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1965  
1965  
MSC-137

Splice plate with mechanical joint is separated by expanding gases of a mild detonating fuse. The gas pressures of the low-yield explosive eliminate component fragmentation and achieve excellent control of the separation line.

B65-10168  
LATHE ATTACHMENT USED TO MACHINE ELLIPTICAL  
CONES  
ALLEN, J. H., SR. WOBIG, O. A. JUN. 1965  
MSC-100

Close-tolerance elliptical cones are fabricated by cutting-tool guide assembly used with conventional tracer cartridge on turret lathe accurately produced in two machine operations

B65-10170  
METAL PARTS HYDROSIZED BY EXPLOSIVE FORCE  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1965  
1965  
M-FS-289

Large metal parts are sized by a charge exploded above a sealed container filled with evacuated die and water. Explosive hydrosizing achieves close dimensional tolerances, eliminates damage to the surface, and allows longer force application and more even pressure distribution.

B65-10174  
PRESSURE TRANSDUCER SYSTEM IS FORCE-BALANCED,  
HAS DIGITAL OUTPUT  
INNOVATOR NOT GIVEN /GIANNINI CONTROLS CORP./  
JUN. 1965

M-FS-154

Forced-balanced pressure transducer and associated circuitry controls pressure testing of space equipment systems under actual operating conditions. The transducer and circuitry automatically converts the sensed pressure to digital form.

B65-10176

DEVICE ENABLES MEASUREMENT OF MOMENTS OF INERTIA ABOUT THREE AXES

CONN, J. JUN. 1965

GSFC-49

Device measures moments of inertia of an irregularly shaped mass about three mutually perpendicular axes by the standard pendulum and torque methods. A fixture suspends the test mass at one point and can be adjusted to allow oscillation of the mass.

B65-10177

EPOXY-RESIN PATTERNS SPEED SHELL-MOLDING OF ALUMINUM PARTS

INNOVATOR NOT GIVEN /ALABAMA UNIV./ JUN. 1965

M-FS-303

Half patterns cast from commercial epoxy resin containing aluminum powder are used for shell-molding of aluminum parts. The half patterns are cast in plastic molds of the original wooden pattern. Ten serviceable sand-resin molds are made from each epoxy pattern.

B65-10180

NEW NUT AND SLEEVE IMPROVE FLARED CONNECTIONS

GARRARD, J. S. JUN. 1965

M-FS-194

Improved nut and sleeve of standard stainless steel flared tube connection allows forces on the mating surfaces to be uniformly applied. This can be applied to pressurized fluid systems such as refrigeration, air conditioning, and hydraulic systems.

B65-10181

HAND TOOL BENDS COMPONENT LEADS ACCURATELY

INNOVATOR NOT GIVEN /CHRYSLER CORP./ JUN. 1965

M-FS-308

Hand-operated die set bends, without damage, electrical component leads to perfectly match holes in printed circuit board. This tool speeds up printed circuit fabrication and reduces the number of component rejections.

B65-10185

DISPENSING SYSTEM ELIMINATES TORSION IN DEPLOYED HOSES

INNOVATOR NOT GIVEN /IIT RES. INST./ JUN. 1965

INST./ JUN. 1965

MSC-80

Dispensing system uses a rotating drum, transfer arm, and stationary drum to deploy, reel in, and store an attached hose. This system which eliminates torsion and minimizes strain and wear of flexible hoses, is used for handling flexible cables that have one end permanently attached to an outlet or connector.

B65-10191

EXTENDIBLE COLUMN CAN BE STOWED ON DRUM

HOLTZ, G. M. HOWARD, E. A. JUN. 1965

JPL-686

Column formed from a series of segments held together by an internal spring or cable can be coiled on a drum or extended into a rigid structure. This storable coil is useful in boring for soil samples and supporting electrical and optical sensors.

B65-10192

SPIRAL HEATER COILS HAND-FORMED WITH FIXTURE

CHATTIN, J. H. JUN. 1965

LEWIS-208

Bench model jig and fixture used for hand fabricating spiral coils of various lengths from flat strip stock. This tool is used to make springs and coils to custom lengths.

B65-10198

SELF-ALIGNING FIXTURE USED IN LATHE CHUCK JAW REFACING

LINN, C. C. JUN. 1965

FRC-21

Self-aligning tool positions and rigidly holds lathe chuck jaws for refacing and truing of the clamping surface. The jaws clamp the fixture in the manner of clamping a workpiece. The fixture can be modified to accommodate four-jawed checks.

B65-10201

ELECTRICAL CABLE CONNECTOR-CLAMP HAS SMOOTH EXTERIOR SURFACE

INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1965

1965

MSC-154

Electrical cable connector-clamp fitted with a collet has a smooth exterior surface that can be easily gripped. The collet clamps a portion of the cable and provides for connecting it to a standard electrical connector.

B65-10205

BALL-AND SOCKET JOINTS PROVIDE ACCURATE BIAXIAL GIMBAL

ROUZE, E. R. JUL. 1965

JPL-658

Ball-and-socket joints are used to connect two rotating inputs to orthogonally pivoted outputs. This provides an accurate biaxial gimbal which will operate in continuous motion without backlash.

B65-10207

FLUID CHECK VALVE HAS FAIL-SAFE FEATURE

GAUL, L. C. JUL. 1965

JPL-0019

Check valve ensures unidirectional fluid flow and, in case of failure, vents the downstream fluid to the atmosphere and gives a positive indication of malfunction. This dual valve consists of a master check valve and a fail-safe valve.

B65-10210

FIBERGLASS DIES SPEED FORMING OF LARGE METAL SHEETS

BROWN, R. L. SCHUERER, P. JUL. 1965

M-FS-214

Fiberglass tooling dies accelerate forming of large metal sheets. The dies, fabricated to fit over and fasten to the die bases, are lightweight, quickly replaced and have nongalling surfaces.

B65-10216

WIRE MESH ISOLATOR PROTECTS SENSITIVE ELECTRONIC COMPONENTS

KERLEY, J. J., JR. JUL. 1965

GSFC-347

Sensitive electronic components are enclosed in wire mesh for protection. The wire mesh isolates the component from shock and vibration. It acts as a heat sink and as a screen against rf interference.

B65-10219

FLEXIBLE MAGNETIC PLANNING BOARDS ARE EASILY TRANSPORTED

INNOVATOR NOT GIVEN /GEN. DYN./ASTRONAUTICS/ AUG. 1965

1965

M-FS-340

Easily transportable preprinted magnetic planning boards are made by coating thin sheet steel with clear plastic. Flexible magnetic boards used with paper charts are constructed from close mesh steel screen.

B65-10222

INEXPENSIVE CHECK VALVE IS INSTALLED IN STANDARD AN FITTINGS

MARTINEZ, J. S. AUG. 1965

JPL-2A

Check valve with a cylindrical flanged tube body is used in standard AN fittings. The valve also has an easily removable spring-loaded piston.

B65-10227

DIAPHRAGM ELIMINATES LEAKAGE IN CRYOGENIC FLUID DUCT COUPLING

INNOVATOR NOT GIVEN /DOUGLAS AIRCRAFT CO./ AUG. 1965

W00-142

Duct coupling with nickel steel diaphragm of low thermal expansivity is leakproof when used with cryogenic fluids. The diaphragm, located between the two flanges of the coupling, reduces axial shrinkage at the coupling flanges to a minimum.

B65-10229

SCOOP ATTACHMENT MAKES HELICOPTER RECOVERIES EASIER AND SAFER

KOONS, W. E. AUG. 1965

MSC-130

Helicopter with rigid boom and net attachment performs rescue or recovery operations easily and safely. The attachment in the front of the helicopter scoops objects from difficult and otherwise inaccessible areas and pivots to the side hatch of the aircraft so that no crew member need leave the craft.

B65-10230

HYDRAULIC DEVICE PROVIDES ACCURATE DISPLACEMENTS TO MICROINCHES

TSUTSUMI, K. /MIT/ AUG. 1965

MSC-112

Hydraulic drive device translates microinch deviation measurements into precise corrective displacements. The unit is driven by a servomotor activated by the output of an attitude sensing device.

B65-10231

HANDTOOL FACILITATES EXTRACTION OF CIRCUIT MODULES

LUSBY, T. K., JR. AUG. 1965

LANGLEY-38

Compact handtool extracts electronic modules from circuit board socket. It is used on modules that have four small notches in the base of the plastic housing.

B65-10235

ANGULAR GLASS TUBING DRAWN FROM ROUND TUBING INNOVATOR NOT GIVEN /DEBELL AND RICHARDSON/ AUG. 1965

HQ-20

Round glass tubing softened in a furnace is drawn over a shaped plug or mandrel to form shapes with other than a circular cross section. Irregularly shaped tubing is formed without limitations on tube length or wall thickness.

B65-10236

BURST DIAPHRAGM PROTECTS VACUUM VESSEL FROM INTERNAL PRESSURE TRANSIENTS

HOTZ, G. M. HOWARD, E. A. AUG. 1965

JPL-687

Supported dual-mode burst diaphragm protects vacuum vessels from transient internal pressures. It forms the interface between the vacuum in the vessel and an external pressure.

B65-10241

SHOCK ABSORBER OPERATES OVER WIDE RANGE CREASY, W. K. JONES, J. C. AUG. 1965

MSC-168

Piston-type hydraulic shock absorber, with a metered damping system, operates over a wide range of kinetic energy loading rates. It is used for absorbing shock and vibration on mounted machinery and heavy earth-moving equipment.

B65-10245

CAPTIVE NUT FASTENER SECURELY JOINS BRITTLE MATERIALS

SACCOCIO, R. M. /WESTINGHOUSE ELEC. CORP./ AUG. 1965

NU-0008

Extension tube captive nut with a standard bolt joins assemblies with an inaccessible nut location. This fastener is excellent for joining brittle materials.

B65-10246

THERMOCOUPLE-TO-INSTRUMENTATION CONNECTOR FEATURES QUICK ASSEMBLY

HENSHAW, E. /WESTINGHOUSE ELEC. CORP./ AUG. 1965

NU-0022

Rigid thermocouple leads are connected to flexible instrumentation leads by a crimping and bridging process. This method eliminates the need for expensive transition sections and can be accomplished in about five minutes.

B65-10248

SYSTEM TRANSMITS MECHANICAL VIBRATION INTO HAZARDOUS ENVIRONMENT

ARMSTRONG, D. G. /WESTINGHOUSE ELEC. CO./ GAAL, A. E. AUG. 1965

NU-0025

Vibration transducers are tested in a hazardous environment using a single axis transmission system with an electromagnetic shaker table and vibrating wires which drive identical rocker arms, one in the test cell and the other outside. This system can be modified for a multiaxis configuration.

B65-10251

CONTROL OF COMPONENT DIFFERENTIAL HARDNESS INCREASES BEARING LIFE

ANDERSON, W. J. PARKER, R. J. ZARETSKY, E. V. AUG. 1965

LEWIS-190

Bearing fatigue life is maximized when the bearing ball or roller hardness is between one and two points greater than that of the bearing race as measured on the Rockwell C scale.

B65-10254

REMOVED OPERATED CLAMPING TOOL HAS POSITIVE GRIP

ADUCCI, S. A. /WESTINGHOUSE ELEC. CORP./ SEWALD, A. W. AUG. 1965

NU-0020

Jaw-type clamping tool inserts or removes objects in a hazardous environment. It has a strong, positive gripping force which is remotely operated by means of a wedge-screw mechanism.

B65-10256

HOLLOW PLASTIC HOOPS PROTECT THERMOCOUPLE IN STORAGE AND HANDLING

OSMOND, L. H. /WESTINGHOUSE ELEC. CORP./ AUG. 1965

NU-0023

Thermocouples are shipped and stored in hollow plastic hoops. The hoop is an inexpensive but efficient method of protection.

B65-10262

ROTATING HOLDER PERMITS ACCURATE GRINDING OF METALLURGICAL MICROSAMPLES

CRAMER, D. L. SEP. 1965

LEWIS-131

Metallurgical microsamples are held in a fixture which rotates the sample across a rotating grinding wheel. The dual rotation results in a level, flat surface on the sample.

B65-10266

ONE-SHOT VALVE MAY BE REMOTELY ACTUATED KAMI, S. /HUGHES AIRCRAFT CO./ SEP. 1965

W00-195

One-shot valve, with spring-loaded plunger and sealing diaphragm, incorporates an emergency release actuated by a remote sensor. The plunger is released by the electrical melting of a fuse link and pierces the valve seal. The valve lowers fluid pressure in a container without losing the contained fluid.

B65-10285

DIFFERENTIAL PRESSURE GAUGE HAS FAST RESPONSE WEBER, H. S. /ARMOUR RES. FOUND./ SEP. 1965

M-FS-358

Differential pressure gauge with semiconductor-type strain gauge elements measures rapidly changing pressure. Output of the strain gauge elements is a dc voltage that is directly proportional to the pressure difference being measured.

B65-10312

AIR BRAKE-DYNAMOMETER ACCURATELY MEASURES TORQUE



INNOVATOR NOT GIVEN OCT. 1965

LEWIS-163

Air brake-dynamometer assembly combines the principles of the air turbine and the air pump to apply braking torque. The assembly absorbs and measures power outputs of rotating machinery over a wide range of shaft speeds. It can also be used as an air turbine.

B65-10319

REFRACTORY METALS WELDED OR BRAZED WITH TUNGSTEN INERT GAS EQUIPMENT

WISNER, J. P. OCT. 1965

LEWIS-219

Appropriate brazing metals and temperatures facilitate the welding or brazing of base metals with tungsten inert gas equipment. The highest quality bond is obtained when TIG welding is performed in an inert atmosphere.

B65-10323

VOLUMETRIC SYSTEM CALIBRATES METERS FOR LARGE FLOW RATES

INNOVATOR NOT GIVEN /N. AM. AVIATION/ NOV. 1965

WOO-130

Volumetric system calibrates meters used for large liquid flow rates. The system employs trip probes and equipment to time the flow of liquid from a tare vessel into a calibrated vessel. This calibration system is used in the petroleum and chemical industries.

B65-10326

ROUGH SURFACE IMPROVES STABILITY OF AIR-SOUNDING BALLOONS

SCOGGINS, J. R. NOV. 1965

M-FS-320

Aerodynamic stability of balloons used for measuring the intensity and direction of atmospheric winds at various elevations is improved by incorporating a rough surface on the balloons. The rough-surfaced balloon is useful for collecting wind profiles and other meteorological data.

B65-10327

PRESSURE RESPONSIVE SEAL HANDLES STATIC AND DYNAMIC LOADS

MARSH, H. W. /N. AM. AVIATION/ NOV. 1965

GSFC-441

Ported ball valves are sealed under both static and dynamic load conditions by a line-pressure responsive double-acting seal. The top of the seal engages the ported ball at the outer circumferential edge of the seal upper end, and the bottom of the seal seats on a flat circular land with a continuous wall.

B65-10338

INERT-GAS WELDING AND BRAZING ENCLOSURE FABRICATED FROM SHEET PLASTIC

WISNER, J. P. NOV. 1965

LEWIS-220

Custom-fabricated plastic bag maintains an inert-gas atmosphere for welding and brazing certain metals. The bag fits over part of the workpieces and the welding and brazing tools. It is also used for metal brazing and fusion plating which require an inert-gas atmosphere.

B65-10339

DISK CALCULATOR INDICATES LEGIBLE LETTERING SIZE FOR SLIDE PROJECTION

HULTBERG, R. R. NOV. 1965

GSFC-409

Hand-operated disk calculator indicates the minimum size of letters and numbers in relation to the width and height of a working drawing. The lettering is legible when a slide of the drawing is projected.

B65-10342

ELECTROMAGNETIC HAMMER REMOVES WELD DISTORTIONS FROM ALUMINUM TANKS

SCHWINGHAMER, R. J. NOV. 1965

M-FS-287

Distortions around weld areas on sheet-aluminum tanks and other structures are removed with a portable electromagnetic hammer. The hammer

incorporates a coil that generates a controlled high-energy pulsed magnetic field over localized areas on the metal surface.

B65-10346

IMPROVED POPPET VALVE PROVIDES POSITIVE DAMAGEPROOF SEAL

WALLACE, E. D. NOV. 1965

M-FS-293

Soft-seat poppet valve provides positive closure against fluid without damage to the seating surface on repeated cycling. It incorporates two compressible soft rings and a retaining ring of hard metal. Sealing is effected when the poppet seat is forced into intimate contact with a mating surface on one of the soft rings.

B65-10348

STANDOFF TOOL SPEEDS PLACEMENT OF FRICTION-FIT ELECTRICAL TERMINALS

MOORE, D. J. SKIFSTROM, W. W. /SPACE TECHNOL. LABS./ NOV. 1965

WOO-029

Hand operated tool inserts terminals through compartment walls in electronic equipment. The tool is in the configuration of a modified pair of pliers with jaws consisting of a split chuck and anvil.

B65-10351

HYDRAULIC DRIVE SYSTEM PREVENTS BACKLASH

ACORD, J. D. NOV. 1965

JPL-371

Hydraulic drive system uses a second drive motor operating at reduced torque. This exerts a relative braking action which eliminates the normal gear train backlash that is intolerable when driving certain heavy loads.

B65-10358

FASTENER DISTRIBUTES STRESS EVENLY FROM SANDWICH-PANEL-HUNG ITEMS

SHAPIRO, J. /N. AM. AVIATION/ NOV. 1965

MSC-236

Items are attached externally to cellular-core sandwich panels by a fastener anchored in the panel by a constant amount of adhesive. The changes caused to the core cells and skin sheets are minimized.

B65-10360

PORTABLE TOOL REMOVES BURRS FROM PIPE AND TUBING

HEADLEY, C. A. PADILLA, V. E. SCHOPPMAN, R. A. /MCDONNELL AIRCRAFT CORP./ NOV. 1965

MSC-237

Portable tool cleanly removes burrs that remain on tubing when it is cut. It restores the cut end to its original configuration, and carries away all chips and pieces. This tool is used in places of limited access where a larger tool could not be used.

B65-10367

FLEXIBLE PLASTIC RING ASSEMBLY MAKES DURABLE SHAFT SEAL

INNOVATOR NOT GIVEN /N. AM. AVIATION/ DEC. 1965

WOO-227

Stacked flexible rings interleaved with solid metal rings of smaller width provide a durable seal ring for rotating shafts used in vacuum or pressure pumps.

B65-10370

BRAZING METHOD PRODUCES SOLID-SOLUTION BOND BETWEEN REFRACTORY METALS

INNOVATOR NOT GIVEN /AVCO CORP./ DEC. 1965

LEWIS-212

Brazing two refractory metals by diffusion bonding minimizes distortion and avoids excessive grain growth in the metals. This method requires the selection of an interface metal that forms intermediate low-melting eutectics or solid solutions with the metals to be brazed.

B65-10371

UNIVERSAL BELLOWS JOINT RESTRAINT PERMITS ANGULAR AND OFFSET MOVEMENT

KUHN, R. F., JR. /N. AM. AVIATION/ DEC. 1965

W00-102

Universal joint-type restraint that employs ball joints permits maximum angular and lateral offset movement in a bellows joint without danger of rupture or pressure drop in the line. It is used in high pressure and high-temperature applications in refineries, steam plants, or stationary power plants.

B65-10375

PORTABLE TOOL CLEANS PIPES AND TUBING  
HEADLEY, C. A. /MCDONNELL AIRCRAFT CORP./  
HEADLEY, R. JONES, D. D. DEC. 1965  
MSC-238

Portable tool cleans and polishes the external surfaces of tubes and pipes without contaminating the interior areas with loose particles. The tool is driven by an electric drill and is connected to a vacuum source that removes debris resulting from the cleaning and polishing action.

B65-10378

REINFORCEMENT CORE FACILITATES O-RING  
INSTALLATION  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ DEC. 1965  
W00-228

Reinforcement core holds O-ring in place within a structure while adjacent parts are being assembled. The core in the O-ring adds circumferential rigidity to the O-ring material. This inner core does not appreciably affect the sectional elasticity or gland-sealing characteristics of the O-ring.

B65-10383

THREADED SPLIT RING CONNECTOR SEPARATES  
STRUCTURAL SECTIONS  
MAYO, J. W. JUL. 1965  
LANGLEY-145

Threaded split ring connector quickly and cleanly separates two structural members by remote control. The connector is retained in an expanded position by spring plates that are deflected and held by an explosive bolt. Ignition of the bolt effects the separation. This conceptual approach lends itself to various configurations and sizes of structures.

B65-10385

RACK MOUNT DEVICE QUICKLY INSERTS OR EXTRACTS  
CHASSIS UNITS  
HAERTHER, L. W. ZIMMERMAN, P. A. /COLLINS RADIO  
CO./ DEC. 1965  
MSC-244

Rack mounted chassis units are quickly inserted or extracted by a device which is driven in either direction by turning a simple hand crank. This device is used in aircraft and water craft.

B65-10386

DRILL BIT DESIGN ASSURES CLEAN HOLES IN  
LAMINATED MATERIALS  
TILLOTSON, R. N. /DOUGLAS AIRCRAFT CO./ DEC.  
1965  
W00-098

Drill bit eliminates delamination when drilling laminated material. It cuts or shaves the material as it progresses through it. The bit acts to hold down the material during drilling to prevent tearing or ripping and produces a clean, smooth and defect-free hole. It prevents chipping in stretched plastic windows for high-altitude, high-performance aircraft.

B65-10388

STRAINER FITS INSIDE FLARED-TUBE FITTINGS  
PARKER, O. J. DEC. 1965  
LANGLEY-180

Cylindrical wire-mesh strainer which fits inside flare-tube fittings is readily installed and easily replaced. It has a collar that seats on the tapered shoulder of the male fitting.

B65-10391

TUNGSTEN WIRE AND TUBING JOINED BY NICKEL  
BRAZING  
INNOVATOR NOT GIVEN /AUTO-CONTROLS LABS./ DEC.  
1965  
M-FS-394

Thin tungsten wire and tungsten tubing are brazed together using a contacting coil of nickel wire heated to its melting point in an inert-gas atmosphere. This method is also effective for brazing tungsten to tungsten-rhenium parts.

B65-10393

DIE AND TELESOPING PUNCH FORM CONVOLUTIONS IN  
THIN DIAPHRAGM  
INNOVATOR NOT GIVEN /HONEYWELL/ DEC. 1965  
JPL-SC-135

Die and punch set forms convolutions in thin dished metal diaphragm without stretching the metal too thin at sharp curvatures. The die corresponds to the metal shape to be formed, and the punch consists of elements that progressively slide against one another under the restraint of a compressed-air cushion to mate with the die.

B65-10394

CENTRIFUGAL DEVICE SEPARATES LIQUID FROM GAS  
HANDLEWICH, R. M. /UNITED AIRCRAFT CORP./  
STROUP, K. E. DEC. 1965  
MSC-282

Liquid-to-gas ratio is reduced from maximum efficiency of jet engine fuel by a centrifugal separator. The amount of liquid removed from the fuel is controlled by the separator-screen mesh size and its rotational speed.

B65-10401

PHOTOSENSORS USED TO MAINTAIN WELDING  
ELECTRODE-TO-JOINT ALIGNMENT  
BOWEN, J. B. /N. AM. AVIATION/ DEC. 1965  
MSC-243

Photosensors maintain electrode-to-joint alignment in automatic precision arc welding. They detect the presence and relative position of a joint to be welded and actuate a servomechanism to guide the welding head accordingly thus permitting alignment for more than straight line or true circle joints.

B65-10402

LIGHTWEIGHT DOOR SEALS CRYOGENIC CONTAINER  
AGAINST DIAPHRAGM TYPE LOADING  
ENGLEHART, R. C., JR. /N. AM. AVIATION/ DEC.  
1965  
M-FS-476

Lightweight, removable, sealed joint access door for a spherical or semispherical pressure vessel containing cryogenic materials uses a joint overlock design to take the shear and moment loads. Oversize bolt holes are used so that the attaching bolts are in tension only.

B66-10001

FORMING TOOL IMPROVES QUALITY OF TUBING FLARES  
INNOVATOR NOT GIVEN /GEN. DYN./ASTRONAUTICS/ JAN.  
1966  
W00-231

Punch and die set improves the quality of tubing flares for use with standard flared-tube fittings in high-pressure systems. It forges a dimensionally accurate flare in the tubing and forces more tubing material into the high-stress areas to improve the strength and tightness of the tubing connection.

B66-10003

IMPROVED TOOL EASILY REMOVES BRAZED TUBE  
CONNECTORS  
SCHOPPMAN, R. A. /MCDONNELL AIRCRAFT CORP./ JAN.  
1966  
MSC-263

Portable, compact tool quickly and cleanly removes brazed connectors from system tubes. The tool uses an induction coil to melt the braze and a compression spring to automatically separate the connection. An inert gas is force-fed about the heated area to prevent oxidation of the tube.

B66-10007

FLOATING DEVICE ALIGNS BLIND CONNECTIONS  
RESEL, J. E. /N. AM. AVIATION/ JAN. 1966  
MSC-256

Panel-mounted connectors overcome the misalignment of blind connectors in electronic rack mounted equipment. The connector is free to move in the

vertical direction by the action of a parallelogram mount. This freedom of motion maintains the guide pin hole centerline parallel to the guide pin centerline at all times.

**B66-10011**  
TORQUE WRENCH DESIGNED FOR RESTRICTED AREAS  
FAGERBERG, E. R. /LOCKHEED MISSILES AND SPACE  
CO./ JAN. 1966  
LEWIS-246

Wrench with twisting handle grip applies torque to a fastener in a restricted area. The wrench handle may be any length without affecting output torque.

**B66-10014**  
EXPLOSIVE FORCE OF PRIMACORD GRID FORMS LARGE SHEET METAL PARTS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
SEE ALSO NASA-SP-5017  
M-FS-316

Primacord which is woven through fish netting in a grid pattern is used for explosive forming of large sheet metal parts. The explosive force generated by the Primacord detonation is uniformly distributed over the entire surface of the sheet metal workpiece.

**B66-10018**  
COMPACT RETRACTOR PROTECTS CABLING LOOPS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
M-FS-561

Core and swivel retractor mechanism combined with cable stiffeners provides compact, long-wearing protection for cabling loops in cabinet-mounted electronic equipment drawers.

**B66-10019**  
BUOYANT STOKES LITTER ASSEMBLY USED FOR SEA RESCUE OPERATIONS  
POLLARD, R. A. SHEWMAKE, G. A. JAN. 1966  
MSC-131

Standard Stokes litter is fastened to inflatable flotation units for sea rescue operations. The assembly keeps an injured person immobilized during transportation to a first aid station.

**B66-10020**  
O-RING TUBE FITTINGS FORM LEAKPROOF SEAL IN HYDRAULIC SYSTEMS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
M-FS-481

Leakproof fittings for hydraulic systems are designed to be welded to the ends of the tubing to be joined and mated to form a seal with one O-ring at the joint. Since the fittings are coupled at only one joint, they tend to be more reliable than standard fittings coupled at two joints.

**B66-10022**  
RING VALVE RESPONDS TO DIFFERENTIAL PRESSURE CHANGES  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
WOO-247

Pressure valve has a moving annular ring seal that automatically reacts to differential pressure changes across the seat. This valve has good potential for the petroleum and chemical industries.

**B66-10023**  
SIMPLE KEY LOCKS TURBINE ROTOR BLADES  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
WOO-103

Symmetrical, cruciform key has end tabs which bend up to lock turbine rotor blades against axial displacement. The key locks without introducing aerodynamic resistance or upsetting rotor balance.

**B66-10030**  
FRICTION DEVICE DAMPS LINEAR MOTION OF ROTATING SHAFT  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
WOO-214

Damping device checks the axial motion of a rotating shaft by exerting a controllable, radial frictional load to the outer race of the ball bearing in which the shaft is mounted. The device

can be used as a soft bearing mount to damp resonant frequencies at critical shaft speed.

**B66-10032**  
SHEET METAL STRIP UNROLLS TO FORM CIRCULAR BOOM  
INNOVATOR NOT GIVEN /HELPA, INC./ JAN. 1966  
GSFC-423

Preformed metal strip, coiled flat on a storage drum, unrolls to form a cylindrical boom. Tabs and slots on opposite sides of the strip interlock to form a continuous circular cross section. This retractable boom can be used as a spacecraft antenna, gravity gradient, or positioning device.

**B66-10035**  
RESILIENT CLAMP HOLDS FUEL CELL STACK THROUGH THERMAL CYCLE  
SHINN, B. H. /UNITED AIRCRAFT CORP./ FEB. 1966  
MSC-313

Resilient clamping device holds a stack of fuel cells during thermal expansion and contraction periods. The clamp has torsion bar action which maintains seal integrity over a wide stress range.

**B66-10040**  
ASSEMBLY JIG ASSURES RELIABLE SOLAR CELL MODULES  
OPARELL, H. O. /TRW SPACE TECHNOL. LABS./ FEB. 1966  
GSFC-455

Assembly jig holds the components for a solar cell module in place as the assembly is soldered and bonded by the even heat of an oven. The jig is designed to the configuration of the planned module. It eliminates uneven thermal conditions caused by hand soldering methods.

**B66-10047**  
HEATED DIE FACILITATES TUNGSTEN FORMING  
CHATTIN, J. H. HAYSTRICK, J. E. LAUGHLIN, J. C. LEIDY, R. A. FEB. 1966  
LEWIS-25A

Tungsten forming in a press brake employs a bottom die assembly with a heating manifold between two water-cooled die sections. The manifold has hydrogen-oxygen burners spaced along its length for even heat during forming.

**B66-10052**  
COMBUSTION CHAMBER INLET MANIFOLD SEPARATES VAPOR FROM LIQUID  
BAKER, D. I. /N. AM. AVIATION/ FEB. 1966 SEE ALSO B63-10251  
M-FS-531

Circular manifold with tangential orifices at the inner circumference provides for the vapor constituent of a vaporized cryogenic propellant to enter a rocket combustion chamber before the liquid constituent. The vapor is separated from the liquid by centrifugal action and precedes it into the chamber through carefully positioned orifices.

**B66-10054**  
MODIFIED POWER TOOL RAPIDLY DRIVES SERIES TORQUE BOLTS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ FEB. 1966  
MSC-221

Feeder attachment, which fits on a standard power driver, drives a series of longitudinally attached torque bolts into place with great speed. It allows loading of a series of bolts and then positions individual bolts in the driving head for assembly. The attachment contains a socket gun which may be modified to accommodate different types and sizes of bolts.

**B66-10055**  
HYDROGEN-ATMOSPHERE INDUCTION FURNACE HAS INCREASED TEMPERATURE RANGE  
CAVES, R. M. GRESSLIN, C. H. FEB. 1966  
LEWIS-153

Improved hydrogen-atmosphere induction furnace operates at temperatures up to 5,350 deg. F. The furnace heats up from room temperature to 4,750 deg. F in 30 seconds and cools down to room temperature in 2 minutes.

B66-10056

BENCH VISE ADAPTER GRIPS TUBING SECURELY AND SAFELY

HOWLAND, B. T. JONES, A. S., JR. /N. AM.

AVIATION/ FEB. 1966

MSC-279

Plastic self-compressing adapter with grooves, attached to the jaws of a bench vise, secures thin-wall tubing vertically or horizontally during cutting and flaring operations without marring or damaging it. Magnets incorporated in both sections of the adapter prevent detachment from the jaws when the vise is opened.

B66-10059

CALIBRATED CLAMP FACILITATES PRESSURE

APPLICATION

INNOVATOR NOT GIVEN /N. AM. AVIATION/ FEB. 1966

MSC-298

Spring-loaded clamp applies specific pressure to hold materials together during bonding, welding, and machining. The clamp has two adjustable legs terminating in suction cups for easy attachment to a surface.

B66-10061

INSTRUMENT QUICKLY TRANSPOSES GROUND REFERENCE TARGET TO EYE LEVEL

GREEN, B. E. VAN DEVENTER, E. L. /N. AM.

AVIATION/ FEB. 1966

MSC-275

Optical alignment of equipment is facilitated by a traverse target with a string suspending a plumb bob to transpose the ground level point to eye-level operation. This instrument appreciably decreases the time required from the present method but achieves the same degree of precision.

B66-10063

TENSILE-STRENGTH APPARATUS APPLIES HIGH STRAIN-RATE LOADING WITH MINIMUM SHOCK

COTRILL, H. E., JR. MAC GLASHAN, W. F., JR. FEB.

1966

JPL-28 JPL-29

Tensile-strength testing apparatus employs a capillary bundle through which a noncompressible fluid is extruded and a quick-release valve system. This apparatus applies the test loads at relatively constant very high strain rates with minimal shock and vibration to the tensile specimen and apparatus.

B66-10065

T-HANDLE WRENCH HAS TORQUE-LIMITING ACTION

KEMPLE, S. B. /N. AM. AVIATION/ FEB. 1966

MSC-280

T-handle wrench can be preset to release when a certain torque value is exceeded by means of a spring-loaded roller and groove torque-limiting mechanism contained in the handle of the wrench. The wrench is also equipped with a push button in the handle that permits the operator to lock the handle to the spindle shaft, thus eliminating the torque-limiting function.

B66-10069

RUN-IN WITH CHEMICAL ADDITIVE PROTECTS GEAR SURFACE

HARTMAN, M. A. /N. AM. AVIATION/ FEB. 1966

M-FS-548

Run-in treatment provides a protective coating on turbopump gear surfaces so that they are capable of operation under marginal conditions in mineral oil and diester lubricants. This treatment protects highly loaded gears during relatively short-term operation.

B66-10071

MECHANISM ISOLATES LOAD WEIGHING CELL DURING LIFTING OF LOAD

HAIGLER, J. S. /N. AM. AVIATION/ FEB. 1966

MSC-297

Load weighing cell used in conjunction with a hoist is isolated during lifting and manipulation of the load. A simple mechanism, attached to a crane hook, provides a screw adjustment for engaging the load cell during weighing of the load and isolating it from lift forces during hoisting of the load.

B66-10073

CALCULATIONS ENABLE OPTIMUM DESIGN OF MAGNETIC BRAKE

KOSMAHL, H. G. FEB. 1966

LEWIS-251

Mathematical analysis and computations determine optimum magnetic coil configurations for a magnetic brake which controllably decelerates a free falling load to a soft stop. Calculations on unconventionally wound coils determine the required parameters for the desired deceleration with minimum electrical energy supplied to the stationary coil.

B66-10074

THREADED PILOT INSURES CUTTING TOOL

ALIGNMENT

GOLDMAN, R. /N. AM. AVIATION/ SCHNEIDER, W. E.

FEB. 1966

M-FS-527

Threaded pilot allows machining of a port component, or boss, after the reciprocating hole has been threaded. It is used to align cutting surfaces with the boss threads, thus insuring precision alignment.

B66-10076

SHOULDER ADAPTER STEADIES SPOT WELDING GUN

LOVE, T. H. MAR. 1966

M-FS-321

Shoulder adapter fits on one end of a hand-held spot welding gun. With the adapter, the operator can hold the gun steadily at uniform pressure to ensure defect-free welds.

B66-10077

PLUGGED HOLLOW SHAFT MAKES FATIGUE-RESISTANT

SHEAR PIN

HANKINSON, T. W. E. MAR. 1966

LANGLEY-195

Shear pin coupling with plugged hollow shaft provides required load capacity for shaft protection and has no groove to induce fatigue failure.

B66-10078

THERMAL MOTOR POSITIONS MAGNETOMETER SENSORS

KERWIN, W. J. SCOTT, S. G. MAR. 1966

ARC-51

Reversing, thermal, motor-driven device positions magnetometer sensors for checking zero offset. The device alternately positions two sensors at fixed positions 90 degrees apart. The thermal motor is fabricated completely of nonmagnetic materials.

B66-10080

NYLON SHOCK ABSORBER PREVENTS INJURY TO PARACHUTE JUMPERS

MANDEL, J. A. /GOODYEAR AEROSPACE CORP./ MAR. 1966

MSC-226

Nylon shock absorbers reduce the canopy-opening shock of a parachute to a level that protects the wearer from injury. A shock absorber is mounted on each of the four risers between the shroud lines and the harness. Because of their size and location, they pose no problem in repacking the chute and harness after a jump.

B66-10092

FINGERTIP CURRENT CONTROL FACILITATES USE OF ARC WELDING GUN

ROTH, B. /N. AM. AVIATION/ MAR. 1966

MSC-289

Fingertip-operated trigger accurately controls the current supplied to an arc welding gun. The trigger is mounted directly on the handle of the gun.

B66-10093

TOOL PROVIDES CONSTANT PURGE DURING TUBE WELDING

LANG, E. R. /N. AM. AVIATION/ MAR. 1966

M-FS-547

Tool provides a constant purge of inert gas during in-place welding of tubular components to prevent contamination and oxidation. It also permits self-jigging of the tube and sleeve to be welded.

B66-10100

QUEUEING REGISTER USES FLUID LOGIC ELEMENTS  
INNOVATOR NOT GIVEN /UNIVAC DIV. OF SPERRY RAND/  
MAR. 1966  
M-FS-317

Queueing register /a multistage bit-shifting device/ uses a series of pure fluid elements to perform the required logic operations. The register has several stages of three-state pure fluid elements combined with two-input NOR gates.

B66-10102

PIPE CUTTING TOOL IS USEFUL IN LIMITED SPACE  
HEADLEY, C. A. /MCDONNELL AIRCRAFT CORP./ JONES,  
D. D. MAR. 1966  
MSC-36

Portable pipe cutting tool is used in areas of limited space. The pipe is clamped in the tool and then cut by a rotating cutter assembly that is internally connected to a drive shaft engaged in the chuck of a portable electric drill. The tool is held in a fixed position during the cutting operation.

B66-10107

MECHANISM CONTINUOUSLY MEASURES STATIC AND DYNAMIC CABLE LOADS  
MAR. 1966  
MSC-217

Pulley mechanism measures the tensile loads on a cable under static and dynamic conditions, without disturbing the continuity of operation of the system. A set of takeoff pulleys are mounted on a pivoted frame that is linked to a strain gage which measures the frame displacement as a function of the static or dynamic tensile load on the cable.

B66-10115

SOLDERING TOOL HEATS WORKPIECES AND APPLIES SOLDER IN ONE OPERATION  
GUDKESE, V. W. MAY 1966  
LEWIS-247

Fountain-pen type soldering iron heats workpieces and applies solder to joints in densely packed electronics assemblies. The basic soldering tool is used with different-sized orifice tips, eliminating the need for an assortment of conventional soldering guns.

B66-10116

TELESCOPING OF INSTRUMENTATION TUBING ELIMINATES SWAGING  
MC GLELLAN, E. L. /N. AM. AVIATION/ MAY 1966  
M-FS-546

Short sections of stainless steel tubing of slide-fit sizes fitted together and silver-soldered at the junctions form small-diameter tubing assemblies with accurately stepped-down dimensions. This method of fabrication eliminates the costly swaging operations formerly used.

B66-10123

HAND DRILL ADAPTER LIMITS HOLES TO DESIRED DEPTH  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1966  
MSC-346

Adjustable adapter fastened to the shank of a drill bit limits the depth of bored holes. The adapter may be made in sizes appropriate for bits of different diameters.

B66-10124

ECONOMICAL AND MAINTENANCE-FREE GAS SYSTEM OPERATES RAILROAD SWITCHES  
VISSING, G. S. MAR. 1966  
NU-0045

Remote control system that uses bottled nitrogen as a power source operates infrequently used railroad switches. This system is economical and maintenance free.

B66-10125

ALUMINUM OXIDE FILLER PREVENTS OBSTRUCTIONS IN TUBING DURING WELDING  
OKELLY, K. P. MAR. 1966  
MSC-222

Granular aluminum oxide is used as filler in

serpentine tubing while welding the tubing to a flat surface. The filler eliminates obstructions in the tubes formed by molten weld nuggets and is porous enough to allow gases to escape from the welding area.

B66-10132

EXPANDABLE INSERT SERVES AS SCREW ANCHOR  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1966  
MSC-301

Expandable self-locking adapter secures components to panels having one accessible side. Mounting holes in the panels may not be threaded to accommodate screws, therefore, the adapter contains a female thread that will mate a mounting screw.

B66-10135

CHART CASE OPENS TO FORM BRIEFING EASEL  
NELSON, R. A. /N. AM. AVIATION/ APR. 1966  
MSC-349

Aluminum carrying case protects charts during transit and opens to form a rigid easel for their presentation. Looseleaf clamps hold the charts in place for both carrying and displaying them.

B66-10136

CRYOGENIC TRAP VALVE HAS NO MOVING PARTS  
BRANUM, L. W. WELLS, G. /N. AM. AVIATION/ APR. 1966  
M-FS-487

Aluminum-body trap valve with an invar stem keeps cryogenic materials in the liquid state while entering the final component of a system. The valve has no moving parts and is self-actuated and self-monitoring.

B66-10137

ROTATING MANDREL SPEEDS ASSEMBLY OF PLASTIC INFLATABLES  
MAC FADDEN, J. A. /SCHJELDAHL /G. T./ CO./  
STENLUND, S. J. WENDT, A. J. APR. 1966  
LANGLEY-155

Rotating mandrel permits the accurate cutting, forming, and sealing of plastic gores for assembly of an inflatable surface of revolution. The gores remain on the mandrel until the final seam is reached. Tolerances are tightly controlled by the mandrel configuration.

B66-10145

PORTABLE POWER TOOL MACHINES WELD JOINTS IN FIELD  
SPIER, R. A. APR. 1966  
M-FS-258

Portable routing machine for cutting precise weld joints required by nonstandard pipe sections used in the field for transfer of cryogenic fluids. This tool is adaptable for various sizes of pipes and has a selection of router bits for different joint configurations.

B66-10146

EXTENDABLE MAST USED IN ONE SHOT SOIL PENETROMETER  
HOTZ, G. M. HOWARD, G. A. APR. 1966  
JPL-685

Penetrometer to test soil characteristics has a piercing head with soil instrumentation equipment attached to an expandable mast actuated by compressed air. The penetrometer gives continuous measurements as the mast pushes the piercing head through the soil.

B66-10149

DEPTH INDICATOR AND STOP AID MACHINING TO PRECISE TOLERANCES  
LAVERTY, J. L. /N. AM. AVIATION/ APR. 1966  
M-FS-553

Attachment for machine tools provides a visual indication of the depth of cut and a positive stop to prevent overcutting. This attachment is used with drill presses, vertical milling machines, and jig borers.

B66-10150

MOUNTING FACILITATES REMOVAL AND INSTALLATION OF FLAME-DETECTOR RODS  
CASTLE, F. /N. AM. AVIATION/ APR. 1966

## M-FS-555

Flame-detector-rod holder is easily removed from the wall of a gas-fired furnace for maintenance or replacement of the detector rod without requiring shutdown of the furnace. The holder consists of an externally threaded outer bushing, a sleeve which is held inside the outer bushing with a set screw, and a detector rod assembly which screws into the sleeve.

## B66-10151

## SPLIT GLASS TUBE ASSURES QUALITY IN ELECTRON BEAM BRAZING

KRESSIN, W. J. /N. AM. AVIATION/ APR. 1966  
M-FS-564

Sealed enclosure of heat-resistant glass tubing and silicone rubber molds provide good visibility for electron beam brazing of metal tubes in an inert gas atmosphere. The glass tubing and rubber molds, which are bonded together, are easily applied to and removed from the brazing area by operation of a clamp.

## B66-10152

## NYLON BIT REMOVES CORK INSULATION WITHOUT DAMAGE TO SUBSTRATE

CRANDALL, J. C. /N. AM. AVIATION/ APR. 1966  
MSC-381

Nylon router bit in an electric hand-held drill removes small quantities of cork insulation from a metal or fiberglass surface without cutting or scratching the surface.

## B66-10155

## SIMPLE DEVICE FACILITATES INERT-GAS WELDING OF TUBES

CARRITHERS, K. V. /N. AM. AVIATION/ KELLEY, W. B. APR. 1966  
M-FS-558

Metal Y-tube simultaneously directs argon streams over weld areas on both sides of tubes being joined along a line on their outer periphery. The device is advanced along the junction in step with the welding operation.

## B66-10167

## DUAL REGULATOR CONTROLS TWO GASES FROM A SINGLE REFERENCE

JACKSON, K. /GARRETT CORP./ APR. 1966  
MSC-227

Dual-pressure regulator uses single reference for parallel control of two gases. The regulator uses an external fluid pressure to modulate the flow of one gas, and the regulated flow of the first gas to modulate the flow of the second.

## B66-10168

## SAFETY SWITCH PERMITS EMERGENCY BRIDGE CRANE SHUTDOWN

LONG, E. J. R. /N. AM. AVIATION/ APR. 1966  
M-FS-549

Safety switch on a crane control pendant must be held closed to operate the crane. This provides for immediate power cutoff to the crane in an emergency or a pendant circuit failure.

## B66-10169

## MODIFIED DRILL PERMITS ONE-STEP DRILLING OPERATION

LIBERTONE, C. /N. AM. AVIATION/ APR. 1966  
M-FS-559

Drill with modified cutting faces permits one-step drilling operation without chatter upon contact and premature wear. The modification of the drill, which has the same diameter as that of the desired hole, consists of a groove across the bottom of each of the cutting faces of the drill flutes.

## B66-10171

## MULTISURFACE FIXTURE PERMITS EASY GRINDING OF TOOL BIT ANGLES

JONES, C. R. /N. AM. AVIATION/ APR. 1966  
M-FS-586

Multisurface fixture with a tool holder permits accurate grinding and finishing of right- and left-hand single point threading tools. All angles are ground by changing the fixture position to rest at various reference angles without

removing the tool from the holder.

## B66-10172

## FLEXIBLE COILED SPLINE SECURELY JOINS MATING CYLINDERS

COPPERNOL, R. W. /GEN. DYN./ASTRONAUTICS/ APR. 1966  
W00-270

Mating cylindrical members are joined by spline to form an integral structure. The spline is made of tightly coiled, high-tensile-strength steel spiral wire that fits a groove between the mating members. It provides a continuous bearing surface for axial thrust between the members.

## B66-10174

## EPOXY-COATED CONTAINERS EASILY OPENED BY WIRE BAND

MC COY, J. W. /N. AM. AVIATION/ APR. 1966  
M-FS-592

Epoxy coating reduces punctures, abrasions, and contamination of synthetic cellular containers used for shipping and storing fragile goods and equipment. A wire band is wound around the closure joint, followed by the epoxy coating. The container can then be easily opened by pulling the wire through the epoxy around the joint.

## B66-10175

## DEVICE SPOT-LAPS SPHERES TO VERY CLOSE TOLERANCES

AVERY, H. W. /GE/ MAY 1966  
JPL-SC-119

Device laps precise amounts of metal from high spots on a spherical body to correct minute surface imperfections. The device generates the lapped surface with reference to an existing true surface on the spherical workpiece. Lapping is performed by applying a rotary and oscillatory motion to the workpiece while the lapping tool is held on the workpiece high spot.

## B66-10176

## LIFTING CLAMP POSITIVELY GRIPS STRUCTURAL SHAPES

REINHARDT, E. C. MAY 1966  
M-FS-593

Welded steel clamps securely grip structural shapes of various sizes for crane operations. The clamp has adjustable clamping jaws and screw-operated internal V-jaws and provides greater safety than hoisting slings presently used. The structural member can be rotated in any manner, angle, or direction without being released by the clamp.

## B66-10188

## CONTROL SYSTEM MAINTAINS COMPARTMENT AT CONSTANT TEMPERATURE

LINDBERG, J. G. /N. AM. AVIATION/ MAY 1966  
JPL-SC-145

Gas-filled permeable insulating material maintains an enclosed compartment at a uniform temperature. The material is interposed between the two walls of a double-walled enclosure surrounding the compartment.

## B66-10189

## PNEUMATIC SHUTOFF AND TIME-DELAY VALVE OPERATES AT CONTROLLED RATE

HORNING, J. L. TOMLINSON, L. E. /N. AM. AVIATION/ MAY 1966  
M-FS-602

Shutoff and time delay valve, which incorporates a metering spool that moves at constant velocity under pneumatic pressure and spring compression, increases fluid-flow area at a uniform rate. Diaphragm areas, control cavity volume, and bleed-orifice size may be varied to give any desired combination of time delay and spool travel time.

## B66-10190

## BELLWS DESIGN FEATURES LOW SPRING RATE AND LONG LIFE

LUSIC, R. F. /N. AM. AVIATION/ MAY 1966  
MSC-521

High pressure bellows has high strength rigid hoops for strength and stability and sheet stock

for low spring rate effects. The simplicity of this bellows design facilitates mass production.

B66-10191

TOOL POST MODIFICATION ALLOWS EASY TURRET LATHE CUTTING-TOOL ALIGNMENT

FOOTS, L. /N. AM. AVIATION/ MAY 1966

M-FS-581

Modified tool holder and tool post permit alignment of turret lathe cutting tools on the center of the spindle. The tool is aligned with the spindle by the holder which is kept in position by a hydraulic lock-in feature of the tool post. The tool post is used on horizontal and vertical turret lathes and other engine lathes.

B66-10195

SEGMENTED BALL VALVE IS EASY TO OPEN AND CLOSE

PRONG, E. SHINAULT, L. H. /N. AM. AVIATION/

SPEISMAN, C. JUN. 1966

WOO-248

Segmented ball valve and flowmeter in the same spherical housing provide a valve that will handle large fluid volume without bulkiness and weight of blade valves or conventional ball valves. The valve is easily opened or closed and the flowmeter remains stationary, so errors are eliminated.

B66-10197

INTERMEDIATE ROTATING RING IMPROVES RELIABILITY OF DYNAMIC SHAFT SEAL

MESNY, P. R. /N. AM. AVIATION/ MAY 1966

M-FS-575

Intermediate rotating ring improves the reliability of dynamic shaft seals whose rubbing surfaces wear down rapidly at high shaft speeds. The rotating ring is placed between the rotating shaft sealing surfaces and the stationary surface, and driven at one-half the shaft speed.

B66-10201

SELF-CONTAINED CLOTHING SYSTEM PROVIDES PROTECTION AGAINST HAZARDOUS ENVIRONMENTS

INNOVATOR NOT GIVEN /GARRETT CORP./ MAY 1965

M-FS-536

Self-contained clothing system protects personnel against hazardous environments. The clothing has an environmental control system and a complete protection envelope consisting of an outer garment, inner garment, underwear, boots, gloves, and helmet.

B66-10202

BODY-FITTED HARNESS PROVIDES SAFE AND EASY COMPONENT HANDLING

MILLER, E. G. ROTHWELL, G. E. /IBM/ MAY 1966

M-FS-533

Body-fitted restraint harness enables workers to safely and conveniently handle critical components during their installation or removal. Since the harness supports the components, the worker is able to maneuver through restricted areas with his hands free. It is easily put on, adjusted, and removed, or comfortably worn without interfering with normal activities.

B66-10204

TORQUE WRENCH ALLOWS READINGS FROM INACCESSIBLE LOCATIONS

DE BARNARDO, M. /N. AM. AVIATION/ MAY 1966

M-FS-598

Torque wrench with an adjustable drive shaft permits indicator to remain in view when used on sections of equipment with limited access. The shaft is capable of protruding from either side of the wrench head by means of spring loaded balls.

B66-10206

LOW POWER HEATING ELEMENT PROVIDES THERMAL CONTROL DURING SWAGING OPERATIONS

CROWELL, J. W. /CHRYSLER CORP./ MAY 1966

M-FS-457

Low-power, cylindrical heating element in a swaging anvil assembly heats the material being worked on. The increased ductility of heated material results in crack-free deformation.

B66-10208

TOOL ENABLES PROPER MATING OF ACCELEROMETER AND CABLE CONNECTOR

STEED, C. N. /N. AM. AVIATION/ MAY 1966

M-FS-611

Tool supports accelerometer in axial alignment with an accelerometer cable connector and permits tightening of the accelerometer to the cable connector with a torque wrench. This is done without damaging the components or permitting them to work loose under sustained, high-level vibrations.

B66-10209

SPECIAL TOOL SEALS CONDUCTORS WITH COMBINATION OF PLASTIC SLEEVES

YOUNG, S. /N. AM. AVIATION/ MAY 1966

M-FS-579

Special tool seals electrical conductors connecting instrumentation within space vehicle cryogenic fuel tanks and oxidizer tanks. An inner sleeve of fluorinated ethylene-propylene and an outer sleeve of tetrafluoroethylene enclose a bundle of conductors and are heated with the tool to form a tight seal of the bundle and each individual wire.

B66-10210

ADJUSTABLE CUTTING GUIDE ALIGNS AND POSITIONS STACKS OF MATERIAL

THIEL, A. M. MAY 1966

MSC-321

Adjustable guide tool aligns and positions stacks of material for cutting at various angles. The device adapts its shape to stacks of any corner angle, adjusts to any cutting angle, and quickly aligns the stacks for repeated cutting. With this device, an operator need not place his hands under the knife during alignment.

B66-10211

PRESSURE SEAL RING MAY BE EFFECTIVE OVER WIDE TEMPERATURE RANGE

INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAY 1966

M-FS-486

Positive pressure seal rings seal bolted flange joints in pressure vessels containing fluids whose temperatures can vary over a wide range. The seal rings mate with grooves in the flanges and compensate for the excessive thermal expansion or contraction of a gasketed joint.

B66-10212

LIQUID TRAP SEALS THERMOCOUPLE LEADS

RUPPE, E. P. /N. AM. AVIATION/ MAY 1966

M-FS-688

Liquid trap seals thermocouple leads coming out of a brazing retort that operates with a controlled atmosphere so that air cannot enter the retort and hydrogen cannot escape. The trap is fastened to a duct welded to the retort. Thermocouple leads are led out through the duct and trap, with the fluid forming a gastight seal between the atmosphere and the retort.

B66-10213

CYLINDRICAL CLAW CLAMP HAS QUICK RELEASE

FEATURE

GOODWIN, G. D. /CHRYSLER CORP./ MAY 1966

M-FS-513

Claw clamp grasps cylindrical shapes by pressing its jaws around the object. The clamp is released by retraction of a release pin which extends beyond the clamp handle on both sides for better purchase.

B66-10214

COLLOIDAL SUSPENSION SIMULATES LINEAR DYNAMIC PRESSURE PROFILE

MC CANN, R. J. /LOCKHEED MISSILES AND SPACE CO./ JUN. 1966

WOO-266

Missile nose fairings immersed in colloidal suspension prepared with various specific gravities simulate pressure profiles very similar to those encountered during reentry. Stress and deflection conditions similar to those expected during atmospheric reentry are thus attained in the laboratory.

B66-10215

ELECTRON BEAM WELDING OF COPPER-MONEL  
FACILITATED BY CIRCULAR MAGNETIC SHIELDS  
LAMB, J. N. /N. AM. AVIATION/ MAY 1966  
M-FS-569

High permeability, soft magnetic rings are placed on both sides of electron beam weld seams in copper-Monel circular joint. This eliminates deflection of the electron beam caused by magnetic fields present in the weld area.

B66-10216

SOFT-SEAL VALVE HOLDS HAZARDOUS FLUIDS  
SAFELY  
MAY 1966 SEE ALSO NASA-TN-D-1727  
LEWIS-275

Valve assembly allows transfer of hazardous or reactive fluids such as liquid fluorine without corrosion of valve face and seat material. The assembly consists of a plug to block bulk flow and a soft-seal outer seat to effect zero-leak stoppage.

B66-10217

FIBERGLASS CONTAINER SHELLS FORM  
CONTAMINATION-FREE STORAGE UNITS  
KRAUS, H. M. /N. AM. AVIATION/ JUN. 1966  
WOO-275

Interchangeable molded fiberglass shells are locked together to form storage units of various depths. These units can hold components weighing 1500 pounds, are easily transportable, and protect contents from contamination.

B66-10218

PRESSURE VESSELS FABRICATED WITH HIGH-STRENGTH  
WIRE AND ELECTROFORMED NICKEL  
ROTH, B. /N. AM. AVIATION/ JUN. 1966  
M-FS-580

Metal pressure vessels of various shapes having high strength-to-weight ratios are fabricated by using known techniques of filament winding and electroforming. This eliminates nonuniform wall thickness and unequal wall strength which resulted from welding formed vessel segments together.

B66-10219

TOOL PERMITS DAMAGE-FREE REMOVAL OF SOLAR CELL  
BECKLEY, J. E., JR. /COMPREHENSIVE DESIGNERS/  
MAY 1966  
GSFC-467

Modified soldering iron extracts a wrap-around solar cell that is attached with solder or adhesive to a substrate without destroying the cell removed or damaging adjacent cells. Heat, vacuum, and compressed air, operated from a special head attached to the soldering iron, loosens, extracts, and protects the cell.

B66-10226

A CONCEPTUAL DESIGN FOR SQUEEZE FILM BEARINGS  
INNOVATOR NOT GIVEN /BENDIX CORP./ JUN. 1966  
M-FS-573

Squeeze film bearings which require at least one of two adjacent surfaces to oscillate at high frequency and low amplitude have the oscillating /strain-producing/ member on a double gas film. This means of support allows dynamic changing of the gap between the bearing surfaces without the disadvantages produced when the oscillator is affixed to the bearing base itself.

B66-10228

STUDIES REVEAL EFFECTS OF PIPE BENDS ON FLUID  
FLOW CAVITATION  
STONEMETZ, R. E. MAY 1966  
M-FS-516

Incipient cavitation in liquids flowing in pipes curved in one plane are affected by the pipe bend radii and pipe diameters, but little by pipe bend angles ranging from 60 to 120 degrees. Critical cavitation indices decrease with higher Reynolds number and pressure ratio. Bulk liquid temperature increase lowers the mean critical velocity at which cavitation occurs.

B66-10229

EXPANDABLE RUBBER PLUG SEALS OPENINGS FOR  
PRESSURE TESTING

MAY 1966

NU-0048

Plug assembly seals openings in piping systems, vessels, and chambers for low pressure leak testing. The assembly, which consists of a rubber sealing plug and the mechanism for expanding it into a pressure-tight configuration, adequately seals irregular diameters without damage to mating surfaces.

B66-10233

QUICK-CLOSING VALVE IS ACTUATED BY EXPLOSIVE  
DISCHARGE  
MAJESKI, S. J. JUN. 1966  
ARC-55

Remotely controlled plug-type valve shuts off a high-pressure, high-temperature gas flow in a few milliseconds. The valve is actuated by a commercially available electrically initiated squib of low explosive power. More rapid closure is attainable with squibs containing heavier explosive charges.

B66-10235

KEY-LOCKED GUARD PREVENTS ACCIDENTAL SWITCH  
ACTUATION  
HAWTHORNE, K. C. /N. AM. AVIATION/ JUN. 1966  
MSC-419

Switch guard, which locks in place on a panel, protects individual switches from accidental activation. The guard consists of a cup to cover the switch lever, a standard screw lock tumbler, and a stud that mates with a threaded adapter in the panel.

B66-10236

AUTOMATIC REEL CONTROLS FILLER WIRE IN  
WELDING MACHINES  
MILLETT, A. V. /N. AM. AVIATION/ JUN. 1966  
MSC-416

Automatic reel on automatic welding equipment takes up slack in the reel-fed filler wire when welding operation is terminated. The reel maintains constant, adjustable tension on the wire during the welding operation and rewinds the wire from the wire feed unit when the welding is completed.

B66-10237

ADJUSTABLE KNIFE CUTS HONEYCOMB MATERIAL TO  
SPECIFIED DEPTH  
RAUSCHL, J. A. /N. AM. AVIATION/ JUN. 1966  
MSC-475

Calibrated, adjustable knife cuts aluminum honeycomb or other soft materials to a desired depth. The frame of the device accommodates standard commercial blades. Since the blade is always visible to the operator, the device can be used on any straight or irregular layout line.

B66-10238

INSERT SLEEVE PREVENTS TUBE SOLDERING  
CONTAMINATION  
STEIN, J. /N. AM. AVIATION/ JUN. 1966  
MSC-552

Teflon sleeve insert prevents contamination of internal tube surfaces by solder compound during soldering operations that connect and seal the tube ends. The sleeve insert is pressed into the mating tube ends with a slight interference fit.

B66-10239

HAND TOOL PERMITS SHRINK SIZING OF ASSEMBLED  
TUBING  
MILLETT, A. ODOR, M. /N. AM. AVIATION/ JUN. 1966  
MSC-504

Portable tool sizes tubing ends without disassembling the tubing installation. The shrink sizing tool is clamped to the tubing and operated by a ratchet wrench. A gear train forces the tubing end against an appropriate die or mandrel to effect the sizing.

B66-10240

JIG PROTECTS TRANSISTORS FROM HEAT WHILE  
TINNING LEADS  
PELLETIER, A. J. WILLIS, G. A. /N. AM. AVIATION/  
JUN. 1966



MSC-515

In tinning transistor leads, an aluminum jig is used to dip the leads into the molten tin. The jig's mass shunts excess heat given off by the molten tin before it reaches and damages the transistor body.

B66-10241

BRAZING PROCESS USING AL-SI FILLER ALLOY RELIABLY BONDS ALUMINUM PARTS  
BEUYUKIAN, C. S. JOHNSON, W. R. /N. AM. AVIATION/ JUN. 1966

MSC-448

Brazing process employs an aluminum-silicon filler alloy for diffusion bonding of aluminum parts in a vacuum or inert gas atmosphere. This process is carried out at temperatures substantially below those required in conventional process and produces bonds of greater strength and reliability.

B66-10242

PORTABLE SANDBLASTER CLEANS SMALL AREAS  
SEVERIN, H. J. /N. AM. AVIATION/ JUN. 1966

MSC-523

Portable sandblasting unit rapidly and effectively cleans localized areas on a metal surface. The unit incorporates a bellows enclosure, masking plate, sand container, and used sand accumulator connected to a vacuum system. The bellows is equipped with an inspection window and light for observation of the sanding operation.

B66-10243

LATHE CHUCK KEY INCORPORATES SAFETY FEATURE  
CHRISTMAN, G. L. /N. AM. AVIATION/ JUN. 1966

MSC-506

Lathe chuck key with spring loaded plunger cannot inadvertently be left in the chuck when the lathe is started. The plunger automatically ejects the key from the chuck when hand pressure is released.

B66-10244

HOLLOW NEEDLE USED TO CUT METAL HONEYCOMB STRUCTURES  
GREGG, E. A. /N. AM. AVIATION/ JUN. 1966

MSC-486

Hollow needle tool cuts metal honeycomb structures without damaging adjacent material. The hollow needle combines an electrostatic discharge and a stream of oxygen at a common point to effect rapid, accurate metal cutting. The tool design can be varied to use the hollow needle principle for cutting a variety of shapes.

B66-10246

MODIFIED SOLDERING IRON SPEEDS CUTTING OF SYNTHETIC MATERIALS

SCHAFER, W. G., JR. /N. AM. AVIATION/ JUN. 1966

M-FS-725

Modified soldering iron cuts large lots of synthetic materials economically without leaving frayed or jagged edges. The soldering iron is modified by machining an axial slot in its heating element tip and mounting a cutting disk in it. An alternate design has an axially threaded bore in the tip to permit the use of various shapes of cutting blades.

B66-10247

PRESSURE-WELDED FLANGE ASSEMBLY PROVIDES LEAKTIGHT SEAL AT REDUCED BOLT LOADS

MARTENSON, A. J. /GE/ JUN. 1966

M-FS-640

Vibration resistant flange-connector assembly provides a leaktight seal under reduced bolt loads. The assembly consists of ductile metal plates that are pressure welded between dies mounted in recessed flanges.

B66-10248

ELECTRICAL UPSETTING OF METAL SHEET FORMS WELD EDGE

SCHERBA, E. S. /N. AM. AVIATION/ JUN. 1966

M-FS-720

Electric gathering of sheet stock edges forms metal sheets in the shape of gore sections with heavier edge areas that can be welded without loss of strength. The edges are gathered by

progressive resistance heating and upsetting, and are formed automatically. This process avoids disturbance of the metal's internal structure.

B66-10249

FLUID DAMPING REDUCES BELLOWS SEAL FATIGUE FAILURES

INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1966

M-FS-565

Service life of a bellows-type seal in the presence of mechanical vibration is increased by a system of interconnected bellows with intervening cavities filled with a fluid which damps the amplitude of periodic deflection of the sealing bellows. Different damping fluids are used according to environmental conditions.

B66-10250

DIFFUSION BONDING MAKES STRONG SEAL AT FLANGED CONNECTOR

GITZENDANNER, L. G. LANIEWSKI, J. P. RATHBUN, F. O., JR. /GE/ JUN. 1966

M-FS-637

Copper strip seals a high pressure fluid system connector so that it is insensitive to relaxation of the bolt loads. The copper strip is diffusion bonded to the surfaces of the connector flange by application of high pressure and temperature.

B66-10253

TOOL SEPARATES SLEEVE-TYPE UNIONS WITHOUT HEAT  
MILLETT, A. U. /N. AM. AVIATION/ JUN. 1966

MSC-497

Tool that uses conventional milling and cutting techniques separates sleeve type tubing unions and tubes without using heat. A selection of holders, associated bits, and cutting wheels permits preparation of varied diameter unions.

B66-10254

MILL PROFILER MACHINES SOFT MATERIALS ACCURATELY

RAUSCHL, J. A. /N. AM. AVIATION/ JUN. 1966

M-FS-692

Mill profiler machines bevels, slots, and grooves in soft materials, such as styrofoam phenolic-filled cores, to any desired thickness. A single operator can accurately control cutting depths in contour or straight line work.

B66-10255

FLOW RING VALVE IS SIMPLE, QUICK-ACTING

LINDFORS, J. A. /N. AM. AVIATION/ JUN. 1966

M-FS-752

Two porting rings, one within the other, control gas or liquid flow by using seal buttons as the sliding valve closers. Multiporting within the ring allows close control of the flow by the slight rotation of the outer porting ring.

B66-10258

CRITICAL PARTS ARE STORED AND SHIPPED IN ENVIRONMENTALLY CONTROLLED REUSABLE CONTAINER

KUMMERFELD, K. R. /N. AM. AVIATION/ JUN. 1966

M-FS-703

Environmentally controlled, hermetically sealed, reusable metal cabinet with storage drawers is used to ship and store sensitive electronic, pneumatic, or hydraulic parts or medical supplies under extreme weather or handling conditions. This container is compatible with on-site and transportation handling facilities.

B66-10262

ALUMINUM/STEEL WIRE COMPOSITE PLATES EXHIBIT HIGH TENSILE STRENGTH

INNOVATOR NOT GIVEN /HARVEY ALUMINUM CO./ JUN. 1966

M-FS-401

Composite plate of fine steel wires imbedded in an aluminum alloy matrix results in a lightweight material with high tensile strength. Plates have been prepared having the strength of titanium with only 85 percent of its density.

B66-10265

COMPACT ACTUATOR CONVERTS ROTARY TO LINEAR MOTION

FORD, A. G. JUN. 1966

JPL-786

Compact motor mounted on a stationary base converts rotary to linear motion. The motor rotates a gear train assembly so that the end of an arm attached to the assembly moves in a linear path.

B66-10266

SEAL SURFACES PROTECTED DURING ASSEMBLY

RICHARDSON, G. L. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0067

Protection device for sealed surfaces is placed over the polished surface entrance of trapped bosses and removed when the seal fitting has been engaged with the boss threads. This technique applies to various seal types used in close fitting, spring-loaded, threaded fittings.

B66-10267

RADIAL COOLANT CHANNELS FABRICATED BY  
SIMPLIFIED METHOD

FREEMAN, A. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0070

Radial coolant channels for distributing a coolant over the inner wall of a circular section are fabricated by cold-rolling indentations on the inside circumference of the base section and covering the indentations with a rolled flange.

B66-10269

DIFFERENTIAL EXPANSION PROVIDES PRESSURE FOR  
DIFFUSION BONDING OF LARGE DIAMETER RINGS

INNOVATOR NOT GIVEN /BOEING CO./ JUN. 1966 2 P  
M-FS-588

External pressure band is used to bond aluminum alloy collars to large diameter, stainless steel rings. The band contracts while cooling and exerts pressure on the joint between the silver-plated surfaces of the ring and collar which expand toward the band. This diffusion bonding by differential expansion minimizes aluminum deformation.

B66-10275

FASTENER PROVIDES FOR BOLT MISALIGNMENT AND  
QUICK RELEASE OF FLANGE

ENGLAND, C. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0074

Fastener enables two large flanges to be bolted together without close alignment between the bolt and bolt-hole diameters, and provides for a quick release of one of the flanges under emergency conditions. It contains a nut that is retained by a square head in a recess in one side of the removable flange and by a collar and snap ring on the other side of the flange.

B66-10276

REMOTELY CONTROLLED SYSTEM COUPLES AND  
DECouples LARGE DIAMETER PIPES

GRIFFIN, P. A. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0062

Remote control, air-motor driven, chain-drive system engages and disengages a flange coupling from large-diameter, high pressure fluid lines.

B66-10277

DEVICE FACILITATES CENTERING OF WORKPIECES IN  
LATHE CHUCK

PRATER, L. /N. AM. AVIATION/ JUN. 1966  
M-FS-685

Spring-loaded device used in conjunction with a standard dial indicator facilitates centering a workpiece in an independent four-jaw lathe chuck.

B66-10278

O-RINGS WITH MYLAR BACK-UP PROVIDE HIGH-  
PRESSURE CRYOGENIC SEAL

FUNK, G. M. /N. AM. AVIATION/ JUN. 1966  
M-FS-603

Mylar lip type back-up ring installed in combination with three rubber O-rings seal the junctions between a tube stub and an adapter during high pressure gas flow at cryogenic to room temperatures. Mylar seals should not be used with oxygen under pressure or in the liquid state.

B66-10279

MAGNETIC LATCHES PROVIDE POSITIVE

OVERPRESSURE CONTROL

LOY, J. L. /WESTINGHOUSE ASTRONUCL. LAB./ JUN. 1966

NU-0057

Louvers are used for overpressure safety venting in rooms or chambers where explosion hazards exist. The louvers have individually hinged closures that are held in locked position by commercially available magnets that quickly release them in an overpressure condition.

B66-10283

FIXED VACUUM PLATE CLAMPS STYROFOAM FOR  
MACHINING

RAUSCHL, J. A. /N. AM. AVIATION/ JUN. 1966  
M-FS-683 M-FS-726

Aluminum plate holds styrofoam securely in place for machining operations. The styrofoam is clamped to rubber or cork pads on the plate surface by vacuum. Foam rubber tape provides the vacuum seal.

B66-10284

EXTENSOMETER AUTOMATICALLY MEASURES  
ELONGATION IN ELASTOMERS

HOOPER, C. D. JUN. 1966  
M-FS-517

Extensometer, with a calibrated shaft, measures the elongation of elastomers and automatically records this distance on a chart. It is adaptable to almost any tensile testing machine and is fabricated at a relatively low cost.

B66-10285

HIGH PRESSURE TUBE COUPLING REQUIRES NO  
THREADS OR FLARES

STEIN, J. A. /N. AM. AVIATION/ JUN. 1966  
MSC-600

High pressure tube coupling connects to any straight, unthreaded, and unflared tubing end without deforming or damaging the tubing. The coupling grips the tube wall tightly between an external compression sleeve and an internal hollow mandrel. It is adaptable to standard screw fittings for test stand attachment.

B66-10294

PNEUMATIC SEPARATOR GIVES QUICK RELEASE TO  
HEAVY LOADS

BUCHANAN, D. C. DAVIS, E. J. PHILLIPS, J. D.  
JUL. 1966  
KSC-66-10

Pneumatic separator, using applied pressure, quickly releases restraining devices securing heavy loads. With minor modifications this separator can be used as a coupling device.

B66-10297

DIAPHRAGM SPRING GIVES CLUTCH OVER-CENTER  
TOGGLE EFFECT

ROSENBERG, H. W. /GE/ AUG. 1966  
GSFC-499

Diaphragm spring clutch mechanism is used in testing the relative merits of eddy-current and hysteresis dampers. The dampers are alternately coupled to a single damping boom shaft. The floating clutch mechanism enables the inoperative damper to remain completely isolated from the damping boom shaft during test of the other damper.

B66-10301

TOOL PRE-TENSIONS COVERS PRIOR TO LACING

FORMAN, M. A. VOGEL, R. C. /N. AM. AVIATION/  
JUL. 1966  
MSC-631

In securing a bulky object in a storage compartment, a cinching or tightening tool is used to draw two opposing cover halves together at a predetermined tension to permit quick lacing to retain the stored object. This tool is also useful in fabrication industries to draw components together during assembly or treating.

B66-10302

SIMPLE SCALE INTERPOLATOR FACILITATES READING  
OF GRAPHS

FAZIO, A. HENRY, B. HOOD, D. JUL. 1966  
LEWIS-92 LEWIS-93

Set of cards with scale divisions and a scale finder permits accurate reading of the coordinates of points on linear or logarithmic graphs plotted on rectangular grids. The set contains 34 different scales for linear plotting and 28 single cycle scales for log plots.

B66-10303

BYPASS ROD TRANSFERS HEAT DEVELOPED IN THERMIONIC DIODE

LAZARIDIS, L. J. /THERMO ELECTRON ENG. CORP./

JUL. 1966

JPL-SC-136

In a thermionic diode, a cesium tube joining the emitter-collector area and the cesium reservoir is fitted with a copper bypass rod held in place by two standoff brackets. The rod transfers heat from the emitter-collector to the reservoir without going through the ceramic seal structure which surrounds the cesium tube and cannot sustain large temperature gradients.

B66-10304

FLEXIBLE FASTENER EFFECTS AIRTIGHT MATERIAL CLOSURE

NAY, D. L. JUL. 1966

JPL-684

Flexible tube inserted into a 3/4-round strip receptacle inflates to form an airtight material fastener. Inflation is done with a carbon dioxide and deflation by a manually operated release valve. Device has potential use in space suits, underwater suits, and other protective clothing.

B66-10310

MODIFIED HYDRAULIC BRAKING SYSTEM LIMITS

ANGULAR DECELERATION TO SAFE VALUES

BRIGGS, R. S. COUNCIL, M. GREEN, P. M. /COLLINS

RADIO CO./ JUL. 1966

GSFC-476

Conventional spring-actuated, hydraulically released, fail-safe disk braking system is modified to control the angular deceleration of a massive antenna. The hydraulic system provides an immediate preset pressure to the spring-loaded brake shoes and holds it at this value to decelerate the antenna at the desired rate.

B66-10311

UNION WOULD FACILITATE JOINING OF TUBING,

MINIMIZE BRAZE CONTAMINATION

TERRIL, A. E. /N. AM. AVIATION/ JUL. 1966

MSC-777

Union assembly provides a fluidtight joint between two lengths of tubing and minimizes introduction of braze contaminants into the tubing. The union contains two brazing preforms separated by a metal ring that serves as a dam for the molten brazing alloy.

B66-10317

FLEXIBLE ARMS PROVIDE CONSTANT FORCE FOR

PRESSURE SWITCH CALIBRATION

CAIN, D. E. KUNZ, R. W. /GE/ JUL. 1966

HQ-38

In-place calibration of a pressure switch is provided by a system of radially oriented flexing arms which, when rotated at a known velocity, convert the centrifugal force of the arms to a linear force along the shaft. The linear force, when applied to a pressure switch diaphragm, can then be calculated.

B66-10318

TORUS ELEMENTS USED IN EFFECTIVE SHOCK

ABSORBER

CUNNINGHAM, P. PLATUS, D. L. /AEROSPACE RES.

ASSOC./ JUL. 1966

WOO-114

Energy absorbing device forces torus elements to revolve annularly between two concentric tubes when a load is applied to one tube. Interference forces can be varied by using focus elements of different thicknesses. The device operates repeatedly in compression or tension, and under problems of large onset rate tolerance or structural overload.

B66-10319

FIBER LENGTH AND ORIENTATION PREVENT MIGRATION IN FLUID FILTERS

REIMAN, P. A. /ARTHUR D. LITTLE/ JUL. 1966

M-FS-541

Stainless steel fiber web filter resists fiber migration which causes contamination of filtered fluids. This filter is capable of holding five times more particulate matter before arbitrary cutoff pressure drop and shows excellent retention in fuel flow at high rates.

B66-10321

SWIVELING LATHE JAW CONCEPT FOR HOLDING

IRREGULAR PIECES

DAVID, J. /N. AM. AVIATION/ JUL. 1960

M-FS-783

Clamp holds irregularly shaped pieces in lathe chuck without damage and eliminates excessive time in selecting optimum mounting. Interchangeable jaws ride in standard jaw slots but swivel so that the jaw face bears evenly against the workpiece regardless of contour. The jaws can be used on both engine and turret lathes.

B66-10323

SPECIAL MANDREL PERMITS UNIFORM WELDING OF

OUT-OF-ROUND TUBING

DOR, M. E. FUEG, L. B. WHIFFEN, E. L. /N. AM.

AVIATION/ JUL. 1966

M-FS-706

Segmented, expandable mandrel provides uniform weld bead chilling in machine welding of circumferential seams on out-of-round tubes. Radial expansion of a rubber actuator forces the individual mandrel segments into intimate contact with the inner walls of mating tubes. Various sizes of tubing may be welded by using different mandrels and actuators.

B66-10326

EXTERNAL LINKAGE TIE PERMITS REDUCTION IN

DUCTING SYSTEM FLANGE THICKNESS

PFLEGER, R. O. /N. AM. AVIATION/ JUL. 1966

M-FS-823

External linkage tie reduces flange thickness and increases seal efficiency in high pressure ducting and piping systems. The linkage transmits the pressure separating load to the tube wall behind the flange allowing the flange to support only the seal.

B66-10328

CORK IS USED TO MAKE TOOLING PATTERNS AND

MOLDS

HOFFMAN, F. J. /N. AM. AVIATION/ JUL. 1966

MSC-425

Sheet and waste cork are cemented together to provide a tooling pattern or mold. The cork form withstands moderately high temperatures under vacuum or pressure with minimum expansion, shrinkage, or distortion.

B66-10329

INSPECTION OF FINE WIRES SIMPLIFIED BY

CAPILLARY TUBE WIRE HOLDER

RAPHAEL, H. A. /N. AM. AVIATION/ JUL. 1966

MSC-358

Capillary tube wire holder provides a mount for fine wires for photomicrographs. The holder is mounted in a stainless steel tube and cast in a transparent casting material. It protects and permits easy location of the wire.

B66-10330

ADAPTER ASSEMBLY PREVENTS DAMAGE TO TUBING

DURING HIGH PRESSURE TESTS

STINETT, L. L. /N. AM. AVIATION/ JUL. 1966

MSC-563

Portable adapter assembly prevents damage to tubing and injury to personnel when pressurizing a system or during high pressure tests. The assembly is capable of withstanding high pressure. It is securely attached to the tubing stub end and may be removed without brazing, cutting or cleaning the tube.

B66-10332

BELLOWS JOINT ABSORBS TORSIONAL DEFLECTIONS IN

## DUCT SYSTEM

DANIELS, C. M. /N. AM. AVIATION/ JUL. 1966  
M-FS-882

Long, thin-walled bellows compressed into a short length absorbs the same amount of torsional deflection as the same tube in full length condition and saves in cost, complexity and space. This bellows has lower torsional spring rate to absorb the bulk of the duct assembly torsional deflections, leaving the other bellows free to absorb axial and angular deflections.

B66-10333

## VIBRATOR IMPROVES SPARK EROSION CUTTING PROCESS

THRALL, L. R. /AEROJET-GEN. CORP./ JUL. 1966  
NU-0071

Variable frequency mechanical vibrator improves spark erosion cutting process. The vibration of the cutting tip permits continual flushing away of residue around the cut area with nondestructive electric transformer oil during the cutting process.

B66-10334

## STRIPPABLE GRID FACILITATES REMOVAL OF GRID-SURFACED CONICAL WORKPIECE FROM DIE

RUPPE, E. P. /N. AM. AVIATION/ JUL. 1966  
M-FS-716

Female die facilitates the removal of a sheet metal structure from a die used for explosive forming of the metal. The female die consists of a smooth conical frustum made of fiberglass with a cured epoxy-resin surface on which a molded grid pattern made of a polyurethane resin is overlaid.

B66-10335

## SHOCK-OPERATED VALVE WOULD AUTOMATICALLY PROTECT FLUID SYSTEMS

BRANUM, L. W. WELLS, G. H. /N. AM. AVIATION/ JUL. 1966  
M-FS-801

Glandless valve shuts down high-pressure fluid systems when severe shock from an explosion or earthquake occurs. The valve uses a pendulum to support the valve closure plug in the open position. When jarred, the valve body is moved relative to the pendulum and the plug support is displaced, allowing the plug to seat and be held by spring pressure.

B66-10336

## CONCEALED HINGE PERMITS FLUSH MOUNTING OF DOORS AND HATCHES

HOLMAN, E. V. /N. AM. AVIATION/ JUL. 1966  
MSC-623

Hinge assembly permits flush mounting of doors and hatches of considerable thickness so that the axis of instant rotation, produced by the hinge, lies outside the panel surface and beyond the perimeter adjacent to the hinge. In operation, motion of the assembly is initially parallel, changing to angular after clearing the panel perimeter.

B66-10337

## SEMI-AUTOMATIC DEVICE TESTS COMPONENTS WITH BIAXIAL LEADS

MARSHALL, T. C. /N. AM. AVIATION/ AUG. 1966 SEE ALSO B65-10243  
MSC-516

Semiautomatic device with a four-terminal network tests quantities of components having biaxial leads. The four-terminal network permits the testing of components in different environments. This device is easily modified for completely automatic operation.

B66-10338

## LATCHING MECHANISM OPERATES IN LIMITED ACCESS AREA

HOLMAN, E. V. /N. AM. AVIATION/ JUL. 1966  
MSC-230

Latching mechanism that is securely locked by the movement of the operating handle in one direction, is used in limited access areas. This mechanism is operated by a force applied to the handle at small angles.

B66-10339

## SIMULATOR EFFECTS PARTIAL GRAVITY CONDITIONS

JOHNSON, H. I. TRADER, A. G. JUL. 1966  
MSC-152

Adjustable apparatus which simulates partial to zero gravity partially supports the weight of convalescing patients in rehabilitation exercises. This device is an ideal tool for physical therapy.

B66-10342

## GAS DIFFUSER FACILITATES WITHDRAWAL OF CRYOGENIC LIQUIDS FROM TANKS

DUNN, J. D. /N. AM. AVIATION/ JUL. 1966  
M-FS-915

Compact, cylindrical gas diffuser with radial exhaust slots and internal axial flow channels maintains the necessary pressure for the desired withdrawal rate of cryogenic liquids from tanks. The diffuser minimizes pressure loss which results from condensation of nitrogen gas in the liquid and prevents direct impingement of gas jets on liquid surface to reduce turbulence.

B66-10343

## CONCEPT FOR PASSIVE SYSTEM TO CONTROL GAS FLOW INDEPENDENTLY OF TEMPERATURE

CHAVEZ, E. S. MILLEMAN, S. E. RICKEMAN, E. C. /N. AM. AVIATION/ JUL. 1966  
M-FS-982

Volumetric flow rate of gas is maintained at a constant value independent of temperature by passing the gas through a parallel or series combination of turbulent flow and laminar flow resistors. By proper combination of resistors, the flow rate may be automatically made to vary as an increasing or decreasing function of temperature.

B66-10345

## FRICTION LOADING DEVICE ENABLES ACCURATE TESTING OF BRITTLE MATERIALS

HENGSTENBERG, T. F. ZIBRITOSKY, G. /WESTINGHOUSE ASTRONUCL. LAB./ JUL. 1966  
NU-0051

Friction loading device gives axial symmetry to test specimen of brittle materials during tensile testing. This axial alignment prevents bending stresses which hinder measurement of tensile strength.

B66-10346

## TOOL FORMS RIGHT ANGLES IN COMPONENT LEADS

GLENN, C. G. JUL. 1966  
M-FS-722

Hand tool forms right angles in electronic component leads so they fit the spaced holes of a printed circuit board. This tool firmly holds the leads at points near the component ends to prevent damage and provide accuracy.

B66-10352

## BRAZING PROCESS PROVIDES HIGH-STRENGTH BOND BETWEEN ALUMINUM AND STAINLESS STEEL

HUSCHKE, E. G., JR. NORD, D. B. /N. AM. AVIATION/ AUG. 1966  
M-FS-803

Brazing process uses vapor-deposited titanium and an aluminum-zirconium-silicon alloy to prevent formation of brittle intermetallic compounds in stainless steel and aluminum bonding. Joints formed by this process maintain their high strength, corrosion resistance, and hermetic sealing properties.

B66-10354

## WELDS CHILLED BY LIQUID COOLANT MANIFOLD

ODOR, M. E. WHIFFEN, E. E. /N. AM. AVIATION/ AUG. 1966  
M-FS-679 M-FS-680

Liquid coolant chill tool provides uniform cooling to materials adjacent to weld areas on long or contoured butt welds. This tool incorporates a manifold that clamps to the weld joint by vacuum and circulates liquid in direct contact with adjacent material.

B66-10357

## SUPPRESSOR PLATE ELIMINATES UNDESIRABLE ARCING

**DURING ELECTRON BEAM WELDING**

HANCHEY, K. K. KUBIK, J. MAHON, J. C. /HAYES  
INTERN. CORP./ AUG. 1966  
M-FS-1126

Suppressor grid eliminates undesired arcing during electron beam welding in one of two ways. A grid at ground potential collects secondary emission of ions and electrons produced by the beam as it strikes the workpiece, or a negatively energized grid repels the plasma arc back to the workpiece. This eliminates ground screens used to cover view ports.

B66-10360

**ALUMINUM CORE STRUCTURES BRAZED WITHOUT USE OF FLUX**

INNOVATOR NOT GIVEN /AERONCA MFG. CORP./, AUG. 1966

M-FS-659

Aluminum alloy face sheets are brazed to aluminum alloy honeycomb cores without using corrosive flux by means of one or three methods. The completed brazed structure has the high-strength characteristics of heat treated aluminum alloys.

B66-10364

**VERSATILE MACHINE MILLS, SAWS LIGHT MATERIALS**

RAUSCHL, J. A. /N. AM. AVIATION/ AUG. 1966

M-FS-827

Versatile milling/sawing machine performs angle cuts, flat and profile milling, machining of grooves and slots, and edge trimming of phenolic panels. The machine is mounted on rails above a table equipped with vacuum capability for holding workpieces.

B66-10365

**DIAPHRAGM VALVE FOR CORROSIVE AND HIGH TEMPERATURE FLUID FLOW CONTROL HAS UNIQUE FEATURES**

EBIHARA, B. T. VARY, A. AUG. 1966

LEWIS-304

Monometallic diaphragm valve is used for corrosive and high temperature fluid flow control. The body, diaphragm, and plug of the valve are welded together to form an integral leakproof unit for containing the fluid as it passes through the valve from inlet to outlet.

B66-10366

**HOLLOW SPHERICAL ROTORS FABRICATED BY ELECTROPLATING**

AVERY, H. W. CONROY, T. F. /GE/ AUG. 1966

JPL-SC-117

Equatorial bands are fabricated to provide a locating fit for the hemispheres of hollow spherical rotors which are then jointed by electroplating. Several nonmagnetic materials may be used to form the joint, such as aluminum, copper, iron, gold, platinum, and zinc.

B66-10367

**DOT PATTERNS PROVIDE REPRODUCIBLE FLAW AREAS FOR STUDY OF ADHESIVE BONDS**

FRANK, L. SCHMITZ, G. /GEN. AM. TRANSPORTATION CORP./ AUG. 1966

M-FS-862

Photographic production of a small-dot pattern of known geometry on the surface of a substrate for controlled area degradation enables a study of adhesive bond strengths. These dot patterns may also be applied to force-limiting devices which must depend on the adhesive bonding strength between mating surfaces.

B66-10369

**AUTOMATIC PROTECTIVE VENT HAS FAIL-SAFE FEATURE**

DAMERON, C. E. AUG. 1966

LANGLEY-218

Delayed vent valve system in a mechanical backing pump in a vacuum system allows the pneumatic foreline valve to seal before the pump vent opens. The system is designed to be fail-safe and operate even though there is loss of electrical power.

B66-10370

**PORTABLE LIGHTWEIGHT CELL PROVIDES CONTROLLED**

**ENVIRONMENT**

SHELTON, S. TARR, J. /N. AM. AVIATION/ AUG. 1966

MSC-648

Inflatable, lightweight cell provides a separate, secondary environment for a spacesuited man in case of spacesuit damage or malfunction. The cell has a pressure-sealing zipper and is equipped to maintain a livable atmosphere.

B66-10371

**BRAZING RETORT MANIFOLD DESIGN CONCEPT MAY MINIMIZE AIR CONTAMINATION AND ENHANCE UNIFORM GAS FLOW**

RUPPE, E. P. /N. AM. AVIATION/ AUG. 1966

M-FS-707

Brazing retort manifold minimizes air contamination, prevents gas entrapment during purging, and provides uniform gas flow into the retort bell. The manifold is easily cleaned and turbulence within the bell is minimized because all manifold construction lies outside the main enclosure.

B66-10375

**IMPACT- AND PUNCTURE-RESISTANT MATERIAL PROTECTS PARTS FROM DAMAGE**

SHERIFF, D. D. /N. AM. AVIATION/ AUG. 1966

MSC-747

Uniform sized, laminated panels protect delicate parts and equipment from damage during storage and transportation. The panels consist of sheets of steel foil bonded between sheets of elastic foam. They are lightweight, impact- and puncture-resistant, and, when formed into an enclosure, provide a barrier against moisture and thermal shock.

B66-10378

**NONHAZARDOUS ACID ETCHES WELD SAMPLES**

ALLEN, B. C. /N. AM. AVIATION/ AUG. 1966

M-FS-975

Nonhazardous citric acid solution used with 24-volt dc power supply etches weld samples. This etching method is limited to 300 stainless steel and a small range of other high temperature alloys.

B66-10381

**GAS-INJECTION VALVE OPERATES AT HIGH SPEED**

HOH, F. C. LOWDER, R. S. /ADVANCED KINETICS, INC./ AUG. 1966 2 P

HQ-49

Fast acting gas valve is used for injecting a short pulse of gas into a vacuum chamber during plasma acceleration experiments. It contains a lightweight closure disk that is forced away from the valve seat when an electromagnetic coil is momentarily energized and immediately rebounds from a stop back onto the seat.

B66-10383

**GEAR DRIVE AUTOMATICALLY INDEXES ROTARY TABLE**

JOHNS, M. F. /N. AM. AVIATION/ AUG. 1966

M-FS-753

Combination indexer and drive unit drills equally spaced circular hole patterns on rotary tables. It automatically rotates the table a distance exactly equal to one hole spacing for each revolution of a special idler gear.

B66-10384

**UNIVERSAL TRANSLOADER MOVES DELICATE EQUIPMENT WITHOUT STRESS**

BARBOUR, J. R. KESSLER, P. N. /N. AM. AVIATION/ AUG. 1966

MSC-654

Transloader moves delicate or heavy items over irregular surfaces without transmitting stress to the load. The loader is supported on three pivot points which produce a wrap-free base. The base is supported by an articulated four-wheel frame.

B66-10385

**INFLATABLE O-RING SEAL WOULD EASE CLOSING OF HATCH COVER PLATE**

NEARY, K. J. /N. AM. AVIATION/ AUG. 1966

MSC-740

Inflatable O-ring seal provides positive sealing

means that does not require the manual exertion of a large compressive force during opening or closing of a rotary-type hatch cover plate. The O-ring is deflated during opening and closing, and inflated after closure by a gas pressure source.

B66-10390  
ONE-PIECE TRANSPARENT SHELL IMPROVES DESIGN OF  
HELMET ASSEMBLY  
JONES, R. L. OKANE, J. H. AUG. 1966  
MSC-187

One-piece transparent helmet shell made of polycarbonate is equipped with a helmet protection pad, a visor assembly, a communications skull cap, and an emergency oxygen supply. This design offers improvements over previous designs in weight, visual field, comfort and protection.

B66-10399  
EXPANDABLE TAKEUP REEL FACILITATES PAPER TAPE  
REMOVAL  
WESTERMAN, H. E. /DOUGLAS AIRCRAFT CO./ SEPT.  
1966  
WGO-271

Takeup reel receives continuous paper tapes from data recording machines. The roller is recessed to have four longitudinal members about its periphery which can be extended or retracted to change the overall diameter of the assembly to allow easy removal of the tapes.

B66-10402  
ROTARY VALVE CONTROLS MULTIPLE HYDRAULIC  
LEVELING CYLINDERS  
INNOVATOR NOT GIVEN /BOEING CO./ SEP. 1966  
M-FS-361

Single rotary valve controls a circular bank of hydraulic leveling cylinders that must maintain large loads within plus or minus three arc minutes of the true vertical. Since the position of the valve spool determines the flow rate of each bank of cylinders and hence cylinder position, different flow rates may be obtained by changing the spool shape.

B66-10403  
SPECIAL TOOL KIT AIDS HEAVILY GARMENTED  
WORKERS  
HOLMES, A. E. /MARTIN CO./ SEP. 1966  
MSC-163

Triangular aluminum tool kit, filled with polyurethane is constructed to receive various tools and hold them in a snug but quick-release fit as an aid to heavily gloved workers. The kit is designed to allow mounting within easily accessible reach and to provide protection of the tools during storage.

B66-10405  
DESIGN RELIABILITY GOAL DEVELOPED FROM SMALL  
SAMPLE  
BURROWS, D. L. HEATHCOCK, R. SEP. 1966  
M-FS-403

Sampling distributions, constructed by Monte Carlo simulation are used in hardware development to establish a design reliability goal, to place a confidence coefficient on reliability estimates, and to determine whether sample stress/strength data demonstrate a specified reliability at a specified confidence level.

B66-10408  
CLOSED LOOP OPERATION ELIMINATES NEED FOR  
AUXILIARY GAS IN HIGH PRESSURE PUMPING  
STATION  
LANDY, D. G. /N. AM. AVIATION/ SEP. 1966  
M-FS-893

Closed loop system for a liquid nitrogen high pressure pump feeds back gaseous nitrogen generated by heat leak into the reservoir to maintain the pressure in the storage tank. This safer, more efficient system eliminates the need for auxiliary gas to maintain the tank pressure and can be used on relatively high cryogenic pumping systems.

B66-10410  
ALIGNMENT TOOL FACILITATES PIN PLACEMENT ON

IRREGULAR HORIZONTAL SURFACES  
BOYLE, J. V. SEP. 1966  
LANGLEY-219

Alignment tool facilitates spotting and cementing plastic pins on the true vertical to irregular concave and convex surfaces. The tool consists of a wood tripod with individually adjustable legs, a wood block with a hole for placing the pins and two spirit levels at a 90 degree angle for easy alignment.

B66-10411  
HEAVY DUTY PRECISION LEVELING JACKS EXPEDITE  
SETUP TIME ON HORIZONTAL BORING MILL  
DELLENBAUGH, W. JONES, C. /N. AM. AVIATION/  
SEP. 1966  
M-FS-1084

Leveling jack is a precise alignment tool which expedites the setup of components or assemblies up to 2500 pounds on horizontal boring mills. This tool eliminates the necessity of wedges and blocks to shim the components to proper position.

B66-10415  
ELECTROPLATING ELIMINATES GAS LEAKAGE IN  
BRAZED AREAS  
LEIGH, J. D. /N. AM. AVIATION/ SEP. 1966  
M-FS-923

Electroplating method seals brazed or welded joints against gas leakage under high pressure. Any conventional electroplating process with many different metal anodes can be used, as well as the build up of layers of different metals to any required thickness.

B66-10416  
MATCHING FLOW CHARACTERISTICS OF STANDARD  
SHUTOFF VALVES ELIMINATES NEED FOR CUSTOM  
FABRICATED VALVES  
BEVAN, A. F. /N. AM. AVIATION/ SEP. 1966  
M-FS-1069

Standard high pressure valves are used in low pressure fluid system testing when a substantial system pressure increase is required. The flow-vs-valve stroke is matched with that of the valves being replaced. Some correction to the plug contour may be necessary.

B66-10417  
MODIFIED PLIERS FACILITATE COUPLING OF  
BAYONET-TYPE CONNECTORS  
HARRIS, F. /N. AM. AVIATION/ SEP. 1966  
M-FS-1344

Modified single-tube hole punch or grommet-setting pliers couples or uncouples spring-loaded bayonet-type connectors quickly and easily. The anvil and tube or punch of the single-tube hole punch or pliers are removed and an open-end slot is machined in the tips of the jaws.

B66-10418  
BEARING PULLER FACILITATES REMOVAL AND  
REPLACEMENT OF BEARING ASSEMBLIES  
SCHAUS, R. B. /N. AM. AVIATION/ SEP. 1966  
M-FS-1538

Bearing puller removes ball bearing assemblies, which carry the rotor, from turbine type flowmeters. It matches the bearing configuration to facilitate removal of the bearing assemblies from the support members.

B66-10422  
LARGE DIAMETER METAL RING SEAL PREVENTS GAS  
LEAKAGE AT 5000 PSI  
MIDDELKOOP, J. H. /N. AM. AVIATION/ SEP. 1966  
M-FS-1064

Large metal ring seal prevents gas leakage in hydrogen, helium, or nitrogen storage bottles at pressures up to 5,000 psi. The grooved ring seal which contains elastomer O-rings is installed between the mating faces of the access cover and the storage bottle.

B66-10424  
LABYRINTH-TYPE VALVE SEAT INCREASES VALVE  
LIFE BY DECREASING FLUID VELOCITY  
HICKS, J. E. /N. AM. AVIATION/ SEP. 1966  
M-FS-1051

Labyrinth-type valve seat and a moving piston with V-notch openings reduce the fluid velocity and thus, the erosion rate of regulator valves.

B66-10425

INTERIOR SERVICING PLATFORM SIMPLIFIES  
MAINTENANCE OF STORAGE TANKS

RANGER, C. S. /N. AM. AVIATION/ OCT. 1966  
M-FS-1300

Folded work platform simplifies the servicing of the interiors of storage tanks and vessels with limited access openings. The extendable platform which can be lowered through the limited access openings is mounted on a segmented shaft which is externally supported.

B66-10428

FLEXIBLE DRIVE ALLOWS BLIND MACHINING AND  
WELDING IN HARD-TO-REACH AREAS

HARVEY, D. E. ROHRBERG, R. G. /N. AM. AVIATION/  
OCT. 1966  
MSC-524

Flexible power and control unit performs welding and machining operations in confined areas. A machine/weld head is connected to the unit by a flexible transmission shaft, and a locking-indexing collar is incorporated onto the head to allow it to be placed and held in position.

B66-10434

ROTATING MAGNETIC POLES USED TO PUMP MERCURY  
EBIHARA, B. T. LOWDERMILK, W. H. VARY, A. OCT.

1966 SEE ALSO NASA-TN-D-2965  
LEWIS-276

Rotating magnetic pump with redesigned pump cell is used for pumping mercury. The modified pump has better electrical continuity, more efficient heat removal, and good wetting characteristics in the mercury flow channel.

B66-10443

NEW BACKUP-BAR GROOVE CONFIGURATION IMPROVES  
HELIARC WELDING OF 2014-T6 ALUMINUM

BLACK, F. J. /N. AM. AVIATION/ OCT. 1966  
MSC-806

Backup chill bars with new grooved dimensions improve welding of 2014-T6 aluminum. This groove geometry affords optimum chilling characteristics, reduces shrinkage and the weld bead is narrower and consistently free from impurities or voids.

B66-10446

SEAL-OFF ASSEMBLY PERMITS RAPID EVACUATION  
OF AIR FROM CONTAINERS

DEMERS, R. R. /RCA/ OCT. 1966  
GSFC-513

Seal-off assembly which permits rapid container evacuation using large diameter tubing has a vacuum valve that permits sealing plate transfer from the vacuum valve stem to the container after evacuation. The sealing plate can be reused repeatedly. This device can repump in case of a small leak without exposing the container to the atmosphere.

B66-10450

METAL TUBE CAN BE FOLDED FOR COMPACT  
STOWAGE, IS SELF-ERECTING

OCT. 1966 SEE ALSO NASA-TN-X-1187  
LEWIS-288

Metal tube configuration reduces the section modulus to that of a thin plate, thus permitting the section to be bent into a coil for stowage in limited space without destructive yielding of the material. It is readily released to serve as a rigid fluid transportation conduit or structural member.

B66-10455

MYLAR FILM ELIMINATES SILK SCREENING OF  
EQUIPMENT PANELS

CONGER, D. R. /N. AM. AVIATION/ OCT. 1966  
MSC-798

Equipment panel designs and nomenclature are photographed on clear Mylar film to permit fast and inexpensive panel redesigns and revisions and to eliminate the silk screen process. The film is coated with an adhesive and impressed on the

panel. For revisions, the film is easily peeled off and replaced.

B66-10457

LOGIC SYSTEM AIDS IN EVALUATION OF PROJECT  
READINESS

MARIS, S. J. OBRIEN, T. J. /N. AM. AVIATION/  
OCT. 1966  
MSC-753

Measurement Operational Readiness Requirements /MORR/ assignments logic is used for determining the readiness of a complex project to go forward as planned. The system uses logic network which assigns qualities to all important criteria in a project and establishes a logical sequence of measurements to determine what the conditions are.

B66-10459

IMPROVED METHOD FACILITATES DEBULKING AND  
CURING OF PHENOLIC IMPREGNATED ASBESTOS

GAINES, P. /N. AM. AVIATION/ OCT. 1966  
MSC-949

Workpieces covered with phenolic impregnated asbestos tape and then wrapped with a specified thickness of nylon yarn under pressure, are debulked and cured in a standard oven. This method of debulking and curing is used in the fabrication of ablative chambers for the Gemini and Apollo attitude control engines.

B66-10460

CHART SYSTEM SIMPLIFIES IDENTIFICATION OF  
COMPLEX DESIGN ASSEMBLIES

MORIN, H. P. /N. AM. AVIATION/ OCT. 1966  
MSC-752

Identification breakdown chart that lists the component parts required for any specific end item is used to identify rapidly and accurately, from numerous drawings, all the component parts of a complex design assembly. Cylindrical and complex configurations are depicted as continuous flat surfaces for ready identification.

B66-10463

MICROMINIATURE THERMOCOUPLE MONITORS OWN  
INSTALLATION

GARRETT, A. J. SELLERS, J. P., JR. /N. AM.  
AVIATION/ OCT. 1966  
M-FS-1111

Microminiature thermocouple makes precision gas sidewall temperature readings inside large thrust chambers. It is installed by a technique whereby the sensor monitors its own installation to insure against thermal damage to the thermocouple and ensure minimum disturbance to chamber surfaces.

B66-10464

LARGE SEALS FABRICATED FROM SMALL SEGMENTS  
REDUCE PROCUREMENT LEAD TIME

DANIELS, C. M. HANES, V. D. /N. AM. AVIATION/  
OCT. 1966  
M-FS-1117

Large diameter seals are fabricated from narrow strip stock welded in segments to form a complete ring. This technique could be used to reduce the cost of critical, large diameter seals in the heating and ventilating industry, petrochemical industry, and marine fabrication industry.

B66-10470

INDICATOR SYSTEM PROVIDES COMPLETE DATA OF  
ENGINE CYLINDER PRESSURE VARIATION

MC JONES, R. W. MORGAN, N. E. /VICKERS, INC./  
DEC. 1966  
LEWIS-291

Varying reference pressure used together with a balanced pressure pickup /a diaphragm switch/ to switch the electric output of the pressure transducer in a reference pressure line obtains precise engine cylinder pressure data from a high speed internal combustion engine.

B66-10471

COPPER-ACRYLIC ENAMEL SERVES AS LUBRICANT  
FOR COLD DRAWING OF REFRACTORY METALS

BEANE, C. KARASEK, F. NOV. 1966  
ARG-54

Acrylic enamel spray containing metallic copper pigment lubricates refractory metal tubing during

cold drawing operations so that the tubing surface remains free from scratches and nicks and does not seize in the die. Zirconium alloys, zirconium, tantalum alloys, niobium alloys, and titanium alloys have been drawn using this lubricant.

B66-10472  
RUBBER AND ALUMINA GASKETS RETAIN VACUUM  
SEAL IN HIGH TEMPERATURE EMF CELL  
HESSON, J. C. NOV. 1966  
ARG-17

Silicone rubber gasket and an alumina gasket retain a vacuum inside a high temperature emf cell in which higher and lower density liquid metal electrodes are separated by an intermediate density fused salt electrolyte. This innovation is in use on a sodium bismuth regenerable emf cell in which the fused salts and metals are at about 500 deg to 600 deg C.

B66-10473  
MINIATURE VALVE ACCURATELY CONTROLS SMALL  
VOLUME FLUID FLOW  
GRUNWALD, A. NOV. 1966  
ARG-66

Hydraulic or pneumatic actuated valve accurately controls small volume flow of liquids or gases by expanding or relaxing an O-ring within an annular flow space. In one application, 2 such valves were used to accurately meter small volumes of helium under a pressure of 1000 psi.

B66-10477  
CONCEPT OF PLANETARY GEAR SYSTEM TO CONTROL  
FLUID MIXTURE RATIO  
MC GROARTY, J. D. /N. AM. AVIATION/ DEC. 1966  
M-FS-1785

Mechanical device senses and corrects for fluid flow departures from the selected flow ratio of two fluids. This system has been considered for control of rocket engine propellant mixture control but could find use wherever control of the flow ratio of any two fluids is desired.

B66-10484  
BRAKING MECHANISM IS SELF ACTUATING AND  
BIDIRECTIONAL  
PIZZO, J. /N. AM. AVIATION/ OCT. 1966  
M-FS-1299

Mechanism automatically applies a braking action on a moving item, in either direction of motion, immediately upon removal of the driving force and with no human operator involvement. This device would be useful wherever free movement is undesirable after an object has been guided into a precise position.

B66-10485  
COMBINATION SPACER AND GASKET PROVIDES  
EFFECTIVE STATIC SEAL  
JONES, F. B. /N. AM. AVIATION/ OCT. 1966  
M-FS-1397

Closely machined steel ring having narrow sealing lands on both faces and a thin coating of a commercially available halocarbon polymer combines the functions of a spacer and static seal ring or gasket having a minimum of potential leak paths. The device is effective over a wide range of temperatures down to minus 423 deg F and at pressure up to 180 psig.

B66-10489  
PLUG REPLACES WELD FILLER AS SEAL IN COMPLEX  
CASTING  
GOUNDEY, R. L. HARRIS, C. L. /AEROJET-GEN.  
CORP./ OCT. 1966  
NU-0049

Expandable metal plug is inserted to provide a seal to support the mold core with small blocks, referred to as chaplets, during the casting of a complex volute. Weld-warpage and multiple X-ray inspection are eliminated by use of this technique.

B66-10495  
SPOOL VALVE CYCLES AT CONTROLLED FREQUENCY  
CHARLTON, K. W. VAN ARNAM, D. E. /BECKMAN  
INSTR./ NOV. 1966  
MSC-143

Spool valve accurately controls the cycle of a pneumatically-actuated system over long periods. Regulation of pressure from the external source, positioning of the adjusting plugs, and magnet selection, together afford wide variation in cyclic timing and speed of closure in either direction.

B66-10498  
QUICK-RESPONSE SERVO AMPLIFIES SMALL  
HYDRAULIC PRESSURE DIFFERENCES  
WIEGARD, D. E. NOV. 1966  
ARG-99

Hydraulic servo, which quickly diverts fluid to either of two actuators, controls the flow rates and pressures within a hydraulic system so that the output force of the servo system is independent of the velocity of the mechanism which the system actuates. This servo is a dynamic feedback control device.

B66-10513  
OPPOSED ARCS PERMIT DEEP WELD PENETRATION  
WITH ONLY ONE PASS  
BUDDS, L. E. /N. AM. AVIATION/ NOV. 1966  
M-FS-1696

Arc welding technique uses opposed electrodes on either side of the workpiece, operated in right angles, out-of-phase, pulsating direct current. Complete penetration has been obtained with this technique in metals ranging from 0.062- to 1.0-inch thickness.

B66-10514  
IN-TANK SHUTOFF VALVE IS PROVIDED WITH  
MAXIMUM BLAST PROTECTION  
HOLDEN, C. F. /N. AM. AVIATION/ NOV. 1966  
M-FS-1529

In-tank shutoff valve is installed with the valve poppet and actuator inside the tank to provide maximum blast protection during rocket engine test operation. This valve design is applicable wherever explosive fuels are used and is currently being used in lox and liquid hydrogen tanks at a rocket engine test site.

B66-10522  
SELF-ACTUATING GRAPPLE AUTOMATICALLY  
ENGAGES AND RELEASES LOADS FROM OVERHEAD  
CRANES  
FROELICH, J. A. KARASTAS, G. A. NOV. 1966  
ARG-81

Two-piece grapple mechanism consisting of a lift knob secured to the load and a grapple member connected to the crane or lift automatically disengages the load from the overhead lifting device when the load contacts the ground. The key feature is the sliding collar under the lift knob which enables the grapple latch to be stripped off over the lift knob.

B66-10523  
HYDRAULIC FLUID SERVES AS MANDREL FOR SMALL  
DIAMETER REFRACTORY TUBE DRAWING  
MAYFIELD, R. M. DEC. 1966  
ARG-44

Sealing hydraulic fluid within a tube and passing the tube through a reducing die produces high quality small diameter refractory metal tubing. The encased fluid eliminates the need for mandrel or ductile core removal and drawing can proceed with less handling operations.

B66-10530  
PERFORATIONS IN JET ENGINE SUPERSONIC INLET  
INCREASE SHOCK STABILITY  
KEPPLER, C. R. /UNITED AIRCRAFT CORP./ NOV. 1966  
NEO-8

Modification of a conventional jet engine internal compression supersonic inlet results in increased shock stability and thus, engine instantaneous response to changes in inlet air properties. This technique provides a large amount of bleed near the maximum pressure recovery at the expense of minor bleed flow during critical operation.

B66-10537  
GAGE TESTS TUBE FLARES QUICKLY AND  
ACCURATELY



GRIFFIN, F. D. NOV. 1966

KSC-66-19

Flared tube gauge with a test cone that is precisely made with a tapering surface to complement the tube flare is capable of determining the accuracy of a tube flare efficiently and economically. This device should improve the speed, efficiency, and accuracy of tube flare inspections.

B66-10545

HOIST IS AUTOMATICALLY STOPPED AT LOW

DECCELERATION RATE

GEORGE, T. R. HESS, H. C. /N. AM. AVIATION/

DEC. 1966

M-FS-1639

In operating a hoist to transport delicate or fragile components, an automatic stopping device is adjusted to impose a predetermined deceleration rate during stopping.

B66-10546

INTERNAL MACHINING ACCOMPLISHED AT CONSTANT

RADII

GOLLIHUGH, T. E. /N. AM. AVIATION/ DEC. 1966

M-FS-1573

Device machines fluid passages in workpieces at constant radii through two adjacent surfaces that are at included angles up to approximately 120 degrees. This technique has been used extensively in fabricating engine parts where close control of fluid flow is a requirement.

B66-10550

DAMPER REDUCES EFFECTS OF RESONANCE ON

FORCE TRANSDUCER

POSTMA, R. W. /N. AM. AVIATION/ NOV. 1966

WSO-321

Viscous-film damper eliminates response lag of resonance generated noise when inserted into the thrust measuring system. This technique can be applied to automated devices when pulsed force or low order impact is involved, and where signal noise is produced by stopping or reversal of mechanical travel or by water hammer.

B66-10562

METALLOGRAPHIC HOLDING FIXTURE PERMITS

POLISHING OF SOFT METALS ON VIBRATORY

LAPPING MACHINE

MATRAS, S. DEC. 1966

ARG-42

Circular fixture which mounts several specimens within a single turret prevents specimen smearing during grinding and polishing operations performed on a vibratory lapping machine. Each specimen is loaded individually with a weight small enough to prevent smearing but large enough to promote polishing.

B66-10567

HEAT EXCHANGER TUBES SUPPORTED IN HIGH

VIBRATION ENVIRONMENT

URQUIDI, R. /N. AM. AVIATION/ DEC. 1966

M-FS-1401

Cantilevered structure supports heat exchanger coils against vibration loading while allowing freedom for differential thermal growth. The support channels will accept a variety of coil angles with the same coil pitch, thus reducing the number of parts required. This design, with slight modification, could be used to support parallel rows of straight piping.

B66-10570

STATIONARY DEVICE PRODUCES HOMOGENEOUS

MIXTURE OF FLUIDS

BAKER, D. I. CALLISON, M. P. /N. AM. AVIATION/

DEC. 1966

M-FS-525

Stationary device produces a homogeneous mixture of two or more one-phase or two-phase fluids. The device contains two concentric flow guides with helical passageways through which the fluids are forced into turbulent flow by the system pressure differential.

B66-10571

DUCTILE MANDREL AND PARTING COMPOUND

FACILITATE TUBE DRAWING

BURT, W. R., JR. MAYFIELD, R. M. POLAKOWSKI, N.

H. DEC. 1966

ARG-43

Refractory tubing is warm drawn over a solid ductile mandrel with a powder parting compound packed between mandrel and the tube's inner surface. This method applies also to the coextrusion of a billet and a ductile mandrel.

B66-10573

ORTHOPEDIC STRETCHER WITH AVERAGE-SIZED

PERSON CAN PASS THROUGH 18-INCH OPENING

LOTHSCHUETZ, F. X. /MASON-RUST CO./ DEC. 1966

M-FS-811

Modified robinson stretcher for vertical lifting and carrying, will pass through an opening 18 inches in diameter, while containing a person of average height and weight. A subject 6 feet tall and weighing 200 pounds was lowered and raised out of an 18-inch diameter opening in a tank to test the stretcher.

B66-10575

EMERGENCY ESCAPE SYSTEM USES SELF-BRAKING

MECHANISM ON FIXED CABLE

BILLINGS, C. R. MC DARIS, R. A. MC GOUGH, J. T.

NEAL, P. F. DEC. 1966

KSC-66-44

Slide-wire system with a twist level slide device incorporates automatic descent and braking for the safe and rapid evacuation of personnel from tall structures. This device is used on any tall structure that might require emergency evacuation. It is also used to transfer materials and equipment.

B66-10582

COMPOSITE BULKHEAD FABRICATION DEVELOPMENT

ORR, J. DEC. 1966

M-FS-1264

Composite bulkhead is produced by a fabrication concept utilizing vacuum and/or autoclave pressure to hold preformed welded sandwich elements in place during bonding and aging.

B66-10585

ROTATIONAL FLUID COUPLING ELIMINATES HOSE

ENTANGLEMENTS

AUBOL, P. B. /TRW/ DEC. 1966

MSC-312

Rotational fluid coupling mechanism circulates a temperature controlled fluid between a stationary heat exchanger and a coolant plate on a rotating platform. The mechanism consists of two concentric cylinders containing one or more flexible tubes which are controlled and positioned in such a way that it eliminates tubing entanglement.

B66-10587

QUALITY CONTROL CRITERIA FOR ACCEPTANCE

TESTING OF CROSS-WIRE WELDS

BRYANT, R. D. /N. AM. AVIATION/ DEC. 1966

MSC-627

Visual inspection criteria assure the metallurgical integrity of spot welds joining nickel leads and nickel ribbon in a 90-degree cross-wire configuration.

B66-10588

PLASTIC TUBING PROTECTS FLEXIBLE COPPER HOSE

MELTGREN, B. E. /N. AM. AVIATION/ DEC. 1966

M-FS-772

Flexible copper purge and coolant hoses is covered with a high-temperature shrinkable plastic for protection against severe vibration during rocket engine tests. This type of tubing is being used on all flexible water tubes used in F-1 engine tests.

B66-10589

POSITIVE DISPLACEMENT CYLINDER MEASURES

CORROSIVE LIQUID VOLUME

MARIMAN, R. A. VENDL, C. J. /N. AM. AVIATION/

DEC. 1966

MSC-1038

Positive displacement cylinder accurately measures volumetric flow rates of corrosive liquids. The

cylinder is compatible with corrosive liquids and handles flow rates from zero to 75 gpm at pressures to 900 psig with an accuracy of 0.25 per cent.

**B66-10593**  
FLUID LOGIC CONTROL CIRCUIT OPERATES NUTATOR ACTUATOR MOTOR  
INNOVATOR NOT GIVEN /BENDIX CORP./ DEC. 1966 SEE ALSO NASA-CR-54788  
LEWIS-294

Fluid logic control circuit operates a pneumatic nutator actuator motor. It has no moving parts and consists of connected fluid interaction devices. The operation of this circuit demonstrates the ability of fluid interaction devices to operate in a complex combination of series and parallel logic sequence.

**B66-10595**  
TREATMENT INCREASES STRESS-CORROSION RESISTANCE OF ALUMINUM ALLOYS  
JACOBS, A. J. /N. AM. AVIATION/ DEC. 1966  
M-FS-1840

Overaging during heat treatment of the aluminum alloys immediately followed by moderate plastic deformation, preferably by shock loading achieves near optimum values of both yield strength and resistance to stress corrosion. Similar results may be obtained by substituting a conventional deformation process for the shock loading step.

**B66-10597**  
GRIT BLASTING NOZZLE FABRICATED FROM MILD TOOL STEEL PROVES SATISFACTORY  
MC FARLAND, J. E. TURBITT, B. DEC. 1966  
M-FS-1420

Dry blasting with glass beads through a nozzle assembly descales both the outside and inside surfaces of tubes of inconel 718 used for the distribution of gaseous oxygen. The inside of the nozzle is coated with polyurethane and the deflector with a commercially available liquid urethane rubber.

**B66-10601**  
EQUATIONS PROVIDE TUBULAR INFORMATION ON EFFECTS OF UNIFORM AND VARIABLE LOADS ON THIN, FLAT, CIRCULAR PLATES  
HEAP, J. C. DEC. 1966  
ARG-151 ARG-152

Unit-mass system of derivation of equations determines the deflection, slope, and moments for thin, flat, circular plates subjected to either a uniform or a symmetrical variable load. The derived equations are computed, organized in tabular form, and graphically depicted.

**B66-10604**  
HOLE SAW DRILL ATTACHMENT HAS ZERO FORCE REACTION  
RILEY, R. H., JR. /BLACK AND DECKER MFG. CO./  
HOLMES, A. E. /MARTIN CO./  
DEC. 1966  
MSC-543

Zero reaction tools require no force application by workers in space. The tool accomplishes hole cutting by holding the workpiece and feeding the cutting blade into and through it by forces entirely absorbed within the tool.

**B66-10608**  
FRICTION BRAKE CUSHIONS ACCELERATION AND VIBRATION LOADS  
FRASER, G. F. ZAWADSKI, G. Z. /N. AM. AVIATION/  
DEC. 1966  
MSC-715

Friction brake cushions an object in a vehicle from axially applied vibration and steady-state acceleration forces. The brake incorporates a doubly tapered piston that applies a controlled radial force to friction brake segments bearing against the walls of a cylinder.

**B66-10610**  
SELECTIVE TUBE ROUGHENING INCREASES HEAT TRANSFER CAPABILITY  
CARLSON, L. W. DEC. 1966  
M-FS-599

Selectively roughening inside surfaces of tubes increases the heat transfer capabilities, but, minimizes the pressure drop. This technique is used to construct roughened test sections for hydrogen heat transfer studies.

**B66-10611**  
MULTILAYER REFRACTORY NOZZLES PRODUCED BY PLASMA-SPRAY PROCESS  
BLITON, J. L. RAUSCH, J. L. /IIT RES. INST./  
DEC. 1966  
WOO-318

Multilayer rocket nozzles formed by plasma spraying have good thermal shock resistance and can be reheated in an oxidizing environment without loss of coating adherence. Suggested application of this process are for the production of refractory components, which can be formed as surfaces of revolution.

**B66-10613**  
NEW WELDABLE HIGH STRENGTH ALUMINUM ALLOY DEVELOPED FOR CRYOGENIC SERVICE  
INNOVATOR NOT GIVEN /ALUMINUM CO. OF AM./ DEC. 1966  
M-FS-737

Wrought aluminum alloy has improved low temperature notch toughness and weldability. This alloy can be mill-fabricated to plate and sheet without difficulty. Post-weld aging improves weld ductility and strength properties. A typical treatment is 8 hours at 225 deg F plus 16 hours at 300 deg F.

**B66-10618**  
A DESIGN PROCEDURE FOR THE WEIGHT OPTIMIZATION OF STRAIGHT FINNED RADIATORS  
BURIAN, R. J. HARRIS, D. W. KETCHMAN, J. J. /BATTELLE MEM. INST./ DEC. 1966 SEE ALSO NASA-TN-D-3489  
GSFC-547

Design technique evaluates optimum weight of space radiator consisting of finned, right circular cylinder.

**B66-10620**  
TURBINE BLADE ROOT DESIGN CONCEPT PROMISES SUPERIOR ALIGNMENT  
KING, O. D. /N. AM. AVIATION/ DEC. 1966  
M-FS-1685

Blade-to-hub mounting concept assures excellent alignment integrity and results in elimination of some welding problems associated with present designs. With this design, if rework is required, blade removal and replacement may be readily accomplished without damage to blade positioning media on the wheel hub.

**B66-10626**  
HYDRAULICALLY CONTROLLED FLEXIBLE ARM CAN BEND IN ANY DIRECTION  
GRIFFIN, F. D. DEC. 1966  
KSC-66-20

Arm assembly consisting of four flexible tubes controlled by a four-way hydraulic or pneumatic valve can bend in any direction. The flexible arm could be used for probing areas that cannot be reached by ordinary tools, handling hazardous materials, and for graph recording.

**B66-10627**  
QUICK ATTACH AND RELEASE FLUID COUPLING ASSEMBLY IS SELF-ALIGNING, SELF-SEALING  
HEROLD, C. P. STAHLEY, S. D. DEC. 1966  
KSC-66-8

Fluid coupling assembly that is self-aligning, self-sealing and contains a bellow ball and socket coupling for quick attach and release is highly reliable and can handle cryogenic fluids where icing is encountered. The fluid coupling assembly is used in many fluid systems but is particularly applicable to cryogenic systems.

**B66-10628**  
CONTROLLED RELEASE DEVICE PREVENTS DAMAGE FROM DYNAMIC STRESSES  
BURCHAM, T. W. DEC. 1966  
KSC-66-14

Controlled release device that retards motion by

extruding or drawing a tapered ductile pin through a die will control launch vehicle motion at liftoff. The device prevents the damaging dynamic stresses that are imposed on the vehicle when it is instantaneously released at full thrust.

B66-10633

PREDICTING SURFACE HEATING RATES AND

PRESSURES RESULTING FROM HOT EXHAUST GASES

PIESKI, E. T. SIMKIN, D. J. /N. AM. AVIATION/

DEC. 1966

MSC-971

Structural tests determine experimentally the amount of thermal protection required on the Apollo service module because of plume impingement heating. Exhaust flow field analysis correlates with flat plate heating rate and surface pressure in a vacuum.

B66-10634

EMERGENCY ESCAPE SYSTEM PROTECTS PERSONNEL FROM EXPLOSION AND FIRE

OFFIK, W. G. /MARTIN CO./ DEC. 1966

KSC-66-12

Elevator-type emergency escape system evacuates personnel from tall structures, especially when the possibility of explosion or fire exists. The system consists of a spike shaped rescue cabin which descends along a vertical guide cable, penetrates the dome shaped roof of an underground blast shelter and stops in a deceleration bed of granular material.

B66-10635

LIGHTWEIGHT, ALL-METAL HOSE ASSEMBLY HAS HIGH FLEXIBILITY AND STRENGTH OVER WIDE

RANGE OF TEMPERATURE AND PRESSURE

BESSING, L. L. /N. AM. AVIATION/ DEC. 1966

M-FS-1831

Lightweight flexible, metal braid reinforced hose assembly is used in high and low pressure oxygen, helium, and hydrogen systems. These hose assemblies have been successfully used on the Saturn-II stage to provide joints of sufficient flexibility to absorb movement resulting from structural and load induced excursions and temperature variations.

B66-10641

POWER ARC WELDER TOUCH-STARTED WITH

CONSUMABLE ELECTRODE

JEANNETTE, J. C. /AIR REDUCTION CO./ DEC. 1966

M-FS-1485

Power arc welder formed as a hand-held welding gun touch-starts, retracts a consumable electrode to create the desired arc, and then commences feeding of the consumable electrode at the rate required to form the intended bead or spot. This device achieves uniform spot welds repeatedly.

B66-10642

DEVICE MEASURES REACTION ENGINE THRUST VECTOR

DEVIATIONS

LEONARD, K. SHIEBER, H. /TRW SPACE TECHNOL.

LABS./ DEC. 1966

JPL-SC-163

Gimbal mounted test device measures thrust vector deviation of reaction engines in terms of angular displacement and thus precludes force interaction.

B66-10648

FUEL AND OXIDIZER VALVE ASSEMBLY EMPLOYS

SINGLE SOLENOID ACTUATOR

INNOVATOR NOT GIVEN /PARKER AIRCRAFT CO./ DEC.

1966

MSC-1046

Valve assembly simultaneously starts or stops the flow of oxidizer and fuel from separate inlet channels to reaction control motors. The assembly combines an oxidizer shutoff valve and a fuel shutoff valve which are mechanically linked and operated by a single high-speed solenoid actuator.

B66-10655

CHECK VALVE INSTALLATION IN PILOT OPERATED

RELIEF VALVE PREVENTS REVERSE PRESSURIZATION

OSWALT, L. /N. AM. AVIATION/ DEC. 1966

M-FS-1925

Two check valves prevent reverse flow through pilot-operated relief valves of differential area piston design. Title valves control pressure flow to ensure that the piston dome pressure is always at least as great as the main relief valve discharge pressure.

B66-10656

MECHANICAL GAUGE ACCURATELY CHECKS TUBING FLARE, ROUNDNESS, AND CONCENTRICITY

CLARK, L. K. /IBM/ DEC. 1966

M-FS-1822

Mechanical gauge checks flare roundness and concentricity of metal tubing. The gauge, which is available from off-the-shelf standard toolmaking supplies, provides the needed accuracy and is easily operated.

B66-10662

METHOD FOR PREDICTING FRICTIONAL LOSS IN

METAL BELLOWS AND FLEXIBLE HOSE

CLEVELAND, J. R. DANIELS, C. M. /N. AM.

AVIATION/ DEC. 1966

M-FS-883

Test data obtained concerning the frictional pressure loss to fluids flowing in unsleeved bellows and flexible hose. This data should be useful in the design of fluid systems where high delivery velocities are involved and flexible hose or bellows must be employed.

B66-10663

LATERAL RING METAL ELASTIC WHEEL ABSORBS

SHOCK LOADING

GALAN, L. /BENDIX CORP./ DEC. 1966

M-FS-1312

Lateral ring metal elastic wheel absorbs practically all shock loading when operated over extremely rough terrain and delivers only a negligible shock residue to associated suspension components. The wheel consists of a rigid aluminum assembly to which lateral titanium ring flexible elements with treads are attached.

B66-10665

SPHERICAL PIPE JOINT DELIVERS LOADS EQUALLY

TO MATING FLANGE

PFLEGER, R. O. /N. AM. AVIATION/ DEC. 1966

M-FS-807

Oxidizer inlet duct with a ball joint pipe fitting incorporating two spherical bearing races and balls in contact with centering cage springs transmits an evenly distributed load to the mating flange. This design should find application in piping systems where unequal load distributions exist.

B66-10667

SILAZANE ELASTOMER REMAINS RESILIENT AT

400 DEG C

INNOVATOR NOT GIVEN /SOUTHERN RES. INST./ DEC.

1966

M-FS-1144

Smooth, unfoamed elastomer is unaffected by common acids, alkalis, and organic solvents. Its thermal stability, chemical resistance, and physical properties make it of interest for various applications.

B66-10672

RESONANT FREQUENCY CAN BE ADJUSTED ON

VIBRATION MOUNT

HODGES, F. /RYAN AERON./ DEC. 1966

JPL-SC-134

Vibration mount allows adjustment of its resonant frequency and is insensitive to wide temperature variation. The concept is essentially a multidirectional, frictionally damped spring with an adjustable cap. The mount provides vibration isolation in both compression and shear and may be applicable to space use.

B66-10674

ELIMINATION OF ROCKET ENGINE ASYMMETRIC

LOADS DURING TESTS AT SEA LEVEL

JOHNSON, J. R. /N. AM. AVIATION/ DEC. 1966

M-FS-1730

Secondary injection concept eliminates asymmetric

and may increase thrust rocket engine loads during sea level tests. The concept uses either a tubular manifold with evenly spaced injection ports or secondary fluid injected at the turbine exhaust inlet to the thrust chamber.

B66-10676

STUDY MADE OF DESTRUCTIVE SECTIONING OF COMPLEX STRUCTURES FOR EXAMINATION  
RILEY, T. DEC. 1966  
LEWIS-341

Advances in destructive sectioning of very small or complex structures are discussed. Examination is made by filling the structure in a vacuum with a low viscosity potting compound and then cutting without danger of spatial disorientation.

B66-10677

STUDY MADE TO CONTROL DEPTH OF POTTING COMPOUND FOR HONEYCOMB SANDWICH FASTENERS  
CUSHMAN, J. /GEN. DYN./CONVAIR/ DEC. 1966  
LEWIS-370

Study determines optimum fastener insert size and shape, type of embedding cement, diameter, undercut and depth control by fiberglass plug in a honeycomb structure for maximum tensile strength. The best potting compound is 5-5-1 weight mixture of epoxy resin, curing agent, and milled glass fibers.

B66-10678

IMPROVED ROLLING ELEMENT BEARINGS PROVIDE LOW TORQUE AND SMALL TEMPERATURE RISE IN ULTRAHIGH VACUUM ENVIRONMENT  
GLENN, D. C. DEC. 1966  
LEWIS-359

Rolling element bearing with stainless steel races and rolling elements and a porous bronze cage successfully operates in ultrahigh vacuum environments at a low torque and with small temperature rise. All components are burnished in molybdenum disulfide.

B66-10683

VALVE EFFECTIVELY CONTROLS AMOUNT OF CONTAMINANT IN FLOW STREAM  
SCHNITZER, T. E. DEC. 1966  
M-FS-1771

Contaminant valve with a coaxial groove rotor uniformly deposits contaminant into a flow stream under full pressure and flow conditions. The valve tests filters and filter elements of hydraulic oil, fuel, or lubricant systems without any detrimental effect on the performance.

B66-10686

ACTUATOR DEVICE SCHEDULES RATE OF VALVE CLOSURE  
INNOVATOR NOT GIVEN /WHITTAKER CORP./ DEC. 1966  
M-FS-1556

Prevalve actuator schedules the closure rate of a valve. The actuator is spring-loaded to produce a normally open valve and pneumatically powered to close the valve. The closure rate is controlled by means of pneumatic snubber and booster circuitry.

B66-10688

PREFORMED STIFFENERS USED TO FABRICATE STRUCTURAL COMPONENTS FOR PRESSURIZED TANKS  
LEWIS, J. C. SHERBA, E. S. /N. AM. AVIATION/ DEC. 1966  
M-FS-1796

Process of fabricating stiffened section components of pressurized tanks for aerospace use was developed. A potential use of the fabrication process is the production of gore and quarter-panel sections of hydrogen and oxygen tanks for space-vehicle boosters.

B66-10694

MECHANICAL DEVICE ACCURATELY MEASURES RF PHASE DIFFERENCES IN VHF OR UHF RANGES  
HOPP, L. A. /N. AM. AVIATION/ DEC. 1966  
M-FS-1738

Dual range linear measurement device accurately measures rf phase differences in either VHF or UHF ranges. The device has a capability

consisting of a coarse range extending to 30 cm/readable to 1 mm/, and any fine range portion of 2.5 cm readable to .01 mm.

B66-10695

MOTION DRIVE SYSTEM IS ACCURATELY CONTROLLED IN THE 1-MICRON RANGE  
MORECROFT, J. H. DEC. 1966  
JPL-864

Motion drive system has been developed for use with interferometers where accurate control of minuscule distance in the 1-micron range is of prime importance. The drive system is applicable to any device that requires extremely accurate positioning control.

B66-10697

COMBINATION DOUBLE DOOR HIGH-VACUUM VALVE PROVIDES ACCESS TO VACUUM CHAMBER  
YAGER, S. P. DEC. 1966  
JPL-849

Double door provides an extreme high vacuum seal as well as access to a vacuum chamber for insertion of test devices into the vacuum environment. This arrangement is applicable to any vacuum chamber and could be of value in cryopumping or mechanically pumped chambers.

B66-10698

MECHANISM FACILITATES COATING OF INNER SURFACES OF METAL CYLINDERS  
BILLINGSLEY, J. M. TAFT, A. R. DEC. 1966  
GSFC-515

Cylinder is rotated about shielded hot filament to vapor deposit thin coatings of aluminum or other metallic substances on the inner surface of a cylinder while avoiding heat-producing high-density current flow which causes outgassing of the coating surface. This method is acceptable for glass or metal.

B66-10702

TEFLON SHEET PERMITS VALVE AND VALVE OPERATOR TO MOVE AS A SINGLE UNIT IN A CRYOGENIC PIPE LINE  
KINDER, S. K. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1966  
NU-0077

Free floating support system in cryogenic pipe lines maintains the valve and valve operator in alignment. A teflon sheet that is placed between the slide support plate and the base plate permits the valve and valve operator to move freely, as a unit, when the pipe line moves.

B66-10703

SILVER PLATING TECHNIQUE SEALS LEAKS IN THIN WALL TUBING JOINTS  
BLENDERMAN, W. H. /N. AM. AVIATION/ DEC. 1966  
NU-0090

Leaks in thin wall tubing joints are sealed by cleaning and silver plating the hot gas side of the joint in the leakage area. The pressure differential across the silver during hydrostatic test and subsequent use forces the ductile silver into the leak area and seals it.

B66-10704

METAL BOOT PERMITS FABRICATION OF HERMETICALLY SEALED SPLICES IN METAL SHEATHED INSTRUMENTATION CABLES  
CHAMBERS, G. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1966 SEE ALSO B66-10705  
NU-0083

Metal boot splices hard sheathed instrumentation cables used with high temperature strain gauges and thermocouples. Silver brazing the conductors together, hermetically seals the splice. This boot is a highly reliable sealed splice which is equally effective at cryogenic temperatures, high temperatures, nuclear environments, and combinations of the above.

B66-10707

PNEUMATIC WRENCH RETAINS OR DISCHARGES NUTS OR BOLTS AS DESIRED  
BOUILLE, J. R. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1966  
NU-0085

Pneumatic wrench grips, screws or unscrews, and discharges a nut or bolt as desired. The device consists of a standard pneumatic wrench modified with a special hex bolt head socket assembly and a diaphragm air cylinder.

B66-10708

AIR BEARING PROVIDES FRICTION-FREE SUPPORT FOR SHAKER SYSTEM SLIP TABLE

SKOFF, R. W. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1966

NU-0086

Air bearing system supports a shaker system slip table with minimum friction. At each corner of a square of grooves made on the table, a hole is drilled through the table and fitted with air connections. Air pressure is simultaneously fed to the four fittings forming an air bearing.

B66-10711

CARRIAGE SYSTEM REMOTELY MOVES DRAWER OVER EXTENDED DISTANCE

SALZANO, G. H. /PARSONS-JURDEN CORP./ DEC. 1966

NU-0092

In the transferring of material remotely through thick radiation shielding walls, a drawer is mounted on rollers which operate on rails carried on a slide carriage to eliminate the feature of the slide hardware projecting beyond the drawer when the drawer is extended its full distance.

B66-10712

SIMPLE MOTOR DRIVE SYSTEM OPERATES HEAVY HINGED DOOR

PITKIN, R. G. /PARSONS-JURDEN CORP./ DEC. 1966

NU-0093

Motor drive system remotely operates heavy steel radiation shielding doors. The drive consists of a standard motor reducer unit which is mounted on the door. This reducer drives a sprocket which is linked by chain to a fixed sprocket of the same size on the door jamb.

B66-10713

SWING-OUT RAIL SYSTEM SEPARATES OVERHEAD CRANE RAILS

PITKIN, R. G. /PARSONS-JURDEN CORP./ DEC. 1966

NU-0094

Swing-out rail system separates and reconnects the overhead traveling crane rails of a building to provide for the passage of a thick concrete radiation shield sliding door through the rails. In the swing-out position, the rail cantilevered from an axial shaft.

#### Subject Index

The title of each Tech Brief is listed under several selected subject headings to provide the user with a variety of approaches in his search for specific information. The Tech Brief number, e.g., B66-10148, is located under and to the right of the title and is followed by a two-digit number, e.g., 05, which designates the subject category in which the entire entry can be found.

#### A

##### ABLATING MATERIAL

Computer simulation program is adaptable to industrial processes  
LEWIS-240 B66-10426 01

High intensity radiation heat source is capable of sustained operation  
ARC-61 B66-10547 02

Sensors measure surface ablation rate of reentry vehicle heat shield  
LANGLEY-287 B66-10592 01

##### ABLATION

Computational procedure for finite difference solution of one-dimensional heat conduction problems reduces computer time  
MSC-1120 B66-10566 01

##### ABRASION

Portable sandblaster cleans small areas  
MSC-523 B66-10242 05

##### ABSORBER

Kinetic-energy absorber employs frictional force between mating cylinders  
LEWIS-75 B63-10442 05

Bellows joint absorbs torsional deflections in duct system  
M-FS-882 B66-10332 05

##### ABSORPTION

Bidirectional torque filter eliminates backlash  
GSFC-335 B65-10148 05

Removable well in reaction flask facilitates carbon dioxide collection  
ARC-47 B65-10316 03

Hole saw drill attachment has zero force reaction  
MSC-543 B66-10604 05

##### ABSORPTION SPECTRUM

A radiometer-pyrometer  
LEWIS-284 B66-10606 01

##### ACCELERATION

Low-cost tape system measures velocity of

acceleration  
GSFC-85 B63-10512 01

##### ACCELERATION PROTECTION

Friction brake cushions acceleration and vibration loads  
MSC-715 B66-10608 05

##### ACCELEROMETER

Crystal measures short-term, large-magnitude forces  
JPL-77 B65-10187 01

Simple device produces accelerometer calibration pulse  
M-FS-363 B65-10269 01

Miniature servo accelerometer is force-balanced  
JPL-155 B65-10340 01

Tool enables proper mating of accelerometer and cable connector  
M-FS-611 B66-10208 05

Damping technique gives accelerometer flat frequency response  
M-FS-471 B66-10293 01

Rectilinear accelerometer possesses self-calibration feature  
M-FS-1480 B66-10452 01

Instrument automatically selects peak acceleration signal from several accelerometers  
JPL-816 B66-10462 01

Miniature capacitive accelerometer is especially applicable to telemetry  
ARC-72 B66-10491 01

Low level accelerometer test methods are investigated  
M-FS-908 B66-10510 01

Miniature piezoelectric triaxial accelerometer measures cranial accelerations  
ARC-71 B66-10534 01

##### ACCUMULATOR

High-pressure regulating system prevents pressure surges  
JPL-231 B63-10170 05

Nonresonant support facilitates vibration testing of structures  
M-FS-224 B65-10039 05

##### ACETONE

Freon provides heat transfer for solid CO<sub>2</sub> calibration standard  
M-FS-644 B66-10257 02

##### ACETYLENE

Miniature oxygen-hydrogen cutting torch constructed from hypodermic needle  
JPL-545 B63-10517 05

##### ACID

Nonhazardous acid etches weld samples  
M-FS-975 B66-10378 05

##### ACOUSTIC GENERATOR

Device detects unbonded areas in plastic

laminates WOO-206	B65-10380	01	Peel resistance of adhesive bonds accurately measured GSFC-320	B65-10173	03
<b>ACOUSTIC RADIATION</b>			Electronic modules easily separated from heat sink MSC-142	B65-10186	02
Ultrasonic emission method enables testing of adhesive bonds M-FS-799	B66-10341	01	Fastener distributes stress evenly from sandwich-panel-hung items MSC-236	B65-10358	05
<b>ACOUSTIC STABILITY</b>			Adhesive-backed terminal board eliminates mounting screws MSC-173	B65-10396	01
Damping technique gives accelerometer flat frequency response M-FS-471	B66-10293	01	Improved electrode paste provides reliable measurement of galvanic skin response MSC-146	B66-10049	04
<b>ACTIVATION ENERGY</b>			Compound improves thermal interface between thermocouple and sensed surface NU-0028	B66-10121	02
Electrically controlled optical latch and switch requires less current JPL-SC-111	B66-10414	01	Improved adhesive for cryogenic applications cures at room temperature WOO-132	B66-10185	03
<b>ACTUATOR</b>			Mylar film eliminates silk screening of equipment panels MSC-798	B66-10455	05
Stepping switch with simple actuator provides many contacts in small space JPL-122	B63-10118	01	Adhesive for polyester films cures at room temperature, has high initial tack M-FS-938	B66-10487	03
Three-position rocker switch actuator has positive centering MSC-261	B65-10376	01	<b>ADSORPTION</b>		
Special mandrel permits uniform welding of out-of-round tubing M-FS-706	B66-10323	05	Radioactive method enables determination of surface areas rapidly and accurately NU-0088	B66-10710	03
Pneumatic binary encoder replaces multiple solenoid system M-FS-665	B66-10374	01	<b>AERODYNAMIC HEATING</b>		
Matching flow characteristics of standard shutoff valves eliminates need for custom fabricated valves M-FS-1069	B66-10416	05	Instrument accurately measures small temperature changes on test surface LANGLEY-174	B66-10637	01
Fluid logic control circuit operates nutator actuator motor LEWIS-294	B66-10593	05	<b>AERODYNAMIC NOISE</b>		
Fuel and oxidizer valve assembly employs single solenoid actuator MSC-1046	B66-10648	05	Study of hot wire techniques in low density flows with high turbulence levels M-FS-1269	B66-10687	01
Actuator device schedules rate of valve closure M-FS-1556	B66-10686	05	<b>AERODYNAMICS</b>		
<b>ADAPTATION</b>			Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05
Adapter assembly prevents damage to tubing during high pressure tests MSC-563	B66-10330	05	<b>AGING</b>		
<b>ADDITIVE</b>			Thermal stress-relief treatments for 2219 aluminum alloy are evaluated M-FS-1213	B66-10448	03
Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application LANGLEY-6A	B63-10318	03	Treatment increases stress-corrosion resistance of aluminum alloys M-FS-1840	B66-10595	05
<b>ADHESION</b>			<b>AIR</b>		
Electrolytic etching process provides effective bonding surface on stainless steel GSFC-484	B66-10299	03	Rapid helium-air analyzer can measure other binary gas mixtures LANGLEY-16	B63-10557	03
Ultrasonic emission method enables testing of adhesive bonds M-FS-799	B66-10341	01	Device induces lungs to maintain known constant pressure MSC-50	B64-10108	04
Dot patterns provide reproducible flaw areas for study of adhesive bonds M-FS-862	B66-10367	05	Pneumatic power is transmitted through air bearing MSC-8	B64-10141	05
<b>ADHESIVE</b>			Thermistor connector assembly increases accuracy of measurements LANGLEY-62	B65-10045	01
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## SUBJECT INDEX

## ALTERNATING CURRENT /AC/

## AIR CONDITIONING

New nut and sleeve improve flared connections  
M-FS-194 B65-10180 05

## AIR CURRENT

Electron beam seals outer surfaces of porous  
bodies  
M-FS-562 B66-10033 03

## AIR PURIFICATION

Gas diffusion cell removes carbon dioxide from  
occupied airtight enclosures  
MSC-118 B64-10319 03

## AIRBORNE EQUIPMENT

Frequency offset in linear FM/CW transponder  
eliminates clutter  
M-FS-249 B65-10146 01

## AIRCRAFT

Device measures fluid drag on test vehicles  
LANGLEY-34 B65-10195 01

Drill bit design assures clean holes in  
laminated materials  
WOO-098 B65-10386 05

## AIRCRAFT DETECTION

Frequency offset in linear FM/CW transponder  
eliminates clutter  
M-FS-249 B65-10146 01

## AIRCRAFT INSTRUMENT

FM/CW system measures aircraft attitude  
M-FS-276 B65-10290 01

## AIRCRAFT INSTRUMENTATION

FM/CW system measures aircraft attitude  
M-FS-276 B65-10290 01

## ALIGNMENT

Design of valve permits sealing even if the  
stem is misaligned  
LEWIS-38 B63-10341 05

Novel clamps align large rocket cases,  
eliminate back-up bars  
M-FS-1 B63-10376 05

Mirror device aligns machine surface perpen-  
dicular to sight lines  
WOO-5 B63-10421 02

Guide for extrusion dies eliminates  
straightening operation  
LEWIS-152 B64-10014 05

Attachment converts microscope to point source  
autocollimator  
JPL-499 B64-10124 05

Light ray modulation controls optical system  
alignment  
GSFC-171 B65-10211 02

Titanium diaphragm makes excellent amplatron  
cathode support  
GSFC-394 B65-10298 01

Photosensors used to maintain welding  
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MSC-243 B65-10401 05

Instrument quickly transposes ground reference  
target to eye level  
MSC-275 B66-10061 05

Threaded pilot insures cutting tool  
alignment  
M-FS-527 B66-10074 05

Tool enables proper mating of accelerometer  
and cable connector  
M-FS-611 B66-10208 05

Adjustable cutting guide aligns and positions  
stacks of material  
MSC-321 B66-10210 05

Fastener provides for bolt misalignment and  
quick release of flange  
NU-0074 B66-10275 05

Friction loading device enables accurate  
testing of brittle materials  
NU-0051 B66-10345 05

Direction indicator system does not require  
complicated optics  
WOO-305 B66-10407 01

Alignment tool facilitates pin placement on  
irregular horizontal surfaces  
LANGLEY-219 B66-10410 05

Heavy duty precision leveling jacks expedite  
setup time on horizontal boring mill  
M-FS-1084 B66-10411 05

Simplified fixture permits precision  
alignment of an optical target  
M-FS-1181 B66-10556 01

Turbine blade root design concept promises  
superior alignment  
M-FS-1685 B66-10620 05

## ALKALI

Composite seal reduces alkaline battery  
leakage  
GSFC-337 B65-10271 01

## ALKALI METAL

Apparatus enables accurate determination of  
alkali oxides in alkali metals  
LEWIS-256 B66-10296 03

Process for preparing dispersions of  
alkali metals  
JPL-734 B66-10639 03

## ALLOY

Integral coolant channels simply made by melt-  
out method  
M-FS-91 B63-10497 05

Titanium treatment improves brazed joints  
MSC-127 B65-10153 05

Single-crystal semiconductor films grown on  
foreign substrates  
WOO-076 B66-10225 01

Braze alloys used as temperature indicators  
NU-0063 B66-10274 01

Tantalum alloys resist creep deformation at  
elevated temperatures  
LEWIS-350 B66-10558 03

## ALTERNATING CURRENT /AC/

Dc to ac converter operates efficiency at  
low input voltages  
GSFC-130 B65-10178 01

Field effect transistor presents high input  
impedance in ac amplifier  
JPL-500 B65-10232 01

High-speed square-wave current limiter  
operates efficiently  
JPL-SC-073 B65-10233 01

Dual-voltage power supply has increased  
efficiency  
LEWIS-107A B66-10002 01

Two-light circuit continuously monitors ac  
ground, phase, and neutral wires  
MSC-356 B66-10163 01

Substituting transistor for diode improves  
rectifying means  
GSFC-474 B66-10295 01

Electronic bidirectional valve circuit  
prevents crossover distortion and threshold



effect MSC-193	B66-10420	01	Jig protects transistors from heat while tinning leads MSC-515	B66-10240	05
Rectilinear accelerometer possesses self- calibration feature M-FS-1480	B66-10452	01	Fixed vacuum plate clamps styrofoam for machining M-FS-683	B66-10283	05
Instrument automatically selects peak acceleration signal from several accelerometers JPL-816	B66-10462	01	Chemical milling solution produces smooth surface finish on aluminum MSC-549	B66-10312	03
Solid state circuit switches ac load JPL-798	B66-10465	01	Brazing process provides high-strength bond between aluminum and stainless steel M-FS-803	B66-10352	05
Simple technique determines ac properties of hard superconductive materials M-FS-1818	B66-10657	02	Self-supported aluminum thin films produced by vacuum deposition process ARC-58	B66-10387	03
<b>ALTERNATING CURRENT GENERATOR</b>			System for etching thick aluminum layers minimizes bridging and undercutting M-FS-1366	B66-10400	03
New low-level a-c amplifier provides adjust- able noise cancellation and automatic tempera- ture compensation ARC-2	B63-10003	04	New backup-bar groove configuration improves heliarc welding of 2014-T6 aluminum MSC-806	B66-10443	05
<b>ALTIMETER</b>			Heat treatment stabilizes welded aluminum jig and tool structures MSC-800	B66-10458	03
Frequency offset in linear FM/CW transponder eliminates clutter M-FS-249	B65-10146	01	<b>ALUMINUM ALLOY</b>		
<b>ALTITUDE</b>			Lightweight aluminum casting alloy is useful at cryogenic temperatures M-FS-267	B65-10092	03
Scanning photometer system automatically determines atmospheric layer height MSC-245	B66-10170	01	Aluminum alloys protected against stress- corrosion cracking M-FS-235	B65-10172	03
<b>ALUMINUM</b>			White primer permits a corrosion-resistant coating of minimum weight M-FS-304	B66-10207	03
Chain friction system gives positive, revers- ible drive ARC-8	B63-10009	05	Brazing process using Al-Si filler alloy reliably bonds aluminum parts MSC-448	B66-10241	05
Helical tube separates nitrogen gas from liquid nitrogen JPL-398	B63-10251	05	Aluminum/steel wire composite plates exhibit high tensile strength M-FS-401	B66-10262	05
Portable flooring protects finished surfaces, is easily moved M-FS-15	B63-10387	05	Differential expansion provides pressure for diffusion bonding of large diameter rings M-FS-588	B66-10269	05
Built-in templates speed up process for making accurate models LANGLEY-23	B63-10526	05	Aluminum core structures brazed without use of flux M-FS-659	B66-10360	05
Stringent cleaning technique assures reliable epoxy bond GSFC-161	B64-10142	03	Weldable aluminum alloy has improved mechanical properties M-FS-295	B66-10445	03
Magnetic field test coils are temperature compensated GSFC-294	B65-10081	02	Thermal stress-relief treatments for 2219 aluminum alloy are evaluated M-FS-1213	B66-10448	03
Galvanic corrosion reduced in aluminum fabrications M-FS-272	B65-10140	03	Electroless nickel plating on stainless steels and aluminum GSFC-533	B66-10479	03
Electroless nickel resist used in alkali- etching of aluminum GSFC-284	B65-10162	03	Treatment increases stress-corrosion resistance of aluminum alloys M-FS-1840	B66-10595	05
Epoxy-resin patterns speed shell-molding of aluminum parts M-FS-303	B65-10177	05	New weldable high strength aluminum alloy developed for cryogenic service M-FS-737	B66-10613	05
Anodization process produces opaque, reflective coatings on aluminum M-FS-348	B65-10336	03	<b>ALUMINUM CHLORIDE</b>		
Electromagnetic hammer removes weld distortions from aluminum tanks M-FS-287	B65-10342	05	Crack detection method is safe in presence of liquid oxygen M-FS-236	B65-10107	03
Aluminized fiberglass insulation conforms to curved surfaces M-FS-477	B66-10024	03	<b>ALUMINUM OXIDE</b>		
Cryogenic trap valve has no moving parts M-FS-487	B66-10136	05	Gate valve with ceramic-coated base operates at high temperatures		
Aluminum doping improves silicon solar cells LEWIS-206	B66-10181	02			

ARC-23	B63-10562	03	<b>ANALOG DATA</b>		
Fabrication method produces high-grade alumina crucibles			Digital logic elements provide additional functions from analog input		
M-FS-216	B65-10078	05	MSC-64	B64-10064	01
Aluminum oxide filler prevents obstructions in tubing during welding			Auxiliary circuit enables automatic monitoring of EKG		
MSC-222	B66-10125	05	MSC-106	B65-10142	01
Chromium oxide coatings improve thermal emissivity of alumina			<b>ANALOG SIMULATION</b>		
WOO-263	B66-10227	03	Analog device simulates physiological waveforms		
Rubber and alumina gaskets retain vacuum seal in high temperature emf cell			MSC-51	B64-10109	01
ARG-17	B66-10472	05	Analog solar system model relates celestial bodies spatially		
<b>AMPLIFICATION FACTOR</b>			JPL-195	B66-10413	01
Temperature transducer has high output, is time stable			Study made of application of stereoscopic display system to analog computer simulation		
GSFC-446	B65-10362	01	M-FS-1263	B66-10590	01
<b>AMPLIFIER</b>			<b>ANALOG-TO-DIGITAL CONVERTER</b>		
Transfluxor circuit amplifies sensing current for computer memories			Pneumotachometer counts respiration rate of human subject		
JPL-406	B63-10255	01	MSC-92	B64-10259	01
Improved variable-reluctance transducer measures transient pressures			Analog-to-digital converter has increased reliability and reduced power consumption		
LANGLEY-10	B63-10321	01	GSFC-246	B65-10194	01
Digital logic elements provide additional functions from analog input			Simple pulse counting circuit computes sum of squares		
MSC-64	B64-10064	01	GSFC-391	B65-10260	01
Improved insertion-loss tester			Electronic ohmmeter provides direct digital output		
JPL-358	B64-10080	01	GSFC-363	B65-10274	01
Field-effect transistor improves electrometer amplifier			Nonlinear feedback reduces analog-to-digital converter error		
ARC-36	B64-10143	01	ARC-46	B65-10277	01
Stepping motor drive circuit designed for low power drain			Variable word length encoder reduces TV bandwidth requirements		
GSFC-198	B65-10026	01	LANGLEY-87	B65-10345	01
Phase detector circuit synthesizes own reference signal			FET comparator detects analog signal levels without loading analog device		
M-FS-247	B65-10080	01	M-FS-503	B66-10224	01
Traveling-wave tube circuit simplifies microwave relay			<b>ANALYTIC FUNCTION</b>		
GSFC-299	B65-10127	01	Computer program performs flow analysis through turbines		
Instrument calibrates low gas-rate flowmeters			LEWIS-236	B66-10496	01
MSC-134	B65-10137	01	An orthonormalization procedure for multivariable function approximation		
Logarithmic amplifier uses field effect transistors			M-FS-1313	B66-10579	01
JPL-509	B65-10145	01	<b>ANALYZER</b>		
Digital system provides superregulation of nanosecond amplifier-discriminator circuit			Pulse height analyzer operates at high repetition rates, low power		
ARG-61	B66-10500	01	WOO-046	B65-10041	01
<b>AMPLITUDE</b>			Multiaxial analyzer detects low-energy electrons		
Device calibrates vibration transducers at amplitudes up to 20g.			GSFC-329	B65-10213	01
M-FS-86	B63-10572	01	Highly sensitive solids mass spectrometer uses inert-gas ion source		
<b>AMPLITUDE MODULATION</b>			ERC-11	B66-10114	02
Solid-state laser transmitter is amplitude modulated			Single channel pulse-height analyzer operates in subnanosecond range		
MSC-121	B65-10238	01	LEWIS-267	B66-10377	01
<b>ANALOG COMPUTER</b>			<b>ANEMOMETER</b>		
Hybrid computer technique yields random signal probability distributions			New anemometer has fast response, measures dynamic pressure directly		
ARC-34	B65-10208	01	LANGLEY-28	B63-10530	05
FET comparator detects analog signal levels without loading analog device			<b>ANESTHESIOLOGY</b>		
M-FS-503	B66-10224	01	Test monkeys anesthetized by routine procedure		
Automatic system determines moments of inertia of asymmetrical objects			HQ-18	B65-10332	04
M-FS-1769	B66-10636	01	<b>ANGULAR ACCELERATION</b>		
			Switching mechanism senses angular acceleration		

GSFC-462	B66-10158	01	APOLLO PROJECT		
ANGULAR MOTION			Spiral spring/strain gage combination		
System measures angular displacement without contact			accurately measures shock induced deflection	B66-10488	01
LANGLEY-46	B65-10073	01	APOLLO SPACECRAFT		
Universal bellows joint restraint permits angular and offset movement			Predicting surface heating rates and pressures resulting from hot exhaust gases	B66-10633	05
WOO-102	B65-10371	05	MSC-971		
Mount enables precision adjustment of optical-instrumentation mirror			APPROXIMATION METHOD		
MSC-184	B66-10199	02	An orthonormalization procedure for multivariable function approximation	B66-10579	01
Modified hydraulic braking system limits angular deceleration to safe values			M-FS-1313		
GSFC-476	B66-10310	05	ARC DISCHARGE		
Motion drive system is accurately controlled in the 1-micron range			Improved carbon electrode reduces arc sputtering	B66-10026	01
JPL-864	B66-10695	05	MSC-219		
ANIMAL STUDY			ARC GENERATOR		
A technique for making animal restraints			Magnetic field controls carbon arc tail flame	B65-10108	01
ARC-25	B63-10564	05	MSC-139		
ANNULAR FLOW			ARC HEATING		
Miniature valve accurately controls small volume fluid flow			Carbon arc ignition improved by simple auxiliary circuit	B65-10018	01
ARG-66	B66-10473	05	MSC-103		
ANNULAR PLATE			Electric arc heater is self starting	B66-10230	03
Fastener provides cooling and compensates for thermal expansion			LANGLEY-208		
NU-0003	B65-10038	05	Experimental investigation of megawatt dc arc heating of nitrogen	B66-10508	02
ANODE			LEWIS-313		
Tantalum cathode improves electron-beam evaporation of tantalum			ARC WELDING		
JPL-WOO-021	B65-10175	03	Photosensors used to maintain welding electrode-to-joint alignment	B65-10401	05
Titanium diaphragm makes excellent amplitron cathode support			MSC-243		
GSFC-394	B65-10298	01	Fingertip current control facilitates use of arc welding gun	B66-10092	05
Anodization process produces opaque, reflective coatings on aluminum			MSC-289		
M-FS-348	B65-10336	03	Standard arc welders provide high amperage direct current source	B66-10441	01
ANTENNA			LANGLEY-267		
Polychart contour plotter enables data extrapolation from multiple plotting charts			Opposed arcs permit deep weld penetration with only one pass	B66-10513	05
M-FS-37	B64-10406	05	M-FS-1696		
Helical coaxial-resonator makes excellent RF filter			Power arc welder touch-started with consumable electrode	B66-10641	05
GSFC-243	B65-10012	01	M-FS-1485		
Oceanborne transponder platform has good stability			ARGON		
M-FS-171	B65-10035	05	Argon purge gas cooled by chill box	B66-10153	02
Sheet metal strip unrolls to form circular boom			M-FS-560		
GSFC-423	B66-10032	05	Simple device facilitates inert-gas welding of tubes	B66-10155	05
Modified hydraulic braking system limits angular deceleration to safe values			M-FS-558		
GSFC-476	B66-10310	05	Cold trap increases sensitivity of gas chromatograph	B66-10517	03
ANTENNA ARRAY			M-FS-1617		
Modified interelement spacing improves Yagi antenna array			ARITHMETIC		
LANGLEY-130	B65-10183	01	Subroutine allows easy computation in extended precision arithmetic	B66-10504	01
ANVIL			M-FS-1136		
Low power heating element provides thermal control during swaging operations			ARITHMETIC AND LOGIC UNIT /ALU/		
M-FS-457	B66-10206	05	Transfluxor circuit amplifies sensing current for computer memories	B63-10255	01
JPL-SC-097	B66-10380	03	JPL-406		
APERTURE			AROMATIC COMPOUND		
Micromachining produces optical apertures to micron dimensions			Irradiation improves properties of an aromatic polyester	B65-10164	03
GSFC-206	B64-10211	05	LANGLEY-115		
Submicron holes in thin films increase sampling range of mass spectrometers			Polymer film exhibits thermal and radiation stability	B66-10043	03
JPL-SC-097	B66-10380	03	LANGLEY-100		
			Process for preparing dispersions of		

## SUBJECT INDEX

## BALL BEARING

alkali metals			Braking mechanism is self actuating and		
JPL-734	B66-10639	03	bidirectional	B66-10484	05
ASBESTOS			M-FS-1299		
Improved method facilitates debulking and			Computer used to program numerically		
curing of phenolic impregnated asbestos			controlled milling machine		
MSC-949	B66-10459	05	M-FS-1608	B66-10541	01
ASTRONAUT PERFORMANCE			Hoist is automatically stopped at low		
Helmet system broadcasts			deceleration rate		
electroencephalograms of wearer			M-FS-1639	B66-10545	05
ARC-70	B66-10536	01	Emergency escape system uses self-braking		
ATMOSPHERE			mechanism on fixed cable		
Scanning photometer system automatically			KSC-66-44	B66-10575	05
determines atmospheric layer height			AUTOMATIC DATA PROCESSING SYSTEM		
MSC-245	B66-10170	01	New computer system simplifies programming of		
ATMOSPHERIC ENTRY			mathematical equations		
High intensity radiation heat source is			M-FS-441	B66-10361	01
capable of sustained operation			AUTOMATIC GAIN CONTROL /AGC/		
ARC-61	B66-10547	02	Automatic gain control circuit handles wide		
ATMOSPHERIC PRESSURE			input range		
Segmented electrode increases operating			MSC-166	B66-10089	01
pressure of MHD accelerator			Optical automatic gain channel		
LANGLEY-95	B65-10356	02	M-FS-1550	B66-10596	02
Process reduces secondary resonant emission			AXIAL FLOW		
in electronic components			Pressure probe compensates for dimensional		
JPL-934	B66-10685	01	tolerance variations		
ATMOSPHERIC TURBULENCE			LEWIS-302	B66-10599	01
Rough surface improves stability of air-			AXIAL LOAD		
sounding balloons			Fatigue tester achieves true axial motion		
M-FS-320	B65-10326	05	through flex plates and bars		
ATTITUDE INDICATOR			NU-0021	B66-10164	01
Hydraulic device provides accurate			Semiautomatic device tests components with		
displacements to microinches			biaxial leads		
MSC-112	B65-10230	05	MSC-516	B66-10337	05
FM/CW system measures aircraft attitude			AXIAL STRESS		
M-FS-276	B65-10290	01	Bearing transmits rotary and axial motion		
Developmental instrument supplies accurate			LANGLEY-27	B64-10130	05
attitude and attitude-rate data			Testing device subjects elastic materials to		
HQ-57	B66-10607	01	biaxial deformations		
AUDIO EQUIPMENT			JPL-616	B65-10189	03
High-gain amplifier has excellent stability			Simple key locks turbine rotor blades		
and low power consumption			WOO-103	B66-10023	05
GSFC-272	B65-10138	01	Thin plastic sheet eliminates need for		
Phonocardiograph microphone is rugged and			expensive plating		
moistureproof			M-FS-1896	B66-10681	03
MSC-212	B66-10314	04	AXISYMMETRY		
AUDIOFREQUENCY			Friction loading device enables accurate		
Circuit reduces distortion of FM modulator			testing of brittle materials		
GSFC-257	B65-10152	01	NU-0051	B66-10345	05
Pressure transducers dynamically tested with			AZIMUTH		
sinusoidal pressure generator			Optical automatic gain channel		
LEWIS-268	B66-10031	01	M-FS-1550	B66-10596	02
AUDITORY SIGNAL					
Microphone multiplex system provides multiple					
outlets from single source					
GSFC-426	B66-10308	01			
AUTOMATIC CONTROL					
New low-level a-c amplifier provides adjust-					
able noise cancellation and automatic tempera-					
ture compensation					
ARC-2	B63-10003	04			
Level of super-cold liquids automatically					
maintained by levelometer					
JPL-397	B63-10250	01			
Unmanned seismometer levels self, corrects					
drift errors					
GSFC-100	B63-10551	01			
Ring valve responds to differential pressure					
changes					
WOO-247	B66-10022	05			

## B

BACKGROUND EFFECT			Point-source light sensor circuit is		
			insensitive to background light		
JPL-778	B66-10502	01			
BALANCE			System measures unidirectional forces,		
			excludes extraneous forces		
LEWIS-170	B65-10154	05			
BALANCE EQUATION			Equations provide tubular information on		
			effects of uniform and variable loads on		
thin, flat, circular plates			ARG-151	B66-10601	05
BALL BEARING			Ball bearing used in design of rugged flow-		
			meter		
LEWIS-159	B64-10170	05			

## BAND PASS FILTER

## SUBJECT INDEX

Miniature bearings lubricated by sonic dispersion method M-FS-202	B65-10106	03	GSFC-345	B65-10237	01
Control of component differential hardness increases bearing life LEWIS-190	B65-10251	05	<b>BEARING</b> Device transmits rotary motion through hermetically sealed wall JPL-303	B63-10198	05
Friction device damps linear motion of rotating shaft WOO-214	B66-10030	05	Gallium useful bearing lubricant in high-vacuum environment LEWIS-12	B63-10337	03
Polytetrafluoroethylene lubricates ball bearings in vacuum environment M-FS-379	B66-10081	03	Molybdenum disulfide mixtures make effective high-vacuum lubricants M-FS-54	B63-10453	03
Bearing puller facilitates removal and replacement of bearing assemblies M-FS-1538	B66-10418	05	Lead oxide ceramic makes excellent high-temperature lubricant LEWIS-144	B64-10116	03
Improved rolling element bearings provide low torque and small temperature rise in ultrahigh vacuum environment LEWIS-359	B66-10678	05	Bearing transmits rotary and axial motion LANGLEY-27	B64-10130	05
<b>BAND PASS FILTER</b> Thin carbon film serves as UV bandpass filter ERC-8	B66-10060	02	Pneumatic power is transmitted through air bearing MSC-8	B64-10141	05
High-performance rc bandpass filter is adapted to miniaturized construction ARC-60	B66-10309	01	Fluid pressure used to test turbopump bearings NU-0001	B65-10024	03
Composite filter steepens rejection slopes in microwave application GSFC-480	B66-10393	01	Nonresonant support facilitates vibration testing of structures M-FS-224	B65-10039	05
<b>BANDWIDTH</b> Bandwidth switching is transient-free, avoids loss of loop lock WOO-054	B64-10349	01	Electron beam seals outer surfaces of porous bodies M-FS-562	B66-10033	03
Variable word length encoder reduces TV bandwidth requirements LANGLEY-87	B65-10345	01	Bearing alloys with hexagonal crystal structures provide improved friction and wear characteristics LEWIS-320	B66-10373	03
<b>BAR</b> Novel clamps align large rocket cases, eliminate back-up bars M-FS-1	B63-10376	05	Air bearing provides friction-free support for shaker system slip table NU-0086	B66-10708	05
Vacuum-type backup bar speeds weld repairs M-FS-12	B63-10384	05	<b>BELLOWS</b> Device transmits rotary motion through hermetically sealed wall JPL-303	B63-10198	05
Mounting for diodes provides efficient heat sink M-FS-197	B64-10283	01	Composite, vacuum-jacketed tubing replaces bellows in cryogenic systems LEWIS-67	B63-10368	05
<b>BARIUM FLUORIDE</b> Fluoride coatings make effective lubricants in molten sodium environment LEWIS-229	B66-10005	03	Filler device for handling hot corrosive materials MSC-85	B64-10166	03
<b>BARIUM SULFIDE</b> Crack detection method is safe in presence of liquid oxygen M-FS-236	B65-10107	03	Fastener provides cooling and compensates for thermal expansion NU-0003	B65-10038	05
<b>BATTERY</b> Pressure sensor responds only to shock wave M-FS-238	B65-10184	01	Mouthpiece adapter for pipettes protects mouth from harmful liquids LANGLEY-47	B65-10043	03
Composite seal reduces alkaline battery leakage GSFC-337	B65-10271	01	Metal bellows custom-fabricated from tubing LEWIS-192	B65-10150	05
Circuit prevents overcharging of secondary cell batteries GSFC-454	B66-10492	01	Lightweight hinged bellows restraint has high load capacity WOO-151	B65-10341	03
<b>BEACON</b> High-intensity flashing beacon powered by mercury cells LANGLEY-80	B65-10361	01	Universal bellows joint restraint permits angular and offset movement WOO-102	B65-10371	05
<b>BEAM SWITCHING</b> Brushless dc motor uses electron beam switching tube as commutator			Rubber-coated bellows improves vibration damping in vacuum lines LEWIS-273	B66-10187	02
			Bellows design features low spring rate and long life MSC-521	B66-10190	05
			Fluid damping reduces bellows seal fatigue failures M-FS-565	B66-10249	05

Bellows joint absorbs torsional deflections in duct system M-FS-882	B66-10332	05	
Method for predicting frictional loss in metal bellows and flexible hose M-FS-883	B66-10662	05	
<b>BENDING</b>			
Handtool bends component leads accurately M-FS-308	B65-10181	05	
Tool forms right angles in component leads M-FS-722	B66-10346	05	
Hydraulically controlled flexible arm can bend in any direction KSC-66-20	B66-10626	05	
<b>BENDING FATIGUE</b>			
Machine tests crease durability of sheet materials JPL-604	B64-10178	05	
<b>BENDING MOMENT</b>			
Metal-bending brake facilitates lightweight, close-tolerance fabrication ARC-29	B64-10069	05	
<b>BERYLLIUM</b>			
Accurate depth control provided for thermocouple junction locations LANGLEY-289	B66-10632	01	
<b>BERYLLIUM OXIDE</b>			
Indium foil with beryllia washer improves transistor heat dissipation GSFC-42	B63-10033	01	
Carbon-arc rod holder has long life, reduces arc splatter MSC-144	B65-10095	03	
Mounting improves heat-sink contact with beryllia washer MSC-194	B66-10144	01	
Crucible cast from beryllium oxide and refractory cement is impervious to flux and molten metal ARG-22	B66-10527	03	
<b>BILLET</b>			
Rapid billet loader aids extrusion of refractory metals LEWIS-50	B63-10354	05	
<b>BINARY CODE</b>			
Frequency divider is free of spurious outputs GSFC-308	B65-10334	01	
Binary sequence detector uses minimum number of decision elements JPL-673	B66-10264	01	
<b>BINARY DATA</b>			
Logic redundancy improves digital system reliability JPL-SC-069	B65-10025	01	
Frequency discriminator with binary output eliminates tuned circuits M-FS-376	B65-10349	01	
Binary counter accumulates time by complementary preset MSC-242	B65-10399	01	
Simplified circuit corrects faults in parallel binary information channels JPL-SC-090	B66-10261	01	
Subroutine allows easy computation in extended precision arithmetic M-FS-1136	B66-10504	01	
Computer routine adds plotting capabilities to existing programs GSFC-490	B66-10511	01	
<b>BINARY MIXTURE</b>			
Rapid helium-air analyzer can measure other binary gas mixtures LANGLEY-16	B63-10557	03	
<b>BINARY SUMMATOR</b>			
Simple circuit performs binary addition and subtraction GSFC-399	B65-10355	01	
Binary counter uses fluid logic elements M-FS-323	B65-10377	01	
<b>BINDER</b>			
Solid-film lubricant is effective at high temperatures in vacuum LEWIS-228	B66-10087	03	
<b>BIOELECTRIC POTENTIAL</b>			
Miniature electrometer preamplifier effectively compensates for input capacitance ARC-69	B66-10549	01	
<b>BIOINSTRUMENTATION</b>			
New low-level a-c amplifier provides adjustable noise cancellation and automatic temperature compensation ARC-2	B63-10003	04	
Improved electrode gives high-quality biological recordings MSC-17	B64-10025	04	
Device induces lungs to maintain known constant pressure MSC-50	B64-10108	04	
Subminiature biotelemetry unit permits remote physiological investigations ARC-39	B64-10171	01	
Inexpensive, stable circuit measures heart rate MSC-95	B65-10010	01	
Improved conductive paste secures biomedical electrodes MSC-107	B65-10015	03	
Mouthpiece adapter for pipettes protects mouth from harmful liquids LANGLEY-47	B65-10043	03	
Photoelectric sensor output controlled by eyeball movements M-FS-274	B65-10079	01	
Simulator produces physiological waveforms MSC-94	B65-10091	01	
Tiny biomedical amplifier combines high performance, low power drain ARC-41	B65-10203	01	
Rugged pressed disk electrode has low contact potential MSC-158	B65-10320	01	
Direct force-measuring transducer used in blood pressure research ARC-53	B65-10325	01	
Improved electrode paste provides reliable measurement of galvanic skin response MSC-146	B66-10049	04	
Miniature bioelectric device accurately measures and telemeters temperature ARC-52	B66-10057	01	
Gelatin coated electrodes allow prolonged bioelectronic measurements MSC-153	B66-10088	01	
Plant respirometer enables high resolution of oxygen consumption rates HQ-47	B66-10406	04	

Spray-on electrodes enable EKG monitoring of physically active subjects FRC-36	B66-10649	04	GSFC-422	B66-10051	01
<b>BIREFRINGENT COATING</b>			<b>BOLT</b>		
Sprayable birefringent coating enables strain measurements on large surfaces M-FS-1484	B66-10578	03	Modified power tool rapidly drives series torque bolts MSC-221	B66-10054	05
<b>BISMUTH ALLOY</b>			Omnidirectional antennas transmit and receive over large bandwidth GSFC-436	B66-10133	01
Bismuth alloy potting seals aluminum connector in cryogenic application WOO-260	B66-10138	03	Fastener provides for bolt misalignment and quick release of flange NU-0074	B66-10275	05
<b>BISMUTH OXIDE</b>			Nondestructive test method accurately sorts mixed bolts M-FS-1426	B66-10574	01
IR-transmission glasses formed from oxides of bismuth and tellurium M-FS-279	B65-10190	03	<b>BONDING</b>		
<b>BIT SYNCHRONIZATION</b>			New method forms bond line free of voids LANGLEY-20	B63-10558	05
Pn acquisition demodulator achieves automatic synchronization of a telemetry channel JPL-612	B66-10271	01	Elastomers bonded to metal surfaces seal electrochemical cells GSFC-168	B64-10113	03
<b>BLACK BODY RADIATION</b>			Screening technique makes reliable bond at room temperature M-FS-227	B65-10004	03
Reference black body is compact, convenient to use ARC-3	B63-10004	03	Thermocompression bonding produces efficient surface-barrier diode JPL-SC-066	B65-10007	05
Blackbody cavity radiometer has rapid response JPL-521	B66-10679	01	Thermistor connector assembly increases accuracy of measurements LANGLEY-62	B65-10045	01
<b>BLADDER</b>			Selenium bond decreases on resistance of light-activated switch JPL-SC-101	B65-10324	01
Inflatable bladder provides accurate calibration of pressure switch M-FS-367	B65-10279	01	Calibrated clamp facilitates pressure application MSC-298	B66-10059	05
<b>BLADE</b>			Reflective insulator layers separated by bonded silica beads MSC-215	B66-10070	03
Blade valve isolates compartment in pipe, opens to allow free flow JPL-585	B64-10188	05	Dot patterns provide reproducible flaw areas for study of adhesive bonds M-FS-862	B66-10367	05
Adjustable knife cuts honeycomb material to specified depth MSC-475	B66-10237	05	<b>BOOLEAN ALGEBRA</b>		
<b>BLAST</b>			Veitch diagram plotter simplifies Boolean functions JPL-385	B63-10241	05
In-tank shutoff valve is provided with maximum blast protection M-FS-1529	B66-10514	05	<b>BOOM</b>		
Grit blasting nozzle fabricated from mild tool steel proves satisfactory M-FS-1420	B66-10597	05	Apparatus of small size can be extended into long, rigid boom JPL-305	B63-10200	05
<b>BLOOD PRESSURE</b>			Metal strip forms 21 foot boom, rolls up for compact storage GSFC-151	B64-10011	05
Direct force-measuring transducer used in blood pressure research ARC-53	B65-10325	01	Scoop attachment makes helicopter recoveries easier and safer MSC-130	B65-10229	05
<b>BLOWER</b>			Sheet metal strip unrolls to form circular boom GSFC-423	B66-10032	05
Composite, vacuum-jacketed tubing replaces bellows in cryogenic systems LEWIS-67	B63-10368	05	<b>BORATE</b>		
<b>BODY FLUID</b>			Borate glass efficiently transmits ultraviolet light ARG-91	B66-10475	03
Apparatus enables automatic microanalysis of body fluids JPL-962	B66-10515	04	<b>BORON</b>		
<b>BODY OF REVOLUTION</b>			Boron-deoxidized copper withstands brazing temperatures M-FS-762	B66-10273	03
Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	<b>BORON CARBIDE</b>		
<b>BODY TEMPERATURE /BIOL/</b>			Boron carbide whiskers produced by vapor		
Miniature bioelectric device accurately measures and telemeters temperature ARC-52	B66-10057	01			
<b>BOLOMETER</b>					
Wedge immersed thermistor bolometer measures infrared radiation GSFC-443	B65-10330	02			
Ferroelectric bolometer measures RF absolute power at submillimeter wavelengths					

## SUBJECT INDEX

## CALCIUM FLUORIDE

deposition HQ-24	B65-10261	03	reliably bonds aluminum parts MSC-448	B66-10241	05
<b>BORON NITRIDE</b>			High-speed furnace uses infrared radiation for controlled brazing NU-0047	B66-10268	02
Boron nitride housing cools transistors WOO-079	B65-10289	01	Braze alloys used as temperature indicators NU-0063	B66-10274	01
<b>BORON OXIDE</b>			Union would facilitate joining of tubing, minimize braze contamination MSC-777	B66-10311	05
Thin-film ferrites vapor deposited by one-step process in vacuum MSC-259	B66-10398	03	Brazing process provides high-strength bond between aluminum and stainless steel M-FS-803	B66-10352	05
<b>BOUNDARY LAYER TRANSITION</b>			Aluminum core structures brazed without use of flux M-FS-659	B66-10360	05
Thin-film gage measures low heat-transfer rates LANGLEY 205	B66-10180	01	Brazing retort manifold design concept may minimize air contamination and enhance uniform gas flow M-FS-707	B66-10371	05
<b>BRAKE</b>			Braze alloy holds bonding strength over wide temperature range LEWIS-337	B66-10519	03
Frictional wedge shock mount is inexpensive, has good damping characteristics JPL-IT-1001	B63-10289	05	Silver-palladium braze alloy recovered from masking materials M-FS-1845	B66-10631	03
Metal-bending brake facilitates lightweight, close-tolerance fabrication ARC-29	B64-10069	05	Metal boot permits fabrication of hermetically sealed splices in metal sheathed instrumentation cables NU-0083	B66-10704	05
Compressed gas system operates semitrailer brakes during winching operation JPL-0036	B64-10306	05	<b>BRIDGE</b>		
Air brake-dynamometer accurately measures torque LEWIS-163	B65-10312	05	Electronic modules easily separated from heat sink MSC-142	B65-10186	02
Hydraulic drive system prevents backlash JPL-371	B65-10351	05	<b>BRITTLENESS</b>		
Calculations enable optimum design of magnetic brake LEWIS-251	B66-10073	05	Friction loading device enables accurate testing of brittle materials NU-0051	B66-10345	05
Modified hydraulic braking system limits angular deceleration to safe values GSFC-476	B66-10310	05	<b>BUBBLE</b>		
Braking mechanism is self actuating and bidirectional M-FS-1299	B66-10484	05	Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01
Emergency escape system uses self-braking mechanism on fixed cable KSC-66-44	B66-10575	05	<b>BUFFER</b>		
Friction brake cushions acceleration and vibration loads MSC-715	B66-10608	05	Intermediate rotating ring improves reliability of dynamic shaft seal M-FS-575	B66-10197	05
<b>BRAZING</b>			<b>BULKHEAD</b>		
New alloy brazes titanium to stainless steel MSC-102	B65-10060	05	Composite bulkhead fabrication development M-FS-1264	B66-10582	05
Titanium treatment improves brazed joints MSC-127	B65-10153	05	<b>BUOY</b>		
Refractory metals welded or brazed with tungsten inert gas equipment LEWIS-219	B65-10319	05	Oceanborne transponder platform has good stability M-FS-171	B65-10035	05
Inert-gas welding and brazing enclosure fabricated from sheet plastic LEWIS-220	B65-10338	05	<b>BURNOUT</b>		
Brazing method produces solid-solution bond between refractory metals LEWIS-212	B65-10370	05	Lamp automatically switches to new filament on burnout M-FS-498	B66-10046	01
Tungsten wire and tubing joined by nickel brazing M-FS-394	B65-10391	05	<b>C</b>		
New brazing alloy eliminates metal-stress cracking WOO-249	B65-10397	03	<b>CADMIUM SELENIDE</b>		
Improved tool easily removes brazed tube connectors MSC-263	B66-10003	05	Thin-film semiconductor rectifier has improved properties MSC-207	B66-10012	01
Brazing process using Al-Si filler alloy			<b>CALCIUM FLUORIDE</b>		
			Fluoride coatings make effective lubricants in molten sodium environment LEWIS-229	B66-10005	03
			Solid-film lubricant is effective at high temperatures in vacuum LEWIS-228	B66-10087	03



# CALIBRATION

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## CALIBRATION

Variable light source with a million-to-one intensity ratio  
JPL-W00-008 B63-10424 03

Fluid-pressure meter can be calibrated without removal from flow line  
M-FS-98 B63-10502 05

Device calibrates vibration transducers at amplitudes up to 20g.  
M-FS-86 B63-10572 01

Attachment converts microscope to point source autocollimator  
JPL-499 B64-10124 05

Raster linearity of video cameras calibrated with precision tester  
GSFC-200 B64-10209 01

Gage measures electrical connector pin retention force  
JPL-SC-071 B65-10034 03

Metal diaphragm used to calibrate miniature transducers  
M-FS-207 B65-10059 01

Oil-damped mercury pool makes precise optical alignment tool  
GSFC-353 B65-10253 02

Simple device produces accelerometer calibration pulse  
M-FS-363 B65-10269 01

Inflatable bladder provides accurate calibration of pressure switch  
M-FS-367 B65-10279 01

Volumetric system calibrates meters for large flow rates  
W00-130 B65-10323 05

Noncontacting vibration transducer has constant sensitivity  
LANGLEY-99 B65-10392 01

PTFE-aluminum films serve as neutral density filters  
LANGLEY-189 B66-10017 02

Pressure transducers dynamically tested with sinusoidal pressure generator  
LEWIS-268 B66-10031 01

Freon provides heat transfer for solid CO2 calibration standard  
M-FS-644 B66-10257 02

Flexible arms provide constant force for pressure switch calibration  
HQ-38 B66-10317 05

High voltage potential divider calibrated by simple device  
ARG-83 B66-10497 01

Pyrometry handbook describes practical aspects of surface temperature measurements of opaque materials  
LEWIS-349 B66-10520 01

Volume-ratio calibration system for vacuum gages  
LEWIS-303 B66-10640 01

Blackbody cavity radiometer has rapid response  
JPL-521 B66-10679 01

**CALIBRATOR**  
Explosives actuate nonmagnetic indexing device  
GSFC-237 B65-10017 05

Instrument calibrates low gas-rate flowmeters  
MSC-134 B65-10137 01

Design concept for pressure switch calibrator  
HQ-36 B66-10598 01

**CALORIMETER**  
Probe measures characteristics of hot gas stream  
M-FS-240 B65-10133 02

Servo calorimeter measures material heating rate  
NU-0024 B65-10247 01

Calorimeter accurately measures thermal radiation energy  
LANGLEY-173 B66-10058 02

Instrument accurately measures small temperature changes on test surface  
LANGLEY-174 B66-10637 01

**CAMERA**  
System selects framing rate for spectrograph camera  
LANGLEY-55 B65-10086 01

Planetary camera control improves microfiche production  
HQ-1 B65-10313 01

Modified procedure speeds camera copy layout for offset printing  
GSFC-424 B65-10373 02

New television camera eliminates vidicon tube  
M-FS-472 B66-10112 01

Gas pressure feeds film into camera at high speed  
ARG-97 B66-10474 02

Photographic method measures particle size and velocity in fluid stream  
M-FS-1536 B66-10668 01

**CAMERA SHUTTER**  
Electromechanically operated camera shutter provides uniform exposure  
JPL-357 B63-10227 01

Camera shutter is actuated by electric signal  
ARC-20 B63-10560 05

**CANTILEVER BEAM**  
Method permits mechanical and electrical checkout of piezoelectric transducers while installed in a system  
ARC-73 B66-10533 01

**CAPACITANCE**  
Thin-film resistors used in functional electronic blocks  
GSFC-380 B65-10305 01

Capacitive system detects and locates fluid leaks  
M-FS-478 B66-10099 01

Variable-capacitance tachometer eliminates troublesome magnetic fields  
GSFC-435 B66-10126 01

Miniature capacitive accelerometer is especially applicable to telemetry  
ARC-72 B66-10491 01

**CAPACITOR**  
Improved sensor counts micrometeoroid penetrations  
LEWIS-76 B63-10443 01

Circuit switches latching relay in response to signals of different polarity  
W00-055 B63-10508 01

Highly efficient square-wave oscillator operator at high power levels  
GSFC-112 B63-10554 01

Thermistor connector assembly increases accuracy of measurements LANGLEY-62	B65-10045	01	CARBON DIOXIDE CONCENTRATION Test strips detect different CO2 concentrations in closed compartments MSC-210	B65-10390	03
Microparticle impact sensor measures energy directly GSFC-252	B65-10048	01	CARBON DIOXIDE REMOVAL Removable well in reaction flask facilitates carbon dioxide collection ARC-47	B65-10316	03
Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01	CARDIOGRAPHY Digital cardiometer computes and displays heartbeat rate MSC-93	B64-10258	01
Circuit reduces distortion of FM modulator GSFC-257	B65-10152	01	Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01
Electrostatically driven dynamic capacitor employs capacitive feedback JPL-771	B65-10293	01	CARDIOLOGY Computer circuit calculates cardiac output MSC-274	B66-10006	01
Coaxial capacitor used to determine fluid density LEWIS-232	B65-10296	02	CARRIER SYSTEM Phase shift frequency synthesizer is efficient, small in size M-FS-250	B65-10169	01
Compact SCR trigger circuit for ignitron switch operates efficiently M-FS-371	B65-10347	01	Carriage system remotely moves drawer over extended distance NU-0092	B66-10711	05
Three-dimensional wire-mesh capacitor system measures fluid density WOO-194	B65-10379	01	CARTRIDGE Pulse technique provides more accurate checkout of exploding bridge wire device HQ-62	B66-10561	01
Large capacitor performs as a distributed parameter pulse line LEWIS-176	B66-10291	01	CASE Compact cartridge drives coded tape at constant readout speed JPL-472	B64-10222	01
Pulse stretcher has improved dynamic range and linearity ARG-82	B66-10509	01	Chart case opens to form briefing easel MSC-349	B66-10135	05
Nonelectrolytic tantalum capacitors developed M-FS-1546	B66-10552	01	CASTING Refractory ceramic has wide usage, low fabrication cost M-FS-67	B63-10481	03
Compact microwave mixer has high conversion efficiency GSFC-197	B66-10625	01	Plastic molds reduce cost of encapsulating electric cable connectors M-FS-69	B63-10568	05
Thermocouples easily installed in hard-to-get-to places M-FS-1946	B66-10653	01	Pressure molding of powdered materials improved by rubber mold insert WOO-100	B64-10270	03
CAPILLARY Tensile-strength apparatus applies high strain-rate loading with minimum shock JPL-28	B66-10063	05	Lightweight aluminum casting alloy is useful at cryogenic temperatures M-FS-267	B65-10092	03
CARBON Improved carbon electrode reduces arc sputtering MSC-219	B66-10026	01	Epoxy-resin patterns speed shell-molding of aluminum parts M-FS-303	B65-10177	05
Thin carbon film serves as UV bandpass filter ERC-8	B66-10060	02	Plug replaces weld filler as seal in complex casting NU-0049	B66-10489	05
New tungsten alloy has high strength at elevated temperatures LEWIS-336	B66-10551	03	CATALYST Compact assembly generates plastic foam, inflates flotation bag LANGLEY-96	B65-10090	05
CARBON ARC Carbon arc ignition improved by simple auxiliary circuit MSC-103	B65-10018	01	Plated nickel wire mesh makes superior catalyst bed MSC-216	B65-10321	03
Carbon-arc rod holder has long life, reduces arc splatter MSC-144	B65-10095	03	CATALYTIC ACTIVITY Cryopumping of hydrogen in vacuum chambers is aided by catalytic oxidation of hydrogen LEWIS-15	B63-10340	05
Magnetic field controls carbon arc tail flame MSC-139	B65-10108	01	CATHODE Wire winding increases lifetime of oxide-coated cathodes LEWIS-154	B65-10032	03
CARBON DIOXIDE Gas diffusion cell removes carbon dioxide from occupied airtight enclosures MSC-118	B64-10319	03			
Freon provides heat transfer for solid CO2 calibration standard M-FS-644	B66-10257	02			

Tantalum cathode improves electron-beam evaporation of tantalum JPL-W00-021	B65-10175	03	thermionic diode JPL-SC-136	B66-10303	05
Titanium diaphragm makes excellent amplatron cathode support GSFC-394	B65-10298	01	Special treatment reduces helium permeation of glass in vacuum systems HQ-25	B66-10372	02
Rod and dish cathode improves Penning-type vacuum gauge GSFC-447	B66-10082	01	CESIUM IODIDE Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03
Nixie tube display unit employs time-shared logic ARG-117	B66-10512	01	CHAMBER Control system maintains compartment at constant temperature JPL-SC-145	B66-10188	05
CAVITATION Studies reveal effects of pipe bends on fluid flow cavitation M-FS-516	B66-10228	05	CHANNEL Integral coolant channels simply made by melt-out method M-FS-91	B63-10497	05
CAVITY Sensitive low-pressure relief valve has positive seating against leakage W00-041	B64-10278	05	Logic redundancy improves digital system reliability JPL-SC-069	B65-10025	01
CENTRIFUGAL COMPRESSOR Electropneumatic transducer automatically limits motor current LEWIS-253	B66-10160	01	Pulsed plasma accelerator operates repetitively without complex controls LANGLEY-48	B65-10062	01
CENTRIFUGAL FORCE Helical tube separates nitrogen gas from liquid nitrogen JPL-398	B63-10251	05	Spiraled channels improve heat transfer between fluids JPL-694	B65-10291	02
Centrifugal device separates liquid from gas MSC-282	B65-10394	05	Simplified circuit corrects faults in parallel binary information channels JPL-SC-090	B66-10261	01
Flexible arms provide constant force for pressure switch calibration HQ-38	B66-10317	05	Radial coolant channels fabricated by simplified method NU-0070	B66-10267	05
CERAMAL PROTECTIVE COATING Air-cured ceramic coating insulates against high heat fluxes M-FS-150	B65-10357	03	CHANNEL CAPACITY Monitoring system determines amplitude and time of vibration channel peaks JPL-879	B66-10699	01
CERAMIC BONDING Mounting for diodes provides efficient heat sink M-FS-197	B64-10283	01	CHAPMAN-JOUGET FLAME Computer program determines chemical equilibria in complex systems LEWIS-281	B66-10671	01
CERAMIC COATING Gate valve with ceramic-coated base operates at high temperatures ARC-23	B63-10562	03	CHAR Argon purge gas cooled by chill box M-FS-560	B66-10153	02
Ceramic-coated boat is chemically inert, provides good heat transfer LANGLEY-90	B65-10063	05	CHARGE DISTRIBUTION Computer programs calculate potential and charge distributions in a plasma M-FS-871	B66-10553	01
Improved method of edge coating flat ribbon wire M-FS-902	B66-10684	03	CHARGE TRANSFER Primary cells utilize halogen-organic charge transfer complex JPL-926	B66-10682	02
CERAMICS Refractory ceramic has wide usage, low fabrication cost M-FS-67	B63-10481	03	CHART Polychart contour plotter enables data extrapolation from multiple plotting charts M-FS-37	B64-10406	05
Lead oxide ceramic makes excellent high-temperature lubricant LEWIS-144	B64-10116	03	Chart case opens to form briefing easel MSC-349	B66-10135	05
Fabrication method produces high-grade alumina crucibles M-FS-216	B65-10078	05	Chart system simplifies identification of complex design assemblies MSC-752	B66-10460	05
Ceramic materials purified by experimental method LEWIS-225	B65-10270	03	Slide rule-type color chart predicts reproduced photo tones MSC-1227	B66-10680	01
Fibers of newly developed refractory ceramics produced by improved process W00-169	B66-10196	03	CHASSIS Modular chassis simplifies packaging and interconnecting of circuit boards JPL-236A	B63-10174	01
CESIUM Bypass rod transfers heat developed in			Rack mount device quickly inserts or extracts chassis units		

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# CIRCUIT

MSC-244	B65-10385	05	M-FS-1658	B66-10646	03
Insulator-holder protects transistors in dense electronic assemblies			CHOPPER		
MSC-214	B65-10389	01	Improved chopper circuit uses parallel transistors		
Floating device aligns blind connections			M-FS-468	B66-10113	01
MSC-256	B66-10007	05	CHROMATOGRAPHY		
CHECKOUT EQUIPMENT			Reusable chelating resins concentrate metal ions from highly dilute solutions		
Solid state thermostat has integral probe and circuitry			JPL-758	B66-10451	03
M-FS-434	B66-10193	01	CHROMIUM OXIDE		
System monitors discrete computer inputs			Chromium oxide coatings improve thermal emissivity of alumina		
M-FS-1021	B66-10389	01	WOO-263	B66-10227	03
Antenna simulator permits preinstallation system checkout			CIRCUIT		
GSFC-522	B66-10518	01	Circuit switches latching relay in response to signals of different polarity		
CHELATE COMPOUND			WOO-055	B63-10508	01
Reusable chelating resins concentrate metal ions from highly dilute solutions			Frequency-shift-keyer circuit improves PCM conversion for radio transmission		
JPL-758	B66-10451	03	GSFC-80	B63-10511	01
CHEMICAL ANALYSIS			Computer circuit will fit on single silicon chip		
Removable well in reaction flask facilitates carbon dioxide collection			JPL-513	B63-10514	01
ARC-47	B65-10316	03	Simple circuit provides adjustable voltage with linear temperature variation		
Instrument performs nondestructive chemical analysis, data can be telemetered			JPL-WOO-029	B63-10537	01
JPL-SC-078	B65-10317	01	Transistorized trigger circuit is frequency-controllable		
Apparatus enables accurate determination of alkali oxides in alkali metals			GSFC-111	B63-10553	01
LEWIS-256	B66-10296	03	Simple circuit continuously monitors thermocouple sensor		
CHEMICAL COMPOUND			M-FS-61	B63-10567	01
Crack detection method is safe in presence of liquid oxygen			Circuit controls transients in SCR inverters		
M-FS-236	B65-10107	03	GSFC-120	B63-10600	01
CHEMICAL EFFECT			Monostable circuit with tunnel diode has fast recovery		
Chemical regeneration of emitter surface increases thermionic diode life			GSFC-132	B63-10603	01
LEWIS-17	B66-10435	02	Temperature-sensitive network drives astable multivibrator		
CHEMICAL EQUILIBRIUM			GSFC-137	B63-10609	01
Computer program determines chemical composition of physical system at equilibrium			Circuit reliability boosted by soldering pins of disconnect plugs to sockets		
MSC-1119	B66-10670	01	JPL-447	B64-10002	01
Computer program determines chemical equilibria in complex systems			Low-power transistorized circuit provides staircase waveform		
LEWIS-281	B66-10671	01	GSFC-48	B64-10007	01
CHEMICAL MILLING			Efficient circuit triggers high-current, high-voltage pulses		
Electroless nickel resist used in alkali-etching of aluminum			MSC-14	B64-10024	01
GSFC-284	B65-10162	03	Continuity tester screens out faulty socket connections		
Reusable neoprene jacket protects parts for chemical milling			JPL-596	B64-10065	01
WOO-071	B65-10179	03	Ring counter may be advanced or retarded by command signal		
Etching process mills pH 14-8 Mo alloy steel to precise tolerances			GSFC-101	B64-10144	01
MSC-270	B66-10110	03	Temperature-compensation circuit stabilizes performance of vidicons		
Chemical milling solution produces smooth surface finish on aluminum			JPL-486	B64-10226	01
MSC-549	B66-10312	03	Circuit converts AM signals to FM for magnetic recording		
Gage of 6.5 per cent Si-Fe sheet is chemically reduced			GSFC-227	B65-10001	01
MSC-537	B66-10454	03	Tunnel-diode circuit features zero-level clipping		
CHEMILUMINESCENCE			GSFC-241	B65-10002	01
Porous glass makes effective substrate for ozone-sensing reagent			Screening technique makes reliable bond at room temperature		
GSFC-388	B65-10364	03	M-FS-227	B65-10004	03
CHLORODAROMATICS					
Process produces chlorinated aromatic isocyanate in high yield					

Circuit improvement produces monostable multivibrator with load-carrying capability GSFC-34A B65-10011	01	Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133 B65-10143	01
Zener diode function generator requires no external reference voltage JPL-33 B65-10013	01	Rotor position sensor switches currents in brushless dc motors GSFC-315 B65-10151	01
Use of tear ring permits repair of sealed module circuitry M-FS-210 B65-10014	05	Circuit reduces distortion of FM modulator GSFC-257 B65-10152	01
Carbon arc ignition improved by simple auxiliary circuit MSC-103 B65-10018	01	Phase shift frequency synthesizer is efficient, small in size M-FS-250 B65-10169	01
Stepping motor drive circuit designed for low power drain GSFC-198 B65-10026	01	Pressure transducer system is force-balanced, has digital output M-FS-154 B65-10174	05
Ionization vacuum gage starts quickly, is unaffected by spurious currents JPL-304 B65-10036	02	Dc to ac converter operates efficiency at low input voltages GSFC-130 B65-10178	01
Pulse generator permits nondestructive testing of component breakdown voltage MSC-122 B65-10054	01	Oscillator circuit measures liquid level in tanks M-FS-245 B65-10209	01
FM oscillator uses tetrode transistor JPL-82 B65-10055	01	Voltage controlled oscillator is easily aligned, has low phase noise JPL-510 B65-10223	01
Vibrating-membrane electrometer has high conversion gain ARC-38 B65-10056	01	Simple BCD circuit accurately counts to 24 GSFC-317 B65-10225	01
Feedback oscillator functions as low-level pulse stretcher GSFC-261 B65-10069	01	Simple circuit produces high-speed, fixed duration pulses GSFC-285 B65-10228	01
Synchronized pulse generator needs no external power GSFC-274 B65-10072	01	Electrometer has automatic zero bias control GSFC-350 B65-10242	01
Light-sensitive potentiometer measures product of two variables GSFC-240 B65-10076	01	Electrometer preamplifier has drift correction feedback JPL-SC-074 B65-10267	01
Phase detector circuit synthesizes own reference signal M-FS-247 B65-10080	01	Electronic ohmmeter provides direct digital output GSFC-363 B65-10274	01
System selects framing rate for spectrograph camera LANGLEY-55 B65-10086	01	Added diodes increase output of balanced mixer circuit GSFC-354 B65-10276	01
Simple circuit functions as frequency discriminator for PFM signals GSFC-267 B65-10102	01	Compact SCR trigger circuit for ignitron switch operates efficiently M-FS-371 B65-10347	01
Unijunction frequency divider is free of backward loading JPL-W00-010 B65-10112	01	Multiphase clock-pulse generator uses simplified circuitry M-FS-297 B65-10353	01
Simplified electrometer has excellent operating characteristics JPL-413 B65-10125	01	Adhesive-backed terminal board eliminates mounting screws MSC-173 B65-10396	01
Traveling-wave tube circuit simplifies microwave relay GSFC-299 B65-10127	01	Dual-voltage power supply has increased efficiency LEWIS-107A B66-10002	01
Piezoresistive gage tests pin-connector sockets JPL-675 B65-10128	01	Computer circuit calculates cardiac output MSC-274 B66-10006	01
Simple circuit positions film frames in projector JPL-508 B65-10132	02	Circuit exhibits power efficiency greater than 75 percent MSC-254 B66-10034	01
Instrument calibrates low gas-rate flowmeters MSC-134 B65-10137	01	Miniature bioelectric device accurately measures and telemeters temperature ARC-52 B66-10057	01
High-gain amplifier has excellent stability and low power consumption GSFC-272 B65-10138	01	Electronic phase-locked-loop speed control system is stable JPL-SC-084 B66-10232	01
Auxiliary circuit enables automatic monitoring of EKG MSC-106 B65-10142	01	Simplified circuit corrects faults in parallel binary information channels JPL-SC-090 B66-10261	01

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# CLAMP

Simple circuit provides reliable multiple signal average and reject capability NU-0069	B66-10282	01	circuit board prints LANGLEY-288	B66-10660	02
Circuit protects regulated power supply against overload current GSFC-453	B66-10292	01	<b>CIRCUIT PROTECTION</b> Rugged microelectronic module package supports circuitry on heat sink MSC-81A	B66-10245	01
Circuit provides accurate four-quadrant multiplication WOO-272	B66-10331	01	Trisphere spark gap actuates overvoltage relay ARC-68	B66-10557	01
Phase inverter provides variable reference push-pull output HQ-23	B66-10344	01	Solid-state recoverable fuse functions as circuit breaker GSFC-560	B66-10691	01
Function generator eliminates necessity of series summation GSFC-214	B66-10351	01	<b>CIRCUIT RELIABILITY</b> Logic circuit exhibits optimum performance LANGLEY-129	B65-10193	01
Feedback loop compensates for rectifier nonlinearity M-FS-384	B66-10382	01	Two-light circuit continuously monitors ac ground, phase, and neutral wires MSC-356	B66-10163	01
Control circuit maintains unity power factor of reactive load MSC-192	B66-10431	01	Complementary monostable circuits achieve low power drain and high reliability GSFC-433	B66-10179	01
Remote preamplifier circuit maintains stability over wide temperature range WOO-278	B66-10432	01	<b>CIRCULAR CYLINDER</b> A design procedure for the weight optimization of straight finned radiators GSFC-547	B66-10618	05
Shaft encoder presents digital output JPL-SC-191	B66-10436	01	<b>CIRCULAR PLATE</b> Equations provide tubular information on effects of uniform and variable loads on thin, flat, circular plates ARG-151	B66-10601	05
Semiconductors can be tested without removing them from circuitry M-FS-1163	B66-10447	01	<b>CLAMP</b> Novel clamps align large rocket cases, eliminate back-up bars M-FS-1	B63-10376	05
Simple, one transistor circuit boosts pulse amplitude GSFC-501	B66-10480	01	Transistorized circuit clamps voltage with 0.1 percent error GSFC-196	B65-10118	01
Circuit prevents overcharging of secondary cell batteries GSFC-454	B66-10492	01	Self-aligning fixture used in lathe chuck jaw refacing FRC-21	B65-10198	05
Electronic circuit delivers pulse of high interval stability MSC-673	B66-10501	01	Electrical cable connector-clamp has smooth exterior surface MSC-154	B65-10201	05
Point-source light sensor circuit is insensitive to background light JPL-778	B66-10502	01	Remotely operated clamping tool has positive grip NU-0020	B65-10254	05
Preregulator feedback circuit utilizes Light Actuated Switch M-FS-1180	B66-10542	01	Resilient clamp holds fuel cell stack through thermal cycle MSC-313	B66-10035	05
Collector/collector guard ring balancing circuit eliminates edge effects JPL-SC-143	B66-10563	01	Calibrated clamp facilitates pressure application MSC-298	B66-10059	05
Electronic circuit provides accurate sensing and control of dc voltage NU-0089	B66-10591	01	<b>CIRCUIT BOARD</b> Fixture aids soldering of electronic components on circuit board ARC-56	B66-10162	01
<b>CIRCUIT BOARD</b> Modular chassis simplifies packaging and interconnecting of circuit boards JPL-236A	B63-10174	01	Lifting clamp positively grips structural shapes M-FS-593	B66-10176	05
Handtool bends component leads accurately M-FS-308	B65-10181	05	Cylindrical claw clamp has quick release feature M-FS-513	B66-10213	05
Handtool facilitates extraction of circuit modules LANGLEY-38	B65-10231	05	Swiveling lathe jaw concept for holding irregular pieces M-FS-783	B66-10321	05
Fixture aids soldering of electronic components on circuit board ARC-56	B66-10162	01	Latching mechanism operates in limited access area MSC-230	B66-10338	05
Device serves as hinge and electrical connector for circuit boards M-FS-743	B66-10359	01			
Process produces accurate registry between					

## CLEANING

Stringent cleaning technique assures reliable epoxy bond  
GSFC-161 B64-10142 03

Portable tool cleans pipes and tubing  
MSC-238 B65-10375 05

Surfactant for dye-penetrant inspection is insensitive to liquid oxygen  
M-FS-475 B66-10131 03

Portable sandblaster cleans small areas  
MSC-523 B66-10242 05

Ultrasonic cleaning restores depth-type filters  
M-FS-540 B66-10298 03

Grit blasting nozzle fabricated from mild tool steel proves satisfactory  
M-FS-1420 B66-10597 05

Silver plating technique seals leaks in thin wall tubing joints  
NU-0090 B66-10703 05

## CLEFTAGE

Electronic modules easily separated from heat sink  
MSC-142 B65-10186 02

## CLOCK

Variable frequency magnetic multivibrator generates stable square-wave output  
GSFC-AE-21 B65-10124 01

Simple BCD circuit accurately counts to 24  
GSFC-317 B65-10225 01

## CLOSED CIRCUIT TELEVISION

Infrared television used to detect hydrogen fires  
M-FS-654 B66-10363 01

## CLOSED LOOP SYSTEM

Photoresistance analog multiplier has wide range  
GSFC-360 B65-10287 01

Closed loop operation eliminates need for auxiliary gas in high pressure pumping station  
M-FS-893 B66-10408 05

## CLOSURE

Valve designed with elastic seat  
JPL-442 B65-10040 05

Inflatable O-ring seal would ease closing of hatch cover plate  
MSC-740 B66-10385 05

Actuator device schedules rate of valve closure  
M-FS-1556 B66-10686 05

## CLUTCH

Quick-acting clutch disengages idle drive motor  
GSFC-143 B64-10028 05

Diaphragm spring gives clutch over-center toggle effect  
GSFC-499 B66-10297 05

## COATING

Elastomers bonded to metal surfaces seal electrochemical cells  
GSFC-168 B64-10113 03

Coating method enables low-temperature brazing of stainless steel  
NU-0030 B65-10250 03

Special coatings control temperature of structures  
GSFC-444 B65-10337 03

Pigmented coating resists thermal shock  
JPL-SC-083 B65-10354 03

Nickel/tin coating protects threaded fasteners in corrosive environment  
MSC-253 B65-10398 03

Fluoride coatings make effective lubricants in molten sodium environment  
LEWIS-229 B66-10005 03

PTFE-aluminum films serve as neutral density filters  
LANGLEY-189 B66-10017 02

Optically driven switch turn-off time reduced by opaque coatings  
JPL-SC-107 B66-10141 01

Epoxy-coated containers easily opened by wire band  
M-FS-592 B66-10174 05

Rubber-coated bellows improves vibration damping in vacuum lines  
LEWIS-273 B66-10187 02

Chromium oxide coatings improve thermal emissivity of alumina  
WOO-263 B66-10227 03

Valve seat pores sealed with thermosetting monomer  
M-FS-900 B66-10322 03

Film coating permits low-force scribing  
MSC-990 B66-10609 03

Mechanism facilitates coating of inner surfaces of metal cylinders  
GSFC-515 B66-10698 05

COAXIAL CABLE

Modified rf coaxial connector ends vacuum chamber wiring problem  
GSFC-150 B64-10010 01

Compact coaxial connector for printed circuit adds reliability  
MSC-57 B64-10016 01

Cutter and stripper reduces coaxial cable connection time  
ARC-40 B65-10094 05

Lightweight coaxial cable connector reduces signal loss  
JPL-720 B65-10244 01

Boron trifluoride nuclear detector preamplifier uses single-cable connection  
LEWIS-178 B65-10255 01

Junction connectors permit strategic placement of television cameras  
KSC-66-22 B66-10391 01

Plug-in connector socket accepts coaxial cable end  
ARG-9 B66-10478 01

High frequency wide-band transformer uses coax to achieve high turn ratio and flat response  
ARG-107 B66-10600 01

Connector acts as quick coupling in coaxial cable application  
JPL-803 B66-10621 01

COBALT ALLOY

New cobalt alloys have high-temperature strength and long life in vacuum environments  
LEWIS-47 B63-10351 03

Process yield Co-Fe alloys with superior high temperature magnetic properties  
LEWIS-333 B66-10535 03

# SUBJECT INDEX

# COMPENSATION

## COIL

Improved magnetometer uses toroidal gating coil  
GSFC-249 B65-10103 01

Collapsible truss structure is automatically expandable  
GSFC-265 B65-10126 05

Collar positions strip stock used to form coil on mandrel  
JPL-198 B65-10130 05

Spiral heater coils hand-formed with fixture  
LEWIS-208 B65-10192 05

Coiled sheet metal strip opens into tubular configuration  
GSFC-425 B66-10009 03

Auxiliary coil controls temperature of RF induction heater  
GSFC-428 B66-10067 01

Flexible coiled spline securely joins mating cylinders  
WOO-270 B66-10172 05

Heat exchanger tubes supported in high vibration environment  
M-FS-1401 B66-10567 05

## COLD CATHODE

Cold cathode ionization gauge has rigid metal housing  
GSFC-445 B66-10041 01

## COLD DRAWING

Copper-acrylic enamel serves as lubricant for cold drawing of refractory metals  
ARG-54 B66-10471 05

## COLD PRESSING

Integral ribs formed in metal panels by cold-press extrusion  
M-FS-230 B65-10141 05

## COLD TRAP

Cold trap increases sensitivity of gas chromatograph  
M-FS-1617 B66-10517 03

## COLD WORKING

Radial coolant channels fabricated by simplified method  
NU-0070 B66-10267 05

## COLLECTOR

Wide-aperture solar energy collector is light in weight  
JPL-SC-055 B65-10046 02

Plastic bags in evacuated chamber make lightweight gas sampling system  
FRC-31 B65-10264 01

Removable well in reaction flask facilitates carbon dioxide collection  
ARC-47 B65-10316 03

Vapor grown silicon dioxide improves transistor base-collector junctions  
GSFC-389 B66-10091 01

## COLLOID

Magnetic fluid readily controlled in zero gravity environment  
LEWIS-126 B65-10335 03

Colloidal suspension simulates linear dynamic pressure profile  
WOO-266 B66-10214 05

## COLOR PERCEPTION

Slide rule-type color chart predicts reproduced photo tones  
MSC-1227 B66-10680 01

## COLOR PHOTOGRAPHY

Device to color modulate a stationary light beam gives high intensity  
HQ-44 B66-10476 01

## COLORIMETRY

Test strips detect different CO2 concentrations in closed compartments  
MSC-210 B65-10390 03

## COLUMN

Extendible column can be stowed on drum  
JPL-686 B65-10191 05

## COMBUSTION

Plastic bags in evacuated chamber make lightweight gas sampling system  
FRC-31 B65-10264 01

Infrared television used to detect hydrogen fires  
M-FS-654 B66-10363 01

Hydrogen fire detection system features sharp discrimination  
M-FS-643 B66-10368 01

Computer program determines chemical equilibria in complex systems  
LEWIS-281 B66-10671 01

## COMBUSTION CHAMBER

Combustion chamber inlet manifold separates vapor from liquid  
M-FS-531 B66-10052 05

Microminiature thermocouple monitors own installation  
M-FS-1111 B66-10463 05

Combustion chamber struts can be effectively transpiration cooled  
M-FS-1830 B66-10643 03

## COMMAND SYSTEM

Remote control electrical switching system has 1000-output capability  
M-FS-380 B65-10318 01

## COMMUNICATION SYSTEM

Superconductor magnets used for stagger-tuning traveling-wave maser  
GSFC-292 B65-10165 01

Lightweight coaxial cable connector reduces signal loss  
JPL-720 B65-10244 01

## COMMUNICATIONS DEVICE

Simple circuit produces high-speed, fixed duration pulses  
GSFC-285 B65-10228 01

Circuit maintains digital decision threshold at preset level  
M-FS-331 B65-10281 01

## COMMUNICATIONS SATELLITE

Omnidirectional antennas transmit and receive over large bandwidth  
GSFC-436 B66-10133 01

## COMMUTATOR

Brushless dc motor has high efficiency, long life  
GSFC-181 B66-10355 01

Solid-state switch increases switching speed  
WOO-298 B66-10430 01

## COMPARATOR

FET comparator detects analog signal levels without loading analog device  
M-FS-503 B66-10224 01

## COMPENSATION

Fastener provides cooling and compensates for



## COMPENSATOR

thermal expansion  
NU-0003 B65-10038 05

## COMPENSATOR

Detector circuit compensates for vidicon beam  
current variations  
GSFC-310 B65-10212 01

## COMPONENT RELIABILITY

Improved insertion-loss tester  
JPL-358 B64-10080 01

Analog-to-digital converter has increased  
reliability and reduced power consumption  
GSFC-246 B65-10194 01

Interferometer construction assures  
parallelism of critical components  
JPL-704 B65-10292 02

Semiautomatic device tests components with  
biaxial leads  
MSC-516 B66-10337 05

## COMPOSITE MATERIAL

Aluminum/steel wire composite plates exhibit  
high tensile strength  
M-FS-401 B66-10262 05

Tungsten fiber-reinforced copper composites  
form high strength electrical  
conductors  
LEWIS-338 B66-10572 03

## COMPOSITE STRUCTURE

Composite seal reduces alkaline battery  
leakage  
GSFC-337 B65-10271 01

Flexible coiled spline securely joins mating  
cylinders  
WOO-270 B66-10172 05

Composite bulkhead fabrication development  
M-FS-1264 B66-10582 05

## COMPRESSIBILITY

Bellows joint absorbs torsional deflections in  
duct system  
M-FS-882 B66-10332 05

## COMPRESSIBLE FLOW

Computer program determines gas flow rates in  
piping systems  
M-FS-443 B66-10300 01

## COMPRESSIBLE FLUID

Coaxial capacitor used to determine fluid  
density  
LEWIS-232 B65-10296 02

## COMPRESSION

Resonant frequency can be adjusted on  
vibration mount  
JPL-SC-134 B66-10672 05

## COMPRESSOR BLADE

Wire material reduces compressor blade  
vibration  
LEWIS-357 B66-10666 03

## COMPUTATION

Disk calculator indicates legible lettering  
size for slide projection  
GSFC-409 B65-10339 05

## COMPUTER

Computer determines high-frequency phase  
stability  
GSFC-113 B63-10555 01

Improved wire memory matrix uses very little  
power  
JPL-SC-167 B65-10359 01

Computer circuit calculates cardiac output  
MSC-274 B66-10006 01

## SUBJECT INDEX

## COMPUTER DESIGN

Modular chassis simplifies packaging and  
interconnecting of circuit boards  
JPL-236A B63-10174 01

Veitch diagram plotter simplifies Boolean  
functions  
JPL-385 B63-10241 05

Transfluxor circuit amplifies sensing current  
for computer memories  
JPL-406 B63-10255 01

Computer circuit will fit on single silicon  
chip  
JPL-513 B63-10514 01

New sintering process adjusts magnetic value  
of ferrite cores  
GSFC-129 B63-10606 01

Molded elastomer provides compact ferrite-core  
holder, simplifies assembly  
JPL-584 B64-10084 05

## COMPUTER METHOD

Computer modification reduces time of  
performing iterative division  
M-FS-166 B65-10005 01

Density trace made with computer printout  
GSFC-322 B65-10200 01

Uppercase and lowercase computer printout  
increases readability  
HQ-12 B65-10286 01

Delayed ripple counter simplifies square-root  
computation  
GSFC-398 B65-10343 01

Instrument calculates moments of inertia of  
complex plane figures  
MSC-628 B66-10306 01

Human transfer functions used to predict  
system performance parameters  
LANGLEY-203 B66-10379 01

System monitors discrete computer inputs  
M-FS-1021 B66-10389 01

Study compares methods for the numerical  
solution of ordinary differential equations  
M-FS-830 B66-10466 01

Computational procedure for finite difference  
solution of one-dimensional heat conduction  
problems reduces computer time  
MSC-1120 B66-10566 01

## COMPUTER PROGRAM

Computer programs simplify optical system  
analysis  
GSFC-306 B65-10093 01

Fortran program flowchart is automatically  
produced  
M-FS-369 B66-10062 01

Computer program simplifies selection of  
structural steel columns  
NU-0044 B66-10097 01

Computer program determines gas flow rates in  
piping systems  
M-FS-443 B66-10300 01

New computer program solves wide variety of  
heat flow problems  
M-FS-421 B66-10404 01

Computer program performs flow analysis  
through turbines  
LEWIS-236 B66-10496 01

Computer program determines performance  
efficiency of remote measuring systems  
M-FS-1137 B66-10503 01

## SUBJECT INDEX

## CONNECTOR

Subroutine allows easy computation in extended precision arithmetic M-FS-1136	B66-10504	01	Logic circuitry used to automatically test shielded cables HQ-60	B66-10659	01
Computer program determines inventory size M-FS-1135	B66-10506	01	Metal boot permits fabrication of hermetically sealed splices in metal sheathed instrumentation cables NU-0083	B66-10704	05
Computer routine adds plotting capabilities to existing programs GSFC-490	B66-10511	01	CONE Lathe attachment used to machine elliptical cones MSC-100	B65-10168	05
Computer program performs statistical analysis for random processes M-FS-723	B66-10525	01	CONNECTOR Modular chassis simplifies packaging and interconnecting of circuit boards JPL-236A	B63-10174	01
Computer programs perform spectral analyses of up to seven time series M-FS-1133	B66-10539	01	Portable display paneling has wide use, easy take down and assembly ARC-17	B63-10435	05
Computer used to program numerically controlled milling machine M-FS-1608	B66-10541	01	Connector for thermocouple leads saves costly wire, makes reliable connectors LANGLEY-26	B63-10529	01
Ultrasonic quality inspection of bonded honeycomb assemblies is automated MSC-859	B66-10544	01	Plastic molds reduce cost of encapsulating electric cable connectors M-FS-69	B63-10568	05
Computer programs calculate potential and charge distributions in a plasma M-FS-871	B66-10553	01	Circuit reliability boosted by soldering pins of disconnect plugs to sockets JPL-447	B64-10002	01
Computer program simplifies transient and steady-state temperature prediction for complex body shapes MSC-989	B66-10619	01	Modified rf coaxial connector ends vacuum chamber wiring problem GSFC-150	B64-10010	01
Computer program determines chemical composition of physical system at equilibrium MSC-1119	B66-10670	01	Compact coaxial connector for printed circuit adds reliability MSC-57	B64-10016	01
Computer program determines chemical equilibria in complex systems LEWIS-281	B66-10671	01	Continuity tester screens out faulty socket connections JPL-596	B64-10065	01
COMPUTER PROGRAMMING New computer system simplifies programming of mathematical equations M-FS-441	B66-10361	01	Connector seals fluid lines at cryogenic temperatures and high vacuums GSFC-253	B64-10327	05
COMPUTER SIMULATION Computer simulation program is adaptable to industrial processes LEWIS-240	B66-10426	01	Gage measures electrical connector pin retention force JPL-SC-071	B65-10034	03
Video signal processing system uses gated current mode switches to perform high speed multiplication and digital-to-analog conversion MSC-781	B66-10429	01	Feed-through has polyterminal feature M-FS-25	B65-10057	01
Equivalent circuit for a field effect transistor established for computer simulation M-FS-1752	B66-10690	01	Cutter and stripper reduces coaxial cable connection time ARC-40	B65-10094	05
CONDENSER Vapor condensation process produces slurry of magnesium particles in liquid hydrocarbons LEWIS-263	B66-10104	03	New nut and sleeve improve flared connections M-FS-194	B65-10180	05
CONDUCTING MEDIUM Compound improves thermal interface between thermocouple and sensed surface NU-0028	B66-10121	02	Improved solderless connector is easily disconnected JPL-SC-060	B65-10197	01
Inductive system detects level of conducting fluids LEWIS-322	B66-10392	01	Electrical cable connector-clamp has smooth exterior surface MSC-154	B65-10201	05
CONDUCTIVITY Meter accurately measures flow of low-conductivity fluids JPL-0021	B63-10280	01	Electrical probe ensures reliable contact in socket M-FS-315	B65-10215	01
CONDUCTOR Plug-in connector socket accepts coaxial cable end ARG-9	B66-10478	01	Lightweight coaxial cable connector reduces signal loss JPL-720	B65-10244	01
			Thermocouple-to-instrumentation connector features quick assembly NU-0022	B65-10246	05
			Indexing device ensures proper mating of electrical connectors MSC-155	B65-10263	01

Feed-through connector withstands high temperatures in vacuum environment GSFC-442	B65-10328	01	NU-0094	B66-10713	05
Keyed plugs and sockets prevent improper connections MSC-231	B65-10381	01	<b>CONTACT</b> Improved holder protects crystal during high acceleration and impact JPL-463	B65-10037	05
Threaded split ring connector separates structural sections LANGLEY-145	B65-10383	05	<b>CONTACT LENS</b> Thin transparent films formed from powdered glass GSFC-352	B65-10217	03
Shrinkable sleeve eliminates shielding gap in RF cable WOO-207	B65-10387	01	<b>CONTACT POTENTIAL</b> Electrometer has automatic zero bias control GSFC-350	B65-10242	01
Floating device aligns blind connections MSC-256	B66-10007	05	Rugged pressed disk electrode has low contact potential MSC-158	B65-10320	01
Single connector provides safety fuses for multiple lines MSC-199	B66-10050	01	<b>CONTACT RESISTANCE</b> Diffusion technique stabilizes resistor values MSC-205	B66-10142	01
High-pressure, low temperature electrical connector makes no-leak seal MSC-276	B66-10079	02	<b>CONTAINER</b> Lightweight magnesium-lithium alloys show promise M-FS-17	B63-10389	03
Bismuth alloy potting seals aluminum connector in cryogenic application WOO-260	B66-10138	03	Electrically heated diaphragm eliminates use of pyrotechnics MSC-241	B65-10400	01
Rubber-coated bellows improves vibration damping in vacuum lines LEWIS-273	B66-10187	02	Seismometer designed for remote operation in random orientation JPL-320	B66-10085	01
Tool enables proper mating of accelerometer and cable connector M-FS-611	B66-10208	05	Epoxy-coated containers easily opened by wire band M-FS-592	B66-10174	05
Pressure-welded flange assembly provides leaktight seal at reduced bolt loads M-FS-640	B66-10247	05	Fiberglass container shells form contamination-free storage units WOO-275	B66-10217	05
Diffusion bonding makes strong seal at flanged connector M-FS-637	B66-10250	05	Special tool kit aids heavily garmented workers MSC-163	B66-10403	05
Polarizing keys prevent mismatch of connector plugs and receptacles MSC-443	B66-10251	01	Seal-off assembly permits rapid evacuation of air from containers GSFC-513	B66-10446	05
Exclusive-or logic circuit has useful properties LANGLEY-214	B66-10272	01	Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys ARG-199	B66-10594	03
Device serves as hinge and electrical connector for circuit boards M-FS-743	B66-10359	01	<b>CONTAMINANT</b> Sensor detects hydrocarbon oil contaminants in fluid lines M-FS-522	B66-10068	01
Junction connectors permit strategic placement of television cameras KSC-66-22	B66-10391	01	<b>CONTAMINATION</b> Magnetic field controls carbon arc tail flame MSC-139	B65-10108	01
Modified pliers facilitate coupling of bayonet-type connectors M-FS-1344	B66-10417	05	Double gloves reduce contamination of dry box atmosphere LEWIS-211	B65-10117	03
Connector acts as quick coupling in coaxial cable application JPL-803	B66-10621	01	Radioactive tracer system detects oil contaminants in fluid lines M-FS-512	B66-10090	03
Process reduces secondary resonant emission in electronic components JPL-934	B66-10685	01	Tool provides constant purge during tube welding M-FS-547	B66-10093	05
<b>CONSTRUCTION</b> Computer program simplifies selection of structural steel columns NU-0044	B66-10097	01	Insert sleeve prevents tube soldering contamination MSC-552	B66-10238	05
Large capacitor performs as a distributed parameter pulse line LEWIS-176	B66-10291	01	Union would facilitate joining of tubing, minimize braze contamination MSC-777	B66-10311	05
Composite bulkhead fabrication development M-FS-1264	B66-10582	05	Brazing retort manifold design concept may minimize air contamination and enhance		
Swing-out rail system separates overhead crane rails					

# SUBJECT INDEX

# CONTROL VALVE

uniform gas flow M-FS-707	B66-10371	05	to demand signals GSFC-457	B66-10094	01
Tungsten insulated susceptor cup for high temperature induction furnace eliminates contamination LEWIS-283	B66-10538	03	Electronic phase-locked-loop speed control system is stable JPL-SC-084	B66-10232	01
CONTINUOUS FUNCTION			Flow ring valve is simple, quick-acting M-FS-752	B66-10255	05
Ball-and socket joints provide accurate biaxial gimbal JPL-658	B65-10205	05	Linear signal noise summer accurately determines and controls S/N ratio JPL-SC-152	B66-10433	01
CONTINUOUS WAVE /CW/ RADAR			CONTROL VALVE		
FM/CW system measures aircraft attitude M-FS-276	B65-10290	01	High-pressure regulating system prevents pressure surges JPL-231	B63-10170	05
CONTOUR			Flow control valve is independent of pressure drop JPL-W00-039	B65-10121	05
Novel shock absorber features varying yield strengths MSC-63A	B64-10138	03	Improved fluid control valve extends diaphragm life JPL-345	B65-10147	05
Noncontacting vibration transducer has constant sensitivity LANGLEY-99	B65-10392	01	Fluid check valve has fail-safe feature JPL-0019	B65-10207	05
CONTROL DEVICE			Inexpensive check valve is installed in standard AN fittings JPL-2A	B65-10222	05
Knob linkage permits one-hand control of several operations MSC-30	B65-10022	05	Ring valve responds to differential pressure changes W00-247	B66-10022	05
Simple control device senses solar position JPL-638	B65-10061	01	Pneumatic shutoff and time-delay valve operates at controlled rate M-FS-602	B66-10189	05
Pulsed plasma accelerator operates repetitively without complex controls LANGLEY-48	B65-10062	01	Segmented ball valve is easy to open and close W00-248	B66-10195	05
Variable frequency magnetic multivibrator generates stable square-wave output GSFC-AE-21	B65-10124	01	Shock-operated valve would automatically protect fluid systems M-FS-801	B66-10335	05
Zener diode controls switching of large direct currents MSC-188	B65-10350	01	Diaphragm valve for corrosive and high temperature fluid flow control has unique features LEWIS-304	B66-10365	05
Rack mount device quickly inserts or extracts chassis units MSC-244	B65-10385	05	Automatic protective vent has fail-safe feature LANGLEY-218	B66-10369	05
Auxiliary coil controls temperature of RF induction heater GSFC-428	B66-10067	01	Rotary valve controls multiple hydraulic leveling cylinders M-FS-361	B66-10402	05
Control circuit maintains unity power factor of reactive load MSC-192	B66-10431	01	Electronic bidirectional valve circuit prevents crossover distortion and threshold effect MSC-193	B66-10420	01
Automatic cryogenic liquid level controller is safe for use near combustible substances LEWIS-195	B66-10482	01	Miniature valve accurately controls small volume fluid flow ARG-66	B66-10473	05
Fluid logic control circuit operates nutator actuator motor LEWIS-294	B66-10593	05	Spool valve cycles at controlled frequency MSC-143	B66-10495	05
Gage accurately controls force for placing chips on substrates M-FS-1941	B66-10675	01	In-tank shutoff valve is provided with maximum blast protection M-FS-1529	B66-10514	05
CONTROL SYSTEM			Study of vortex valve for medium temperature solid propellants LANGLEY-204	B66-10524	01
Bidirectional torque filter eliminates backlash GSFC-335	B65-10148	05	Monitoring circuit accurately measures movement of solenoid valve M-FS-1829	B66-10568	01
Planetary camera control improves microfiche production HQ-1	B65-10313	01	Fuel and oxidizer valve assembly employs single solenoid actuator MSC-1046	B66-10648	05
Remote control electrical switching system has 1000-output capability M-FS-380	B65-10318	01			
Control system maintains selected liquid level M-FS-470	B66-10039	01			
System proportions fluid-flow in response					

## CONVERSION

## SUBJECT INDEX

Check valve installation in pilot operated relief valve prevents reverse pressurization M-FS-1925 B66-10655	05	mixed bolts M-FS-1426	B66-10574	01.
Valve effectively controls amount of contaminant in flow stream M-FS-1771 B66-10683	05	Plastic tubing protects flexible copper hose M-FS-772	B66-10588	05
CONVERSION		Intergranular metal phase increases thermal shock resistance of ceramic coating M-FS-1862	B66-10651	03
Fibers of newly developed refractory ceramics produced by improved process WOO-169 B66-10196	03	COPPER ALLOY		
CONVERTER		Coiled sheet metal strip opens into tubular configuration GSFC-425	B66-10009	03
Transistorized converter provides nondissipative regulation GSFC-238 B64-10305	01	Improved rolling element bearings provide low torque and small temperature rise in ultrahigh vacuum environment LEWIS-359	B66-10678	05
Dc to ac converter operates efficiency at low input voltages GSFC-130 B65-10178	01	COPPER COMPOUND		
Efficient dc to dc converter eliminates large stray magnetic fields GSFC-463 B66-10376	01	Cuprous selenide and sulfide form improved photovoltaic barriers WOO-212	B66-10025	01
Low input voltage converter/regulator minimizes external disturbances GSFC-527 B66-10689	01	COPPER SULFIDE		
COOLANT		Crack detection method is safe in presence of liquid oxygen M-FS-236	B65-10107	03
Integral coolant channels simply made by melt-out method M-FS-91 B63-10497	05	CORE		
COOLING		Improved carbon electrode reduces arc sputtering MSC-219	B66-10026	01
Cooling method prolongs life of hot-wire transducer LEWIS-41 B63-10344	02	Efficient dc to dc converter eliminates large stray magnetic fields GSFC-463	B66-10376	01
Boron nitride housing cools transistors WOO-079 B65-10289	01	CORK		
Welds chilled by liquid coolant manifold M-FS-679 B66-10354	05	Nylon bit removes cork insulation without damage to substrate MSC-381	B66-10152	05
COOLING SYSTEM		Cork is used to make tooling patterns and molds MSC-425	B66-10328	05
Argon purge gas cooled by chill box M-FS-560 B66-10153	02	CORROSION PREVENTION		
Modular Porous Plate Sublimator /MPPS/ requires only water supply for coolant M-FS-1374 B66-10409	01	Carbon-arc rod holder has long life, reduces arc splatter MSC-144	B65-10095	03
COORDINATE SYSTEM		Galvanic corrosion reduced in aluminum fabrications M-FS-272	B65-10140	03
Solar-angle sensor has no moving parts JPL-418 B63-10260	02	Gallium alloy films investigated for use as boundary lubricants LEWIS-245	B66-10165	03
COPPER		Soft-seal valve holds hazardous fluids safely LEWIS-275	B66-10216	05
Adherent protective coatings plated on magnesium-lithium alloy M-FS-365 B65-10294	03	CORROSION RESISTANCE		
Copper foil provides uniform heat sink path MSC-262 B66-10004	02	Removable preheater elements improve oxide induction furnace JPL-288	B63-10193	01
Boron-deoxidized copper withstands brazing temperatures M-FS-762 B66-10273	03	Filler device for handling hot corrosive materials MSC-85	B64-10166	03
Bypass rod transfers heat developed in thermionic diode JPL-SC-136 B66-10303	05	Solder flux leaves corrosion-resistant coating on metal JPL-611	B64-10206	03
Copper wire plated with nickel and silver resists corrosion M-FS-761 B66-10421	03	Wide-angle sensor measures radiant heat energy in corrosive atmospheres M-FS-228	B65-10019	05
Copper-acrylic enamel serves as lubricant for cold drawing of refractory metals ARG-54 B66-10471	05	Inexpensive electrical connector is moisture and corrosionproof MSC-164	B65-10196	01
Tungsten fiber-reinforced copper composites form high strength electrical conductors LEWIS-338 B66-10572	03	Nickel/tin coating protects threaded fasteners in corrosive environment MSC-253	B65-10398	03
Nondestructive test method accurately sorts				

## SUBJECT INDEX

## CRUCIBLE

White primer permits a corrosion-resistant coating of minimum weight M-FS-304	B66-10207	03	High pressure tube coupling requires no threads or flares MSC-600	B66-10285	05
Valve seat pores sealed with thermosetting monomer M-FS-900	B66-10322	03	Diaphragm spring gives clutch over-center toggle effect GSFC-499	B66-10297	05
Copper wire plated with nickel and silver resists corrosion M-FS-761	B66-10421	03	Modified pliers facilitate coupling of bayonet-type connectors M-FS-1344	B66-10417	05
Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys ARG-199	B66-10594	03	Rotational fluid coupling eliminates hose entanglements MSC-312	B66-10585	05
Treatment increases stress-corrosion resistance of aluminum alloys M-FS-1840	B66-10595	05	Connector acts as quick coupling in coaxial cable application JPL-803	B66-10621	01
<b>CORROSION TEST</b>			Quick attach and release fluid coupling assembly is self-aligning, self-sealing KSC-66-8	B66-10627	05
Oxygen-hydrogen torch is a small-scale steam generator NU-0042	B66-10120	03	<b>COVER</b>		
<b>COUNTER</b>			Spray-on technique simplifies fabrication of complex thermal insulation blanket M-FS-497	B66-10053	03
Ring counter may be advanced or retarded by command signal GSFC-101	B64-10144	01	Tool pre-tensions covers prior to lacing MSC-631	B66-10301	05
Novel circuit combines pulse stretcher with NOR gate GSFC-187	B64-10150	01	Inflatable O-ring seal would ease closing of hatch cover plate MSC-740	B66-10385	05
Simple BCD circuit accurately counts to 24 GSFC-317	B65-10225	01	<b>CRACK</b>		
Binary counter accumulates time by complementary preset MSC-242	B65-10399	01	Crack detection method is safe in presence of liquid oxygen M-FS-236	B65-10107	03
Queuing register uses fluid logic elements M-FS-317	B66-10100	05	<b>CRACK FORMATION</b>		
Ring counter circuit switches multiphase motor direction of rotation JPL-SC-166	B66-10101	01	New brazing alloy eliminates metal-stress cracking WOO-249	B65-10397	03
Low-power ring counter drives high-level loads GSFC-431	B66-10106	01	<b>CRANE</b>		
One-count memory circuit prevents machine mode interaction ARG-90	B66-10559	01	Speed-sensing device aids crane operators WS-4	B64-10006	05
Digital frequency counter permits readout without disturbing counting process JPL-906	B66-10658	01	Safety switch permits emergency bridge crane shutdown M-FS-549	B66-10168	05
<b>COUNTERBALANCE SYSTEM</b>			Self-actuating grapple automatically engages and releases loads from overhead cranes ARG-81	B66-10522	05
Self-balancing beam permits safe, easy load handling under overhang M-FS-84	B63-10571	05	Swing-out rail system separates overhead crane rails NU-0094	B66-10713	05
<b>COUPLING</b>			<b>CRANIUM</b>		
New coupling compensates for shaft misalignment NU-0013	B65-10077	05	Miniature piezoelectric triaxial accelerometer measures cranial accelerations ARC-71	B66-10534	01
Device disconnects several couplings simultaneously JPL-226	B65-10163	05	<b>CREEP RESISTANCE</b>		
Quick-disconnect coupling safe transfer of hazardous fluids LEWIS-125	B65-10202	01	Tantalum alloys resist creep deformation at elevated temperatures LEWIS-350	B66-10558	03
Diaphragm eliminates leakage in cryogenic fluid duct coupling WOO-142	B65-10227	05	<b>CROSS LINKING</b>		
Plugged hollow shaft makes fatigue-resistant shear pin LANGLEY-195	B66-10077	05	Irradiation improves properties of an aromatic polyester LANGLEY-115	B65-10164	03
Remotely controlled system couples and decouples large diameter pipes NU-0062	B66-10276	05	<b>CROSSED FIELD</b>		
			Improved design provides faster response time in photomultiplier GSFC-451	B66-10526	01
			<b>CRUCIBLE</b>		
			Fabrication method produces high-grade alumina crucibles M-FS-216	B65-10078	05
			Crucible cast from beryllium oxide and		

## CRYOGENIC EQUIPMENT

## SUBJECT INDEX

refractory cement is impervious to flux and molten metal ARG-22	B66-10527	03	M-FS-888	B66-10412	01
<b>CRYOGENIC EQUIPMENT</b>			Automatic cryogenic liquid level controller is safe for use near combustible substances LEWIS-195	B66-10482	01
Cryogenic filter method produces super-pure helium and helium isotopes JPL-374	B63-10235	03	Quick attach and release fluid coupling assembly is self-aligning, self-sealing KSC-66-8	B66-10627	05
Composite, vacuum-jacketed tubing replaces bellows in cryogenic systems LEWIS-67	B63-10368	05	<b>CRYOGENIC GYROSCOPE</b> Optical gyro pickoff operates at cryogenic temperatures M-FS-407	B66-10128	01
Cryogenic waveguide window is sealed with plastic foam JPL-559	B63-10613	01	<b>CRYOGENIC PROPELLANT</b> Combustion chamber inlet manifold separates vapor from liquid M-FS-531	B66-10052	05
Sensitive low-pressure relief valve has positive seating against leakage WOO-041	B64-10278	05	Cryogenic fluid sampling device permits testing under hazardous conditions M-FS-1927	B66-10654	02
Automatic thermal switch accelerates cooling-down of cryogenic system JPL-655	B65-10068	01	<b>CRYOGENIC STORAGE</b> Lightweight door seals cryogenic container against diaphragm type loading M-FS-476	B65-10402	05
Insulation accelerates rate of cooling with cryogenic fluid MSC-161	B65-10240	02	Insulation for cryogenic tanks has reduced thickness and weight M-FS-326	B66-10183	02
Bismuth alloy potting seals aluminum connector in cryogenic application WOO-260	B66-10138	03	<b>CRYOGENIC TEMPERATURE</b> Connector seals fluid lines at cryogenic temperatures and high vacuums GSFC-253	B64-10327	05
Densitometer system for liquid hydrogen has high accuracy, fast response M-FS-909	B66-10438	01	Lightweight aluminum casting alloy is useful at cryogenic temperatures M-FS-267	B65-10092	03
Teflon sheet permits valve and valve operator to move as a single unit in a cryogenic pipe line NU-0077	B66-10702	05	Cryostat modified to aid rotating beam fatigue test M-FS-435	B66-10083	03
<b>CRYOGENIC FLUID</b>			Compound improves thermal interface between thermocouple and sensed surface NU-0028	B66-10121	02
Level of super-cold liquids automatically maintained by levelometer JPL-397	B63-10250	01	Improved adhesive for cryogenic applications cures at room temperature WOO-132	B66-10185	03
Liquid-level meter has no moving parts M-FS-3	B63-10378	03	O-rings with Mylar back-up provide high-pressure cryogenic seal M-FS-603	B66-10278	05
Inert gas spraying device aids in repair of hazardous systems LEWIS-8B	B65-10115	05	Bimetallic devices help maintain constant sealing forces down to cryogenic temperatures M-FS-800	B66-10325	02
Quick-disconnect coupling safe transfer of hazardous fluids LEWIS-125	B65-10202	01	Feed-thru flange is useful in vacuum applications to cryogenic temperatures JPL-846	B66-10615	02
Diaphragm eliminates leakage in cryogenic fluid duct coupling WOO-142	B65-10227	05	<b>CRYOGENICS</b> Aluminized fiberglass insulation conforms to curved surfaces M-FS-477	B66-10024	03
High-pressure, low temperature electrical connector makes no-leak seal MSC-276	B66-10079	02	Cryogenic cooling reduces high voltage arcing between electrodes operating in a vacuum ARG-109	B66-10499	02
Portable power tool machines weld joints in field M-FS-258	B66-10145	05	<b>CRYOPUMPING</b> Cryopumping of hydrogen in vacuum chambers is aided by catalytic oxidation of hydrogen LEWIS-15	B63-10340	05
Cryogenic liquid transfer system reduces residual boiloff LEWIS-274	B66-10157	02	Closed loop operation eliminates need for auxiliary gas in high pressure pumping station M-FS-893	B66-10408	05
Gas diffuser facilitates withdrawal of cryogenic liquids from tanks M-FS-915	B66-10342	05	<b>CRYOSTAT</b> Low-cost insulation system for cryostats eliminates need for a vacuum LEWIS-64	B63-10365	03
Inexpensive insulation is effective for cryogenic transfer lines MSC-618	B66-10348	02			
High pressure cryogenic liquid flow sight assembly provides streamlined flow for easy observation LEWIS-310	B66-10394	01			
Leak locator for vacuum jacketed pipelines eliminates need for removal of outer jacket					

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## CUTTING

Apparatus permits flexure testing of specimens at cryogenic temperatures M-FS-257	B65-10129	02	NU-0087	B66-10706	01
Vacuum chamber provides improved insulation and support for cryostat M-FS-415	B65-10368	02	CURRENT DENSITY Simple technique determines ac properties of hard superconductive materials M-FS-1818	B66-10657	02
CRYOTRAPPING Charged probes, bourdon tubes maintain cryogenic liquid level LEWIS-261	B66-10109	01	CURRENT DISTRIBUTION Simple circuit functions as frequency discriminator for PFM signals GSFC-267	B65-10102	01
Cryogenic trap valve has no moving parts M-FS-487	B66-10136	05	Increased junction lead inductance ballasts high-frequency transistors GSFC-387	B65-10259	01
CRYSTAL Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03	Standard arc welders provide high amperage direct current source LANGLEY-267	B66-10441	01
Improved holder protects crystal during high acceleration and impact JPL-463	B65-10037	05	CURRENT STABILIZER Electropneumatic rheostat regulates high current ARC-44	B65-10299	01
FM oscillator uses tetrode transistor JPL-82	B65-10055	01	CURVED SURFACE Flexible honeycomb structure can bend to fit compound curves M-FS-13	B63-10385	05
Crystal measures short-term, large-magnitude forces JPL-77	B65-10187	01	Lathe converted for grinding aspheric surfaces GSFC-115	B63-10556	05
Voltage controlled oscillator is easily aligned, has low phase noise JPL-510	B65-10223	01	Device measures curved surface finish on gear teeth WOO-112	B65-10064	05
CRYSTALLOGRAPHY Spherical model provides visual aid for cubic crystal study LEWIS-108	B65-10065	03	Aluminized fiberglass insulation conforms to curved surfaces M-FS-477	B66-10024	03
Rotating filters permit wide range of optical pyrometry LANGLEY-33	B65-10100	02	Specimen holder design improves accuracy of X-ray powder analysis JPL-SC-165	B66-10075	02
CUBIC CRYSTAL Spherical model provides visual aid for cubic crystal study LEWIS-108	B65-10065	03	Alignment tool facilitates pin placement on irregular horizontal surfaces LANGLEY-219	B66-10410	05
CURIE TEMPERATURE Process yield Co-Fe alloys with superior high temperature magnetic properties LEWIS-333	B66-10535	03	CUTTING Cutter and stripper reduces coaxial cable connection time ARC-40	B65-10094	05
CURING Improved adhesive for cryogenic applications cures at room temperature WOO-132	B66-10185	03	Threaded pilot insures cutting tool alignment M-FS-527	B66-10074	05
Improved method facilitates debulking and curing of phenolic impregnated asbestos MSC-949	B66-10459	05	Pipe cutting tool is useful in limited space MSC-36	B66-10102	05
CURRENT AMPLIFIER New low-level a-c amplifier provides adjustable noise cancellation and automatic temperature compensation ARC-2	B63-10003	04	Rotating mandrel speeds assembly of plastic inflatables LANGLEY-155	B66-10137	05
Transfluxor circuit amplifies sensing current for computer memories JPL-406	B63-10255	01	Portable power tool machines weld joints in field M-FS-258	B66-10145	05
Tester periodically registers dc amplifier characteristics MSC-190	B66-10148	01	Modified drill permits one-step drilling operation M-FS-559	B66-10169	05
Transistor circuit increases range of logarithmic current amplifier NU-0018	B66-10350	01	Tool post modification allows easy turret lathe cutting-tool alignment M-FS-581	B66-10191	05
Bipolar current driver for memory circuits GSFC-213	B66-10469	01	Adjustable cutting guide aligns and positions stacks of material MSC-321	B66-10210	05
Logarithmic current simulator generates electrical currents accurately between 10 to the minus 11 ampere to 10 to the minus 3 ampere			Adjustable knife cuts honeycomb material to specified depth MSC-475	B66-10237	05
			Hollow needle used to cut metal honeycomb structures MSC-486	B66-10244	05



Modified soldering iron speeds cutting of synthetic materials M-FS-725	B66-10246	05	Computer program determines performance efficiency of remote measuring systems M-FS-1137	B66-10503	01
Vibrator improves spark erosion cutting process NU-0071	B66-10333	05	<b>DATA READOUT SYSTEM</b> Nonlinear feedback reduces analog-to-digital converter error ARC-46	B65-10277	01
Versatile machine mills, saws light materials M-FS-827	B66-10364	05	<b>DATA RECORDER</b> PCM magnetic tape system efficiently records and reproduces data GSFC-375	B65-10311	01
<b>CYLINDER</b> Supercold technique duplicates magnetic field in second superconductor JPL-376	B63-10237	05	<b>DATA REDUCTION</b> Polychart contour plotter enables data extrapolation from multiple plotting charts M-FS-37	B64-10406	05
Shaped superconductor cylinder retains intense magnetic field JPL-381	B63-10238	01	<b>DATA RETRIEVAL</b> Gapped toroid provides infinite resolution of delay-line pickup GSFC-370	B65-10258	01
Simple mechanism combines positive locking and quick-release features WOO-4	B63-10420	05	<b>DATA TRANSMISSION</b> Instrument performs nondestructive chemical analysis, data can be telemetered JPL-SC-078	B65-10317	01
Kinetic-energy absorber employs frictional force between mating cylinders LEWIS-75	B63-10442	05	Detection system ensures positive alarm activation in digital message loss WOO-208	B66-10287	01
Seal allows blind assembly and thermal expansion of components NU-0005	B65-10053	05	<b>DECELERATION</b> Kinetic-energy absorber employs frictional force between mating cylinders LEWIS-75	B63-10442	05
Vacuum chamber provides improved insulation and support for cryostat M-FS-415	B65-10368	02	Novel shock absorber features varying yield strengths MSC-63A	B64-10138	03
Flexible coiled spline securely joins mating cylinders WOO-270	B66-10172	05	Calculations enable optimum design of magnetic brake LEWIS-251	B66-10073	05
Cylindrical claw clamp has quick release feature M-FS-513	B66-10213	05	Modified hydraulic braking system limits angular deceleration to safe values GSFC-476	B66-10310	05
Rotary valve controls multiple hydraulic leveling cylinders M-FS-361	B66-10402	05	Hoist is automatically stopped at low deceleration rate M-FS-1639	B66-10545	05
Positive displacement cylinder measures corrosive liquid volume MSC-1038	B66-10589	05	<b>DECISION ELEMENT</b> Circuit maintains digital decision threshold at preset level M-FS-331	B65-10281	01
Mechanism facilitates coating of inner surfaces of metal cylinders GSFC-515	B66-10698	05	Binary sequence detector uses minimum number of decision elements JPL-673	B66-10264	01
<b>D</b>					
<b>DAMAGE</b> Low-cost tool minimizes damage to O-rings during installation MSC-140	B65-10116	05	<b>DEFLECTION</b> Angular acceleration measured by deflection in sensing ring MSC-250	B66-10105	01
Improved poppet valve provides positive damageproof seal M-FS-293	B65-10346	05	Bellows joint absorbs torsional deflections in duct system M-FS-882	B66-10332	05
<b>DAMPER</b> Friction device damps linear motion of rotating shaft WOO-214	B66-10030	05	Spiral spring/strain gage combination accurately measures shock induced deflection MSC-789	B66-10488	01
<b>DAMPING</b> Frictional wedge shock mount is inexpensive, has good damping characteristics JPL-IT-1001	B63-10289	05	<b>DEFORMATION</b> Polymer deformation gauge measures thickness change in tensile tests JPL-745	B66-10147	01
Shock absorber operates over wide range MSC-168	B65-10241	05	<b>DEGASSING</b> Baking enables McLeod gauge to measure in ultrahigh vacuum range GSFC-440	B65-10329	01
<b>DAMPING TESTING MACHINE</b> Diaphragm spring gives clutch over-center toggle effect GSFC-499	B66-10297	05	<b>DEGENERATION</b> Feedback loop compensates for rectifier		
<b>DATA PROCESSING</b> Transfluxor circuit amplifies sensing current for computer memories JPL-406	B63-10255	01			

## SUBJECT INDEX

## DIAPHRAGM

nonlinearity M-FS-384	B66-10382	01	
<b>DEGRADATION</b> Dot patterns provide reproducible flaw areas for study of adhesive bonds M-FS-862	B66-10367	05	
<b>DELAY LINE</b> Gapped toroid provides infinite resolution of delay-line pickup GSFC-370	B65-10258	01	
<b>DEMODULATOR</b> Point-source light sensor circuit is insensitive to background light JPL-778	B66-10502	01	
<b>DENSITOMETER</b> Modified contour projector makes excellent contour densitometer LANGLEY-93	B65-10084	02	
Densitometer system for liquid hydrogen has high accuracy, fast response M-FS-909	B66-10438	01	
<b>DENSITY MEASUREMENT</b> Density trace made with computer printout GSFC-322	B65-10200	01	
Coaxial capacitor used to determine fluid density LEWIS-232	B65-10296	02	
Vibrating diaphragm measures high electrostatic field strengths MSC-189	B65-10352	01	
Three-dimensional wire-mesh capacitor system measures fluid density WOO-194	B65-10379	01	
<b>DEPOSITION</b> Integral coolant channels simply made by melt- out method M-FS-91	B63-10497	05	
<b>DEPTH MEASUREMENT</b> Modified algesimeter provides accurate depth measurements MSC-616	B66-10647	04	
<b>DESTRUCTIVE TESTING</b> Force controlled solenoid drives microweld tester WOO-125	B65-10182	01	
Study made of destructive sectioning of complex structures for examination LEWIS-341	B66-10676	05	
<b>DETECTION</b> Continuity tester screens out faulty socket connections JPL-596	B64-10065	01	
Use of photographs speeds inspection of printed-circuit boards MSC-72	B64-10118	01	
Transistor voltage comparator performs own sensing GSFC-228	B65-10028	01	
Weld leaks rapidly and safely detected M-FS-362	B65-10265	01	
Microorganisms detected by enzyme-catalyzed reaction JPL-782	B66-10117	04	
Infrared television used to detect hydrogen fires M-FS-654	B66-10363	01	
Hydrogen fire detection system features sharp discrimination M-FS-643	B66-10368	01	
<b>DETECTOR</b> Device detects unbonded areas in plastic laminates WOO-206	B65-10380	01	
Hot-wire detector for chemically active materials used in gas chromatography MSC-269	B66-10139	03	
Mounting facilitates removal and installation of flame-detector rods M-FS-555	B66-10150	05	
Fatigue cracks detected and measured without test interruption LEWIS-266	B66-10178	02	
Detection system ensures positive alarm activation in digital message loss WOO-208	B66-10287	01	
Sniffer used as portable hydrogen leak detector M-FS-846	B66-10356	01	
Solid state detectors monitor relay contacts JPL-785	B66-10396	01	
Leak locator for vacuum jacketed pipelines eliminates need for removal of outer jacket M-FS-888	B66-10412	01	
Detector measures power in 50 to 30,000 GHz radiation band ERC-26	B66-10581	01	
Gas leak detector is simple and inexpensive M-FS-1206	B66-10669	01	
<b>DEVAR SYSTEM</b> Cryostat modified to aid rotating beam fatigue test M-FS-435	B66-10083	03	
<b>DIAL</b> Device facilitates centering of workpieces in lathe chuck M-FS-685	B66-10277	05	
<b>DIAPHRAGM</b> Improved fluid control valve extends diaphragm life JPL-345	B65-10147	05	
Diaphragm eliminates leakage in cryogenic fluid duct coupling WOO-142	B65-10227	05	
Burst diaphragm protects vacuum vessel from internal pressure transients JPL-687	B65-10236	05	
Titanium diaphragm makes excellent amplatron cathode support GSFC-394	B65-10298	01	
Vibrating diaphragm measures high electrostatic field strengths MSC-189	B65-10352	01	
Die and telescoping punch form convolutions in thin diaphragm JPL-SC-135	B65-10393	05	
Electrically heated diaphragm eliminates use of pyrotechnics MSC-241	B65-10400	01	
Acceleration-compensated pressure transducer has fast response LANGLEY-113	B66-10353	01	
Diaphragm valve for corrosive and high temperature fluid flow control has unique features LEWIS-304	B66-10365	05	

## DIBORIDE

Protective coating withstands high temperature  
in oxidizing atmosphere  
M-FS-529 B66-10044 03

## DIE

Guide for extrusion dies eliminates  
straightening operation  
LEWIS-152 B64-10014 05

Metal parts hydrosized by explosive force  
M-FS-289 B65-10170 05

Handtool bends component leads accurately  
M-FS-308 B65-10181 05

Fiberglass dies speed forming of large metal  
sheets  
M-FS-214 B65-10210 05

Die and telescoping punch form convolutions in  
thin diaphragm  
JPL-SC-135 B65-10393 05

Forming tool improves quality of tubing flares  
WOO-231 B66-10001 05

Heated die facilitates tungsten forming  
LEWIS-25A B66-10047 05

Strippable grid facilitates removal of  
grid-surfaced conical workpiece from die  
M-FS-716 B66-10334 05

Hydraulic fluid serves as mandrel for small  
diameter refractory tube drawing  
ARG-44 B66-10523 05

## DIELECTRIC MATERIAL

Microparticle impact sensor measures energy  
directly  
GSFC-252 B65-10048 01

Dielectrometer design permits measurement in  
vacuum under irradiation  
M-FS-359 B66-10401 01

## DIELECTRICS

Spherical electrode eliminates high-voltage  
breakdown  
LEWIS-155 B65-10139 01

## DIFFERENTIAL AMPLIFIER

Solid state circuit switches ac load  
JPL-798 B66-10465 01

## DIFFERENTIAL EQUATION

Computer simulation program is adaptable to  
industrial processes  
LEWIS-240 B66-10426 01

Study compares methods for the numerical  
solution of ordinary differential equations  
M-FS-830 B66-10466 01

Study made of application of stereoscopic  
display system to analog computer simulation  
M-FS-1263 B66-10590 01

## DIFFUSER

Gas diffuser facilitates withdrawal of  
cryogenic liquids from tanks  
M-FS-915 B66-10342 05

## DIFFUSION

Fabrication method produces high-grade  
alumina crucibles  
M-FS-216 B65-10078 05

Vapor grown silicon dioxide improves  
transistor base-collector junctions  
GSFC-389 B66-10091 01

## DIFFUSION BONDING

Thoriated nickel bonded by solid-state  
diffusion method  
LANGLEY-116 B65-10220 03

Thermoelectric elements diffusion-bonded to

tungsten electrodes  
GSFC-346 B65-10309 01

Brazing method produces solid-solution bond  
between refractory metals  
LEWIS-212 B65-10370 05

Brazing process using Al-Si filler alloy  
reliably bonds aluminum parts  
MSC-448 B66-10241 05

Differential expansion provides pressure for  
diffusion bonding of large diameter rings  
M-FS-588 B66-10269 05

## DIFFUSION EFFECT

Diffusion technique stabilizes resistor  
values  
MSC-205 B66-10142 01

## DIFFUSION ELECTRODE

Segmented electrode increases operating  
pressure of MHD accelerator  
LANGLEY-95 B65-10356 02

Vapor diffusion electrode improves fuel cell  
operation  
LEWIS-187 B66-10281 03

## DIGITAL COMMAND SYSTEM

Digital system accurately controls velocity  
of electromechanical drive  
GSFC-287 B65-10096 01

Digitally controlled pulse-level discriminator  
operates over wide voltage range  
GSFC-324 B66-10129 01

## DIGITAL COMMUNICATIONS SYSTEM

Pn acquisition demodulator achieves automatic  
synchronization of a telemetry channel  
JPL-612 B66-10271 01

## DIGITAL COMPUTER

Small digital recording head has parallel bit  
channels, minimizes cross talk  
JPL-0029 B63-10284 01

Logic redundancy improves digital system  
reliability  
JPL-SC-069 B65-10025 01

Instrument calibrates low gas-rate flowmeters  
MSC-134 B65-10137 01

Hybrid computer technique yields random  
signal probability distributions  
ARC-34 B65-10208 01

Computer program determines chemical  
composition of physical system at  
equilibrium  
MSC-1119 B66-10670 01

## DIGITAL DATA

Interferometer combines laser light source  
and digital counting system  
MSC-151 B65-10161 01

Sensitive electrometer features digital  
output  
GSFC-288 B65-10206 01

## DIGITAL TECHNIQUE

Binary system generates sidereal rate from  
standard solar rate  
GSFC-190 B64-10200 01

Digital cardiometer computes and displays  
heartbeat rate  
MSC-93 B64-10258 01

Electron-beam deflection controlled by digital  
signals  
GSFC-385 B65-10283 02

Shaft encoder presents digital output  
JPL-SC-191 B66-10436 01

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# DIRECTIONAL CONTROL

Digital system provides superregulation of nanosecond amplifier-discriminator circuit ARG-61	B66-10500	01	Computer program searches characteristic data of diodes and transistors GSFC-493	B66-10529	01
Digital frequency counter permits readout without disturbing counting process JPL-906	B66-10658	01	DIOL Substituted silane-diols polymers have improved thermal stability M-FS-469	B66-10259	03
DIGITAL-TO-ANALOG CONVERTER Digital logic elements provide additional functions from analog input MSC-64	B64-10064	01	DIOXIDE IR-transmission glasses formed from oxides of bismuth and tellurium M-FS-279	B65-10190	03
Transistorized circuit clamps voltage with 0.1 percent error GSFC-196	B65-10118	01	DIRECT CURRENT /DC/ Liquid switch is remotely operated by low dc voltage GSFC-119	B63-10599	01
Pressure transducer system is force-balanced, has digital output M-FS-154	B65-10174	05	High-pass rf coaxial filter rejects dc and low frequency signals GSFC-73	B64-10173	01
Variable word length encoder reduces TV bandwidth requirements LANGLEY-87	B65-10345	01	Variable load automatically tests dc power supplies GSFC-291	B65-10105	01
Video signal processing system uses gated current mode switches to perform high speed multiplication and digital-to-analog conversion MSC-781	B66-10429	01	Rotor position sensor switches currents in brushless dc motors GSFC-315	B65-10151	01
DIGITAL TRANSDUCER Frequency correction device uses digital circuitry GSFC-268	B65-10307	01	Dc to ac converter operates efficiency at low input voltages GSFC-130	B65-10178	01
DIMENSIONAL STABILITY Collapsible truss structure is automatically expandable GSFC-265	B65-10126	05	Inductor flyback characteristic gives voltage regulator fast response GSFC-361	B65-10257	01
DIODE Simple circuit provides adjustable voltage with linear temperature variation JPL-W00-029	B63-10537	01	Electropneumatic rheostat regulates high current ARC-44	B65-10299	01
Mounting for diodes provides efficient heat sink M-FS-197	B64-10283	01	Zener diode controls switching of large direct currents MSC-188	B65-10350	01
Modification increases light output of injection-luminescent diodes M-FS-192	B65-10006	01	Dual-voltage power supply has increased efficiency LEWIS-107A	B66-10002	01
Thermocompression bonding produces efficient surface-barrier diode JPL-SC-066	B65-10007	05	Tester periodically registers dc amplifier characteristics MSC-190	B66-10148	01
Optical arrangement increases useful light output of semiconductor diodes JPL-SC-064	B65-10020	05	Circuit protects regulated power supply against overload current GSFC-453	B66-10292	01
Logarithmic amplifier uses field effect transistors JPL-509	B65-10145	01	Brushless dc motor has high efficiency, long life GSFC-181	B66-10355	01
Solid-state laser transmitter is amplitude modulated MSC-121	B65-10238	01	Efficient dc to dc converter eliminates large stray magnetic fields GSFC-463	B66-10376	01
Added diodes increase output of balanced mixer circuit GSFC-354	B65-10276	01	Solid state circuit switches ac load JPL-798	B66-10465	01
Simple circuit provides reliable multiple signal average and reject capability NU-0069	B66-10282	01	Solid state circuit controls direction, speed, and braking of dc motor JPL-757	B66-10486	01
Function generator eliminates necessity of series summation GSFC-214	B66-10351	01	Opposed arcs permit deep weld penetration with only one pass M-FS-1696	B66-10513	05
Semiconductors can be tested without removing them from circuitry M-FS-1163	B66-10447	01	Electronic circuit provides accurate sensing and control of dc voltage NU-0089	B66-10591	01
Pulse stretcher has improved dynamic range and linearity ARG-82	B66-10509	01	DIRECTIONAL CONTROL System measures unidirectional forces, excludes extraneous forces LEWIS-170	B65-10154	05

Magnetic-shift-register circuit controls step motor operations GSFC-340	B65-10226	01	Legibility of electroluminescent instrument panels investigated MSC-494	B66-10316	02
Solid state circuit controls direction, speed, and braking of dc motor JPL-757	B66-10486	01	Video signal processing system uses gated current mode switches to perform high speed multiplication and digital-to-analog conversion MSC-781	B66-10429	01
<b>DISCHARGE</b> Auxiliary silver electrode eliminates two-step voltage discharge characteristic of silver-zinc cells GSFC-169	B64-10114	01	Nixie tube display unit employs time-shared logic ARG-117	B66-10512	01
<b>DISCHARGE TUBE</b> Neon isotopes cancel errors in gas laser M-FS-1476	B66-10583	02	Study made of application of stereoscopic display system to analog computer simulation M-FS-1263	B66-10590	01
<b>DISCONNECT DEVICE</b> Device disconnects several couplings simultaneously JPL-226	B65-10163	05	<b>DISTILLATION APPARATUS</b> Emergency solar still desalts seawater MSC-135	B65-10214	03
Improved tool easily removes brazed tube connectors MSC-263	B66-10003	05	Liquid trap seals thermocouple leads M-FS-688	B66-10212	05
<b>DISCRIMINATOR</b> Simple circuit functions as frequency discriminator for PFM signals GSFC-267	B65-10102	01	<b>DISTRIBUTION FUNCTION</b> Polychart contour plotter enables data extrapolation from multiple plotting charts M-FS-37	B64-10406	05
<b>DISK</b> Modified interelement spacing improves Yagi antenna array LANGLEY-130	B65-10183	01	<b>DOOR</b> Concealed hinge permits flush mounting of doors and hatches MSC-623	B66-10336	05
<b>DISPERSION</b> Anodization process produces opaque, reflective coatings on aluminum M-FS-348	B65-10336	03	Combination double door high-vacuum valve provides access to vacuum chamber JPL-849	B66-10697	05
<b>DISPERSION HARDENING</b> Tantalum alloys resist creep deformation at elevated temperatures LEWIS-350	B66-10558	03	Simple motor drive system operates heavy hinged door NU-0093	B66-10712	05
<b>DISPLACEMENT</b> Seismic transducer measures small horizontal displacements M-FS-81	B65-10029	05	Swing-out rail system separates overhead crane rails NU-0094	B66-10713	05
Transducer senses displacements of panels subjected to vibration ARC-37	B65-10085	01	<b>DOPING</b> Aluminum doping improves silicon solar cells LEWIS-206	B66-10181	02
Interferometer combines laser light source and digital counting system MSC-151	B65-10161	01	<b>DOPPLER EFFECT</b> Laser Doppler flowmeter measures gas velocity M-FS-1747	B66-10693	02
Hydraulic device provides accurate displacements to microinches MSC-112	B65-10230	05	<b>DRAFTING MACHINE</b> Automated drafting system uses computer techniques M-FS-788	B66-10362	01
Switching mechanism senses angular acceleration GSFC-462	B66-10158	01	<b>DRAG BALANCE</b> Device measures fluid drag on test vehicles LANGLEY-34	B65-10195	01
Positive displacement cylinder measures corrosive liquid volume MSC-1038	B66-10589	05	<b>DRAG MEASUREMENT</b> Device measures fluid drag on test vehicles LANGLEY-34	B65-10195	01
<b>DISPLAY SYSTEM</b> Portable display paneling has wide use, easy take down and assembly ARC-17	B63-10435	05	<b>DRIFT</b> Tester periodically registers dc amplifier characteristics MSC-190	B66-10148	01
New low-level Ac amplifier provides adjustable noise cancellation and automatic temperature compensation MSC-108	B65-10003	05	<b>DRILL</b> Rock bit requires no flushing medium to maintain drilling speed JPL-W00-031	B65-10109	05
Single projector accommodates slides of different size and format GSFC-439	B66-10016	02	Drill bit design assures clean holes in laminated materials W00-098	B65-10386	05
Chart case opens to form briefing easel MSC-349	B66-10135	05	Hand drill adapter limits holes to desired depth MSC-346	B66-10123	05
			Depth indicator and stop aid machining to precise tolerances		

M-FS-553	B66-10149	05	Sea dye marker provides visibility for 20 hours MSC-714	B66-10313	03
Nylon bit removes cork insulation without damage to substrate MSC-381	B66-10152	05	<b>DYNAMIC LOAD</b> Pressure responsive seal handles static and dynamic loads GSFC-441	B65-10327	05
Modified drill permits one-step drilling operation M-FS-559	B66-10169	05	Controlled release device prevents damage from dynamic stresses KSC-66-14	B66-10628	05
Gear drive automatically indexes rotary table M-FS-753	B66-10383	05	<b>DYNAMOMETER</b> Air brake-dynamometer accurately measures torque LEWIS-163	B65-10312	05
<b>DRIVE</b> Quick-acting clutch disengages idle drive motor GSFC-143	B64-10028	05	<b>E</b>		
Bearing transmits rotary and axial motion LANGLEY-27	B64-10130	05			
Threading hook facilitates safe recovery of heavy loads MSC-46	B64-10185	05	<b>EDDY CURRENT</b> Diaphragm spring gives clutch over-center toggle effect GSFC-499	B66-10297	05
Apparatus alters position of objects to facilitate demagnetization GSFC-234	B64-10277	05	<b>EDGE</b> Upsetting butt edge increases weld-joint strength M-FS-175	B64-10164	05
Stepping motor drive circuit designed for low power drain GSFC-198	B65-10026	01	<b>ELASTIC DEFORMATION</b> Testing device subjects elastic materials to biaxial deformations JPL-616	B65-10189	03
Hydraulic drive system prevents backlash JPL-371	B65-10351	05	<b>ELASTIC PROPERTY</b> Valve designed with elastic seat JPL-442	B65-10040	05
Modified power tool rapidly drives series torque bolts MSC-221	B66-10054	05	Lateral ring metal elastic wheel absorbs shock loading M-FS-1312	B66-10663	05
Motion drive system is accurately controlled in the 1-micron range JPL-864	B66-10695	05	<b>ELASTIC SHEET</b> Impact- and puncture-resistant material protects parts from damage MSC-747	B66-10375	05
<b>DROP</b> Apparatus measures concentration of suspended droplets in gas streams LANGLEY-31	B64-10237	01	<b>ELASTICITY</b> Tungsten fiber-reinforced copper composites form high strength electrical conductors LEWIS-338	B66-10572	03
<b>DROP TEST</b> Spiral spring/strain gage combination accurately measures shock induced deflection MSC-789	B66-10488	01	<b>ELASTOMER</b> Elastic orifice automatically regulates gas bearings JPL-135	B63-10123	05
<b>DUCT</b> External linkage tie permits reduction in ducting system flange thickness M-FS-823	B66-10326	05	Molded elastomer provides compact ferrite-core holder, simplifies assembly JPL-584	B64-10084	05
<b>DUCTED FLOW</b> Lightweight hinged bellows restraint has high load capacity WOO-151	B65-10341	03	Elastomers bonded to metal surfaces seal electrochemical cells GSFC-168	B64-10113	03
<b>DUCTILITY</b> Lower-cost tungsten-rhenium alloys LEWIS-332	B66-10528	03	Compact assembly generates plastic foam, inflates flotation bag LANGLEY-96	B65-10090	05
Silver-base ternary alloy proves superior for slip ring lead wires M-FS-1540	B66-10540	03	Silazane polymers show promise for high-temperature application M-FS-466	B66-10194	03
<b>DUOPLASMATRON</b> A continuously operating source of vacuum ultraviolet below 500 angstrom GSFC-545	B66-10576	01	Extensometer automatically measures elongation in elastomers M-FS-517	B66-10284	05
<b>DYE</b> Porous glass makes effective substrate for ozone-sensing reagent GSFC-388	B65-10364	03	Silazane elastomer remains resilient at 400 deg C M-FS-1144	B66-10667	05
Test strips detect different CO2 concentrations in closed compartments MSC-210	B65-10390	03	<b>ELBOW</b> Stainless-steel elbows formed by spin forging M-FS-122	B63-10590	05
Surfactant for dye-penetrant inspection is insensitive to liquid oxygen M-FS-475	B66-10131	03	Spring loaded beaded cable makes efficient wire puller		

WOO-108	B65-10031	05	rotating mechanisms LEWIS-158	B65-10021	05
<b>ELECTRIC ARC</b>					
Electric arc heater is self starting LANGLEY-208	B66-10230	03	Laser beam transmits electric power GSFC-293	B65-10158	01
Magnetically operated limit switch has improved reliability, minimizes arcing MSC-422	B66-10270	01	Sensitive electrometer features digital output GSFC-288	B65-10206	01
Cryogenic cooling reduces high voltage arcing between electrodes operating in a vacuum ARG-109	B66-10499	02	Electrical probe ensures reliable contact in socket M-FS-315	B65-10215	01
<b>ELECTRIC CONDUCTIVITY</b>			Niobium thin films are superconductive in strong magnetic fields at low temperatures JPL-SC-174	B66-10122	02
Portable self-powered device detects internal flaws in tubular structures NU-0019	B66-10028	01	Magnetically operated limit switch has improved reliability, minimizes arcing MSC-422	B66-10270	01
Silver-base ternary alloy proves superior for slip ring lead wires M-FS-1540	B66-10540	03	Trisphere spark gap actuates overvoltage relay ARC-68	B66-10557	01
Thermocouples electrically checked while connected to data system LANGLEY-182	B66-10623	01	Logarithmic current simulator generates electrical currents accurately between 10 to the minus 11 ampere to 10 to the minus 3 ampere NU-0087	B66-10706	01
<b>ELECTRIC CONDUCTOR</b>			<b>ELECTRIC ENERGY</b>		
Special tool seals conductors with combination of plastic sleeves M-FS-579	B66-10209	05	Camera shutter is actuated by electric signal ARC-20	B63-10560	05
Electrically conductive fibers thermally isolate temperature sensor GSFC-456	B66-10349	01	New energy storage concept uses tapes LEWIS-239	B66-10098	02
Electrical cabling withstands severe environmental conditions M-FS-1585	B66-10427	01	<b>ELECTRIC ENERGY STORAGE</b>		
Tungsten fiber-reinforced copper composites form high strength electrical conductors LEWIS-338	B66-10572	03	Regenerative fuel cell combines high efficiency with low cost WOO-090	B65-10363	01
<b>ELECTRIC CONNECTOR</b>			<b>ELECTRIC EQUIPMENT</b>		
Inexpensive electrical connector is moisture and corrosionproof MSC-164	B65-10196	01	Hot-air soldering technique prevents overheat- ing of electrical components GSFC-91	B63-10536	01
Plug-in connector socket accepts coaxial cable end ARG-9	B66-10478	01	Inexpensive electrical connector is moisture and corrosionproof MSC-164	B65-10196	01
<b>ELECTRIC CONTACT</b>			Electrical cable connector-clamp has smooth exterior surface MSC-154	B65-10201	05
Continuity tester screens out faulty socket connections JPL-596	B64-10065	01	Electrical probe ensures reliable contact in socket M-FS-315	B65-10215	01
Lightweight coaxial cable connector reduces signal loss JPL-720	B65-10244	01	Keyed plugs and sockets prevent improper connections MSC-231	B65-10381	01
Device serves as hinge and electrical connector for circuit boards M-FS-743	B66-10359	01	Complementary system vaporizes subcooled liquid, improves transformer efficiency M-FS-550	B66-10045	02
Solid state detectors monitor relay contacts JPL-785	B66-10396	01	High-pressure, low temperature electrical connector makes no-leak seal MSC-276	B66-10079	02
System for etching thick aluminum layers minimizes bridging and undercutting M-FS-1366	B66-10400	03	Mounting improves heat-sink contact with beryllia washer MSC-194	B66-10144	01
<b>ELECTRIC CONTROL</b>			Polarizing keys prevent mismatch of connector plugs and receptacles MSC-443	B66-10251	01
Binary counter accumulates time by complementary preset MSC-242	B65-10399	01	<b>ELECTRIC INSULATION</b>		
Electrically controlled optical latch and switch requires less current JPL-SC-111	B66-10414	01	Connector for thermocouple leads saves costly wire, makes reliable connectors LANGLEY-26	B63-10529	01
<b>ELECTRIC CURRENT</b>			Continuity tester screens out faulty socket connections JPL-596	B64-10065	01
Igniting system for mercury vapor lamps pro- tects transistorized sustaining supply JPL-421	B63-10262	01			
Pickup device reads pressures from ports in					

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## ELECTRODE

Ceramic materials purified by experimental method LEWIS-225	B65-10270	03	Spray-on electrodes enable EKG monitoring of physically active subjects FRC-36	B66-10649	04
Mounting improves heat-sink contact with beryllia washer MSC-194	B66-10144	01	<b>ELECTROCARDIOGRAPHY</b> Inexpensive, stable circuit measures heart rate MSC-95	B65-10010	01
<b>ELECTRIC LEAD</b> Handtool bends component leads accurately M-FS-308	B65-10181	05	Integral skin electrode for electrocardiography is expendable MSC-299	B66-10118	04
<b>ELECTRIC MOTOR</b> Brushless dc motor uses electron beam switching tube as commutator GSFC-345	B65-10237	01	<b>ELECTROCHEMICAL CELL</b> Elastomers bonded to metal surfaces seal electrochemical cells GSFC-168	B64-10113	03
Electropneumatic transducer automatically limits motor current LEWIS-253	B66-10160	01	Apparatus measures swelling of membranes in electrochemical cells GSFC-280	B65-10087	01
Solid state circuit controls direction, speed, and braking of dc motor JPL-757	B66-10486	01	Rubber and alumina gaskets retain vacuum seal in high temperature emf cell ARG-17	B66-10472	05
<b>ELECTRIC POTENTIAL</b> Density trace made with computer printout GSFC-322	B65-10200	01	Primary cells utilize halogen-organic charge transfer complex JPL-926	B66-10682	02
Phase inverter provides variable reference push-pull output HQ-23	B66-10344	01	<b>ELECTROCHEMISTRY</b> Electrochemical milling removes burrs and solder from tubing ends M-FS-714	B66-10358	03
<b>ELECTRIC PULSE</b> Pulse generator using transistors and silicon controlled rectifiers produces high current pulses with fast rise and fall times MSC-405	B66-10456	01	<b>ELECTRODE</b> Improved electrode gives high-quality biological recordings MSC-17	B64-10025	04
Electronic circuit delivers pulse of high interval stability MSC-673	B66-10501	01	Auxiliary silver electrode eliminates two-step voltage discharge characteristic of silver-zinc cells GSFC-169	B64-10114	01
<b>ELECTRIC TERMINAL</b> Electronic bidirectional valve circuit prevents crossover distortion and threshold effect MSC-193	B66-10420	01	Modification increases light output of injection-luminescent diodes M-FS-192	B65-10006	01
<b>ELECTRIC WIRING</b> Circuit reliability boosted by soldering pins of disconnect plugs to sockets JPL-447	B64-10002	01	Improved conductive paste secures biomedical electrodes MSC-107	B65-10015	03
Copper wire plated with nickel and silver resists corrosion M-FS-761	B66-10421	03	Didymium compound improves nickel-cadmium cell GSFC-295	B65-10083	03
Electrical continuity scanner facilitates identification of wires for soldering to connectors MSC-626	B66-10605	01	Spherical electrode eliminates high-voltage breakdown LEWIS-155	B65-10139	01
<b>ELECTRO-OPTICS</b> Liquid-level meter has no moving parts M-FS-3	B63-10378	03	Electrostatically driven dynamic capacitor employs capacitive feedback JPL-771	B65-10293	01
Communication system uses modulated laser beam GSFC-377	B65-10333	01	Rugged pressed disk electrode has low contact potential MSC-158	B65-10320	01
<b>ELECTROCARDIOGRAM</b> Digital cardiometer computes and displays heartbeat rate MSC-93	B64-10258	01	Photosensors used to maintain welding electrode-to-joint alignment MSC-243	B65-10401	05
Simulator produces physiological waveforms MSC-94	B65-10091	01	Reaction heat used in static water removal from fuel cells M-FS-532	B66-10013	01
Auxiliary circuit enables automatic monitoring of EKG MSC-106	B65-10142	01	Improved electrode paste provides reliable measurement of galvanic skin response MSC-146	B66-10049	04
Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01	Gelatin coated electrodes allow prolonged bioelectronic measurements MSC-153	B66-10088	01
Tiny biomedical amplifier combines high performance, low power drain ARC-41	B65-10203	01	Integral skin electrode for electrocardiography is expendable MSC-299	B66-10118	04



- Cryogenic cooling reduces high voltage arcing between electrodes operating in a vacuum  
ARG-109 B66-10499 02
- Computer programs calculate potential and charge distributions in a plasma  
M-FS-871 B66-10553 01
- Collector/collector guard ring balancing circuit eliminates edge effects  
JPL-SC-143 B66-10563 01
- Power arc welder touch-started with consumable electrode  
M-FS-1485 B66-10641 05
- Spray-on electrodes enable EKG monitoring of physically active subjects  
FRC-36 B66-10649 04
- Hermetically sealed cells protected from internal gas pressure  
GSFC-555 B66-10692 01
- ELECTRODEPOSITION**  
Fresnel zone plate forms images at wavelengths below 1000 angstroms  
GSFC-231 B65-10171 02
- ELECTRODERMAL RESPONSE**  
Improved conductive paste secures biomedical electrodes  
MSC-107 B65-10015 03
- ELECTROENCEPHALOGRAM /EEG/**  
Helmet system broadcasts electroencephalograms of wearer  
ARC-70 B66-10536 01
- ELECTROFORMING**  
Nickel solution prepared for precision electroforming  
WOO-070 B65-10303 03
- Pressure vessels fabricated with high-strength wire and electroformed nickel  
M-FS-580 B66-10218 05
- ELECTROLUMINESCENCE**  
Legibility of electroluminescent instrument panels investigated  
MSC-494 B66-10316 02
- ELECTROLUMINESCENT LAMP**  
Panels illuminated by edge-lighted lens technique  
MSC-871 B66-10507 02
- ELECTROLYTE**  
Gelatin coated electrodes allow prolonged bioelectronic measurements  
MSC-153 B66-10088 01
- New energy storage concept uses tapes  
LEWIS-239 B66-10098 02
- Electrochemical milling removes burrs and solder from tubing ends  
M-FS-714 B66-10358 03
- ELECTROLYTIC MACHINING**  
Improved technique for localizing electro-polishing features novel nozzles  
WOO-101 B64-10271 01
- Electrolytic etching process provides effective bonding surface on stainless steel  
GSFC-484 B66-10299 03
- ELECTROLYTIC POLISHING**  
Study shows effect of surface preparations on improving thermionic emission  
JPL-SC-140 B66-10493 01
- ELECTROMAGNET**  
Magnetic field controls carbon arc tail flame  
MSC-139 B65-10108 01
- ELECTROMAGNETIC CONTROL**  
Device calibrates vibration transducers at amplitudes up to 20g.  
M-FS-86 B63-10572 01
- ELECTROMAGNETIC INSTRUMENT**  
Electromagnetic hammer removes weld distortions from aluminum tanks  
M-FS-287 B65-10342 05
- ELECTROMAGNETIC MEASUREMENT**  
Meter accurately measures flow of low-conductivity fluids  
JPL-0021 B63-10280 01
- ELECTROMAGNETIC RADIATION**  
Detector measures power in 50 to 30,000 GHz radiation band  
ERC-26 B66-10581 01
- ELECTROMAGNETIC SHIELDING**  
Transducer measures temperature differentials in presence of strong electromagnetic fields  
ARC-27 B65-10089 01
- ELECTROMECHANICAL DEVICE**  
Stepping switch with simple actuator provides many contacts in small space  
JPL-122 B63-10118 01
- Electromechanically operated camera shutter provides uniform exposure  
JPL-357 B63-10227 01
- Knob linkage permits one-hand control of several operations  
MSC-30 B65-10022 05
- Digital system accurately controls velocity of electromechanical drive  
GSFC-287 B65-10096 01
- Device measures fluid drag on test vehicles  
LANGLEY-34 B65-10195 01
- Circuit operates as sine function generator  
MSC-255 B66-10038 01
- Electropneumatic transducer automatically limits motor current  
LEWIS-253 B66-10160 01
- ELECTROMECHANICS**  
Variable-capacitance tachometer eliminates troublesome magnetic fields  
GSFC-435 B66-10126 01
- ELECTROMETER**  
Field-effect transistor improves electrometer amplifier  
ARC-36 B64-10143 01
- Vibrating-membrane electrometer has high conversion gain  
ARC-38 B65-10056 01
- Simplified electrometer has excellent operating characteristics  
JPL-413 B65-10125 01
- Sensitive electrometer features digital output  
GSFC-288 B65-10206 01
- Electrometer has automatic zero bias control  
GSFC-350 B65-10242 01
- Electrometer preamplifier has drift correction feedback  
JPL-SC-074 B65-10267 01
- Electrostatically driven dynamic capacitor employs capacitive feedback  
JPL-771 B65-10293 01
- ELECTROMOTIVE FORCE**  
Metal sheath improves thermocouple using graphite in one leg  
NU-0011 B65-10051 01

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## ELECTRONIC EQUIPMENT TESTING

Rubber and alumina gaskets retain vacuum seal in high temperature emf cell ARG-17	B66-10472	05	GSFC-469	B66-10234	03
<b>ELECTROMYOGRAM</b> Tiny biomedical amplifier combines high performance, low power drain ARC-41	B65-10203	01	<b>ELECTRON TUBE</b> Wire winding increases lifetime of oxide-coated cathodes LEWIS-154	B65-10032	03
<b>ELECTRON BEAM</b> Tantalum cathode improves electron-beam evaporation of tantalum JPL-W00-021	B65-10175	03	Brushless dc motor uses electron beam switching tube as commutator GSFC-345	B65-10237	01
Electron-beam deflection controlled by digital signals GSFC-385	B65-10283	02	Titanium diaphragm makes excellent amplatron cathode support GSFC-394	B65-10298	01
Electron beam seals outer surfaces of porous bodies M-FS-562	B66-10033	03	Thermionic scanner pinpoints work function of emitter surfaces JPL-SC-177	B66-10444	01
An improved method for testing performance of vidicons during vibration JPL-SC-113	B66-10442	01	<b>ELECTRONIC EQUIPMENT</b> Electronic assembly rack panels snap on and off GSFC-59	B64-10121	05
<b>ELECTRON BEAM WELDING</b> Split glass tube assures quality in electron beam brazing M-FS-564	B66-10151	05	Wire mesh isolator protects sensitive electronic components GSFC-347	B65-10216	05
Electron beam welding of copper-MONEL facilitated by circular magnetic shields M-FS-569	B66-10215	05	Electronic ohmmeter provides direct digital output GSFC-363	B65-10274	01
Suppressor plate eliminates undesired arcing during electron beam welding M-FS-1126	B66-10357	05	Electron-beam deflection controlled by digital signals GSFC-385	B65-10283	02
<b>ELECTRON BOMBARDMENT</b> Multiple element soft X-ray source produces wide range of radiation GSFC-286	B65-10082	02	Boron nitride housing cools transistors W00-079	B65-10289	01
Electron bombardment improves vacuum chamber efficiency LEWIS-160	B65-10280	02	Thin-film resistors used in functional electronic blocks GSFC-380	B65-10305	01
<b>ELECTRON DENSITY</b> Microwave technique measures plasma characteristics LANGLEY-134	B65-10122	02	Standoff tool speeds placement of friction-fit electrical terminals W00-029	B65-10348	05
Concept for using laser beams to measure electron density in plasmas M-FS-965	B66-10645	01	Multiphase clock-pulse generator uses simplified circuitry M-FS-297	B65-10353	01
<b>ELECTRON EMISSION</b> Improved design provides faster response time in photomultiplier GSFC-451	B66-10526	01	Insulator-holder protects transistors in dense electronic assemblies MSC-214	B65-10389	01
Process reduces secondary resonant emission in electronic components JPL-934	B66-10685	01	Adhesive-backed terminal board eliminates mounting screws MSC-173	B65-10396	01
<b>ELECTRON ENERGY</b> Multiaxial analyzer detects low-energy electrons GSFC-329	B65-10213	01	Floating device aligns blind connections MSC-256	B66-10007	05
<b>ELECTRON FLUX</b> Multiaxial analyzer detects low-energy electrons GSFC-329	B65-10213	01	Compact retractor protects cabling loops M-FS-561	B66-10018	05
<b>ELECTRON GUN</b> Electron bombardment improves vacuum chamber efficiency LEWIS-160	B65-10280	02	Circuit operates as sine function generator MSC-255	B66-10038	01
<b>ELECTRON MULTIPLIER</b> Multiaxial analyzer detects low-energy electrons GSFC-329	B65-10213	01	Capacitive system detects and locates fluid leaks M-FS-478	B66-10099	01
<b>ELECTRON PROBE</b> Standards for electron probe microanalysis of silicates prepared by convenient method			Soldering tool heats workpieces and applies solder in one operation LEWIS-247	B66-10115	05
			Fixture aids soldering of electronic components on circuit board ARC-56	B66-10162	01
			Tool forms right angles in component leads M-FS-722	B66-10346	05
			<b>ELECTRONIC EQUIPMENT TESTING</b> Probe tests microweld strength W00-118	B65-10111	05
			Piezoresistive gage tests pin-connector sockets		

JPL-675	B65-10128	01	EMISSION		
Novel probe simplifies electronic component testing			Emission tester for high-power vacuum tubes		
GSFC-342	B65-10243	01	JPL-628	B64-10158	01
Basic suppression techniques are evaluated			Technique for measuring absorptance and emittance by using cyclic incident radiation		
M-FS-867	B66-10449	01	LEWIS-321	B66-10630	02
<b>ELECTRONIC MODULE</b>			<b>EMISSION SPECTRUM</b>		
Use of tear ring permits repair of sealed module circuitry			Trace levels of metallic corrosion in water determined by emission spectrography		
M-FS-210	B65-10014	05	MSC-1193	B66-10701	03
Electronic modules easily separated from heat sink			<b>EMITTER</b>		
MSC-142	B65-10186	02	Two-stage emitter follower is temperature stabilized		
Handtool facilitates extraction of circuit modules			MSC-20	B63-10493	01
LANGLEY-38	B65-10231	05	Vapor grown silicon dioxide improves transistor base-collector junctions		
Packaging of electronic modules			GSFC-389	B66-10091	01
JPL-801	B66-10664	01	Chemical regeneration of emitter surface increases thermionic diode life		
<b>ELECTRONIC STRUCTURE</b>			LEWIS-17	B66-10435	02
Screening technique makes reliable bond at room temperature			<b>ENCAPSULATION</b>		
M-FS-227	B65-10004	03	Connector for thermocouple leads saves costly wire, makes reliable connectors		
<b>ELECTROPLATING</b>			LANGLEY-26	B63-10529	01
High purity electroforming yields superior metal models			Plastic molds reduce cost of encapsulating electric cable connectors		
ARC-6	B63-10007	05	M-FS-69	B63-10568	05
Ellipsoidal optical reflectors reproduced by electroforming			Encapsulation process sterilizes and preserves surgical instruments		
GSFC-92	B63-10547	05	JPL-484	B64-10066	05
Metals plated on fluorocarbon polymers			<b>ENCODER</b>		
JPL-544	B63-10612	03	Variable word length encoder reduces TV bandwidth requirements		
Nickel/tin coating protects threaded fasteners in corrosive environment			LANGLEY-87	B65-10345	01
MSC-253	B65-10398	03	Pneumatic binary encoder replaces multiple solenoid system		
Hollow spherical rotors fabricated by electroplating			M-FS-665	B66-10374	01
JPL-SC-117	B66-10366	05	<b>ENERGY</b>		
Electroplating eliminates gas leakage in brazed areas			Fresnel cup reflector directs maximum energy from light source		
M-FS-923	B66-10415	05	JPL-424	B63-10263	03
Silver plating technique seals leaks in thin wall tubing joints			Regenerative fuel cell combines high efficiency with low cost		
NU-0090	B66-10703	05	WOO-090	B65-10363	01
<b>ELECTROSTATIC CHARGING</b>			<b>ENERGY ABSORPTION</b>		
Vibrating diaphragm measures high electrostatic field strengths			Frictional wedge shock mount is inexpensive, has good damping characteristics		
MSC-189	B65-10352	01	JPL-IT-1001	B63-10289	05
<b>ELECTROSTATIC INSTRUMENT</b>			Kinetic-energy absorber employs frictional force between mating cylinders		
Dust particle injector for hypervelocity accelerators provides high charge-to-mass ratio			LEWIS-75	B63-10442	05
GSFC-509	B66-10347	01	Torus elements used in effective shock absorber		
<b>ELECTROSTATIC SHIELDING</b>			WOO-114	B66-10318	05
Improved magnetometer uses toroidal gating coil			<b>ENERGY CONVERSION</b>		
GSFC-249	B65-10103	01	Laser beam transmits electric power		
Metal oxide silicon /MOS/ transistors protected from destructive damage by wire device			GSFC-293	B65-10158	01
ARC-65	B66-10419	01	<b>ENERGY DISSIPATION</b>		
<b>ELLIPSOID</b>			Break-up of metal tube makes one-time shock absorber, bars rebound		
Fresnel cup reflector directs maximum energy from light source			LANGLEY-1A	B63-10304	05
JPL-424	B63-10263	03	<b>ENERGY SOURCE</b>		
<b>EMBRITTLMENT</b>			Closed fluid system without moving parts controls temperature		
New alloy brazes titanium to stainless steel			LEWIS-222	B65-10331	02
MSC-102	B65-10060	05	<b>ENERGY STORAGE DEVICE</b>		
			New energy storage concept uses tapes		
			LEWIS-239	B66-10098	02
			Large capacitor performs as a distributed		

## SUBJECT INDEX

## ETCHING

parameter pulse line LEWIS-176	B66-10291	01	JPL-782	B66-10117	04
<b>ENGINE</b>			<b>EPOXIDE</b>		
Self-balancing beam permits safe, easy load handling under overhang M-FS-84	B63-10571	05	Integral coolant channels simply made by melt- out method M-FS-91	B63-10497	05
<b>ENGINE CONTROL</b>			<b>EPOXY RESIN</b>		
Fingertip current control facilitates use of arc welding gun MSC-289	B66-10092	05	Integral coolant channels simply made by melt- out method M-FS-91	B63-10497	05
<b>ENGINE COOLANT</b>			Stringent cleaning technique assures reliable epoxy bond GSFC-161	B64-10142	03
Radial coolant channels fabricated by simplified method NU-0070	B66-10267	05	Screening technique makes reliable bond at room temperature M-FS-227	B65-10004	03
<b>ENGINE PART</b>			Aluminum alloys protected against stress- corrosion cracking M-FS-235	B65-10172	03
Ring counter circuit switches multiphase motor direction of rotation JPL-SC-166	B66-10101	01	Epoxy-resin patterns speed shell-molding of aluminum parts M-FS-303	B65-10177	05
Internal machining accomplished at constant radii M-FS-1573	B66-10546	05	Epoxy blanket protects milled part during explosive forming M-FS-307	B66-10029	03
<b>ENGINE TESTING</b>			Compound improves thermal interface between thermocouple and sensed surface NU-0028	B66-10121	02
Rocket engine vibration accurately measured by photography M-FS-1916	B66-10652	02	Epoxy-coated containers easily opened by wire band M-FS-592	B66-10174	05
<b>ENGINEERING DEVELOPMENT</b>			Improved adhesive for cryogenic applications cures at room temperature WOO-132	B66-10185	03
Modified contour projector makes excellent contour densitometer LANGLEY-93	B65-10084	02	<b>EQUILIBRIUM FLOW</b>		
<b>ENVIRONMENT</b>			Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05
Gallium useful bearing lubricant in high- vacuum environment LEWIS-12	B63-10337	03	<b>EQUIPMENT SPECIFICATIONS</b>		
Improved molybdenum disulfide-silver motor brushes have extended life M-FS-64	B63-10479	03	Mylar film eliminates silk screening of equipment panels MSC-798	B66-10455	05
Miniature servo accelerometer is force- balanced JPL-155	B65-10340	01	<b>EROSION</b>		
<b>ENVIRONMENT SIMULATION</b>			Labyrinth-type valve seat increases valve life by decreasing fluid velocity M-FS-1051	B66-10424	05
Miniature piezoelectric triaxial accelerometer measures cranial accelerations ARC-71	B66-10534	01	<b>ERROR CORRECTING DEVICE</b>		
<b>ENVIRONMENTAL CHAMBER</b>			Simplified circuit corrects faults in parallel binary information channels JPL-SC-090	B66-10261	01
Double gloves reduce contamination of dry box atmosphere LEWIS-211	B65-10117	03	Blackbody cavity radiometer has rapid response JPL-521	B66-10679	01
Materials physically tested in variable- environment chamber JPL-789	B66-10130	01	<b>ERROR DETECTING CODE</b>		
Portable lightweight cell provides controlled environment MSC-648	B66-10370	05	Detection system ensures positive alarm activation in digital message loss WOO-208	B66-10287	01
<b>ENVIRONMENTAL CONTROL</b>			Digital system detects binary code patterns containing errors GSFC-541	B66-10516	01
Self-contained clothing system provides protection against hazardous environments M-FS-536	B66-10201	05	<b>ERROR SIGNAL</b>		
Critical parts are stored and shipped in environmentally controlled reusable container M-FS-703	B66-10258	05	Circuit detects errors in address currents for magnetic core arrays M-FS-234	B65-10047	01
<b>ENVIRONMENTAL TESTING</b>			<b>ESCAPE</b>		
System transmits mechanical vibration into hazardous environment NU-0025	B65-10248	05	Emergency escape system uses self-braking mechanism on fixed cable KSC-66-44	B66-10575	05
Multiple test chamber exposes materials to various environments MSC-179	B65-10268	01	<b>ETCHING</b>		
<b>ENZYME</b>			Metals plated on fluorocarbon polymers		
Microorganisms detected by enzyme-catalyzed reaction					

JPL-544	B63-10612	03	EXOTHERMIC REACTION		
Electroless nickel resist used in alkali-etching of aluminum			Nitrogen dioxide produced by self-sustained pyrolysis of nitrous oxide		
GSFC-284	B65-10162	03	LANGLEY-32	B65-10074	05
Fresnel zone plate forms images at wavelengths below 1000 angstroms			EXPANDABLE STRUCTURE		
GSFC-231	B65-10171	02	Collapsible truss structure is automatically expandable	B65-10126	05
Etching process mills PH 14-8 Mo alloy steel to precise tolerances	B66-10110	03	Expandable takeup reel facilitates paper tape removal		
MSC-270			WOO-271	B66-10399	05
Chemical milling solution produces smooth surface finish on aluminum	B66-10312	03	EXPIRATION		
MSC-549			Device induces lungs to maintain known constant pressure	B64-10108	04
Nonhazardous acid etches weld samples			MSC-50		
M-FS-975	B66-10378	05	EXPLOSION		
System for etching thick aluminum layers minimizes bridging and undercutting			Magnetic latches provide positive overpressure control		
M-FS-1366	B66-10400	03	NU-0057	B66-10279	05
Study shows effect of surface preparations on improving thermionic emission			EXPLOSIVE		
JPL-SC-140	B66-10493	01	Explosives actuate nonmagnetic indexing device	B65-10017	05
ETHER			GSFC-237		
Test monkeys anesthetized by routine procedure			EXPLOSIVE DEVICE		
HQ-18	B65-10332	04	Splice plate design assures structural separation by mild explosive		
ETHYLENE OXIDE			MSC-137	B65-10166	05
Encapsulation process sterilizes and preserves surgical instruments			Threaded split ring connector separates structural sections		
JPL-484	B64-10066	05	LANGLEY-145	B65-10383	05
EUTECTIC ALLOY			Pulse technique provides more accurate checkout of exploding bridge wire device		
Coating method enables low-temperature brazing of stainless steel			HQ-62	B66-10561	01
NU-0030	B65-10250	03	EXPLOSIVE FORMING		
EVACUATION			Metal parts hydrosized by explosive force		
Seal-off assembly permits rapid evacuation of air from containers			M-FS-289	B65-10170	05
GSFC-513	B66-10446	05	Explosive force of Primacord grid forms large sheet metal parts		
Emergency escape system uses self-braking mechanism on fixed cable			M-FS-316	B66-10014	05
KSC-66-44	B66-10575	05	Epoxy blanket protects milled part during explosive forming		
Emergency escape system protects personnel from explosion and fire			M-FS-307	B66-10029	03
KSC-66-12	B66-10634	05	Strippable grid facilitates removal of grid-surfaced conical workpiece from die		
EVAPORATION			M-FS-716	B66-10334	05
Tantalum cathode improves electron-beam evaporation of tantalum			EXPOSURE		
JPL-WOO-021	B65-10175	03	Electromechanically operated camera shutter provides uniform exposure		
EXCITATION			JPL-357	B63-10227	01
Electrodeless discharge lamp is easily started, has high stability			EXTENSOMETER		
WOO-030	B66-10015	01	Extensometer automatically measures elongation in elastomers		
EXHAUST			M-FS-517	B66-10284	05
Refractory thermal insulation for smooth metal surfaces			EXTRACTION		
M-FS-160	B64-10099	03	Tool permits damage-free removal of solar cell		
Magnetic field controls carbon arc tail flame			GSFC-467	B66-10219	05
MSC-139	B65-10108	01	EXTRUSION		
EXHAUST GAS			Rapid billet loader aids extrusion of refractory metals		
Plastic bags in evacuated chamber make lightweight gas sampling system			LEWIS-50	B63-10354	05
FRC-31	B65-10264	01	Guide for extrusion dies eliminates straightening operation		
Calculation of infrared spectral transmittances of inhomogeneous gases			LEWIS-152	B64-10014	05
M-FS-1563	B66-10554	02	Integral ribs formed in metal panels by cold-press extrusion		
EXHAUST JET			M-FS-230	B65-10141	05
Probe samples components of rocket engine exhaust			Ductile mandrel and parting compound facilitate tube drawing		
M-FS-485	B65-10384	03	ARG-43	B66-10571	05

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## FEEDBACK CONTROL SYSTEM

<b>EYE</b>			NU-0074	B66-10275	05
Optical projectors simulate human eyes to establish operator's field of view			Tool pre-tensions covers prior to lacing		
WOO-250	B66-10010	02	MSC-631	B66-10301	05
<b>EYE MOVEMENT</b>			Flexible fastener effects airtight material closure		
Photoelectric sensor output controlled by eyeball movements			JPL-684	B66-10304	05
M-FS-274	B65-10079	01	Latching mechanism operates in limited access area		
			MSC-230	B66-10338	05
<b>FACTORIAL DESIGN</b>			Device serves as hinge and electrical connector for circuit boards		
Solenoid magnetic fields calculated from superposed semi-infinite solenoids			M-FS-743	B66-10359	01
LEWIS-184	B66-10490	01	Study made to control depth of potting compound for honeycomb sandwich fasteners		
<b>FAIRING</b>			LEWIS-370	B66-10677	05
Pressure transducer 3/8-inch in size can be faired into surface					
WOO-065	B64-10021	05	<b>FATIGUE</b>		
<b>FAST NEUTRON</b>			Apparatus facilitates pressure-testing of metal tubing		
A fast-neutron spectrometer of advanced design			LEWIS-174	B65-10131	05
M-FS-1664	B66-10555	01	Plugged hollow shaft makes fatigue-resistant shear pin		
<b>FASTENER</b>			LANGLEY-195	B66-10077	05
V-slotted screw head and matching driving tool facilitate insertion and removal of screw fasteners			<b>FATIGUE LIFE</b>		
FRC-16	B63-10023	05	Control of component differential hardness increases bearing life		
Heavy-duty staple remover operated by hand			LEWIS-190	B65-10251	05
JPL-IT-1004	B63-10292	05	Fluid damping reduces bellows seal fatigue failures		
Buckle joins web straps quickly, adjusts easily			M-FS-565	B66-10249	05
LANGLEY-21	B64-10119	05	<b>FATIGUE TEST</b>		
Electronic assembly rack panels snap on and off			Cryostat modified to aid rotating beam fatigue test		
GSFC-59	B64-10121	05	M-FS-435	B66-10083	03
Flexible fastener allows thermal expansion			Fatigue cracks detected and measured without test interruption		
LANGLEY-40	B64-10145	05	LEWIS-266	B66-10178	02
Threading hook facilitates safe recovery of heavy loads			<b>FATIGUE TESTING MACHINE</b>		
MSC-46	B64-10185	05	Apparatus permits flexure testing of specimens at cryogenic temperatures		
Fastener provides cooling and compensates for thermal expansion			M-FS-257	B65-10129	02
NU-0003	B65-10038	05	Fatigue tester achieves true axial motion through flex plates and bars		
Low-cost tool minimizes damage to O-rings during installation			NU-0021	B66-10164	01
MSC-140	B65-10116	05	<b>FEED SYSTEM</b>		
Coiled spring makes self-locking device for threaded fasteners			Gas pressure feeds film into camera at high speed		
MSC-149	B65-10135	05	ARG-97	B66-10474	02
Galvanic corrosion reduced in aluminum fabrications			<b>FEEDBACK</b>		
M-FS-272	B65-10140	03	Electrostatically driven dynamic capacitor employs capacitive feedback		
Captive nut fastener securely joins brittle materials			JPL-771	B65-10293	01
NU-0008	B65-10245	05	<b>FEEDBACK AMPLIFIER</b>		
Burnishing technique improves lubrication of threaded fasteners			Voltage variable oscillator has high phase stability		
LEWIS-217	B65-10302	03	LANGLEY-123	B65-10204	01
Fastener distributes stress evenly from sandwich-panel-hung items			<b>FEEDBACK CONTROL SYSTEM</b>		
MSC-236	B65-10358	05	Apparatus measures very small thrusts		
Nickel/tin coating protects threaded fasteners in corrosive environment			WOO-048	B64-10284	05
MSC-253	B65-10398	03	Feedback oscillator functions as low-level pulse stretcher		
Epoxy-coated containers easily opened by wire band			GSFC-261	B65-10069	01
M-FS-592	B66-10174	05	Noncontacting vibration transducer has constant sensitivity		
Fastener provides for bolt misalignment and quick release of flange			LANGLEY-99	B65-10392	01
			Quick-response servo amplifies small hydraulic pressure differences		
			ARG-99	B66-10498	05
			Digital system provides superregulation of		

nanosecond amplifier-discriminator circuit ARG-61	B66-10500	01	<b>FILAMENT WINDING</b> Fiberglass parts cured during filament winding eliminates oven, saves time M-FS-14	B65-10088	03
Preregulator feedback circuit utilizes Light Actuated Switch M-FS-1180	B66-10542	01	Pressure vessels fabricated with high-strength wire and electroformed nickel M-FS-580	B66-10218	05
<b>FEEDING DEVICE</b> Tension is servo controlled in film advance system LANGLEY-54	B65-10075	05	<b>FILLER</b> Aluminum oxide filler prevents obstructions in tubing during welding MSC-222	B66-10125	05
Modified power tool rapidly drives series torque bolts MSC-221	B66-10054	05	Brazing process using Al-Si filler alloy reliably bonds aluminum parts MSC-448	B66-10241	05
<b>FERRITE</b> Small digital recording head has parallel bit channels, minimizes cross talk JPL-0029	B63-10284	01	<b>FILM</b> Tension is servo controlled in film advance system LANGLEY-54	B65-10075	05
New sintering process adjusts magnetic value of ferrite cores GSFC-129	B63-10606	01	System selects framing rate for spectrograph camera LANGLEY-55	B65-10086	01
Molded elastomer provides compact ferrite-core holder, simplifies assembly JPL-584	B64-10084	05	Single-crystal semiconductor films grown on foreign substrates WOO-076	B66-10225	01
Thin-film ferrites vapor deposited by one-step process in vacuum MSC-259	B66-10398	03	Film coating permits low-force scribing MSC-990	B66-10609	03
<b>FERROELECTRICS</b> Ferroelectric bolometer measures RF absolute power at submillimeter wavelengths GSFC-422	B66-10051	01	<b>FILM THICKNESS</b> White primer permits a corrosion-resistant coating of minimum weight M-FS-304	B66-10207	03
<b>FIBER</b> Plastic plus stainless-steel fibers make resilient, impermeable material WOO-246	B65-10374	03	Uniform reflective films deposited on large surfaces GSFC-507	B66-10483	02
Fibers of newly developed refractory ceramics produced by improved process WOO-169	B66-10196	03	<b>FILTER</b> Modified filter prevents conduction of microwave signals along high-voltage power supply leads JPL-63	B63-10091	01
<b>FIELD EFFECT TRANSISTOR /FET/</b> Field-effect transistor improves electrometer amplifier ARC-36	B64-10143	01	Filter for high-pressure gases has easy take-down, assembly JPL-373	B63-10234	03
Field effect transistors used as voltage-controlled resistors M-FS-174	B64-10163	01	Cryogenic filter method produces super-pure helium and helium isotopes JPL-374	B63-10235	03
Logarithmic amplifier uses field effect transistors JPL-509	B65-10145	01	Fine-particle filter prevents damage to vacuum pumps LEWIS-106	B63-10489	05
Field effect transistor presents high input impedance in ac amplifier JPL-500	B65-10232	01	High-pass rf coaxial filter rejects dc and low frequency signals GSFC-73	B64-10173	01
Field-effect transistor replaces bulky transformer in analog-gate circuit GSFC-351	B65-10284	01	Rotating filters permit wide range of optical pyrometry LANGLEY-33	B65-10100	02
FET comparator detects analog signal levels without loading analog device M-FS-503	B66-10224	01	Process reduces pore diameters to produce superior filters WOO-093	B66-10037	03
Mosfet analog memory circuit achieves long duration signal storage M-FS-860	B66-10603	01	Inexpensive infrared source improvised from flashlight M-FS-494	B66-10096	02
Equivalent circuit for a field effect transistor established for computer simulation M-FS-1752	B66-10690	01	Ultrasonic cleaning restores depth-type filters M-FS-540	B66-10298	03
<b>FILAMENT</b> Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss LEWIS-39	B63-10342	01	Fiber length and orientation prevent migration in fluid filters M-FS-541	B66-10319	05
Lamp automatically switches to new filament on burnout M-FS-498	B66-10046	01	Composite filter steepens rejection slopes in microwave application GSFC-480	B66-10393	01

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# FLEXIBLE BODY

Valve effectively controls amount of contaminant in flow stream M-FS-1771	B66-10683	05	Feed-thru flange is useful in vacuum applications to cryogenic temperatures JPL-846	B66-10615	02
<b>FINDER</b> System locates randomly placed remote objects LANGLEY-209	B66-10315	01	Spherical pipe joint delivers loads equally to mating flange M-FS-807	B66-10665	05
<b>FINITE DIFFERENCE METHOD</b> Computational procedure for finite difference solution of one-dimensional heat conduction problems reduces computer time MSC-1120	B66-10566	01	<b>FLARE</b> Mechanical gauge accurately checks tubing flare, roundness, and concentricity M-FS-1822	B66-10656	05
<b>FINNED BODY</b> A design procedure for the weight optimization of straight finned radiators GSFC-547	B66-10618	05	<b>FLARED BODY</b> Strainer fits inside flared-tube fittings LANGLEY-180	B65-10388	05
<b>FIRE</b> Emergency escape system protects personnel from explosion and fire KSC-66-12	B66-10634	05	Forming tool improves quality of tubing flares WOO-231	B66-10001	05
<b>FIRST AID</b> Buoyant Stokes litter assembly used for sea rescue operations MSC-131	B66-10019	05	Gage tests tube flares quickly and accurately KSC-66-19	B66-10537	05
<b>FITTING</b> Self sealing disconnect for tubing forms metal seal after breakaway JPL-354	B63-10226	05	<b>FLAT LAYER</b> Improved method of edge coating flat ribbon wire M-FS-902	B66-10684	03
Special pliers connect hose containing liquid under pressure JPL-IT-1003	B63-10291	05	<b>FLAT PLATE</b> Equations provide tubular information on effects of uniform and variable loads on thin, flat, circular plates ARG-151	B66-10601	05
Inexpensive check valve is installed in standard AN fittings JPL-2A	B65-10222	05	<b>FLAT SURFACE</b> Sensitive level sensor made with spirit level, gives electrical output LANGLEY-49	B65-10067	01
Strainer fits inside flared-tube fittings LANGLEY-180	B65-10388	05	<b>FLAW</b> Apparatus facilitates pressure-testing of metal tubing LEWIS-174	B65-10131	05
O-ring tube fittings form leakproof seal in hydraulic systems M-FS-481	B66-10020	05	<b>FLAW DETECTION</b> Crack detection method is safe in presence of liquid oxygen M-FS-236	B65-10107	03
Seal surfaces protected during assembly NU-0067	B66-10266	05	Portable self-powered device detects internal flaws in tubular structures NU-0019	B66-10028	01
<b>FLAME</b> Magnetic field controls carbon arc tail flame MSC-139	B65-10108	01	Fatigue cracks detected and measured without test interruption LEWIS-266	B66-10178	02
<b>FLAME HOLDER</b> Mounting facilitates removal and installation of flame-detector rods M-FS-555	B66-10150	05	<b>FLEXIBILITY</b> Flexible honeycomb structure can bend to fit compound curves M-FS-13	B63-10385	05
<b>FLANGE</b> Flange on microwave antenna subreflector cuts ground noise JPL-362	B63-10229	01	Adhesive for vacuum environments resists shock and vibration MSC-56	B65-10016	03
Pressure seal ring may be effective over wide temperature range M-FS-486	B66-10211	05	Extendible column can be stowed on drum JPL-686	B65-10191	05
Pressure-welded flange assembly provides leaktight seal at reduced bolt loads M-FS-640	B66-10247	05	Flexible protective coatings made from silicon-nitrogen materials M-FS-528	B66-10027	03
Radial coolant channels fabricated by simplified method NU-0070	B66-10267	05	Flexible drive allows blind machining and welding in hard-to-reach areas MSC-524	B66-10428	05
Fastener provides for bolt misalignment and quick release of flange NU-0074	B66-10275	05	Metal tube can be folded for compact storage, is self-erecting LEWIS-288	B66-10450	05
Remotely controlled system couples and decouples large diameter pipes NU-0062	B66-10276	05	Lightweight, all-metal hose assembly has high flexibility and strength over wide range of temperature and pressure M-FS-1831	B66-10635	05
External linkage tie permits reduction in ducting system flange thickness M-FS-823	B66-10326	05	<b>FLEXIBLE BODY</b> Hydraulically controlled flexible arm can		



bend in any direction KSC-66-20	B66-10626	05	Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01
Method for predicting frictional loss in metal bellows and flexible hose M-FS-883	B66-10662	05	Electromechanical flowmeter accurately monitors fluid flow GSFC-357	B65-10273	01
<b>FLEXURE</b>			Improved strain-wire flowmeter has fast response time LEWIS-241	B65-10304	01
Lightweight universal joint transmits both torque and thrust JPL-375	B63-10236	05	Volumetric system calibrates meters for large flow rates WOO-130	B65-10323	05
Flexure support system protects thermally and dynamically loaded models LANGLEY-39	B65-10042	05	Optical output enhances flowmeter accuracy M-FS-482	B65-10395	02
<b>FLIGHT ALTITUDE</b>			Flowmeter measures low gas-flow rates M-FS-215	B66-10036	01
Sextant measures spacecraft altitude without gravitational reference MSC-200	B66-10143	02	Segmented ball valve is easy to open and close WOO-248	B66-10195	05
<b>FLIP-FLOP</b>			Bearing puller facilitates removal and replacement of bearing assemblies M-FS-1538	B66-10418	05
Binary counter uses fluid logic elements M-FS-323	B65-10377	01	Flowmeter measures flow rates of high temperature fluids LEWIS-328	B66-10521	01
Pneumatic binary encoder replaces multiple solenoid system M-FS-665	B66-10374	01	Laser Doppler flowmeter measures gas velocity M-FS-1747	B66-10693	02
Bipolar current driver for memory circuits GSFC-213	B66-10469	01	Low rate flow switch can be used for gas or liquid JPL-879	B66-10696	01
<b>FLOOR</b>			<b>FLOW REGULATOR</b>		
Portable flooring protects finished surfaces, is easily moved M-FS-15	B63-10387	05	Flow control valve is independent of pressure drop JPL-WOO-039	B65-10121	05
<b>FLOW CHARACTERISTICS</b>			Electromechanical flowmeter accurately monitors fluid flow GSFC-357	B65-10273	01
Oil-smeared models aid wind tunnel measurements LANGLEY-4	B63-10311	03	High-pressure, low temperature electrical connector makes no-leak seal MSC-276	B66-10079	02
Probe measures characteristics of hot gas stream M-FS-240	B65-10133	02	System proportions fluid-flow in response to demand signals GSFC-457	B66-10094	01
Matching flow characteristics of standard shutoff valves eliminates need for custom fabricated valves M-FS-1069	B66-10416	05	Concept for passive system to control gas flow independently of temperature M-FS-982	B66-10343	05
<b>FLOW GRAPH</b>			Concept of planetary gear system to control fluid mixture ratio M-FS-1785	B66-10477	05
Fortran program flowchart is automatically produced M-FS-369	B66-10062	01	Quick-response servo amplifies small hydraulic pressure differences ARG-99	B66-10498	05
<b>FLOW MEASUREMENT</b>			Internal machining accomplished at constant radii M-FS-1573	B66-10546	05
Fluid-pressure meter can be calibrated without removal from flow line M-FS-98	B63-10502	05	<b>FLOW VELOCITY</b>		
Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01	Device accurately measures and records low gas-flow rates M-FS-1077	B66-10569	01
Wide-range instrument monitors flow rates of chemically active fluids MSC-186	B66-10205	01	<b>FLUID</b>		
Positive displacement cylinder measures corrosive liquid volume MSC-1038	B66-10589	05	High-pressure regulating system prevents pressure surges JPL-231	B63-10170	05
Study of hot wire techniques in low density flows with high turbulence levels M-FS-1269	B66-10687	01	Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02
<b>FLOW METER</b>			Connector seals fluid lines at cryogenic temperatures and high vacuums		
Meter accurately measures flow of low-conduc- tivity fluids JPL-0021	B63-10280	01			
Fluid-pressure meter can be calibrated without removal from flow line M-FS-98	B63-10502	05			
Ball bearing used in design of rugged flow- meter LEWIS-159	B64-10170	05			

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FOIL

GSFC-253	B64-10327	05	in fluid lines		
Improved fluid control valve extends diaphragm life			M-FS-522	B66-10068	01
JPL-345	B65-10147	05	Sea dye marker provides visibility for 20 hours		
Closed fluid system without moving parts controls temperature			MSC-714	B66-10313	03
LEWIS-222	B65-10331	02	FLUORINE		
Magnetic fluid readily controlled in zero gravity environment			Soft-seal valve holds hazardous fluids safely		
LEWIS-126	B65-10335	03	LEWIS-275	B66-10216	05
Binary counter uses fluid logic elements			FLUORINE COMPOUND		
M-FS-323	B65-10377	01	Xenon forms stable compound with fluorine	B66-10467	03
Three-dimensional wire-mesh capacitor system measures fluid density			ARG-4		
WOO-194	B65-10379	01	FLUORO COMPOUND		
Electrically heated diaphragm eliminates use of pyrotechnics			Organic reactants rapidly produce plastic foam		
MSC-241	B65-10400	01	LANGLEY-37	B65-10288	03
Wide-range instrument monitors flow rates of chemically active fluids			FLUOROCARBON		
MSC-186	B66-10205	01	Metals plated on fluorocarbon polymers		
Shock-operated valve would automatically protect fluid systems			JPL-544	B63-10612	03
M-FS-801	B66-10335	05	Low-cost seal compensates for surface irregularities		
FLUID AMPLIFIER			NU-0016	B65-10160	05
Queueing register uses fluid logic elements			Electronic modules easily separated from heat sink		
M-FS-317	B66-10100	05	MSC-142	B65-10186	02
Binary fluid amplifier solves stability and load problems			Composite gaskets are compatible with liquid oxygen, resist compression set		
ERC-15	B66-10177	01	M-FS-455	B66-10395	03
FLUID INJECTION			FLUX		
Study of vortex valve for medium temperature solid propellants			Improved magnetometer uses toroidal gating coil		
LANGLEY-204	B66-10524	01	GSFC-249	B65-10103	01
FLUID MECHANICS			Aluminum core structures brazed without use of flux		
Stationary device produces homogeneous mixture of fluids			M-FS-659	B66-10360	05
M-FS-525	B66-10570	05	FLUX DENSITY		
FLUID POWER			Shaped superconductor cylinder retains intense magnetic field		
Fluid-pressure measurement apparatus uses short-length manometer tubes			JPL-381	B63-10238	01
LEWIS-28	B65-10027	05	Computer programs simplify optical system analysis		
FLUID SWITCHING ELEMENT			GSFC-306	B65-10093	01
Liquid switch is remotely operated by low dc voltage			FOAM		
GSFC-119	B63-10599	01	Organic reactants rapidly produce plastic foam		
FLUID TRANSMISSION LINE			LANGLEY-37	B65-10288	03
Safety restrainer prevents whipping of ruptured high-pressure hose			FOAMED MATERIAL		
LEWIS-99	B64-10348	05	Compact assembly generates plastic foam, inflates flotation bag		
Radioactive tracer system detects oil contaminants in fluid lines			LANGLEY-96	B65-10090	05
M-FS-512	B66-10090	03	Soluble undercoating facilitates removal of foamed-in-place insulation		
Remotely controlled system couples and decouples large diameter pipes			LEWIS-193	B65-10344	03
NU-0062	B66-10276	05	Mill profiler machines soft materials accurately		
Metal tube can be folded for compact storage, is self-erecting			M-FS-692	B66-10254	05
LEWIS-288	B66-10450	05	Improved thermal insulation materials made of foamed refractory oxides		
FLUORESCENCE			M-FS-735	B66-10288	03
Oil-smeared models aid wind tunnel measurements			FOCUS		
LANGLEY-4	B63-10311	03	Fresnel cup reflector directs maximum energy from light source		
Distant objects detected visually with optical filters			JPL-424	B63-10263	03
LANGLEY-166	B65-10252	02	Light ray modulation controls optical system alignment		
FLUORESCENT EMISSION			GSFC-171	B65-10211	02
Sensor detects hydrocarbon oil contaminants			FOIL		
			Indium foil with beryllia washer improves transistor heat dissipation		
			GSFC-42	B63-10033	01

Ceramic-coated boat is chemically inert, provides good heat transfer LANGLEY-90	B65-10063	05
Large capacitor performs as a distributed parameter pulse line LEWIS-176	B66-10291	01
<b>FOLDING STRUCTURE</b> Interior servicing platform simplifies maintenance of storage tanks M-FS-1300	B66-10425	05
<b>FORCE</b> System measures unidirectional forces, excludes extraneous forces LEWIS-170	B65-10154	05
Transducer measures force in vacuum environment LEWIS-218	B66-10161	01
Hole saw drill attachment has zero force reaction MSC-543	B66-10604	05
Gage accurately controls force for placing chips on substrates M-FS-1941	B66-10675	01
<b>FORGING</b> Upsetting butt edge increases weld-joint strength M-FS-175	B64-10164	05
<b>FORMING</b> Angular glass tubing drawn from round tubing HQ-20	B65-10235	05
Rotating mandrel speeds assembly of plastic inflatables LANGLEY-155	B66-10137	05
<b>FORTRAN</b> Fortran program flowchart is automatically produced M-FS-369	B66-10062	01
<b>FRACTURE</b> Pressure molding of powdered materials improved by rubber mold insert WOO-100	B64-10270	03
<b>FRAGMENTATION</b> Break-up of metal tube makes one-time shock absorber, bars rebound LANGLEY-1A	B63-10304	05
<b>FRAME</b> Apparatus alters position of objects to facilitate demagnetization GSFC-234	B64-10277	05
Simple circuit positions film frames in projector JPL-508	B65-10132	02
<b>FREE ENERGY</b> Computer program determines chemical composition of physical system at equilibrium MSC-1119	B66-10670	01
<b>FREE FALL</b> Low level accelerometer test methods are investigated M-FS-908	B66-10510	01
<b>FREE STREAM</b> Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05
<b>FREON</b> Freon provides heat transfer for solid CO <sub>2</sub> calibration standard M-FS-644	B66-10257	02
<b>FREQUENCY</b> Voltage generator sweeps oscillator frequency linearly with time M-FS-219	B64-10320	01
<b>FREQUENCY CONTROL</b> Transistorized trigger circuit is frequency-controllable GSFC-111	B63-10553	01
FM oscillator uses tetrode transistor JPL-82	B65-10055	01
Variable frequency transistor inverters use multiple core transformers GSFC-183	B65-10119	01
Frequency offset in linear FM/CW transponder eliminates clutter M-FS-249	B65-10146	01
Frequency correction device uses digital circuitry GSFC-268	B65-10307	01
<b>FREQUENCY CONVERSION</b> Frequency-shift-keyer circuit improves PCM conversion for radio transmission GSFC-80	B63-10511	01
Electronic ampere-hour integrator is accurate to one percent GSFC-203	B65-10308	01
Frequency discriminator with binary output eliminates tuned circuits M-FS-376	B65-10349	01
<b>FREQUENCY CONVERTER</b> Circuit converts AM signals to FM for magnetic recording GSFC-227	B65-10001	01
Traveling-wave tube circuit simplifies microwave relay GSFC-299	B65-10127	01
<b>FREQUENCY DIVIDER</b> Unijunction frequency divider is free of backward loading JPL-WOO-010	B65-10112	01
Frequency divider is free of spurious outputs GSFC-308	B65-10334	01
<b>FREQUENCY MEASUREMENT</b> Small foamed polystyrene shield protects low-frequency microphones from wind noise M-FS-123	B63-10579	01
Nonresonant support facilitates vibration testing of structures M-FS-224	B65-10039	05
<b>FREQUENCY MODULATION</b> Tunnel-diode circuit features zero-level clipping GSFC-241	B65-10002	01
Voltage variable oscillator has high phase stability LANGLEY-123	B65-10204	01
FM/CW system measures aircraft attitude M-FS-276	B65-10290	01
<b>FREQUENCY MULTIPLIER</b> Phase detector circuit synthesizes own reference signal M-FS-247	B65-10080	01
<b>FREQUENCY RANGE</b> Increased performance reliability obtained with dual /redundant/ oscillator system GSFC-36	B63-10027	01
Photoresistance analog multiplier has wide range GSFC-360	B65-10287	01

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## FUSE

Solid-state switch increases switching speed WOO-298	B66-10430	01	Regenerative fuel cell combines high efficiency with low cost WOO-090	B65-10363	01
<b>FREQUENCY REGULATOR</b> Hybrid circuit achieves pulse regeneration with low power drain GSFC-382	B65-10314	01	Resilient clamp holds fuel cell stack through thermal cycle MSC-313	B66-10035	05
<b>FREQUENCY RESPONSE</b> Simple device produces accelerometer calibration pulse M-FS-363	B65-10269	01	Vapor diffusion electrode improves fuel cell operation LEWIS-187	B66-10281	03
Device detects unbonded areas in plastic laminates WOO-206	B65-10380	01	<b>FUEL CONTAMINATION</b> Fiber length and orientation prevent migration in fluid filters M-FS-541	B66-10319	05
Damping technique gives accelerometer flat frequency response M-FS-471	B66-10293	01	Valve effectively controls amount of contaminant in flow stream M-FS-1771	B66-10683	05
<b>FREQUENCY-SHIFT KEYING</b> Frequency-shift-keyer circuit improves PCM conversion for radio transmission GSFC-80	B63-10511	01	<b>FUEL FLOW</b> Fuel and oxidizer valve assembly employs single solenoid actuator MSC-1046	B66-10648	05
<b>FREQUENCY SYNTHESIS</b> Phase shift frequency synthesizer is efficient, small in size M-FS-250	B65-10169	01	<b>FUEL PUMP</b> Pressure probe compensates for dimensional tolerance variations LEWIS-302	B66-10599	01
<b>FREQUENCY TRANSLATION SYSTEM</b> Optical superheterodyne receiver uses laser for local oscillator M-FS-1605	B66-10584	01	<b>FUEL TANK</b> Automatic fluid separator supplies own driving power WOO-085	B66-10008	02
<b>FRESNEL REFLECTOR</b> Fresnel cup reflector directs maximum energy from light source JPL-424	B63-10263	03	In-tank shutoff valve is provided with maximum blast protection M-FS-1529	B66-10514	05
Wide-aperture solar energy collector is light in weight JPL-SC-055	B65-10046	02	<b>FUNCTION GENERATOR</b> Zener diode function generator requires no external reference voltage JPL-33	B65-10013	01
<b>FRICTION</b> Chain friction system gives positive, reversible drive ARC-8	B63-10009	05	Function generator eliminates necessity of series summation GSFC-214	B66-10351	01
Kinetic-energy absorber employs frictional force between mating cylinders LEWIS-75	B63-10442	05	<b>FURNACE</b> Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss LEWIS-39	B63-10342	01
Gate valve with ceramic-coated base operates at high temperatures ARC-23	B63-10562	03	Rapid billet loader aids extrusion of refractory metals LEWIS-50	B63-10354	05
Buckle joins web straps quickly, adjusts easily LANGLEY-21	B64-10119	05	Hydrogen-atmosphere induction furnace has increased temperature range LEWIS-153	B66-10055	05
Friction device damps linear motion of rotating shaft WOO-214	B66-10030	05	Auxiliary coil controls temperature of RF induction heater GSFC-428	B66-10067	01
Friction brake cushions acceleration and vibration loads MSC-715	B66-10608	05	High-speed furnace uses infrared radiation for controlled brazing NU-0047	B66-10268	02
<b>FRICTION-LOSS COEFFICIENT</b> Method for predicting frictional loss in metal bellows and flexible hose M-FS-883	B66-10662	05	Tungsten insulated susceptor cup for high temperature induction furnace eliminates contamination LEWIS-283	B66-10538	03
<b>FRICTION REDUCTION</b> Bearing alloys with hexagonal crystal structures provide improved friction and wear characteristics LEWIS-320	B66-10373	03	<b>FUSE</b> Splice plate design assures structural separation by mild explosive MSC-137	B65-10166	05
Air bearing provides friction-free support for shaker system slip table NU-0086	B66-10708	05	Cam-operated limit switch features safe fuse replacement MSC-218	B65-10322	01
<b>FUEL CELL</b> Fuel cell serves as oxygen level detector JPL-SC-072	B65-10066	01	Single connector provides safety fuses for multiple lines MSC-199	B66-10050	01
			Solid-state recoverable fuse functions as		

circuit breaker GSFC-560	B66-10691	01	Device removes hydrogen gas from enclosed spaces GSFC-495	B66-10340	03
<b>FUSION</b>			Special treatment reduces helium permeation of glass in vacuum systems HQ-25	B66-10372	02
Circuit reliability boosted by soldering pins of disconnect plugs to sockets JPL-447	B64-10002	01	<b>GAS ANALYZER</b>		
<b>G</b>			Rapid helium-air analyzer can measure other binary gas mixtures LANGLEY-16	B63-10557	03
<b>G FORCE</b>			Subminiaturized gas chromatograph gives fast, efficient analysis JPL-735	B66-10182	01
Miniature piezoelectric triaxial accelerometer measures cranial accelerations ARC-71	B66-10534	01	<b>GAS BEARING</b>		
Design concept for pressure switch calibrator HQ-36	B66-10598	01	Elastic orifice automatically regulates gas bearings JPL-135	B63-10123	05
<b>GAIN</b>			Modified gas bearing is adjustable to optimum stiffness ratio M-FS-145	B64-10050	05
Neon isotopes cancel errors in gas laser M-FS-1476	B66-10583	02	Pneumatic power is transmitted through air bearing MSC-8	B64-10141	05
<b>GALLIUM</b>			A conceptual design for squeeze film bearings M-FS-573	B66-10226	05
Gallium useful bearing lubricant in high-vacuum environment LEWIS-12	B63-10337	03	<b>GAS CHROMATOGRAPHY</b>		
<b>GALLIUM ALLOY</b>			Hot-wire detector for chemically active materials used in gas chromatography MSC-269	B66-10139	03
Gallium alloy films investigated for use as boundary lubricants LEWIS-245	B66-10165	03	Subminiaturized gas chromatograph gives fast, efficient analysis JPL-735	B66-10182	01
<b>GALLIUM ARSENIDE</b>			Cold trap increases sensitivity of gas chromatograph M-FS-1617	B66-10517	03
New method used to fabricate gallium arsenide photovoltaic device WOO-062	B64-10019	01	Gas chromatographic column enables analysis of propellant hydrazines MSC-1161	B66-10586	03
Economical fabrication process produces high-quality junction transistors JPL-SC-065	B64-10330	01	<b>GAS COOLING SYSTEM</b>		
Thermocompression bonding produces efficient surface-barrier diode JPL-SC-066	B65-10007	05	High-temperature, high-pressure spherical segment valve provides quick opening ARC-13	B63-10431	05
Laser beam transmits electric power GSFC-293	B65-10158	01	<b>GAS DISCHARGE</b>		
Cuprous selenide and sulfide form improved photovoltaic barriers WOO-212	B66-10025	01	Electrodeless discharge lamp is easily started, has high stability WOO-030	B66-10015	01
<b>GALVANIC CELL</b>			<b>GAS EVOLUTION</b>		
Device removes hydrogen gas from enclosed spaces GSFC-495	B66-10340	03	Plated nickel wire mesh makes superior catalyst bed MSC-216	B65-10321	03
<b>GALVANOMETER</b>			<b>GAS EXPANSION</b>		
Light-sensitive potentiometer measures product of two variables GSFC-240	B65-10076	01	Volume-ratio calibration system for vacuum gages LEWIS-303	B66-10640	01
<b>GAMMA RADIATION</b>			<b>GAS FLOW</b>		
Mount makes liquid nitrogen-cooled gamma ray detector portable LEWIS-259	B66-10103	01	High-pressure regulating system prevents pressure surges JPL-231	B63-10170	05
A fast-neutron spectrometer of advanced design M-FS-1664	B66-10555	01	Blade valve isolates compartment in pipe, opens to allow free flow JPL-585	B64-10188	05
<b>GAP</b>			Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01
Shrinkable sleeve eliminates shielding gap in RF cable WOO-207	B65-10387	01	Flowmeter measures low gas-flow rates M-FS-215	B66-10036	01
<b>GAS</b>			High temperature thermocouple operates in reduction atmosphere NU-0046	B66-10134	01
Filter for high-pressure gases has easy take-down, assembly JPL-373	B63-10234	03			
Pulsed plasma accelerator operates repetitively without complex controls LANGLEY-48	B65-10062	01			
Inert gas spraying device aids in repair of hazardous systems LEWIS-8B	B65-10115	05			

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## GASKET

Dual regulator controls two gases from a single reference MSC-227	B66-10167	05	speed ARG-97	B66-10474	02
Flow ring valve is simple, quick-acting M-FS-752	B66-10255	05	Modified McLeod pressure gage eliminates measurement errors ARC-62	B66-10481	01
Concept for passive system to control gas flow independently of temperature M-FS-982	B66-10343	05	Gas leak detector is simple and inexpensive M-FS-1206	B66-10669	01
Brazing retort manifold design concept may minimize air contamination and enhance uniform gas flow M-FS-707	B66-10371	05	Hermetically sealed cells protected from internal gas pressure GSFC-555	B66-10692	01
Miniature valve accurately controls small volume fluid flow ARG-66	B66-10473	05	<b>GAS SPECTROSCOPY</b> A radiometer-pyrometer LEWIS-284	B66-10606	01
Device accurately measures and records low gas-flow rates M-FS-1077	B66-10569	01	<b>GAS STREAM</b> Apparatus measures concentration of suspended droplets in gas streams LANGLEY-31	B64-10237	01
<b>GAS HEATING</b> Process reduces pore diameters to produce superior filters WOO-093	B66-10037	03	Probe measures characteristics of hot gas stream M-FS-240	B65-10133	02
<b>GAS INJECTION</b> Gas-injection valve operates at high speed HQ-49	B66-10381	05	Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01
Elimination of rocket engine asymmetric loads during tests at sea level M-FS-1730	B66-10674	05	Internal cooling increases range of immersion-type temperature probe LEWIS-171	B65-10157	02
<b>GAS LASER</b> Neon isotopes cancel errors in gas laser M-FS-1476	B66-10583	02	<b>GAS TUBE</b> Simple device facilitates inert-gas welding of tubes M-FS-558	B66-10155	05
Laser Doppler flowmeter measures gas velocity M-FS-1747	B66-10693	02	Automatic cryogenic liquid level controller is safe for use near combustible substances LEWIS-195	B66-10482	01
<b>GAS-LIQUID INTERACTION</b> Mixer conditions temperature of liquified gas streams M-FS-1784	B66-10565	02	Grit blasting nozzle fabricated from mild tool steel proves satisfactory M-FS-1420	B66-10597	05
<b>GAS LUBRICATED BEARING</b> Slit feeds reduce unbalanced torques in gas-lubricated bearings JPL-264	B65-10099	05	Silver plating technique seals leaks in thin wall tubing joints NU-0090	B66-10703	05
<b>GAS MIXTURE</b> Rapid helium-air analyzer can measure other binary gas mixtures LANGLEY-16	B63-10557	03	<b>GAS VALVE</b> Quick-closing valve is actuated by explosive discharge ARC-55	B66-10233	05
Xenon forms stable compound with fluorine ARG-4	B66-10467	03	Pneumatic binary encoder replaces multiple solenoid system M-FS-665	B66-10374	01
<b>GAS PRESSURE</b> Precision gage measures ultrahigh vacuum levels GSFC-114	B63-10597	01	Gas-injection valve operates at high speed HQ-49	B66-10381	05
Device induces lungs to maintain known constant pressure MSC-50	B64-10108	04	Modified McLeod pressure gage eliminates measurement errors ARC-62	B66-10481	01
Rod and dish cathode improves Penning-type vacuum gauge GSFC-447	B66-10082	01	<b>GAS WELDING</b> Simple device facilitates inert-gas welding of tubes M-FS-558	B66-10155	05
Solid-film lubricant is effective at high temperatures in vacuum LEWIS-228	B66-10087	03	<b>GASEOUS DIFFUSION</b> Impurity diffusion process for silicon semiconductors is fast and precise GSFC-397	B65-10300	01
Inflatable O-ring seal would ease closing of hatch cover plate MSC-740	B66-10385	05	<b>GASKET</b> Flexible plastic ring assembly makes durable shaft seal WOO-227	B65-10367	05
Large diameter metal ring seal prevents gas leakage at 5000 psi M-FS-1064	B66-10422	05	Pressure seal ring may be effective over wide temperature range M-FS-486	B66-10211	05
Gas pressure feeds film into camera at high			Composite gaskets are compatible with liquid oxygen, resist compression set		

M-FS-455	B66-10395	03	Pressure transducers dynamically tested with sinusoidal pressure generator	B66-10031	01
Rubber and alumina gaskets retain vacuum seal in high temperature emf cell			LEWIS-268		
ARG-17	B66-10472	05	Circuit operates as sine function generator	B66-10038	01
Thin plastic sheet eliminates need for expensive plating			MSC-255		
M-FS-1896	B66-10681	03	Pulse generator using transistors and silicon controlled rectifiers produces high current pulses with fast rise and fall times	B66-10456	01
M-FS-1896	B66-10681	03	MSC-405		
<b>GASOLINE</b>			High-reluctance rotor rings improve homopolar generator performance	B66-10543	01
Inert gas spraying device aids in repair of hazardous systems			ARG-104		
LEWIS-8B	B65-10115	05			
<b>GAUGE</b>			Logarithmic current simulator generates electrical currents accurately between 10 to the minus 11 ampere to 10 to the minus 3 ampere	B66-10706	01
Level of super-cold liquids automatically maintained by levelometer			NU-0087		
JPL-397	B63-10250	01	<b>GEOGRAPHY</b>		
Polymer deformation gauge measures thickness change in tensile tests			Density trace made with computer printout	B65-10200	01
JPL-745	B66-10147	01	GSFC-322		
Thin-film gage measures low heat-transfer rates			<b>GEOMETRY</b>		
LANGLEY 205	B66-10180	01	New backup-bar groove configuration improves heliarc welding of 2014-T6 aluminum	B66-10443	05
Gage tests tube flares quickly and accurately			MSC-806		
KSC-66-19	B66-10537	05	<b>GETTER</b>		
Mechanical gauge accurately checks tubing flare, roundness, and concentricity			Auxiliary titanium sublimation pump produces ultrahigh /10 to the minus 11 torr/ vacuum	B66-10388	02
M-FS-1822	B66-10656	05	LANGLEY-212		
Gage accurately controls force for placing chips on substrates			<b>GIMBAL</b>		
M-FS-1941	B66-10675	01	Ball-and socket joints provide accurate biaxial gimbal	B65-10205	05
<b>GEAR</b>			JPL-658		
Chain friction system gives positive, reversible drive			Device measures reaction engine thrust vector deviations	B66-10642	05
ARC-8	B63-10009	05	JPL-SC-163		
Shock absorber protects motive components against overloads			<b>GLASS</b>		
WOO-092	B65-10008	05	IR-transmission glasses formed from oxides of bismuth and tellurium	B65-10190	03
Bidirectional torque filter eliminates backlash			M-FS-279		
GSFC-335	B65-10148	05	Thin transparent films formed from powdered glass	B65-10217	03
Unique gear design provides self-lubrication			GSFC-352		
JPL-SC-079	B65-10366	03	Angular glass tubing drawn from round tubing	B65-10235	05
Run-in with chemical additive protects gear surface			HQ-20		
M-FS-548	B66-10069	05	Porous glass makes effective substrate for ozone-sensing reagent	B65-10364	03
Gear drive automatically indexes rotary table			GSFC-388		
M-FS-753	B66-10383	05	Split glass tube assures quality in electron beam brazing	B66-10151	05
Concept of planetary gear system to control fluid mixture ratio			M-FS-564		
M-FS-1785	B66-10477	05	Fibers of newly developed refractory ceramics produced by improved process	B66-10196	03
<b>GEAR TOOTH</b>			WOO-169		
Device measures curved surface finish on gear teeth			Special treatment reduces helium permeation of glass in vacuum systems	B66-10372	02
WOO-112	B65-10064	05	HQ-25		
Unique gear design provides self-lubrication			Borate glass efficiently transmits ultraviolet light	B66-10475	03
JPL-SC-079	B65-10366	03	ARG-91		
<b>GELATIN</b>			Glass formulation has high coefficient of thermal expansion	B66-10705	03
Gelatin coated electrodes allow prolonged bioelectronic measurements			NU-0084		
MSC-153	B66-10088	01	<b>GLASS FIBER</b>		
<b>GENERATOR</b>			Flexible curtain shields equipment from intense heat fluxes	B65-10044	03
Binary system generates sidereal rate from standard solar rate			M-FS-48		
GSFC-190	B64-10200	01	Fiberglass parts cured during filament winding eliminates oven, saves time	B65-10088	03
Voltage generator sweeps oscillator frequency linearly with time			M-FS-14		
M-FS-219	B64-10320	01			

# SUBJECT INDEX

# HAFNIUM OXIDE

Fiberglass dies speed forming of large metal sheets M-FS-214	B65-10210	05	damper JPL-661	B65-10144	05
Aluminized fiberglass insulation conforms to curved surfaces M-FS-477	B66-10024	03	Electronic modules easily separated from heat sink MSC-142	B65-10186	02
Fiberglass container shells form contamination-free storage units WOO-275	B66-10217	05	GRID Fine-mesh screen made by simplified method WOO-104	B64-10282	03
Composite gaskets are compatible with liquid oxygen, resist compression set M-FS-455	B66-10395	03	Radiation detector-optical hanging device is of simplified construction GSFC-251	B64-10299	01
GOLD Submicron holes in thin films increase sampling range of mass spectrometers JPL-SC-097	B66-10380	03	Forming blocks speed production of strain gage grids LEWIS-182	B65-10009	05
GOLD ALLOY Thermocompression bonding produces efficient surface-barrier diode JPL-SC-066	B65-10007	05	Wire bundle formed into grids with minute interstices WOO-089	B65-10372	03
GRAPH Simple scale interpolator facilitates reading of graphs LANGLEY-88	B65-10070	05	Suppressor plate eliminates undesired arcing during electron beam welding M-FS-1126	B66-10357	05
Simple scale interpolator facilitates reading of graphs LEWIS-92	B66-10302	05	GRINDING MACHINE Lathe converted for grinding aspheric surfaces GSFC-115	B63-10556	05
Automated drafting system uses computer techniques M-FS-788	B66-10362	01	Rotating holder permits accurate grinding of metallurgical microsamples LEWIS-131	B65-10262	05
GRAPHIC ARTS Disk calculator indicates legible lettering size for slide projection GSFC-409	B65-10339	05	Multisurface fixture permits easy grinding of tool bit angles M-FS-586	B66-10171	05
Modified procedure speeds camera copy layout for offset printing GSFC-424	B65-10373	02	Metallographic holding fixture permits polishing of soft metals on vibratory lapping machine ARG-42	B66-10562	05
Offset lenses add versatility to phototypesetting machine HQ-9	B66-10173	02	GROOVE New package for belleville spring permits rate change, easy disassembly JPL-392	B63-10247	05
GRAPHITE Metal sheath improves thermocouple using graphite in one leg NU-0011	B65-10051	01	Bench vise adapter grips tubing securely and safely MSC-279	B66-10056	05
Graphite element serves as radiant heat source M-FS-105	B65-10218	01	New backup-bar groove configuration improves heliarc welding of 2014-T6 aluminum MSC-806	B66-10443	05
Refractory coating protects intricate graphite elements from high-temperature hydrogen NU-0027	B66-10084	01	GROUND RESONANCE Flange on microwave antenna subreflector cuts ground noise JPL-362	B63-10229	01
Primary cells utilize halogen-organic charge transfer complex JPL-926	B66-10682	02	GUN Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application LANGLEY-6A	B63-10318	03
GRATING Simple optical system used to align spectrograph LANGLEY-92	B65-10071	02	Shoulder adapter steadies spot welding gun M-FS-321	B66-10076	05
GRAVITATIONAL EFFECT Technique simulates effect of reduced gravity LANGLEY-44	B64-10146	04	GYROSCOPE Slit feeds reduce unbalanced torques in gas-lubricated bearings JPL-264	B65-10099	05
GRAVITATIONAL FIELD Low level accelerometer test methods are investigated M-FS-908	B66-10510	01	H HAFNIUM ALLOY New tungsten alloy has high strength at elevated temperatures LEWIS-336	B66-10551	03
GRAVITY Miniature servo accelerometer is force-balanced JPL-155	B65-10340	01	HAFNIUM OXIDE Protective coating withstands high temperature in oxidizing atmosphere M-FS-529	B66-10044	03
GREASE Lightweight load support serves as vibration					



<b>HALOGEN</b>				transistor heat dissipation GSFC-42	B63-10033	01
Primary cells utilize halogen-organic charge transfer complex JPL-926	B66-10682	02		Modular Porous Plate Sublimator /MPPS/ requires only water supply for coolant M-FS-1374	B66-10409	01
<b>HAND</b>				<b>HEAT EFFECT</b>		
Standoff tool speeds placement of friction-fit electrical terminals WOO-029	B65-10348	05		Storage-stable foamable polyurethane is activated by heat LANGLEY-187	B66-10111	03
<b>HANDBOOK</b>				<b>HEAT EXCHANGER</b>		
Pyrometry handbook describes practical aspects of surface temperature measurements of opaque materials LEWIS-349	B66-10520	01		Canilerver springs maintain tension in thermally expanded wires LEWIS-136	B65-10149	05
<b>HANDLING EQUIPMENT</b>				Spiraled channels improve heat transfer between fluids JPL-694	B65-10291	02
Filler device for handling hot corrosive materials MSC-85	B64-10166	03		Heat exchanger tubes supported in high vibration environment M-FS-1401	B66-10567	05
Remotely operated clamping tool has positive grip NU-0020	B65-10254	05		Rotational fluid coupling eliminates hose entanglements MSC-312	B66-10585	05
Hollow plastic hoops protect thermocouple in storage and handling NU-0023	B65-10256	05		<b>HEAT FLOW</b>		
Dispenser leak-tests and sterilizes rubber gloves MSC-285	B66-10166	03		New computer program solves wide variety of heat flow problems M-FS-421	B66-10404	01
Body-fitted harness provides safe and easy component handling M-FS-533	B66-10202	05		<b>HEAT FLUX</b>		
Universal transloader moves delicate equipment without stress MSC-654	B66-10384	05		Graphite element serves as radiant heat source M-FS-105	B65-10218	01
<b>HARDENING</b>				Air-cured ceramic coating insulates against high heat fluxes M-FS-150	B65-10357	03
Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application LANGLEY-6A	B63-10318	03		Heat flux sensor design reduces extraneous source effects MSC-400	B66-10531	01
Stringent cleaning technique assures reliable epoxy bond GSFC-161	B64-10142	03		Light-intensity modulator withstands high heat fluxes MSC-246	B66-10532	02
<b>HARDWARE</b>				Study of theory and application of long duration heat flux transducers M-FS-1265	B66-10614	01
Computer program determines chemical equilibria in complex systems LEWIS-281	B66-10671	01		<b>HEAT REGULATION</b>		
<b>HAZARD</b>				Solid state thermostat has integral probe and circuitry M-FS-434	B66-10193	01
Low-cost insulation system for cryostats eliminates need for a vacuum LEWIS-64	B63-10365	03		<b>HEAT RESISTANCE</b>		
<b>HEART RATE</b>				Removable preheater elements improve oxide induction furnace JPL-288	B63-10193	01
Digital cardiometer computes and displays heartbeat rate MSC-93	B64-10258	01		Thermally conductive metal wool-silicone rubber material can be used as shock and vibration damper JPL-321	B63-10207	03
Inexpensive, stable circuit measures heart rate MSC-95	B65-10010	01		Electrical cabling withstands severe environmental conditions M-FS-1585	B66-10427	01
Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01		<b>HEAT SHIELD</b>		
Phonocardiograph system monitors heart sounds MSC-185	B66-10154	04		New method forms bond line free of voids LANGLEY-20	B63-10558	05
<b>HEAT</b>				Refractory thermal insulation for smooth metal surfaces M-FS-160	B64-10099	03
Reaction heat used in static water removal from fuel cells M-FS-532	B66-10013	01		Modified thermocouple is effective from minus 250 deg to 5000 deg F MSC-420	B66-10461	01
<b>HEAT CONTENT</b>				Heat flux sensor design reduces extraneous source effects MSC-400	B66-10531	01
Probe measures characteristics of hot gas stream M-FS-240	B65-10133	02				
<b>HEAT DISSIPATION</b>						
Indium foil with beryllia washer improves						

## HEAT SINK

Indium foil with beryllia washer improves transistor heat dissipation  
GSFC-42 B63-10033 01

Mounting for diodes provides efficient heat sink  
M-FS-197 B64-10283 01

Automatic thermal switch accelerates cooling-down of cryogenic system  
JPL-655 B65-10068 01

Refractory oxides evaluated for high-temperature use  
LANGLEY-121 B65-10167 03

Electronic modules easily separated from heat sink  
MSC-142 B65-10186 02

Wire mesh isolator protects sensitive electronic components  
GSFC-347 B65-10216 05

Boron nitride housing cools transistors  
WOO-079 B65-10289 01

Copper foil provides uniform heat sink path  
MSC-262 B66-10004 02

Mounting improves heat-sink contact with beryllia washer  
MSC-194 B66-10144 01

Jig protects transistors from heat while tinning leads  
MSC-515 B66-10240 05

Rugged microelectronic module package supports circuitry on heat sink  
MSC-81A B66-10245 01

**HEAT SOURCE**

Graphite element serves as radiant heat source  
M-FS-105 B65-10218 01

High-speed furnace uses infrared radiation for controlled brazing  
NU-0047 B66-10268 02

High intensity radiation heat source is capable of sustained operation  
ARC-61 B66-10547 02

**HEAT TRANSFER**

High purity electroforming yields superior metal models  
ARC-6 B63-10007 05

Cooling method prolongs life of hot-wire transducer  
LEWIS-41 B63-10344 02

New method used to fabricate light-weight heat exchanger for rocket motor  
LEWIS-43 B63-10346 02

Simple transducer measures low heat-transfer rates  
JPL-466 B64-10122 01

Adhesive for vacuum environments resists shock and vibration  
MSC-56 B65-10016 03

Thermistor connector assembly increases accuracy of measurements  
LANGLEY-62 B65-10045 01

Internal cooling increases range of immersion-type temperature probe  
LEWIS-171 B65-10157 02

Insulation accelerates rate of cooling with cryogenic fluid  
MSC-161 B65-10240 02

Vacuum chamber provides improved insulation

and support for cryostat  
M-FS-415 B65-10368 02

Mounting improves heat-sink contact with beryllia washer  
MSC-194 B66-10144 01

Thin-film gage measures low heat-transfer rates  
LANGLEY 205 B66-10180 01

Freon provides heat transfer for solid CO2 calibration standard  
M-FS-644 B66-10257 02

Boron-deoxidized copper withstands brazing temperatures  
M-FS-762 B66-10273 03

Bypass rod transfers heat developed in thermionic diode  
JPL-SC-136 B66-10303 05

Computational procedure for finite difference solution of one-dimensional heat conduction problems reduces computer time  
MSC-1120 B66-10566 01

Selective tube roughening increases heat transfer capability  
M-FS-599 B66-10610 05

Study of theory and application of long duration heat flux transducers  
M-FS-1265 B66-10614 01

Computer program simplifies transient and steady-state temperature prediction for complex body shapes  
MSC-989 B66-10619 01

Low input voltage converter/regulator minimizes external disturbances  
GSFC-527 B66-10689 01

**HEAT TREATMENT**

Heat treatment stabilizes welded aluminum jig and tool structures  
MSC-800 B66-10458 03

Treatment increases stress-corrosion resistance of aluminum alloys  
M-FS-1840 B66-10595 05

Heat-treatment of metal parts facilitated by sand embedment  
M-FS-1543 B66-10616 03

**HEATER**

Apparatus facilitates high-temperature tensile testing in vacuum  
LEWIS-42 B63-10345 03

Filler device for handling hot corrosive materials  
MSC-85 B64-10166 03

Wire winding increases lifetime of oxide-coated cathodes  
LEWIS-154 B65-10032 03

Efficient thin film heating element takes minimum space  
GSFC-289 B65-10123 01

Cantilever springs maintain tension in thermally expanded wires  
LEWIS-136 B65-10149 05

Heater decomposes oil backstreaming from high-vacuum pumps  
GSFC-356 B65-10224 02

Refractory coating protects intricate graphite elements from high-temperature hydrogen  
NU-0027 B66-10084 01

Apparatus measures thermal conductivity of honeycomb-core panels

LANGLEY-202	B66-10127	01	HEPTANE		
Experimental investigation of megawatt dc arc heating of nitrogen			Magnetic fluid readily controlled in zero gravity environment		
LEWIS-313	B66-10508	02	LEWIS-126	B65-10335	03
HEATING			HERMETIC SEAL		
Integral coolant channels simply made by melt-out method			Device transmits rotary motion through hermetically sealed wall		
M-FS-91	B63-10497	05	JPL-303	B63-10198	05
Heated die facilitates tungsten forming			Mouthpiece adapter for pipettes protects mouth from harmful liquids		
LEWIS-25A	B66-10047	05	LANGLEY-47	B65-10043	03
HEATING EQUIPMENT			Critical parts are stored and shipped in environmentally controlled reusable container		
Refractory metal shielding /insulation/ increases operating range of induction furnace			M-FS-703	B66-10258	05
LEWIS-202	B65-10188	02	Hermetically sealed cells protected from internal gas pressure		
Low power heating element provides thermal control during swaging operations			GSFC-555	B66-10692	01
M-FS-457	B66-10206	05	Metal boot permits fabrication of hermetically sealed splices in metal sheathed instrumentation cables		
HELICAL FLOW			NU-0083	B66-10704	05
Stationary device produces homogeneous mixture of fluids			Glass formulation has high coefficient of thermal expansion		
M-FS-525	B66-10570	05	NU-0084	B66-10705	03
HELICAL WINDING			HIGH EFFICIENCY		
Helical tube separates nitrogen gas from liquid nitrogen			Highly efficient square-wave oscillator operator at high power levels		
JPL-398	B63-10251	05	GSFC-112	B63-10554	01
Helical coaxial-resonator makes excellent RF filter			HIGH ENERGY ELECTRON		
GSFC-243	B65-10012	01	Radiation used to temperature compensate semiconductor strain gages		
High frequency wide-band transformer uses coax to achieve high turn ratio and flat response			LANGLEY-207	B66-10186	02
ARG-107	B66-10600	01	HIGH EXPLOSIVE		
HELICOPTER			Explosive force of Primacord grid forms large sheet metal parts		
Scoop attachment makes helicopter recoveries easier and safer			M-FS-316	B66-10014	05
MSC-130	B65-10229	05	HIGH FREQUENCY		
HELIUM			Computer determines high-frequency phase stability		
Cryogenic filter method produces super-pure helium and helium isotopes			GSFC-113	B63-10555	01
JPL-374	B63-10235	03	Increased junction lead inductance ballasts high-frequency transistors		
Supercold technique duplicates magnetic field in second superconductor			GSFC-387	B65-10259	01
JPL-376	B63-10237	05	HIGH POWER		
Low-cost insulation system for cryostats eliminates need for a vacuum			Highly efficient square-wave oscillator operator at high power levels		
LEWIS-64	B63-10365	03	GSFC-112	B63-10554	01
Rapid helium-air analyzer can measure other binary gas mixtures			HIGH PRESSURE		
LANGLEY-16	B63-10557	03	High-pressure regulating system prevents pressure surges		
Cold trap increases sensitivity of gas chromatograph			JPL-231	B63-10170	05
M-FS-1617	B66-10517	03	High-temperature, high-pressure spherical segment valve provides quick opening		
A fast-neutron spectrometer of advanced design			ARC-13	B63-10431	05
M-FS-1664	B66-10555	01	Pneumatic power is transmitted through air bearing		
Resistor monitors transfer of liquid helium			MSC-8	B64-10141	05
LANGLEY-229	B66-10580	01	HIGH SPEED		
HELMET			Ohmmeter senses depletion of lubricant in journal bearings		
Comfortable, lightweight safety helmet holds radio transmitter, receiver			LEWIS-37	B64-10042	01
MSC-53	B64-10015	05	HIGH SPEED CAMERA		
One-piece transparent shell improves design of helmet assembly			Rocket engine vibration accurately measured by photography		
MSC-187	B66-10390	05	M-FS-1916	B66-10652	02
Helmet system broadcasts electroencephalograms of wearer			HIGH STRENGTH ALLOY		
ARC-70	B66-10536	01	New cobalt alloys have high-temperature strength and long life in vacuum environments		
			LEWIS-47	B63-10351	03

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## HOLDER

## HIGH TEMPERATURE

Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss  
LEWIS-39 B63-10342 01

Apparatus facilitates high-temperature tensile testing in vacuum  
LEWIS-42 B63-10345 03

High-temperature, high-pressure spherical segment valve provides quick opening  
ARC-13 B63-10431 05

Gate valve with ceramic-coated base operates at high temperatures  
ARC-23 B63-10562 03

## HIGH TEMPERATURE ALLOY

Nickel-base superalloys developed for high-temperature applications  
LEWIS-226 B66-10222 03

Nonhazardous acid etches weld samples  
M-FS-975 B66-10378 05

## HIGH TEMPERATURE ENVIRONMENT

New cobalt alloys have high-temperature strength and long life in vacuum environments  
LEWIS-47 B63-10351 03

Fastener provides cooling and compensates for thermal expansion  
NU-0003 B65-10038 05

Refractory oxides evaluated for high-temperature use  
LANGLEY-121 B65-10167 03

Refractory coating protects intricate graphite elements from high-temperature hydrogen  
NU-0027 B66-10084 01

High temperature thermocouple operates in reduction atmosphere  
NU-0046 B66-10134 01

Gallium alloy films investigated for use as boundary lubricants  
LEWIS-245 B66-10165 03

Bearing alloys with hexagonal crystal structures provide improved friction and wear characteristics  
LEWIS-320 B66-10373 03

## HIGH TEMPERATURE LUBRICANT

Solid-film lubricant is effective at high temperatures in vacuum  
LEWIS-228 B66-10087 03

## HIGH TEMPERATURE MATERIAL

Rapid billet loader aids extrusion of refractory metals  
LEWIS-50 B63-10354 05

Silazane polymers show promise for high-temperature application  
M-FS-466 B66-10194 03

Flowmeter measures flow rates of high temperature fluids  
LEWIS-328 B66-10521 01

## HIGH TEMPERATURE RESEARCH

Modified thermocouple is effective from minus 250 deg to 5000 deg F  
MSC-420 B66-10461 01

Tungsten insulated susceptor cup for high temperature induction furnace eliminates contamination  
LEWIS-283 B66-10538 03

## HIGH VACUUM

Gallium useful bearing lubricant in high-vacuum environment  
LEWIS-12 B63-10337 03

Improved molybdenum disulfide-silver motor

brushes have extended life  
M-FS-64 B63-10479 03

Instrument accurately measures extremely low air densities  
M-FS-193 B65-10221 01

Polytetrafluoroethylene lubricates ball bearings in vacuum environment  
M-FS-379 B66-10081 03

Rod and dish cathode improves Penning-type vacuum gauge  
GSFC-447 B66-10082 01

Solid-film lubricant is effective at high temperatures in vacuum  
LEWIS-228 B66-10087 03

Feed-thru flange is useful in vacuum applications to cryogenic temperatures  
JPL-846 B66-10615 02

Combination double door high-vacuum valve provides access to vacuum chamber  
JPL-849 B66-10697 05

## HIGH VOLTAGE

Modified filter prevents conduction of microwave signals along high-voltage power supply leads  
JPL-63 B63-10091 01

## HINGE

Concealed hinge permits flush mounting of doors and hatches  
MSC-623 B66-10336 05

Device serves as hinge and electrical connector for circuit boards  
M-FS-743 B66-10359 01

## HOLDER

Molded elastomer provides compact ferrite-core holder, simplifies assembly  
JPL-584 B64-10084 05

Improved holder protects crystal during high acceleration and impact  
JPL-463 B65-10037 05

Carbon-arc rod holder has long life, reduces arc splatter  
MSC-144 B65-10095 03

Insulator-holder protects transistors in dense electronic assemblies  
MSC-214 B65-10389 01

Specimen holder design improves accuracy of X-ray powder analysis  
JPL-SC-165 B66-10075 02

Multisurface fixture permits easy grinding of tool bit angles  
M-FS-586 B66-10171 05

Tool post modification allows easy turret lathe cutting-tool alignment  
M-FS-581 B66-10191 05

Fixed vacuum plate clamps styrofoam for machining  
M-FS-683 B66-10283 05

Swiveling lathe jaw concept for holding irregular pieces  
M-FS-783 B66-10321 05

Inflatable holding fixture permits X-rays to be taken of inner weld areas  
M-FS-856 B66-10327 03

Inspection of fine wires simplified by capillary tube wire holder  
MSC-358 B66-10329 05

Versatile machine mills, saws light materials  
M-FS-827 B66-10364 05

## HOLE DISTRIBUTION

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Special tool kit aids heavily garmented workers MSC-163	B66-10403	05	HUMAN BODY Novel shock absorber features varying yield strengths MSC-63A	B64-10138	03
Flexible drive allows blind machining and welding in hard-to-reach areas MSC-524	B66-10428	05	HUMAN FACTOR Body-fitted harness provides safe and easy component handling M-FS-533	B66-10202	05
Heat-treatment of metal parts facilitated by sand embedment M-FS-1543	B66-10616	03	HUMAN PERFORMANCE Spray-on electrodes enable EKG monitoring of physically active subjects FRC-36	B66-10649	04
HOLE DISTRIBUTION Gear drive automatically indexes rotary table M-FS-753	B66-10383	05	HUMAN REACTION Technique simulates effect of reduced gravity LANGLEY-44	B64-10146	04
HOMOGENEITY Stationary device produces homogeneous mixture of fluids M-FS-525	B66-10570	05	Human transfer functions used to predict system performance parameters LANGLEY-203	B66-10379	01
HONEYCOMB Apparatus permits flexure testing of specimens at cryogenic temperatures M-FS-257	B65-10129	02	Modified algometer provides accurate depth measurements MSC-616	B66-10647	04
Adjustable knife cuts honeycomb material to specified depth MSC-475	B66-10237	05	HYBRID COMPUTER Hybrid computer technique yields random signal probability distributions ARC-34	B65-10208	01
Hollow needle used to cut metal honeycomb structures MSC-486	B66-10244	05	HYDRAULIC ACTUATOR Device disconnects several couplings simultaneously JPL-226	B65-10163	05
Ultrasonic quality inspection of bonded honeycomb assemblies is automated MSC-859	B66-10544	01	HYDRAULIC CONTROL Hydraulically controlled flexible arm can bend in any direction KSC-66-20	B66-10626	05
Study made to control depth of potting compound for honeycomb sandwich fasteners LEWIS-370	B66-10677	05	HYDRAULIC EQUIPMENT Upsetting butt edge increases weld-joint strength M-FS-175	B64-10164	05
HONEYCOMB CORE Flexible honeycomb structure can bend to fit compound curves M-FS-13	B63-10385	05	Hydraulic device provides accurate displacements to microinches MSC-112	B65-10230	05
Apparatus measures thermal conductivity of honeycomb-core panels LANGLEY-202	B66-10127	01	Shock absorber operates over wide range MSC-168	B65-10241	05
Insulation for cryogenic tanks has reduced thickness and weight M-FS-326	B66-10183	02	Rotary valve controls multiple hydraulic leveling cylinders M-FS-361	B66-10402	05
Aluminum core structures brazed without use of flux M-FS-659	B66-10360	05	HYDRAULIC FLUID Hydraulic fluid serves as mandrel for small diameter refractory tube drawing ARG-44	B66-10523	05
HORIZON SENSING Sextant measures spacecraft altitude without gravitational reference MSC-200	B66-10143	02	HYDRAULIC SYSTEM New nut and sleeve improve flared connections M-FS-194	B65-10180	05
HORN ANTENNA Novel horn antenna reduces side lobes, improves radiation pattern JPL-425	B63-10264	01	Hydraulic drive system prevents backlash JPL-371	B65-10351	05
HOT GAS Probe measures characteristics of hot gas stream M-FS-240	B65-10133	02	O-ring tube fittings form leakproof seal in hydraulic systems M-FS-481	B66-10020	05
HOT WIRE Hot-wire detector for chemically active materials used in gas chromatography MSC-269	B66-10139	03	Modified hydraulic braking system limits angular deceleration to safe values GSFC-476	B66-10310	05
HOT-WIRE ANEMOMETER Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02	Quick-response servo amplifies small hydraulic pressure differences ARG-99	B66-10498	05
HOT-WIRE TURBULENCE MEASURING APPARATUS Study of hot wire techniques in low density flows with high turbulence levels M-FS-1269	B66-10687	01	HYDRAZINE Solder flux leaves corrosion-resistant coating on metal JPL-611	B64-10206	03
			Gas chromatographic column enables analysis of propellant hydrazines		

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## IMAGE TRANSDUCER

MSC-1161	B66-10586	03	IDENTIFICATION		
HYDROCARBON			Simple, nondestructive test identifies metals		
Vapor condensation process produces slurry of magnesium particles in liquid hydrocarbons			MSC-525	B66-10305	03
LEWIS-263	B66-10104	03	Chart system simplifies identification of complex design assemblies		
HYDROGEN			MSC-752	B66-10460	05
Cryopumping of hydrogen in vacuum chambers is aided by catalytic oxidation of hydrogen			Electrical continuity scanner facilitates identification of wires for soldering to connectors		
LEWIS-15	B63-10340	05	MSC-626	B66-10605	01
Miniature oxygen-hydrogen cutting torch constructed from hypodermic needle			Process produces accurate registry between circuit board prints		
JPL-545	B63-10517	05	LANGLEY-288	B66-10660	02
Process reduces pore diameters to produce superior filters			IGNITER		
WOO-093	B66-10037	03	Igniting system for mercury vapor lamps protects transistorized sustaining supply		
Hydrogen-atmosphere induction furnace has increased temperature range			JPL-421	B63-10262	01
LEWIS-153	B66-10055	05	IGNITION SYSTEM		
Refractory coating protects intricate graphite elements from high-temperature hydrogen			Igniting system for mercury vapor lamps protects transistorized sustaining supply		
NU-0027	B66-10084	01	JPL-421	B63-10262	01
Oxygen-hydrogen torch is a small-scale steam generator			Circuit controls transients in SCR inverters		
NU-0042	B66-10120	03	GSFC-120	B63-10600	01
Device removes hydrogen gas from enclosed spaces			Carbon arc ignition improved by simple auxiliary circuit		
GSFC-495	B66-10340	03	MSC-103	B65-10018	01
Sniffer used as portable hydrogen leak detector			Power arc welder touch-started with consumable electrode		
M-FS-846	B66-10356	01	M-FS-1485	B66-10641	05
Infrared television used to detect hydrogen fires			Cold solid propellant motor has stop-restart capability		
M-FS-654	B66-10363	01	JPL-836	B66-10673	03
Hydrogen fire detection system features sharp discrimination			IGNITRON		
M-FS-643	B66-10368	01	Compact SCR trigger circuit for Ignitron switch operates efficiently		
HYDROGEN PEROXIDE			M-FS-371	B65-10347	01
Plated nickel wire mesh makes superior catalyst bed			ILLUMINATION		
MSC-216	B65-10321	03	New low-level Ac amplifier provides adjustable noise cancellation and automatic temperature compensation		
HYDROSTATIC PRESSURE			MSC-108	B65-10003	05
Nonresonant support facilitates vibration testing of structures			Circular, explosion-proof lamp provides uniform illumination		
M-FS-224	B65-10039	05	MSC-382	B66-10156	02
HYDROX FUEL CELL			Panels illuminated by edge-lighted lens technique		
Reaction heat used in static water removal from fuel cells			MSC-871	B66-10507	02
M-FS-532	B66-10013	01	IMAGE		
HYSTERESIS			Setting of angles on machine tools speeded by magnetic protractor		
New package for belleville spring permits rate change, easy disassembly			ARC-5	B63-10006	01
JPL-392	B63-10247	05	Built-in templates speed up process for making accurate models		
Diaphragm spring gives clutch over-center toggle effect			LANGLEY-23	B63-10526	05
GSFC-499	B66-10297	05	Fresnel zone plate forms images at wavelengths below 1000 angstroms		
I-BEAM			GSFC-231	B65-10171	02
Self-balancing beam permits safe, easy load handling under overhang			IMAGE CONVERTER		
M-FS-84	B63-10571	05	Electron-beam deflection controlled by digital signals		
IBM 7094 COMPUTER			GSFC-385	B65-10283	02
Computer routine adds plotting capabilities to existing programs			New television camera eliminates vidicon tube		
GSFC-490	B66-10511	01	M-FS-472	B66-10112	01
IDEAL GAS			IMAGE TRANSDUCER		
Computer program determines gas flow rates in piping systems			Cesium iodide crystals fused to vacuum tube faceplates		
M-FS-443	B66-10300	01	GSFC-67	B63-10476	03

## IMAGING TECHNIQUE

Electromechanically operated camera shutter provides uniform exposure JPL-357	B63-10227	01	transistor heat dissipation GSFC-42	B63-10033	01
Optical device enables small detector to see large field of view WOO-253	B66-10263	02	<b>INDUCTANCE</b> Simple circuit produces high-speed, fixed duration pulses GSFC-285	B65-10228	01
<b>IMBEDDING</b> Pressure transducer 3/8-inch in size can be faired into surface WOO-065	B64-10021	05	Increased junction lead inductance ballasts high-frequency transistors GSFC-387	B65-10259	01
Accurate depth control provided for thermocouple junction locations LANGLEY-289	B66-10632	01	<b>INDUCTION HEATING EQUIPMENT</b> Removable preheater elements improve oxide induction furnace JPL-288	B63-10193	01
<b>IMMERSION</b> Wedge immersed thermistor bolometer measures infrared radiation GSFC-443	B65-10330	02	Refractory metal shielding /insulation/ increases operating range of induction furnace LEWIS-202	B65-10188	02
<b>IMPACT</b> Ultra-sensitive transducer advances micro-measurement range ARC-26	B64-10004	01	Hydrogen-atmosphere induction furnace has increased temperature range LEWIS-153	B66-10055	05
<b>IMPACT ACCELERATION</b> Improved holder protects crystal during high acceleration and impact JPL-463	B65-10037	05	Auxiliary coil controls temperature of RF induction heater GSFC-428	B66-10067	01
<b>IMPACT DECELERATION</b> Kinetic-energy absorber employs frictional force between mating cylinders LEWIS-75	B63-10442	05	<b>INDUCTION SYSTEM</b> Inductive system detects level of conducting fluids LEWIS-322	B66-10392	01
<b>IMPEDANCE</b> High-pass rf coaxial filter rejects dc and low frequency signals GSFC-73	B64-10173	01	<b>INDUCTOR</b> Inductor flyback characteristic gives voltage regulator fast response GSFC-361	B65-10257	01
<b>IMPINGEMENT</b> Improved technique for localizing electro-polishing features novel nozzles WOO-101	B64-10271	01	<b>INDUSTRIAL SAFETY</b> Emergency escape system protects personnel from explosion and fire KSC-66-12	B66-10634	05
<b>IMPURITY</b> Impurity diffusion process for silicon semiconductors is fast and precise GSFC-397	B65-10300	01	<b>INDUSTRY</b> Computer simulation program is adaptable to industrial processes LEWIS-240	B66-10426	01
<b>INCLINATION</b> Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	<b>INERT ATMOSPHERE</b> Thoriated nickel bonded by solid-state diffusion method LANGLEY-116	B65-10220	03
<b>INCONEL</b> Wire material reduces compressor blade vibration LEWIS-357	B66-10666	03	Refractory metals welded or brazed with tungsten inert gas equipment LEWIS-219	B65-10319	05
<b>INDICATOR</b> Speed-sensing device aids crane operators WS-4	B64-10006	05	Inert-gas welding and brazing enclosure fabricated from sheet plastic LEWIS-220	B65-10338	05
Coaxial capacitor used to determine fluid density LEWIS-232	B65-10296	02	<b>INERT GAS</b> Novel clamps align large rocket cases, eliminate back-up bars M-FS-1	B63-10376	05
Test strips detect different CO2 concentrations in closed compartments MSC-210	B65-10390	03	Welding procedure improves quality of welds, offers other advantages M-FS-32	B64-10309	01
Depth indicator and stop aid machining to precise tolerances M-FS-553	B66-10149	05	<b>INERTIA MOMENT</b> Device enables measurement of moments of inertia about three axes GSFC-49	B65-10176	05
Torque wrench allows readings from inaccessible locations M-FS-598	B66-10204	05	Automatic system determines moments of inertia of asymmetrical objects M-FS-1769	B66-10636	01
Device facilitates centering of workpieces in lathe chuck M-FS-685	B66-10277	05	<b>INFLATABLE DEVICE</b> Buoyant Stokes litter assembly used for sea rescue operations MSC-131	B66-10019	05
<b>INDIUM</b> Indium foil with beryllia washer improves			Self-inflating lifevest stores in small package MSC-5A	B66-10184	04

Flexible fastener effects airtight material closure JPL-684	B66-10304	05	INJECTOR	Dust particle injector for hypervelocity accelerators provides high charge-to-mass ratio GSFC-509	B66-10347	01
Inflatable holding fixture permits X-rays to be taken of inner weld areas M-FS-856	B66-10327	03	INLET	Packless valve with all-metal seal handles wide temperature, pressure range JPL-361	B63-10228	05
Inflatable O-ring seal would ease closing of hatch cover plate MSC-740	B66-10385	05		Filter for high-pressure gases has easy take-down, assembly JPL-373	B63-10234	03
INFLATABLE STRUCTURE				Fluid-pressure meter can be calibrated without removal from flow line M-FS-98	B63-10502	05
New inflatable liferaft is nontippable MSC-4A	B64-10001	05	INORGANIC COATING	Anodization process produces opaque, reflective coatings on aluminum M-FS-348	B65-10336	03
Rotating mandrel speeds assembly of plastic inflatables LANGLEY-155	B66-10137	05	INORGANIC COMPOUND	Inorganic paint is durable, fireproof, easy to apply GSFC-366	B65-10156	03
Portable lightweight cell provides controlled environment MSC-648	B66-10370	05	INPUT	Veitch diagram plotter simplifies Boolean functions JPL-385	B63-10241	05
INFORMATION PROCESSING				Double-throw microwave device switches two lines quickly JPL-410	B63-10258	01
Superconductor magnets used for stagger-tuning traveling-wave maser GSFC-292	B65-10165	01		Computer circuit will fit on single silicon chip JPL-513	B63-10514	01
INFORMATION RETRIEVAL				Transistorized converter provides nondissipative regulation GSFC-238	B64-10305	01
Opaque microfiche masthead permits easy reading HQ-7	B65-10306	01		Stepping motor drive circuit designed for low power drain GSFC-198	B65-10026	01
Computer program searches characteristic data of diodes and transistors GSFC-493	B66-10529	01		Transistor voltage comparator performs own sensing GSFC-228	B65-10028	01
INFRARED FILTER				Photoelectric semiconductor switch operates with low level inputs JPL-SC-068	B65-10033	01
PTFE-aluminum films serve as neutral density filters LANGLEY-189	B66-10017	02		Automatic gain control circuit handles wide input range MSC-166	B66-10089	01
INFRARED INSTRUMENT				Electropneumatic transducer automatically limits motor current LEWIS-253	B66-10160	01
Infrared television used to detect hydrogen fires M-FS-654	B66-10363	01		Offset lenses add versatility to phototypesetting machine HQ-9	B66-10173	02
INFRARED RADIATION			INSERT	Gate valve with ceramic-coated base operates at high temperatures ARC-23	B63-10562	03
IR-transmission glasses formed from oxides of bismuth and tellurium M-FS-279	B65-10190	03		Expandable insert serves as screw anchor MSC-301	B66-10132	05
Infrared shield facilitates optical pyrometer measurements LANGLEY-133	B65-10272	02		Insert sleeve prevents tube soldering contamination MSC-552	B66-10238	05
Wedge immersed thermistor bolometer measures infrared radiation GSFC-443	B65-10330	02		Study made to control depth of potting compound for honeycomb sandwich fasteners LEWIS-370	B66-10677	05
Inexpensive infrared source improvised from flashlight M-FS-494	B66-10096	02	INSERTION	Improved insertion-loss tester JPL-358	B64-10080	01
High-speed furnace uses infrared radiation for controlled brazing NU-0047	B66-10268	02				
INFRARED TRACKING						
Point-source detection system rejects spatially extended radiation sources GSFC-486	B66-10622	01				
INHOMOGENEITY						
Calculation of infrared spectral transmittances of inhomogeneous gases M-FS-1563	B66-10554	02				
INJECTION						
Filler device for handling hot corrosive materials MSC-85	B64-10166	03				
Economical fabrication process produces high-quality junction transistors JPL-SC-065	B64-10330	01				



## INSPECTION

## SUBJECT INDEX

## INSPECTION

Use of photographs speeds inspection of  
printed-circuit boards  
MSC-72 B64-10118 01

Crack detection method is safe in presence of  
liquid oxygen  
M-FS-236 B65-10107 03

Ultrasonic recording scanner used for  
nondestructive weld inspection  
M-FS-284 B66-10220 01

Ultrasonic quality inspection of bonded  
honeycomb assemblies is automated  
MSC-859 B66-10544 01

## INSTALLATION

Low-cost tool minimizes damage to O-rings  
during installation  
MSC-140 B65-10116 05

Microminiature thermocouple monitors own  
installation  
M-FS-1111 B66-10463 05

Thermocouples easily installed in hard-to-  
get-to places  
M-FS-1946 B66-10653 01

## INSTRUMENTATION

Instrument adjustment knob locks to prevent  
accidental maladjustment  
M-FS-190 B64-10249 05

Gapped toroid provides infinite resolution  
of delay-line pickup  
GSFC-370 B65-10258 01

Minimum permissible leakage resistance  
established for instrumentation systems  
M-FS-848 B66-10397 01

Computer program determines performance  
efficiency of remote measuring systems  
M-FS-1137 B66-10503 01

Low level accelerometer test methods are  
investigated  
M-FS-908 B66-10510 01

## INSULATION

Low-cost insulation system for cryostats  
eliminates need for a vacuum  
LEWIS-64 B63-10365 03

Spherical electrode eliminates high-voltage  
breakdown  
LEWIS-155 B65-10139 01

Refractory oxides evaluated for  
high-temperature use  
LANGLEY-121 B65-10167 03

Thin transparent films formed from powdered  
glass  
GSFC-352 B65-10217 03

Insulation accelerates rate of cooling with  
cryogenic fluid  
MSC-161 B65-10240 02

Closed fluid system without moving parts  
controls temperature  
LEWIS-222 B65-10331 02

Soluble undercoating facilitates removal of  
foamed-in-place insulation  
LEWIS-193 B65-10344 03

Air-cured ceramic coating insulates against  
high heat fluxes  
M-FS-150 B65-10357 03

Nylon bit removes cork insulation without  
damage to substrate  
MSC-381 B66-10152 05

Control system maintains compartment at

constant temperature  
JPL-SC-145 B66-10188 05

## INSULATOR

Connector for thermocouple leads saves costly  
wire, makes reliable connectors  
LANGLEY-26 B63-10529 01

Insulator-holder protects transistors in dense  
electronic assemblies  
MSC-214 B65-10389 01

Reflective insulator layers separated by  
bonded silica beads  
MSC-215 B66-10070 03

Thermocouple-flexible cable connector  
insulator is highly reliable  
NU-0082 B66-10709 01

## INTEGRATED CIRCUIT

Field-effect transistor replaces bulky  
transformer in analog-gate circuit  
GSFC-351 B65-10284 01

Diffusion technique stabilizes resistor  
values  
MSC-205 B66-10142 01

High-performance rc bandpass filter is  
adapted to miniaturized construction  
ARC-60 B66-10309 01

## INTEGRATOR

Digital logic elements provide additional  
functions from analog input  
MSC-64 B64-10064 01

Solid-state switching used to speed up  
capacitive integrator  
LANGLEY-104 B65-10159 01

Electronic ampere-hour integrator is accurate  
to one percent  
GSFC-203 B65-10308 01

## INTENSITY

Variable light source with a million-to-one  
intensity ratio  
JPL-W00-008 B63-10424 03

## INTERFACE

Indium foil with beryllia washer improves  
transistor heat dissipation  
GSFC-42 B63-10033 01

Seal allows blind assembly and thermal expan-  
sion of components  
NU-0005 B65-10053 05

## INTERFERENCE FACTOR TABLE

Basic suppression techniques are evaluated  
M-FS-867 B66-10449 01

## INTERFEROMETER

Interferometer combines laser light source  
and digital counting system  
MSC-151 B65-10161 01

Interferometer construction assures  
parallelism of critical components  
JPL-704 B65-10292 02

Unique construction makes interferometer  
insensitive to mechanical stresses  
JPL-725 B65-10295 02

Motion drive system is accurately controlled  
in the 1-micron range  
JPL-864 B66-10695 05

## INTERNAL COMBUSTION ENGINE

Indicator system provides complete data of  
engine cylinder pressure variation  
LEWIS-291 B66-10470 05

## INTERNAL COMPRESSION INLET

Perforations in jet engine supersonic inlet

## SUBJECT INDEX

## JET ENGINE

increase shock stability NEO-8	B66-10530	05	M-FS-909	B66-10438	01
<b>INTERPOLATION</b> Simple scale interpolator facilitates reading of graphs LANGLEY-88	B65-10070	05	<b>IONIZATION GAUGE</b> Precision gage measures ultrahigh vacuum levels GSFC-114	B63-10597	01
<b>INTERSTICE</b> Wire bundle formed into grids with minute interstices WOO-089	B65-10372	03	Cold cathode ionization gauge has rigid metal housing GSFC-445	B66-10041	01
<b>INVENTORY CONTROL</b> Computer program determines inventory size M-FS-1135	B66-10506	01	Rod and dish cathode improves Penning-type vacuum gauge GSFC-447	B66-10082	01
<b>INVERTER</b> Circuit controls transients in SCR inverters GSFC-120	B63-10600	01	<b>IRON</b> Modified filter prevents conduction of micro- wave signals along high-voltage power supply leads JPL-63	B63-10091	01
<b>INVESTMENT CASTING</b> Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns ARC-7	B63-10008	05	<b>IRON ALLOY</b> Gage of 6.5 per cent Si-Fe sheet is chemically reduced MSC-537	B66-10454	03
<b>IODIDE</b> Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03	Process yield Co-Fe alloys with superior high temperature magnetic properties LEWIS-333	B66-10535	03
New method used to fabricate gallium arsenide photovoltaic device WOO-062	B64-10019	01	<b>IRON OXIDE</b> Cryogenic filter method produces super-pure helium and helium isotopes JPL-374	B63-10235	03
Pressure transducer 3/8-inch in size can be faired into surface WOO-065	B64-10021	05	Magnetic fluid readily controlled in zero gravity environment LEWIS-126	B65-10335	03
Cuprous selenide and sulfide form improved photovoltaic barriers WOO-212	B66-10025	01	<b>ISOCYANATE</b> Process produces chlorinated aromatic isocyanate in high yield M-FS-1658	B66-10646	03
<b>ION</b> Fine-mesh screen made by simplified method WOO-104	B64-10282	03	<b>ISOLATION</b> High-pass rf coaxial filter rejects dc and low frequency signals GSFC-73	B64-10173	01
<b>ION BEAM</b> New apparatus increases ion beam power density LEWIS-73	B63-10440	01	Mechanism isolates load weighing cell during lifting of load MSC-297	B66-10071	05
<b>ION BOMBARDMENT</b> Highly sensitive solids mass spectrometer uses inert-gas ion source ERC-11	B66-10114	02	Study of fast response thermocouple measurement of temperatures in cryogenic gases M-FS-1659	B66-10661	01
<b>ION CHAMBER</b> Ion chambers simplify absolute intensity measurements in the vacuum ultraviolet ERC-10	B66-10439	01	<b>ISOLATOR</b> Wire mesh isolator protects sensitive elec- tronic components GSFC-347	B65-10216	05
<b>ION DENSITY</b> New apparatus increases ion beam power density LEWIS-73	B63-10440	01	<b>ISOTOPE</b> Neon isotopes cancel errors in gas laser M-FS-1476	B66-10583	02
<b>ION ENGINE</b> New apparatus increases ion beam power density LEWIS-73	B63-10440	01	<b>ITERATION</b> Computer modification reduces time of performing iterative division M-FS-166	B65-10005	01
Apparatus measures very small thrusts WOO-048	B64-10284	05	<b>J</b>		
Wire bundle formed into grids with minute interstices WOO-089	B65-10372	03			
<b>ION PUMP</b> Ion pump provides increased vacuum pumping speed NEO-13	B65-10239	02	<b>J- 2 ROCKET ENGINE</b> Solid state annunciator facilitates complex system troubleshooting M-FS-1258	B66-10505	01
<b>IONIZATION</b> Radon gas, useful for medical purposes, safely fixed in quartz ARG-2	B66-10468	04	<b>JACKING EQUIPMENT</b> Heavy duty precision leveling jacks expedite setup time on horizontal boring mill M-FS-1084	B66-10411	05
<b>IONIZATION CHAMBER</b> Densitometer system for liquid hydrogen has high accuracy, fast response			<b>JET ENGINE</b> Perforations in jet engine supersonic inlet increase shock stability NEO-8	B66-10530	05

## JET FUEL

Centrifugal device separates liquid from gas  
MSC-282 B65-10394 05

## JIG

Jig and fixture aid fabrication of tungsten  
rivets  
LEWIS-185 B65-10101 05

Spiral heater coils hand-formed with fixture  
LEWIS-208 B65-10192 05

Assembly jig assures reliable solar cell  
modules  
GSFC-455 B66-10040 05

Jig protects transistors from heat while  
tinning leads  
MSC-515 B66-10240 05

Heat treatment stabilizes welded aluminum  
jig and tool structures  
MSC-800 B66-10458 03

## JIG BORING MACHINE

Depth indicator and stop aid machining to  
precise tolerances  
M-FS-553 B66-10149 05

## JOINT

Lightweight universal joint transmits both  
torque and thrust  
JPL-375 B63-10236 05

Sleeve and cutter simplify disconnecting  
welded joint in tubing  
JPL-384 B63-10240 05

New method used to fabricate light-weight heat  
exchanger for rocket motor  
LEWIS-43 B63-10346 02

Circuit reliability boosted by soldering pins  
of disconnect plugs to sockets  
JPL-447 B64-10002 01

Flexible fastener allows thermal expansion  
LANGLEY-40 B64-10145 05

Splice plate design assures structural  
separation by mild explosive  
MSC-137 B65-10166 05

Ball-and socket joints provide accurate  
biaxial gimbal  
JPL-658 B65-10205 05

Thermocouple-to-instrumentation connector  
features quick assembly  
NU-0022 B65-10246 05

Universal bellows joint restraint permits  
angular and offset movement  
WOO-102 B65-10371 05

Photosensors used to maintain welding  
electrode-to-joint alignment  
MSC-243 B65-10401 05

Flexible coiled spline securely joins mating  
cylinders  
WOO-270 B66-10172 05

Tool separates sleeve-type unions without heat  
MSC-497 B66-10253 05

Union would facilitate joining of tubing,  
minimize braze contamination  
MSC-777 B66-10311 05

Hollow spherical rotors fabricated by  
electroplating  
JPL-SC-117 B66-10366 05

Spherical pipe joint delivers loads equally  
to mating flange  
M-FS-807 B66-10665 05

## JOURNAL BEARING

Ohmmeter senses depletion of lubricant in  
journal bearings  
LEWIS-37 B64-10042 01

A conceptual design for squeeze film bearings  
M-FS-573 B66-10226 05

## JUNCTION

Multiple temperatures sampled using only one  
reference junction  
GSFC-485 B66-10260 01

## JUNCTION TRANSISTOR

Economical fabrication process produces high-  
quality junction transistors  
JPL-SC-065 B64-10330 01

## K

## KEYING

Polarizing keys prevent mismatch of connector  
plugs and receptacles  
MSC-443 B66-10251 01

## KINETIC ENERGY

Kinetic-energy absorber employs frictional  
force between mating cylinders  
LEWIS-75 B63-10442 05

Shock absorber operates over wide range  
MSC-168 B65-10241 05

## KRYPTON

Radioactive method enables determination of  
surface areas rapidly and accurately  
NU-0088 B66-10710 03

## L

## LABORATORY APPARATUS

Ceramic-coated boat is chemically inert,  
provides good heat transfer  
LANGLEY-90 B65-10063 05

Apparatus enables automatic microanalysis of  
body fluids  
JPL-962 B66-10515 04

## LABYRINTH

Labyrinth-type valve seat increases valve  
life by decreasing fluid velocity  
M-FS-1051 B66-10424 05

## LAMINAR BOUNDARY LAYER

Thin-film gage measures low heat-transfer  
rates  
LANGLEY 205 B66-10180 01

## LAMINATE

Flexible curtain shields equipment from  
intense heat fluxes  
M-FS-48 B65-10044 03

## LAMINATED MATERIAL

Peel resistance of adhesive bonds accurately  
measured  
GSFC-320 B65-10173 03

Device detects unbonded areas in plastic  
laminates  
WOO-206 B65-10380 01

Drill bit design assures clean holes in  
laminated materials  
WOO-098 B65-10386 05

Impact- and puncture-resistant material  
protects parts from damage  
MSC-747 B66-10375 05

Composite gaskets are compatible with liquid  
oxygen, resist compression set  
M-FS-455 B66-10395 03

## LAMP

Igniting system for mercury vapor lamps pro-  
tects transistorized sustaining supply  
JPL-421 B63-10262 01

## SUBJECT INDEX

## LENS

Electrodeless discharge lamp is easily started, has high stability WOO-030	B66-10015	01	LAUNCHING	Controlled release device prevents damage from dynamic stresses KSC-66-14	B66-10628	05
Lamp automatically switches to new filament on burnout M-FS-498	B66-10046	01	LEAD	Metals plated on fluorocarbon polymers JPL-544	B63-10612	03
Circular, explosion-proof lamp provides uniform illumination MSC-382	B66-10156	02		Tool forms right angles in component leads M-FS-722	B66-10346	05
Two-light circuit continuously monitors ac ground, phase, and neutral wires MSC-356	B66-10163	01	LEAD OXIDE	Lead oxide ceramic makes excellent high-temperature lubricant LEWIS-144	B64-10116	03
LAP JOINT			LEAD TELLURIDE	Thermoelectric elements diffusion-bonded to tungsten electrodes GSFC-346	B65-10309	01
Lightweight door seals cryogenic container against diaphragm type loading M-FS-476	B65-10402	05	LEAKAGE	Vented piston seal prevents fluid leakage between two chambers JPL-179	B63-10141	05
Solar cell submodule design facilitates assembly of lightweight arrays JPL-728	B66-10231	02		Self sealing disconnect for tubing forms metal seal after breakaway JPL-354	B63-10226	05
LASER				Diaphragm eliminates leakage in cryogenic fluid duct coupling WOO-142	B65-10227	05
Modification increases light output of injection-luminescent diodes M-FS-192	B65-10006	01		Weld leaks rapidly and safely detected M-FS-362	B65-10265	01
Laser beam transmits electric power GSFC-293	B65-10158	01		O-ring tube fittings form leakproof seal in hydraulic systems M-FS-481	B66-10020	05
Interferometer combines laser light source and digital counting system MSC-151	B65-10161	01		Capacitive system detects and locates fluid leaks M-FS-478	B66-10099	01
Solid-state laser transmitter is amplitude modulated MSC-121	B65-10238	01		Dispenser leak-tests and sterilizes rubber gloves MSC-285	B66-10166	03
Communication system uses modulated laser beam GSFC-377	B65-10333	01		Expandable rubber plug seals openings for pressure testing NU-0048	B66-10229	05
Laser measuring system accurately locates point coordinates on photograph ARG-74	B66-10560	02		Vacuum test fixture improves leakage rate measurements MSC-271	B66-10286	01
Optical superheterodyne receiver uses laser for local oscillator M-FS-1605	B66-10584	01		Union would facilitate joining of tubing, minimize braze contamination MSC-777	B66-10311	05
Concept for using laser beams to measure electron density in plasmas M-FS-965	B66-10645	01		Minimum permissible leakage resistance established for instrumentation systems M-FS-848	B66-10397	01
LASER MODE				Leak locator for vacuum jacketed pipelines eliminates need for removal of outer jacket M-FS-888	B66-10412	01
Neon isotopes cancel errors in gas laser M-FS-1476	B66-10583	02		Electroplating eliminates gas leakage in brazed areas M-FS-923	B66-10415	05
LATHE				Gas leak detector is simple and inexpensive M-FS-1206	B66-10669	01
Lathe converted for grinding aspheric surfaces GSFC-115	B63-10556	05	LEGIBILITY	Disk calculator indicates legible lettering size for slide projection GSFC-409	B65-10339	05
Metal bellows custom-fabricated from tubing LEWIS-192	B65-10150	05		Legibility of electroluminescent instrument panels investigated MSC-494	B66-10316	02
Lathe attachment used to machine elliptical cones MSC-100	B65-10168	05	LENS	Lathe converted for grinding aspheric surfaces		
Self-aligning fixture used in lathe chuck jaw refacing FRC-21	B65-10198	05				
Tool post modification allows easy turret lathe cutting-tool alignment M-FS-581	B66-10191	05				
Lathe chuck key incorporates safety feature MSC-506	B66-10243	05				
Device facilitates centering of workpieces in lathe chuck M-FS-685	B66-10277	05				
Swiveling lathe jaw concept for holding irregular pieces M-FS-783	B66-10321	05				

GSFC-115	B63-10556	05	heat fluxes MSC-246	B66-10532	02
Optical arrangement increases useful light output of semiconductor diodes JPL-SC-064	B65-10020	05	<b>LIGHT PROBE</b> Photoelectric system continuously monitors liquid level M-FS-417	B65-10382	01
Screen of cylindrical lenses produces stereoscopic television pictures M-FS-273	B66-10086	02	<b>LIGHT SCATTERING</b> Thin carbon film serves as UV bandpass filter ERC-8	B66-10060	02
Circular, explosion-proof lamp provides uniform illumination MSC-382	B66-10156	02	<b>LIGHT SOURCE</b> Fresnel cup reflector directs maximum energy from light source JPL-424	B63-10263	03
Offset lenses add versatility to phototypesetting machine HQ-9	B66-10173	02	Mirror device aligns machine surface perpen- dicular to sight lines W00-5	B63-10421	02
Panels illuminated by edge-lighted lens technique MSC-871	B66-10507	02	Variable light source with a million-to-one intensity ratio JPL-W00-008	B63-10424	03
<b>LIDAR</b> Precision CW laser automatic tracking system investigated M-FS-1606	B66-10629	01	Attachment converts microscope to point source autocollimator JPL-499	B64-10124	05
<b>LIFT DEVICE</b> Mechanism isolates load weighing cell during lifting of load MSC-297	B66-10071	05	Electronic device simulates respiration rate and depth MSC-89	B64-10255	01
Simulator effects partial gravity conditions MSC-152	B66-10339	05	Modification increases light output of injection-luminescent diodes M-FS-192	B65-10006	01
Self-actuating grapple automatically engages and releases loads from overhead cranes ARG-81	B66-10522	05	Simple optical system used to align spectrograph LANGLEY-92	B65-10071	02
Hoist is automatically stopped at low deceleration rate M-FS-1639	B66-10545	05	Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01
Orthopedic stretcher with average-sized person can pass through 18-inch opening M-FS-811	B66-10573	05	Interferometer combines laser light source and digital counting system MSC-151	B65-10161	01
<b>LIGHT</b> Variable light source with a million-to-one intensity ratio JPL-W00-008	B63-10424	03	Photoresistance analog multiplier has wide range GSFC-360	B65-10287	01
<b>LIGHT BULB</b> Inexpensive infrared source improvised from flashlight M-FS-494	B66-10096	02	Small, high-intensity flasher permits continuous close-in photography NU-0043	B66-10119	03
<b>LIGHT EMISSION</b> Optical arrangement increases useful light output of semiconductor diodes JPL-SC-064	B65-10020	05	Optical gyro pickoff operates at cryogenic temperatures M-FS-407	B66-10128	01
Inexpensive infrared source improvised from flashlight M-FS-494	B66-10096	02	Direction indicator system does not require complicated optics W00-305	B66-10407	01
<b>LIGHT INTENSITY</b> Variable light source with a million-to-one intensity ratio JPL-W00-008	B63-10424	03	Electrically controlled optical latch and switch requires less current JPL-SC-111	B66-10414	01
<b>LIGHT MODULATOR</b> Light ray modulation controls optical system alignment GSFC-171	B65-10211	02	Photocell shadowing technique improves light source detector JPL-809	B66-10564	01
Communication system uses modulated laser beam GSFC-377	B65-10333	01	<b>LIGHT TRANSMISSION</b> Borate glass efficiently transmits ultraviolet light ARG-91	B66-10475	03
Device to color modulate a stationary light beam gives high intensity HQ-44	B66-10476	01	<b>LIGHTING</b> New low-level Ac amplifier provides adjustable noise cancellation and automatic temperature compensation MSC-108	B65-10003	05
Improved design provides faster response time in photomultiplier GSFC-451	B66-10526	01	<b>LIGHTING EQUIPMENT</b> Panels illuminated by edge-lighted lens technique MSC-871	B66-10507	02
Light-intensity modulator withstands high					

# SUBJECT INDEX

## LIQUID FLOW

### LIGHTWEIGHT

Break-up of metal tube makes one-time shock absorber, bars rebound  
 LANGLEY-1A B63-10304 05

Lightweight magnesium-lithium alloys show promise  
 M-FS-17 B63-10389 03

Comfortable, lightweight safety helmet holds radio transmitter, receiver  
 MSC-53 B64-10015 05

Aluminum/steel wire composite plates exhibit high tensile strength  
 M-FS-401 B66-10262 05

### LIMITER

Tunnel-diode circuit features zero-level clipping  
 GSFC-241 B65-10002 01

High-speed square-wave current limiter operates efficiently  
 JPL-SC-073 B65-10233 01

T-handle wrench has torque-limiting action  
 MSC-280 B66-10065 05

Hand drill adapter limits holes to desired depth  
 MSC-346 B66-10123 05

Magnetically operated limit switch has improved reliability, minimizes arcing  
 MSC-422 B66-10270 01

Circuit protects regulated power supply against overload current  
 GSFC-453 B66-10292 01

### LINE SHAPE

Parallel line raster eliminates ambiguities in reading timing of pulses less than 500 microseconds apart  
 JPL-805 B66-10386 01

### LINEAR ARRAY

Binary sequence detector uses minimum number of decision elements  
 JPL-673 B66-10264 01

### LINEAR CIRCUIT

Simple circuit functions as frequency discriminator for PFM signals  
 GSFC-267 B65-10102 01

Diffusion technique stabilizes resistor values  
 MSC-205 B66-10142 01

Linear signal noise summer accurately determines and controls S/N ratio  
 JPL-SC-152 B66-10433 01

### LINEAR SYSTEM

Simple circuit provides adjustable voltage with linear temperature variation  
 JPL-W00-029 B63-10537 01

Voltage generator sweeps oscillator frequency linearly with time  
 M-FS-219 B64-10320 01

Interferometer combines laser light source and digital counting system  
 MSC-151 B65-10161 01

### LINEARITY

Raster linearity of video cameras calibrated with precision tester  
 GSFC-200 B64-10209 01

Circuit reduces distortion of FM modulator  
 GSFC-257 B65-10152 01

### LINEARIZATION

Compact actuator converts rotary to linear motion

JPL-786

B66-10265 05

### LINK

Electromechanically operated camera shutter provides uniform exposure  
 JPL-357 B63-10227 01

### LIQUID

Level of super-cold liquids automatically maintained by levelometer  
 JPL-397 B63-10250 01

Special pliers connect hose containing liquid under pressure  
 JPL-IT-1003 B63-10291 05

Tool facilitates sealing of metal fill tubes  
 MSC-24 B63-10519 05

Filler device for handling hot corrosive materials  
 MSC-85 B64-10166 03

### LIQUID FLOW

Meter accurately measures flow of low-conductivity fluids  
 JPL-0021 B63-10280 01

Fluid check valve has fail-safe feature  
 JPL-0019 B65-10207 05

Spiraled channels improve heat transfer between fluids  
 JPL-694 B65-10291 02

Volumetric system calibrates meters for large flow rates  
 W00-130 B65-10323 05

System proportions fluid-flow in response to demand signals  
 GSFC-457 B66-10094 01

Segmented ball valve is easy to open and close  
 W00-248 B66-10195 05

Studies reveal effects of pipe bends on fluid flow cavitation  
 M-FS-516 B66-10228 05

Flow ring valve is simple, quick-acting  
 M-FS-752 B66-10255 05

Vacuum test fixture improves leakage rate measurements  
 MSC-271 B66-10286 01

Fiber length and orientation prevent migration in fluid filters  
 M-FS-541 B66-10319 05

Diaphragm valve for corrosive and high temperature fluid flow control has unique features  
 LEWIS-304 B66-10365 05

High pressure cryogenic liquid flow sight assembly provides streamlined flow for easy observation  
 LEWIS-310 B66-10394 01

Labyrinth-type valve seat increases valve life by decreasing fluid velocity  
 M-FS-1051 B66-10424 05

Miniature valve accurately controls small volume fluid flow  
 ARG-66 B66-10473 05

Computer program performs flow analysis through turbines  
 LEWIS-236 B66-10496 01

Rotational fluid coupling eliminates hose entanglements  
 MSC-312 B66-10585 05

Positive displacement cylinder measures corrosive liquid volume

## LIQUID GAS

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MSC-1038	B66-10589	05	voltage GSFC-119	B63-10599	01
Cryogenic fluid sampling device permits testing under hazardous conditions			LIQUID METAL		
M-FS-1927	B66-10654	02	Inductive system detects level of conducting fluids		
LIQUID GAS			LEWIS-322	B66-10392	01
Complementary system vaporizes subcooled liquid, improves transformer efficiency			Flowmeter measures flow rates of high temperature fluids		
M-FS-550	B66-10045	02	LEWIS-328	B66-10521	01
LIQUID-GAS MIXTURE			Crucible cast from beryllium oxide and refractory cement is impervious to flux and molten metal		
Centrifugal device separates liquid from gas			ARG-22	B66-10527	03
MSC-282	B65-10394	05	LIQUID NITROGEN		
LIQUID HELIUM			Helical tube separates nitrogen gas from liquid nitrogen		
Cryogenic filter method produces super-pure helium and helium isotopes			JPL-398	B63-10251	05
JPL-374	B63-10235	03	Cryopumping of hydrogen in vacuum chambers is aided by catalytic oxidation of hydrogen		
Automatic thermal switch accelerates cooling-down of cryogenic system			LEWIS-15	B63-10340	05
JPL-655	B65-10068	01	Mount makes liquid nitrogen-cooled gamma ray detector portable		
Vacuum chamber provides improved insulation and support for cryostat			LEWIS-259	B66-10103	01
M-FS-415	B65-10368	02	Charged probes, bourdon tubes maintain cryogenic liquid level		
Resistor monitors transfer of liquid helium			LEWIS-261	B66-10109	01
LANGLEY-229	B66-10580	01	Closed loop operation eliminates need for auxiliary gas in high pressure pumping station		
LIQUID HYDROGEN			M-FS-893	B66-10408	05
Control system maintains selected liquid level			LIQUID OXYGEN /LOX/		
M-FS-470	B66-10039	01	Crack detection method is safe in presence of liquid oxygen		
Coating permits use of strain gage in water and liquid hydrogen			M-FS-236	B65-10107	03
M-FS-594	B66-10192	01	Surfactant for dye-penetrant inspection is insensitive to liquid oxygen		
Leak locator for vacuum jacketed pipelines eliminates need for removal of outer jacket			M-FS-475	B66-10131	03
M-FS-888	B66-10412	01	Composite gaskets are compatible with liquid oxygen, resist compression set		
In-tank shutoff valve is provided with maximum blast protection			M-FS-455	B66-10395	03
M-FS-1529	B66-10514	05	In-tank shutoff valve is provided with maximum blast protection		
Mixer conditions temperature of liquified gas streams			M-FS-1529	B66-10514	05
M-FS-1784	B66-10565	02	LIQUID PROPELLANT ROCKET ENGINE		
LIQUID INJECTION			Monitoring circuit accurately measures movement of solenoid valve		
Elimination of rocket engine asymmetric loads during tests at sea level			M-FS-1829	B66-10568	01
M-FS-1730	B66-10674	05	LIQUID SODIUM		
LIQUID LEVEL			Fluoride coatings make effective lubricants in molten sodium environment		
Liquid-level meter has no moving parts			LEWIS-229	B66-10005	03
M-FS-3	B63-10378	03	LITHIUM ALLOY		
Oscillator circuit measures liquid level in tanks			Lightweight magnesium-lithium alloys show promise		
M-FS-245	B65-10209	01	M-FS-17	B63-10389	03
Photoelectric system continuously monitors liquid level			Adherent protective coatings plated on magnesium-lithium alloy		
M-FS-417	B65-10382	01	M-FS-365	B65-10294	03
Control system maintains selected liquid level			LITHIUM FLUORIDE		
M-FS-470	B66-10039	01	Cesium iodide crystals fused to vacuum tube faceplates		
Charged probes, bourdon tubes maintain cryogenic liquid level			GSFC-67	B63-10476	03
LEWIS-261	B66-10109	01	LOAD DISTRIBUTION		
Device without electrical connections in tank measures liquid level			Equations provide tubular information on effects of uniform and variable loads on thin, flat, circular plates		
WOO-235	B66-10198	01	ARG-151	B66-10601	05
Inductive system detects level of conducting fluids			Spherical pipe joint delivers loads equally to mating flange		
LEWIS-322	B66-10392	01	M-FS-807	B66-10665	05
Automatic cryogenic liquid level controller is safe for use near combustible substances					
LEWIS-195	B66-10482	01			
LIQUID MERCURY					
Liquid switch is remotely operated by low dc					

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# LOGIC CIRCUIT

Elimination of rocket engine asymmetric loads during tests at sea level M-FS-1730	B66-10674	05	Universal transloader moves delicate equipment without stress MSC-654	B66-10384	05
<b>LOAD FACTOR</b>			Self-actuating grapple automatically engages and releases loads from overhead cranes ARG-81	B66-10522	05
Rapid billet loader aids extrusion of refractory metals LEWIS-50	B63-10354	05	<b>LOADING RATE</b>		
Ring counter may be advanced or retarded by command signal GSFC-101	B64-10144	01	Shock absorber operates over wide range MSC-168	B65-10241	05
Circuit improvement produces monostable multivibrator with load-carrying capability GSFC-34A	B65-10011	01	<b>LOG PERIODIC ANTENNA</b>		
Variable load automatically tests dc power supplies GSFC-291	B65-10105	01	Antenna configurations provide polarization diversity GSFC-74	B66-10066	01
Lightweight door seals cryogenic container against diaphragm type loading M-FS-476	B65-10402	05	<b>LOGARITHM</b>		
Mechanism isolates load weighing cell during lifting of load MSC-297	B66-10071	05	Logarithmic amplifier uses field effect transistors JPL-509	B65-10145	01
Plugged hollow shaft makes fatigue-resistant shear pin LANGLEY-195	B66-10077	05	<b>LOGIC</b>		
Low-power ring counter drives high-level loads GSFC-431	B66-10106	01	Binary counter uses fluid logic elements M-FS-323	B65-10377	01
Fatigue tester achieves true axial motion through flex plates and bars NU-0021	B66-10164	01	Binary counter accumulates time by complementary preset MSC-242	B65-10399	01
Binary fluid amplifier solves stability and load problems ERC-15	B66-10177	01	<b>LOGIC CIRCUIT</b>		
Pressure-welded flange assembly provides leaktight seal at reduced bolt loads M-FS-640	B66-10247	05	Frequency-shift-keyer circuit improves PCM conversion for radio transmission GSFC-80	B63-10511	01
Diffusion bonding makes strong seal at flanged connector M-FS-637	B66-10250	05	Computer circuit will fit on single silicon chip JPL-513	B63-10514	01
Dry film lubricant is effective at extreme loads M-FS-628	B66-10256	03	Digital logic elements provide additional functions from analog input MSC-64	B64-10064	01
Pneumatic separator gives quick release to heavy loads KSC-66-10	B66-10294	05	Ring counter may be advanced or retarded by command signal GSFC-101	B64-10144	01
Control circuit maintains unity power factor of reactive load MSC-192	B66-10431	01	Novel circuit combines pulse stretcher with NOR gate GSFC-187	B64-10150	01
<b>LOADING</b>			Logic circuit exhibits optimum performance LANGLEY-129	B65-10193	01
Self-balancing beam permits safe, easy load handling under overhang M-FS-84	B63-10571	05	Delayed ripple counter simplifies square-root computation GSFC-398	B65-10343	01
Circuit controls transients in SCR inverters GSFC-120	B63-10600	01	Simple circuit performs binary addition and subtraction GSFC-399	B65-10355	01
Buckle joins web straps quickly, adjusts easily LANGLEY-21	B64-10119	05	Queuing register uses fluid logic elements M-FS-317	B66-10100	05
PTC thermistor protects multiloaded power supplies GSFC-236	B64-10281	01	Exclusive-or logic circuit has useful properties LANGLEY-214	B66-10272	01
<b>LOADING APPARATUS</b>			Bipolar current driver for memory circuits GSFC-213	B66-10469	01
Rapid billet loader aids extrusion of refractory metals LEWIS-50	B63-10354	05	Digital system provides superregulation of nanosecond amplifier-discriminator circuit ARG-61	B66-10500	01
Friction loading device enables accurate testing of brittle materials NU-0051	B66-10345	05	Nixie tube display unit employs time-shared logic ARG-117	B66-10512	01
			One-count memory circuit prevents machine mode interaction ARG-90	B66-10559	01
			Fluid logic control circuit operates nutator actuator motor LEWIS-294	B66-10593	05



Logic circuitry used to automatically test shielded cables HQ-60	B66-10659	01	LUBRICATION	Gate valve with ceramic-coated base operates at high temperatures ARC-23	B63-10562	03
LOGIC NETWORK			LUBRICATION SYSTEM	Miniature bearings lubricated by sonic dispersion method M-FS-202	B65-10106	03
Logic system aids in evaluation of project readiness MSC-753	B66-10457	05	LUMINOUS INTENSITY	Light-intensity modulator withstands high heat fluxes MSC-246	B66-10532	02
LOOP			LUNAR GRAVITATIONAL EFFECT	Technique simulates effect of reduced gravity LANGLEY-44	B64-10146	04
Bandwidth switching is transient-free, avoids loss of loop lock WOO-054	B64-10349	01	LUNAR SPACECRAFT	Three-axis attitude and direction reference instrument has only one moving part M-FS-1819	B66-10644	01
LOW FREQUENCY			LUNG	Device induces lungs to maintain known constant pressure MSC-50	B64-10108	04
New low-level a-c amplifier provides adjustable noise cancellation and automatic temperature compensation ARC-2	B63-10003	04				
High-pass rf coaxial filter rejects dc and low frequency signals GSFC-73	B64-10173	01				
LOW PASS FILTER						
Computer determines high-frequency phase stability GSFC-113	B63-10555	01				
LOW POWER						
Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss LEWIS-39	B63-10342	01				
LOW TEMPERATURE BRAZING						
Coating method enables low-temperature brazing of stainless steel NU-0030	B65-10250	03				
LOW TEMPERATURE ENVIRONMENT						
Gallium useful bearing lubricant in high-vacuum environment LEWIS-12	B63-10337	03				
New weldable high strength aluminum alloy developed for cryogenic service M-FS-737	B66-10613	05				
Cold solid propellant motor has stop-restart capability JPL-836	B66-10673	03				
LUBRICANT						
Gallium useful bearing lubricant in high-vacuum environment LEWIS-12	B63-10337	03				
Molybdenum disulfide mixtures make effective high-vacuum lubricants M-FS-54	B63-10453	03				
Burnishing technique improves lubrication of threaded fasteners LEWIS-217	B65-10302	03				
Unique gear design provides self-lubrication JPL-SC-079	B65-10366	03				
Gallium alloy films investigated for use as boundary lubricants LEWIS-245	B66-10165	03				
Dry film lubricant is effective at extreme loads M-FS-628	B66-10256	03				
Copper-acrylic enamel serves as lubricant for cold drawing of refractory metals ARG-54	B66-10471	05				
LUBRICATING OIL						
Ohmmeter senses depletion of lubricant in journal bearings LEWIS-37	B64-10042	01				
Radioactive tracer system detects oil contaminants in fluid lines M-FS-512	B66-10090	03				

## M

## MACHINE TOOL

Setting of angles on machine tools speeded by magnetic protractor ARC-5	B63-10006	01
Sleeve and cutter simplify disconnecting welded joint in tubing JPL-384	B63-10240	05
T-handle wrench has torque-limiting action MSC-280	B66-10065	05
Threaded pilot insures cutting tool alignment M-FS-527	B66-10074	05
Pipe cutting tool is useful in limited space MSC-36	B66-10102	05
Portable power tool machines weld joints in field M-FS-258	B66-10145	05
Depth indicator and stop aid machining to precise tolerances M-FS-553	B66-10149	05
Nylon bit removes cork insulation without damage to substrate MSC-381	B66-10152	05
Multisurface fixture permits easy grinding of tool bit angles M-FS-586	B66-10171	05
Tool post modification allows easy turret lathe cutting-tool alignment M-FS-581	B66-10191	05
Adjustable cutting guide aligns and positions stacks of material MSC-321	B66-10210	05
Lathe chuck key incorporates safety feature MSC-506	B66-10243	05
Gear drive automatically indexes rotary table M-FS-753	B66-10383	05
Heavy duty precision leveling jacks expedite setup time on horizontal boring mill M-FS-1084	B66-10411	05
Flexible drive allows blind machining and welding in hard-to-reach areas MSC-524	B66-10428	05

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# MAGNETIC FIELD INTENSITY

## MACHINING

Metal-bending brake facilitates lightweight, close-tolerance fabrication  
ARC-29 B64-10069 05

Micromachining produces optical apertures to micron dimensions  
GSFC-206 B64-10211 05

Lathe attachment used to machine elliptical cones  
MSC-100 B65-10168 05

Calibrated clamp facilitates pressure application  
MSC-298 B66-10059 05

Modified soldering iron speeds cutting of synthetic materials  
M-FS-725 B66-10246 05

Mill profiler machines soft materials accurately  
M-FS-692 B66-10254 05

Fixed vacuum plate clamps styrofoam for machining  
M-FS-683 B66-10283 05

Swiveling lathe jaw concept for holding irregular pieces  
M-FS-783 B66-10321 05

Internal machining accomplished at constant radii  
M-FS-1573 B66-10546 05

## MAGNESIUM

New method forms bond line free of voids  
LANGLEY-20 B63-10558 05

Vapor condensation process produces slurry of magnesium particles in liquid hydrocarbons  
LEWIS-263 B66-10104 03

## MAGNESIUM ALLOY

Lightweight magnesium-lithium alloys show promise  
M-FS-17 B63-10389 03

Adherent protective coatings plated on magnesium-lithium alloy  
M-FS-365 B65-10294 03

## MAGNESIUM-LITHIUM ALLOY

Adherent protective coatings plated on magnesium-lithium alloy  
M-FS-365 B65-10294 03

## MAGNET

Unmanned seismometer levels self, corrects drift errors  
GSFC-100 B63-10551 01

Ball bearing used in design of rugged flow-meter  
LEWIS-159 B64-10170 05

## MAGNETIC CIRCUIT

Transfluxor circuit amplifies sensing current for computer memories  
JPL-406 B63-10255 01

Variable frequency transistor inverters use multiple core transformers  
GSFC-183 B65-10119 01

Magnetic-shift-register circuit controls step motor operations  
GSFC-340 B65-10226 01

Magnetically operated limit switch has improved reliability, minimizes arcing  
MSC-422 B66-10270 01

## MAGNETIC COIL

Calculations enable optimum design of magnetic brake  
LEWIS-251 B66-10073 05

## MAGNETIC CONTROL

Magnetic fluid readily controlled in zero gravity environment  
LEWIS-126 B65-10335 03

## MAGNETIC CORE

Transfluxor circuit amplifies sensing current for computer memories  
JPL-406 B63-10255 01

New sintering process adjusts magnetic value of ferrite cores  
GSFC-129 B63-10606 01

Blocking oscillator uses low triggering voltage  
MSC-58 B64-10017 01

Molded elastomer provides compact ferrite-core holder, simplifies assembly  
JPL-584 B64-10084 05

Circuit detects errors in address currents for magnetic core arrays  
M-FS-234 B65-10047 01

Improved magnetometer uses toroidal gating coil  
GSFC-249 B65-10103 01

Analog-to-digital converter has increased reliability and reduced power consumption  
GSFC-246 B65-10194 01

Digital system detects binary code patterns containing errors  
GSFC-541 B66-10516 01

## MAGNETIC EFFECT

Variable-capacitance tachometer eliminates troublesome magnetic fields  
GSFC-435 B66-10126 01

## MAGNETIC FIELD

Supercold technique duplicates magnetic field in second superconductor  
JPL-376 B63-10237 05

Shaped superconductor cylinder retains intense magnetic field  
JPL-381 B63-10238 01

Explosives actuate nonmagnetic indexing device  
GSFC-237 B65-10017 05

Magnetic field controls carbon arc tail flame  
MSC-139 B65-10108 01

High permeability semiconductors permit close-tolerance soldering  
GSFC-319 B65-10134 05

Density trace made with computer printout  
GSFC-322 B65-10200 01

Superconductor shields test chamber from ambient magnetic fields  
JPL-627 B65-10297 02

Magnetometer measures orthogonal components of magnetic fields  
GSFC-395 B65-10315 01

Solenoid magnetic fields calculated from superposed semi-infinite solenoids  
LEWIS-184 B66-10490 01

## MAGNETIC FIELD COIL

Magnetic field test coils are temperature compensated  
GSFC-294 B65-10081 02

## MAGNETIC FIELD DISTURBANCE

Low input voltage converter/regulator minimizes external disturbances  
GSFC-527 B66-10689 01

## MAGNETIC FIELD INTENSITY

Shaped superconductor cylinder retains intense

## MAGNETIC INSTRUMENT

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magnetic field JPL-381	B63-10238	01	GSFC-249	B65-10103	01
Niobium thin films are superconductive in strong magnetic fields at low temperatures JPL-SC-174	B66-10122	02	Magnetometer measures orthogonal components of magnetic fields GSFC-395	B65-10315	01
MAGNETIC INSTRUMENT			Thermal motor positions magnetometer sensors ARC-51	B66-10078	05
Variable frequency magnetic multivibrator generates stable square-wave output GSFC-AE-21	B65-10124	01	MAGNETORESISTANCE		
Optical output enhances flowmeter accuracy M-FS-482	B65-10395	02	Magnetoresistor monitors relay performance M-FS-1754	B66-10650	01
MAGNETIC MATERIAL			MAGNETRON		
Flexible magnetic planning boards are easily transported M-FS-340	B65-10219	05	Ion pump provides increased vacuum pumping speed NEO-13	B65-10239	02
MAGNETIC MEMORY			MAINTENANCE		
Transfluxor circuit amplifies sensing current for computer memories JPL-406	B63-10255	01	Magnetic field controls carbon arc tail flame MSC-139	B65-10108	01
MAGNETIC PROPERTY			Interior servicing platform simplifies maintenance of storage tanks M-FS-1300	B66-10425	05
Process yield Co-Fe alloys with superior high temperature magnetic properties LEWIS-333	B66-10535	03	MANDREL		
MAGNETIC PUMPING			Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns ARC-7	B63-10008	05
Rotating magnetic poles used to pump mercury LEWIS-276	B66-10434	05	Collar positions strip stock used to form coil on mandrel JPL-198	B65-10130	05
MAGNETIC RESONANCE			Metal bellows custom-fabricated from tubing LEWIS-192	B65-10150	05
Magnetometer measures orthogonal components of magnetic fields GSFC-395	B65-10315	01	Rotating mandrel speeds assembly of plastic inflatables LANGLEY-155	B66-10137	05
MAGNETIC SHIELDING			Special mandrel permits uniform welding of out-of-round tubing M-FS-706	B66-10323	05
Electron beam welding of copper-MONEL facilitated by circular magnetic shields M-FS-569	B66-10215	05	Ductile mandrel and parting compound facilitate tube drawing ARG-43	B66-10571	05
MAGNETIC TAPE			MANIFOLD		
Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01	Heated die facilitates tungsten forming LEWIS-25A	B66-10047	05
Metal strip forms 21 foot boom, rolls up for compact storage GSFC-151	B64-10011	05	Combustion chamber inlet manifold separates vapor from liquid M-FS-531	B66-10052	05
Compact cartridge drives coded tape at constant readout speed JPL-472	B64-10222	01	Inflatable holding fixture permits X-rays to be taken of inner weld areas M-FS-856	B66-10327	03
MAGNETIC TAPE RECORDER			Welds chilled by liquid coolant manifold M-FS-679	B66-10354	05
Small digital recording head has parallel bit channels, minimizes cross talk JPL-0029	B63-10284	01	Brazing retort manifold design concept may minimize air contamination and enhance uniform gas flow M-FS-707	B66-10371	05
Circuit converts AM signals to FM for magnetic recording GSFC-227	B65-10001	01	Elimination of rocket engine asymmetric loads during tests at sea level M-FS-1730	B66-10674	05
PCM magnetic tape system efficiently records and reproduces data GSFC-375	B65-10311	01	MANOMETER		
MAGNETISM			Fluid-pressure measurement apparatus uses short-length manometer tubes LEWIS-28	B65-10027	05
Setting of angles on machine tools speeded by magnetic protractor ARC-5	B63-10006	01	MANUAL CONTROL		
MAGNETOHYDRODYNAMIC ACCELERATION			Heavy-duty staple remover operated by hand JPL-IT-1004	B63-10292	05
Segmented electrode increases operating pressure of MHD accelerator LANGLEY-95	B65-10356	02	Knob linkage permits one-hand control of several operations MSC-30	B65-10022	05
MAGNETOHYDRODYNAMIC GENERATOR			Handtool facilitates extraction of circuit modules		
Wire winding increases lifetime of oxide- coated cathodes LEWIS-154	B65-10032	03			
MAGNETOMETER					
Improved magnetometer uses toroidal gating coil					

# SUBJECT INDEX

# MEASURING APPARATUS

LANGLEY-38	B65-10231	05	ed by empirical method ARC-28	B64-10068	03
Manual-feed adapter permits microfilming of continuous oscillograph output NU-0029	B65-10249	01	Delayed ripple counter simplifies square-root computation GSFC-398	B65-10343	01
Rack mount device quickly inserts or extracts chassis units MSC-244	B65-10385	05	MCLEOD GAUGE Baking enables McLeod gauge to measure in ultrahigh vacuum range GSFC-440	B65-10329	01
Fingertip current control facilitates use of arc welding gun MSC-289	B66-10092	05	Modified McLeod gage records automatically LEWIS-290	B66-10290	02
Safety switch permits emergency bridge crane shutdown M-FS-549	B66-10168	05	Modified McLeod pressure gage eliminates measurement errors ARC-62	B66-10481	01
MANUFACTURING Bellows design features low spring rate and long life MSC-521	B66-10190	05	MEASURES Oil-smeared models aid wind tunnel measurements LANGLEY-4	B63-10311	03
MAPPING Photoelectric scanner makes detailed work function maps of metal surface JPL-SC-176	B66-10440	01	Ultra-sensitive transducer advances micro-measurement range ARC-26	B64-10004	01
MASKING Reusable neoprene jacket protects parts for chemical milling WOO-071	B65-10179	03	Corrosion of metal samples rapidly measured NU-0041	B66-10140	03
MASS SPECTROMETER Highly sensitive solids mass spectrometer uses inert-gas ion source ERC-11	B66-10114	02	MEASURING APPARATUS Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01
Submicron holes in thin films increase sampling range of mass spectrometers JPL-SC-097	B66-10380	03	Ultra-sensitive transducer advances micro-measurement range ARC-26	B64-10004	01
MASS SPECTRUM Highly sensitive solids mass spectrometer uses inert-gas ion source ERC-11	B66-10114	02	Improved insertion-loss tester JPL-358	B64-10080	01
MATERIAL REMOVAL Electrochemical milling removes burrs and solder from tubing ends M-FS-714	B66-10358	03	Apparatus measures concentration of suspended droplets in gas streams LANGLEY-31	B64-10237	01
MATERIAL TESTING Graphite element serves as radiant heat source M-FS-105	B65-10218	01	Gage measures electrical connector pin retention force JPL-SC-071	B65-10034	03
Multiple test chamber exposes materials to various environments MSC-179	B65-10268	01	Ionization vacuum gage starts quickly, is unaffected by spurious currents JPL-304	B65-10036	02
Hot-wire detector for chemically active materials used in gas chromatography MSC-269	B66-10139	03	Metal diaphragm used to calibrate miniature transducers M-FS-207	B65-10059	01
Simple technique determines ac properties of hard superconductive materials M-FS-1818	B66-10657	02	Device measures curved surface finish on gear teeth WOO-112	B65-10064	05
MATHEMATICAL TABLE Equations provide tubular information on effects of uniform and variable loads on thin, flat, circular plates ARG-151	B66-10601	05	Sensitive level sensor made with spirit level, gives electrical output LANGLEY-49	B65-10067	01
MATHEMATICS Calculations enable optimum design of magnetic brake LEWIS-251	B66-10073	05	System measures angular displacement without contact LANGLEY-46	B65-10073	01
New computer system simplifies programming of mathematical equations M-FS-441	B66-10361	01	Transducer senses displacements of panels subjected to vibration ARC-37	B65-10085	01
Minimum permissible leakage resistance established for instrumentation systems M-FS-848	B66-10397	01	Apparatus measures swelling of membranes in electrochemical cells GSFC-280	B65-10087	01
MATHEMATICS /GEN/ Mechanical properties of plastics predetermin-			Microwave technique measures plasma characteristics LANGLEY-134	B65-10122	02
			System measures unidirectional forces, excludes extraneous forces LEWIS-170	B65-10154	05
			Device enables measurement of moments of inertia about three axes		

GSFC-49	B65-10176	05	measurement of galvanic skin response MSC-146	B66-10049	04
Sensitive electrometer features digital output GSFC-288	B65-10206	01	Ferroelectric bolometer measures RF absolute power at submillimeter wavelengths GSFC-422	B66-10051	01
Oscillator circuit measures liquid level in tanks M-FS-245	B65-10209	01	Calorimeter accurately measures thermal radiation energy LANGLEY-173	B66-10058	02
Multiaxial analyzer detects low-energy electrons GSFC-329	B65-10213	01	Transmission system isolates pressure transducer from severe environment WOO-239	B66-10064	01
Instrument accurately measures extremely low air densities M-FS-193	B65-10221	01	Angular acceleration measured by deflection in sensing ring MSC-250	B66-10105	01
Servo calorimeter measures material heating rate NU-0024	B65-10247	01	Mechanism continuously measures static and dynamic cable loads MSC-217	B66-10107	05
Differential pressure gauge has fast response M-FS-358	B65-10285	05	Variable-capacitance tachometer eliminates troublesome magnetic fields GSFC-435	B66-10126	01
Coaxial capacitor used to determine fluid density LEWIS-232	B65-10296	02	Apparatus measures thermal conductivity of honeycomb-core panels LANGLEY-202	B66-10127	01
Remote rapidly varying pressures accurately measured FRC-28	B65-10301	01	Sextant measures spacecraft altitude without gravitational reference MSC-200	B66-10143	02
Improved strain-wire flowmeter has fast response time LEWIS-241	B65-10304	01	Extendable mast used in one shot soil penetrometer JPL-685	B66-10146	05
Electronic ampere-hour integrator is accurate to one percent GSFC-203	B65-10308	01	Improved system measures output energy of pyrotechnic devices WOO-256	B66-10159	01
Air brake-dynamometer accurately measures torque LEWIS-163	B65-10312	05	Transducer measures force in vacuum environment LEWIS-218	B66-10161	01
Magnetometer measures orthogonal components of magnetic fields GSFC-395	B65-10315	01	Coating permits use of strain gage in water and liquid hydrogen M-FS-594	B66-10192	01
Direct force-measuring transducer used in blood pressure research ARC-53	B65-10325	01	Segmented ball valve is easy to open and close WOO-248	B66-10195	05
Rough surface improves stability of air-sounding balloons M-FS-320	B65-10326	05	Device without electrical connections in tank measures liquid level WOO-235	B66-10198	01
Baking enables McLeod gauge to measure in ultrahigh vacuum range GSFC-440	B65-10329	01	Hand tool permits shrink sizing of assembled tubing MSC-504	B66-10239	05
Wedge immersed thermistor bolometer measures infrared radiation GSFC-443	B65-10330	02	Strain gage network distinguishes between thermal and mechanical deformations GSFC-478	B66-10280	01
Vibrating diaphragm measures high electrostatic field strengths MSC-189	B65-10352	01	Extensometer automatically measures elongation in elastomers M-FS-517	B66-10284	05
Three-dimensional wire-mesh capacitor system measures fluid density WOO-194	B65-10379	01	Vacuum test fixture improves leakage rate measurements MSC-271	B66-10286	01
Photoelectric system continuously monitors liquid level M-FS-417	B65-10382	01	Dielectrometer design permits measurement in vacuum under irradiation M-FS-359	B66-10401	01
Special mount improves remote transducer accuracy LEWIS-269	B66-10021	01	Plant respirometer enables high resolution of oxygen consumption rates HQ-47	B66-10406	04
Flowmeter measures low gas-flow rates M-FS-215	B66-10036	01	Ion chambers simplify absolute intensity measurements in the vacuum ultraviolet ERC-10	B66-10439	01
Cold cathode ionization gauge has rigid metal housing GSFC-445	B66-10041	01	Thermionic scanner pinpoints work function of emitter surfaces JPL-SC-177	B66-10444	01
Improved electrode paste provides reliable					

# SUBJECT INDEX

METAL

Indicator system provides complete data of engine cylinder pressure variation  
LEWIS-291 B66-10470 05

Spiral spring/strain gage combination accurately measures shock induced deflection  
MSC-789 B66-10488 01

Gage tests tube flares quickly and accurately  
KSC-66-19 B66-10537 05

Device accurately measures and records low gas-flow rates  
M-FS-1077 B66-10569 01

Positive displacement cylinder measures corrosive liquid volume  
MSC-1038 B66-10589 05

Sensors measure surface ablation rate of reentry vehicle heat shield  
LANGLEY-287 B66-10592 01

Instrument accurately measures small temperature changes on test surface  
LANGLEY-174 B66-10637 01

Magnetoresistor monitors relay performance  
M-FS-1754 B66-10650 01

Rocket engine vibration accurately measured by photography  
M-FS-1916 B66-10652 02

Slide rule-type color chart predicts reproduced photo tones  
MSC-1227 B66-10680 01

Mechanical device accurately measures RF phase differences in VHF or UHF ranges  
M-FS-1738 B66-10694 05

**MECHANICAL DRAWING**  
Built-in templates speed up process for making accurate models  
LANGLEY-23 B63-10526 05

Use of photographs speeds inspection of printed-circuit boards  
MSC-72 B64-10118 01

Instrument transmits vanishing point to illustration point  
MSC-267A B66-10324 01

**MECHANICAL PROPERTY**  
Mechanical properties of plastics predetermined by empirical method  
ARC-28 B64-10068 03

Weldable aluminum alloy has improved mechanical properties  
M-FS-295 B66-10445 03

**MECHANICAL SYSTEM**  
Electromechanically operated camera shutter provides uniform exposure  
JPL-357 B63-10227 01

Multiple test tubes stirred mechanically  
ARC-42 B65-10120 01

Concept of planetary gear system to control fluid mixture ratio  
M-FS-1785 B66-10477 05

**MECHANISM**  
Simple mechanism combines positive locking and quick-release features  
WOO-4 B63-10420 05

Latching mechanism operates in limited access area  
MSC-230 B66-10338 05

**MEDICAL ELECTRONICS**  
Phonocardiograph system monitors heart sounds  
MSC-185 B66-10154 04

**MEDICAL EQUIPMENT**  
Tiny biomedical amplifier combines high performance, low power drain  
ARC-41 B65-10203 01

Computer circuit calculates cardiac output  
MSC-274 B66-10006 01

Orthopedic stretcher with average-sized person can pass through 18-inch opening  
M-FS-811 B66-10573 05

Modified algometer provides accurate depth measurements  
MSC-616 B66-10647 04

**MELTING POINT**  
Integral coolant channels simply made by melt-out method  
M-FS-91 B63-10497 05

**MEMORY**  
Bipolar current driver for memory circuits  
GSFC-213 B66-10469 01

**MEMORY STORAGE UNIT**  
Circuit detects errors in address currents for magnetic core arrays  
M-FS-234 B65-10047 01

Improved wire memory matrix uses very little power  
JPL-SC-167 B65-10359 01

One-count memory circuit prevents machine mode interaction  
ARG-90 B66-10559 01

Mosfet analog memory circuit achieves long duration signal storage  
M-FS-860 B66-10603 01

Improved memory word line configuration allows high storage density  
GSFC-559 B66-10617 01

**MERCURY /METAL/**  
Liquid switch is remotely operated by low dc voltage  
GSFC-119 B63-10599 01

Oil-damped mercury pool makes precise optical alignment tool  
GSFC-353 B65-10253 02

Flowmeter measures low gas-flow rates  
M-FS-215 B66-10036 01

Rotating magnetic poles used to pump mercury  
LEWIS-276 B66-10434 05

**MERCURY ARC**  
Emission tester for high-power vacuum tubes  
JPL-628 B64-10158 01

**MERCURY LIGHT**  
Igniting system for mercury vapor lamps protects transistorized sustaining supply  
JPL-421 B63-10262 01

High-intensity flashing beacon powered by mercury cells  
LANGLEY-80 B65-10361 01

**MERCURY VAPOR**  
Igniting system for mercury vapor lamps protects transistorized sustaining supply  
JPL-421 B63-10262 01

**METAL**  
High purity electroforming yields superior metal models  
ARC-6 B63-10007 05

Packless valve with all-metal seal handles wide temperature, pressure range  
JPL-361 B63-10228 05

Break-up of metal tube makes one-time shock

absorber, bars rebound LANGLEY-1A	B63-10304	05	Die and telescoping punch form convolutions in thin diaphragm JPL-SC-135	B65-10393	05
Tool facilitates sealing of metal fill tubes MSC-24	B63-10519	05	Coiled sheet metal strip opens into tubular configuration GSFC-425	B66-10009	03
Refractory thermal insulation for smooth metal surfaces M-FS-160	B64-10099	03	Explosive force of Primacord grid forms large sheet metal parts M-FS-316	B66-10014	05
Mounting for diodes provides efficient heat sink M-FS-197	B64-10283	01	Heated die facilitates tungsten forming LEWIS-25A	B66-10047	05
Metal sheath improves thermocouple using graphite in one leg NU-0011	B65-10051	01	Electrical upsetting of metal sheet forms weld edge M-FS-720	B66-10248	05
Titanium treatment improves brazed joints MSC-127	B65-10153	05	<b>METAL ION</b> Reusable chelating resins concentrate metal ions from highly dilute solutions JPL-758	B66-10451	03
Strain gage network distinguishes between thermal and mechanical deformations GSFC-478	B66-10280	01	<b>METAL JOINT</b> High pressure tube coupling requires no threads or flares MSC-600	B66-10285	05
Heat-treatment of metal parts facilitated by sand embedment M-FS-1543	B66-10616	03	Thin plastic sheet eliminates need for expensive plating M-FS-1896	B66-10681	03
Lightweight, all-metal hose assembly has high flexibility and strength over wide range of temperature and pressure M-FS-1831	B66-10635	05	<b>METAL-METAL BONDING</b> Stringent cleaning technique assures reliable epoxy bond GSFC-161	B64-10142	03
Lateral ring metal elastic wheel absorbs shock loading M-FS-1312	B66-10663	05	Brazing process provides high-strength bond between aluminum and stainless steel M-FS-803	B66-10352	05
<b>METAL BONDING</b> Refractory metals welded or brazed with tungsten inert gas equipment LEWIS-219	B65-10319	05	<b>METAL OXIDE SEMICONDUCTOR /MOS/</b> Field-effect transistor replaces bulky transformer in analog-gate circuit GSFC-351	B65-10284	01
Assembly jig assures reliable solar cell modules GSFC-455	B66-10040	05	Metal oxide silicon /MOS/ transistors protected from destructive damage by wire device ARC-65	B66-10419	01
Adhesive for polyester films cures at room temperature, has high initial tack M-FS-938	B66-10487	03	Mosfet analog memory circuit achieves long duration signal storage M-FS-860	B66-10603	01
<b>METAL COATING</b> Jig protects transistors from heat while tinning leads MSC-515	B66-10240	05	<b>METAL PARTICLE</b> Silver-palladium braze alloy recovered from masking materials M-FS-1845	B66-10631	03
<b>METAL CORROSION</b> Corrosion of metal samples rapidly measured NU-0041	B66-10140	03	<b>METAL PLATE</b> Built-in templates speed up process for making accurate models LANGLEY-23	B63-10526	05
Trace levels of metallic corrosion in water determined by emission spectrography MSC-1193	B66-10701	03	<b>METAL REINFORCEMENT</b> Method of welding joint in closed vessel improves quality of seam JPL-170	B63-10139	05
<b>METAL CUTTING</b> Metal boot permits fabrication of hermetically sealed splices in metal sheathed instrumentation cables NU-0083	B66-10704	05	<b>METAL SURFACE</b> Surfactant for dye-penetrant inspection is insensitive to liquid oxygen M-FS-475	B66-10131	03
<b>METAL FOIL</b> Impact- and puncture-resistant material protects parts from damage MSC-747	B66-10375	05	Portable sandblaster cleans small areas MSC-523	B66-10242	05
Nonelectrolytic tantalum capacitors developed M-FS-1546	B66-10552	01	Braze alloys used as temperature indicators NU-0063	B66-10274	01
<b>METAL FORMING</b> Integral ribs formed in metal panels by cold- press extrusion M-FS-230	B65-10141	05	Photoelectric scanner makes detailed work function maps of metal surface JPL-SC-176	B66-10440	01
Metal parts hydrosized by explosive force M-FS-289	B65-10170	05	Technique for measuring absorptance and emittance by using cyclic incident radiation LEWIS-321	B66-10630	02
Fiberglass dies speed forming of large metal sheets M-FS-214	B65-10210	05			

## SUBJECT INDEX

## MICROPHONE

## METAL WORKING

Rapid billet loader aids extrusion of refractory metals  
LEWIS-50 B63-10354 05

Guide for extrusion dies eliminates straightening operation  
LEWIS-152 B64-10014 05

Jig and fixture aid fabrication of tungsten rivets  
LEWIS-185 B65-10101 05

Collar positions strip stock used to form coil on mandrel  
JPL-198 B65-10130 05

Lathe attachment used to machine elliptical cones  
MSC-100 B65-10168 05

Split glass tube assures quality in electron beam brazing  
M-FS-564 B66-10151 05

Device spot-laps spheres to very close tolerances  
JPL-SC-119 B66-10175 05

Pressure vessels fabricated with high-strength wire and electroformed nickel  
M-FS-580 B66-10218 05

Hollow needle used to cut metal honeycomb structures  
MSC-486 B66-10244 05

Metal tube can be folded for compact storage, is self-erecting  
LEWIS-288 B66-10450 05

Metallographic holding fixture permits polishing of soft metals on vibratory lapping machine  
ARG-42 B66-10562 05

## METALLURGY

Rotating filters permit wide range of optical pyrometry  
LANGLEY-33 B65-10100 02

Rotating holder permits accurate grinding of metallurgical microsamples  
LEWIS-131 B65-10262 05

Simple, nondestructive test identifies metals  
MSC-525 B66-10305 03

## METEOROID

Ultra-sensitive transducer advances micro-measurement range  
ARC-26 B64-10004 01

## METEOROLOGICAL BALLOON

Rough surface improves stability of air-sounding balloons  
M-FS-320 B65-10326 05

## METER

Liquid-level meter has no moving parts  
M-FS-3 B63-10378 03

## MICROANALYSIS

Standards for electron probe microanalysis of silicates prepared by convenient method  
GSFC-469 B66-10234 03

Apparatus enables automatic microanalysis of body fluids  
JPL-962 B66-10515 04

## MICROCIRCUIT

Field-effect transistor replaces bulky transformer in analog-gate circuit  
GSFC-351 B65-10284 01

Rugged microelectronic module package supports circuitry on heat sink  
MSC-81A B66-10245 01

## MICROELECTRONICS

Logic circuit exhibits optimum performance  
LANGLEY-129 B65-10193 01

Miniature electrometer preamplifier effectively compensates for input capacitance  
ARC-69 B66-10549 01

## MICROFILM

Library of documents compressed into lap-held display kit  
MSC-125 B65-10030 01

Manual-feed adapter permits microfilming of continuous oscillograph output  
NU-0029 B65-10249 01

Opaque microfiche masthead permits easy reading  
HQ-7 B65-10306 01

Planetary camera control improves microfiche production  
HQ-1 B65-10313 01

## MICROINSTRUMENTATION

Micromachining produces optical apertures to micron dimensions  
GSFC-206 B64-10211 05

## MICROMETEOROID

Improved sensor counts micrometeoroid penetrations  
LEWIS-76 B63-10443 01

Ultra-sensitive transducer advances micro-measurement range  
ARC-26 B64-10004 01

## MICROMETER

Apparatus measures swelling of membranes in electrochemical cells  
GSFC-280 B65-10087 01

Modified algometer provides accurate depth measurements  
MSC-616 B66-10647 04

## MICROMINIATURIZATION

Microminiature thermocouple monitors own installation  
M-FS-1111 B66-10463 05

## MICROMINIATURIZED ELECTRONIC EQUIPMENT

Frequency discriminator with binary output eliminates tuned circuits  
M-FS-376 B65-10349 01

## MICROMOTOR

Computer circuit will fit on single silicon chip  
JPL-513 B63-10514 01

## MICROORGANISM

Microorganisms detected by enzyme-catalyzed reaction  
JPL-782 B66-10117 04

## MICROPARTICLE

Dust particle injector for hypervelocity accelerators provides high charge-to-mass ratio  
GSFC-509 B66-10347 01

## MICROPHONE

Small foamed polystyrene shield protects low-frequency microphones from wind noise  
M-FS-123 B63-10579 01

Microphone multiplex system provides multiple outlets from single source  
GSFC-426 B66-10308 01

Phonocardiograph microphone is rugged and moistureproof  
MSC-212 B66-10314 04



## MICROSCOPE

## SUBJECT INDEX

## MICROSCOPE

Attachment converts microscope to point source autocollimator  
JPL-499 B64-10124 05

Micromachining produces optical apertures to micron dimensions  
GSFC-206 B64-10211 05

## MICROWAVE

Novel horn antenna reduces side lobes, improves radiation pattern  
JPL-425 B63-10264 01

## MICROWAVE ANTENNA

Flange on microwave antenna subreflector cuts ground noise  
JPL-362 B63-10229 01

## MICROWAVE APPARATUS

Compact microwave mixer has high conversion efficiency  
GSFC-197 B66-10625 01

## MICROWAVE ATTENUATION

Modified filter prevents conduction of microwave signals along high-voltage power supply leads  
JPL-63 B63-10091 01

## MICROWAVE CIRCUIT

Double-throw microwave device switches two lines quickly  
JPL-410 B63-10258 01

Superconductor magnets used for stagger-tuning traveling-wave maser  
GSFC-292 B65-10165 01

## MICROWAVE FILTER

Modified filter prevents conduction of microwave signals along high-voltage power supply leads  
JPL-63 B63-10091 01

## MICROWAVE FREQUENCY

Modified filter prevents conduction of microwave signals along high-voltage power supply leads  
JPL-63 B63-10091 01

Cryogenic waveguide window is sealed with plastic foam  
JPL-559 B63-10613 01

## MICROWAVE SWITCHING

Double-throw microwave device switches two lines quickly  
JPL-410 B63-10258 01

## MICROWAVE TRANSMISSION

Traveling-wave tube circuit simplifies microwave relay  
GSFC-299 B65-10127 01

Composite filter steepens rejection slopes in microwave application  
GSFC-480 B66-10393 01

## MILLIMETER WAVE

Ferroelectric bolometer measures RF absolute power at submillimeter wavelengths  
GSFC-422 B66-10051 01

## MILLING

Electrochemical milling removes burrs and solder from tubing ends  
M-FS-714 B66-10358 03

Heavy duty precision leveling jacks expedite setup time on horizontal boring mill  
M-FS-1084 B66-10411 05

## MILLING MACHINE

Depth indicator and stop aid machining to precise tolerances  
M-FS-553 B66-10149 05

Mill profiler machines soft materials

accurately  
M-FS-692 B66-10254 05

Versatile machine mills, saws light materials  
M-FS-827 B66-10364 05

Computer used to program numerically controlled milling machine  
M-FS-1608 B66-10541 01

## MINIATURE ELECTRONIC EQUIPMENT

Metal diaphragm used to calibrate miniature transducers  
M-FS-207 B65-10059 01

High-performance rc bandpass filter is adapted to miniaturized construction  
ARC-60 B66-10309 01

Miniature telemetry system accurately measures pressure  
ARC-74 B66-10624 01

## MINIATURIZATION

Welded pressure transducer made as small as 1/8th-inch in diameter  
ARC-11 B63-10429 03

Subminiaturized gas chromatograph gives fast, efficient analysis  
JPL-735 B66-10182 01

Miniature capacitive accelerometer is especially applicable to telemetry  
ARC-72 B66-10491 01

## MIRROR

Variable-transparency wall regulates temperatures of structures  
LANGLEY-25 B63-10528 03

Light-sensitive potentiometer measures product of two variables  
GSFC-240 B65-10076 01

Beam splitter used in dual filming technique  
M-FS-501 B66-10072 02

Mount enables precision adjustment of optical-instrumentation mirror  
MSC-184 B66-10199 02

Precision CW laser automatic tracking system investigated  
M-FS-1606 B66-10629 01

## MISSILE

High purity electroforming yields superior metal models  
ARC-6 B63-10007 05

## MIXER

Added diodes increase output of balanced mixer circuit  
GSFC-354 B65-10276 01

Compact microwave mixer has high conversion efficiency  
GSFC-197 B66-10625 01

## MOBILITY

Floating device aligns blind connections  
MSC-256 B66-10007 05

## MODULATION TECHNIQUE

Dual regulator controls two gases from a single reference  
MSC-227 B66-10167 05

Device to color modulate a stationary light beam gives high intensity  
HQ-44 B66-10476 01

## MODULATOR

Added diodes increase output of balanced mixer circuit  
GSFC-354 B65-10276 01

## SUBJECT INDEX

## MOTOR SYSTEM

Single-sideband modulator accurately reproduces phase information in 2-mc signals M-FS-664	B66-10437	01	Rugged pressed disk electrode has low contact potential MSC-158	B65-10320	01
<b>MODULE</b>			Capacitive system detects and locates fluid leaks M-FS-478	B66-10099	01
Portable display paneling has wide use, easy take down and assembly ARC-17	B63-10435	05	Phonocardiograph microphone is rugged and moistureproof MSC-212	B66-10314	04
Solar cell submodule design facilitates assembly of lightweight arrays JPL-728	B66-10231	02	Sniffer used as portable hydrogen leak detector M-FS-846	B66-10356	01
<b>MOLD</b>			System monitors discrete computer inputs M-FS-1021	B66-10389	01
Improved molybdenum disulfide-silver motor brushes have extended life M-FS-64	B63-10479	03	Optical monitor panel provides flexible test panel configurations KSC-66-18	B66-10494	01
Refractory ceramic has wide usage, low fabrication cost M-FS-67	B63-10481	03	Security warning system monitors up to fifteen remote areas simultaneously KSC-66-39	B66-10548	01
Plastic molds reduce cost of encapsulating electric cable connectors M-FS-69	B63-10568	05	Resistor monitors transfer of liquid helium LANGLEY-229	B66-10580	01
Pressure molding of powdered materials improved by rubber mold insert WOO-100	B64-10270	03	Magnetoresistor monitors relay performance M-FS-1754	B66-10650	01
Spray-on technique simplifies fabrication of complex thermal insulation blanket M-FS-497	B66-10053	03	Monitoring system determines amplitude and time of vibration channel peaks JPL-879	B66-10699	01
<b>MOLDING MATERIAL</b>			<b>MONKEY</b>		
Cork is used to make tooling patterns and molds MSC-425	B66-10328	05	Test monkeys anesthetized by routine procedure HQ-18	B65-10332	04
<b>MOLECULAR DISSOCIATION</b>			<b>MONOCHROMATIC RADIATION</b>		
Heater decomposes oil backstreaming from high-vacuum pumps GSFC-356	B65-10224	02	Computer programs simplify optical system analysis GSFC-306	B65-10093	01
<b>MOLECULAR FLOW</b>			<b>MONOMER</b>		
Test device prevents molecular bounce-back GSFC-82	B63-10546	03	Valve seat pores sealed with thermosetting monomer M-FS-900	B66-10322	03
<b>MOLECULE</b>			<b>MONOMOLECULAR LAYER</b>		
Test device prevents molecular bounce-back GSFC-82	B63-10546	03	Miniature bearings lubricated by sonic dispersion method M-FS-202	B65-10106	03
<b>MOLYBDENUM ALLOY</b>			<b>MONOPULSE ANTENNA</b>		
Etching process mills pH 14-8 Mo alloy steel to precise tolerances MSC-270	B66-10110	03	Antenna configurations provide polarization diversity GSFC-74	B66-10066	01
<b>MOLYBDENUM SULFIDE</b>			Antenna simulator permits preinstallation system checkout GSFC-522	B66-10518	01
Molybdenum disulfide mixtures make effective high-vacuum lubricants M-FS-54	B63-10453	03	<b>MONTE CARLO METHOD</b>		
Improved molybdenum disulfide-silver motor brushes have extended life M-FS-64	B63-10479	03	Design reliability goal developed from small sample M-FS-403	B66-10405	05
<b>MOMENT EQUATION</b>			<b>MOTION PICTURE</b>		
Equations provide tubular information on effects of uniform and variable loads on thin, flat, circular plates ARG-151	B66-10601	05	Photographic method measures particle size and velocity in fluid stream M-FS-1536	B66-10668	01
<b>MONITOR</b>			<b>MOTOR CASE</b>		
Circuit switches latching relay in response to signals of different polarity WOO-055	B63-10508	01	Cold solid propellant motor has stop-restart capability JPL-836	B66-10673	03
Simple circuit continuously monitors thermocouple sensor M-FS-61	B63-10567	01	<b>MOTOR SYSTEM</b>		
Auxiliary circuit enables automatic monitoring of EKG MSC-106	B65-10142	01	Improved molybdenum disulfide-silver motor brushes have extended life M-FS-64	B63-10479	03
Electromechanical flowmeter accurately monitors fluid flow GSFC-357	B65-10273	01	Quick-acting clutch disengages idle drive motor		

GSFC-143	B64-10028	05	power drain and high reliability GSFC-433	B66-10179	01
Vehicle walks on varied terrain, can assist handicapped persons W00-005	B64-10274	05	<b>MYLAR</b> O-rings with Mylar back-up provide high- pressure cryogenic seal M-FS-603	B66-10278	05
Rotor position sensor switches currents in brushless dc motors GSFC-315	B65-10151	01	Mylar film eliminates silk screening of equipment panels MSC-798	B66-10455	05
Electronic phase-locked-loop speed control system is stable JPL-SC-084	B66-10232	01	<b>N</b>		
Compact actuator converts rotary to linear motion JPL-786	B66-10265	05			
Brushless dc motor has high efficiency, long life GSFC-181	B66-10355	01	<b>N-P-N JUNCTION</b> Two-stage emitter follower is temperature stabilized MSC-20	B63-10493	01
Simple motor drive system operates heavy hinged door NU-0093	B66-10712	05	<b>NANOSECOND</b> Single channel pulse-height analyzer operates in subnanosecond range LEWIS-267	B66-10377	01
<b>MULTILAYER STRUCTURE</b> Reflective insulator layers separated by bonded silica beads MSC-215	B66-10070	03	Pulse stretcher has improved dynamic range and linearity ARG-82	B66-10509	01
Multilayer refractory nozzles produced by plasma-spray process W00-318	B66-10611	05	<b>NAVIGATION AID</b> Improved magnetometer uses toroidal gating coil GSFC-249	B65-10103	01
<b>MULTIPLEX TRANSMISSION</b> Security warning system monitors up to fifteen remote areas simultaneously KSC-66-39	B66-10548	01	<b>NAVIGATION INSTRUMENT</b> Developmental instrument supplies accurate attitude and attitude-rate data HQ-57	B66-10607	01
<b>MULTIPLEXER</b> Microphone multiplex system provides multiple outlets from single source GSFC-426	B66-10308	01	Three-axis attitude and direction reference instrument has only one moving part M-FS-1819	B66-10644	01
<b>MULTIPLIER</b> Computer determines high-frequency phase stability GSFC-113	B63-10555	01	<b>NEON</b> Neon isotopes cancel errors in gas laser M-FS-1476	B66-10583	02
Variable load automatically tests dc power supplies GSFC-291	B65-10105	01	<b>NEOPRENE</b> Chain friction system gives positive, revers- ible drive ARC-8	B63-10009	05
Photoresistance analog multiplier has wide range GSFC-360	B65-10287	01	Elastomers bonded to metal surfaces seal electrochemical cells GSFC-168	B64-10113	03
Circuit provides accurate four-quadrant multiplication W00-272	B66-10331	01	Reusable neoprene jacket protects parts for chemical milling W00-071	B65-10179	03
<b>MULTIVIBRATOR</b> Monostable circuit with tunnel diode has fast recovery GSFC-132	B63-10603	01	<b>NETWORK SYNTHESIS</b> Boron trifluoride nuclear detector preamplifier uses single-cable connection LEWIS-178	B65-10255	01
Temperature-sensitive network drives astable multivibrator GSFC-137	B63-10609	01	<b>NEUTRON ACTIVATION</b> Nondestructive test method accurately sorts mixed bolts M-FS-1426	B66-10574	01
Circuit improvement produces monostable multivibrator with load-carrying capability GSFC-34A	B65-10011	01	<b>NEUTRON FLUX</b> A fast-neutron spectrometer of advanced design M-FS-1664	B66-10555	01
Variable frequency transistor inverters use multiple core transformers GSFC-183	B65-10119	01	<b>NEUTRON SPECTROMETRY</b> A fast-neutron spectrometer of advanced design M-FS-1664	B66-10555	01
Variable frequency magnetic multivibrator generates stable square-wave output GSFC-AE-21	B65-10124	01	<b>NICKEL</b> Ellipsoidal optical reflectors reproduced by electroforming GSFC-92	B63-10547	05
Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01	Tungsten wire and tubing joined by nickel brazing M-FS-394	B65-10391	05
Complementary monostable circuits achieve low			Quality control criteria for acceptance		

## SUBJECT INDEX

## NOTCH

testing of cross-wire welds MSC-627	B66-10587	05	frequency microphones from wind noise M-FS-123	B63-10579	01
<b>NICKEL ALLOY</b>			<b>NOISE ELIMINATION</b>		
Cryogenic trap valve has no moving parts M-FS-487	B66-10136	05	New low-level a-c amplifier provides adjustable noise cancellation and automatic temperature compensation ARC-2	B63-10003	04
Nickel-base superalloys developed for high-temperature applications LEWIS-226	B66-10222	03	Flange on microwave antenna subreflector cuts ground noise JPL-362	B63-10229	01
<b>NICKEL-CADMIUM BATTERY</b>			<b>NOISE INTENSITY</b>		
Didymium compound improves nickel-cadmium cell GSFC-295	B65-10083	03	Small foamed polystyrene shield protects low-frequency microphones from wind noise M-FS-123	B63-10579	01
Hermetically sealed cells protected from internal gas pressure GSFC-555	B66-10692	01	<b>NOISE REDUCTION</b>		
<b>NICKEL COMPOUND</b>			Flange on microwave antenna subreflector cuts ground noise JPL-362	B63-10229	01
Thoriated nickel bonded by solid-state diffusion method LANGLEY-116	B65-10220	03	<b>NOISE SUPPRESSOR</b>		
<b>NICKEL PLATING</b>			New low-level a-c amplifier provides adjustable noise cancellation and automatic temperature compensation ARC-2	B63-10003	04
Electroless nickel resist used in alkali-etching of aluminum GSFC-284	B65-10162	03	Novel horn antenna reduces side lobes, improves radiation pattern JPL-425	B63-10264	01
Nickel solution prepared for precision electroforming WOO-070	B65-10303	03	Small digital recording head has parallel bit channels, minimizes cross talk JPL-0029	B63-10284	01
Nickel/tin coating protects threaded fasteners in corrosive environment MSC-253	B65-10398	03	Field-effect transistor improves electrometer amplifier ARC-36	B64-10143	01
Copper wire plated with nickel and silver resists corrosion M-FS-761	B66-10421	03	<b>NONDESTRUCTIVE TESTING</b>		
Electroless nickel plating on stainless steels and aluminum GSFC-533	B66-10479	03	Force controlled solenoid drives microweld tester WOO-125	B65-10182	01
Nondestructive test method accurately sorts mixed bolts M-FS-1426	B66-10574	01	Simple, nondestructive test identifies metals MSC-525	B66-10305	03
<b>NIOBIUM</b>			Nondestructive test method accurately sorts mixed bolts M-FS-1426	B66-10574	01
Niobium thin films are superconductive in strong magnetic fields at low temperatures JPL-SC-174	B66-10122	02	<b>NONELECTRONIC APPARATUS</b>		
<b>NITRATE</b>			Nonelectrolytic tantalum capacitors developed M-FS-1546	B66-10552	01
Special treatment reduces helium permeation of glass in vacuum systems HQ-25	B66-10372	02	<b>NONLINEAR EQUATION</b>		
<b>NITROGEN</b>			Computer program determines chemical equilibria in complex systems LEWIS-281	B66-10671	01
Helical tube separates nitrogen gas from liquid nitrogen JPL-398	B63-10251	05	<b>NONLINEAR FEEDBACK</b>		
Compressed gas system operates semitrailer brakes during winching operation JPL-0036	B64-10306	05	Nonlinear feedback reduces analog-to-digital converter error ARC-46	B65-10277	01
Economical and maintenance-free gas system operates railroad switches NU-0045	B66-10124	05	<b>NONLINEARITY</b>		
Experimental investigation of megawatt dc arc heating of nitrogen LEWIS-313	B66-10508	02	Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01
<b>NITROGEN COMPOUND</b>			Feedback loop compensates for rectifier nonlinearity M-FS-384	B66-10382	01
Nitrogen dioxide produced by self-sustained pyrolysis of nitrous oxide LANGLEY-32	B65-10074	05	<b>NOSE CONE</b>		
<b>NITROGEN POLYMER</b>			High purity electroforming yields superior metal models ARC-6	B63-10007	05
Flexible protective coatings made from silicon-nitrogen materials M-FS-528	B66-10027	03	Colloidal suspension simulates linear dynamic pressure profile WOO-266	B66-10214	05
<b>NOISE ATTENUATION</b>			<b>NOTCH</b>		
Small foamed polystyrene shield protects low-			Apparatus of small size can be extended into long, rigid boom JPL-305	B63-10200	05

## NOTCH STRENGTH

New weldable high strength aluminum alloy developed for cryogenic service  
M-FS-737 B66-10613 05

## NOZZLE

Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application  
LANGLEY-6A B63-10318 03

Improved technique for localizing electro-polishing features novel nozzles  
WOO-101 B64-10271 01

Grit blasting nozzle fabricated from mild tool steel proves satisfactory  
M-FS-1420 B66-10597 05

## NOZZLE FLOW

Flow control valve is independent of pressure drop  
JPL-WOO-039 B65-10121 05

## NUCLEAR HEAT

Servo calorimeter measures material heating rate  
NU-0024 B65-10247 01

## NUCLEAR PARTICLE

Instrument performs nondestructive chemical analysis, data can be telemetered  
JPL-SC-078 B65-10317 01

## NUMERICAL ANALYSIS

New computer program solves wide variety of heat flow problems  
M-FS-421 B66-10404 01

An orthonormalization procedure for multivariable function approximation  
M-FS-1313 B66-10579 01

## NUMERICAL CONTROL

Computer used to program numerically controlled milling machine  
M-FS-1608 B66-10541 01

## NUTS AND BOLTS

Simple mechanism combines positive locking and quick-release features  
WOO-4 B63-10420 05

Instrument adjustment knob locks to prevent accidental maladjustment  
M-FS-190 B64-10249 05

Captive nut fastener securely joins brittle materials  
NU-0008 B65-10245 05

Pneumatic wrench retains or discharges nuts or bolts as desired  
NU-0085 B66-10707 05

## NYLON

Portable flooring protects finished surfaces, is easily moved  
M-FS-15 B63-10387 05

Nylon bit removes cork insulation without damage to substrate  
MSC-381 B66-10152 05

Improved adhesive for cryogenic applications cures at room temperature  
WOO-132 B66-10185 03

Improved method facilitates debulking and curing of phenolic impregnated asbestos  
MSC-949 B66-10459 05

## O-RING SEAL

Reinforcement core facilitates O-ring installation  
WOO-228 B65-10378 05

Rubber-coated bellows improves vibration damping in vacuum lines  
LEWIS-273 B66-10187 02

O-rings with Mylar back-up provide high-pressure cryogenic seal  
M-FS-603 B66-10278 05

Inflatable O-ring seal would ease closing of hatch cover plate  
MSC-740 B66-10385 05

## OHMMETER

Ohmmeter senses depletion of lubricant in journal bearings  
LEWIS-37 B64-10042 01

Continuity tester screens out faulty socket connections  
JPL-596 B64-10065 01

Electronic ohmmeter provides direct digital output  
GSFC-363 B65-10274 01

## OIL

Oil-smeared models aid wind tunnel measurements  
LANGLEY-4 B63-10311 03

Fine-particle filter prevents damage to vacuum pumps  
LEWIS-106 B63-10489 05

## OLEFIN

Variable-transparency wall regulates temperatures of structures  
LANGLEY-25 B63-10528 03

## OMNIDIRECTIONAL ANTENNA

Lightweight load support serves as vibration damper  
JPL-661 B65-10144 05

Omnidirectional antennas transmit and receive over large bandwidth  
GSFC-436 B66-10133 01

## OPACITY

Opaque microfiche masthead permits easy reading  
HQ-7 B65-10306 01

Optically driven switch turn-off time reduced by opaque coatings  
JPL-SC-107 B66-10141 01

Pyrometry handbook describes practical aspects of surface temperature measurements of opaque materials  
LEWIS-349 B66-10520 01

## OPERATIONAL PROBLEM

Logic system aids in evaluation of project readiness  
MSC-753 B66-10457 05

## OPTICAL CORRECTION PROCEDURE

Oil-damped mercury pool makes precise optical alignment tool  
GSFC-353 B65-10253 02

## OPTICAL EQUIPMENT

Computer programs simplify optical system analysis  
GSFC-306 B65-10093 01

Light ray modulation controls optical system alignment  
GSFC-171 B65-10211 02

Electrodeless discharge lamp is easily started, has high stability  
WOO-030 B66-10015 01

Improved carbon electrode reduces arc sputtering  
MSC-219 B66-10026 01

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# OPTIMIZATION

Optical gyro pickoff operates at cryogenic temperatures M-FS-407	B66-10128	01	scattering technique M-FS-850	B66-10320	01
Optically driven switch turn-off time reduced by opaque coatings JPL-SC-107	B66-10141	01	Laser measuring system accurately locates point coordinates on photograph ARG-74	B66-10560	02
Electrically controlled optical latch and switch requires less current JPL-SC-111	B66-10414	01	OPTICAL METHOD Liquid-level meter has no moving parts M-FS-3	B63-10378	03
OPTICAL FILTER Thin transparent films formed from powdered glass GSFC-352	B65-10217	03	Instrument quickly transposes ground reference target to eye level MSC-275	B66-10061	05
Exposure valve /eV/ system expanded to include filter factors and transmittance LANGLEY-190	B66-10602	02	OPTICAL PATH Photoelectric system continuously monitors liquid level M-FS-417	B65-10382	01
OPTICAL IMAGE Optical monitor panel provides flexible test panel configurations KSC-66-18	B66-10494	01	OPTICAL PROPERTY Optical output enhances flowmeter accuracy M-FS-482	B65-10395	02
OPTICAL INSTRUMENT Optics used to measure torque at high rotational speeds LEWIS-13	B63-10338	01	OPTICAL PUMPING Magnetometer measures orthogonal components of magnetic fields GSFC-395	B65-10315	01
Mirror device aligns machine surface perpendicular to sight lines WOO-5	B63-10421	02	OPTICAL PYROMETER Infrared shield facilitates optical pyrometer measurements LANGLEY-133	B65-10272	02
Ellipsoidal optical reflectors reproduced by electroforming GSFC-92	B63-10547	05	Ultraviolet photographic pyrometer used in rocket exhaust analysis M-FS-499	B66-10095	02
Plastic films for reflective surfaces reproduced from masters GSFC-188	B64-10151	03	Pyrometry handbook describes practical aspects of surface temperature measurements of opaque materials LEWIS-349	B66-10520	01
Micromachining produces optical apertures to micron dimensions GSFC-206	B64-10211	05	OPTICAL REFLECTIVITY System measures angular displacement without contact LANGLEY-46	B65-10073	01
Carbon-arc rod holder has long life, reduces arc splatter MSC-144	B65-10095	03	OPTICAL SENSOR Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01
Interferometer construction assures parallelism of critical components JPL-704	B65-10292	02	Multicolor stroboscope pinpoints resonances in vibrating components JPL-0033	B66-10223	01
Unique construction makes interferometer insensitive to mechanical stresses JPL-725	B65-10295	02	Direction indicator system does not require complicated optics WOO-305	B66-10407	01
Nickel solution prepared for precision electroforming WOO-070	B65-10303	03	Point-source light sensor circuit is insensitive to background light JPL-778	B66-10502	01
Optical projectors simulate human eyes to establish operator's field of view WOO-250	B66-10010	02	OPTICAL TRACKING Precision CW laser automatic tracking system investigated M-FS-1606	B66-10629	01
Mount enables precision adjustment of optical-instrumentation mirror MSC-184	B66-10199	02	OPTICS Attachment converts microscope to point source autocollimator JPL-499	B64-10124	05
Optical device enables small detector to see large field of view WOO-253	B66-10263	02	Simple optical system used to align spectrograph LANGLEY-92	B65-10071	02
Simplified fixture permits precision alignment of an optical target M-FS-1181	B66-10556	01	System measures angular displacement without contact LANGLEY-46	B65-10073	01
Optical superheterodyne receiver uses laser for local oscillator M-FS-1605	B66-10584	01	OPTIMIZATION Computer program determines inventory size M-FS-1135	B66-10506	01
Optical automatic gain channel M-FS-1550	B66-10596	02	A design procedure for the weight optimization of straight finned radiators		
OPTICAL MEASUREMENT Solvent residue content measured by light					

GSFC-547	B66-10618	05	pulse stretcher GSFC-261	B65-10069	01
Packaging of electronic modules JPL-801	B66-10664	01	Unijunction frequency divider is free of backward loading JPL-W00-010	B65-10112	01
<b>ORGANIC COMPOUND</b>			Variable frequency transistor inverters use multiple core transformers GSFC-183	B65-10119	01
Solvent residue content measured by light scattering technique M-FS-850	B66-10320	01	Circuit reduces distortion of FM modulator GSFC-257	B65-10152	01
Primary cells utilize halogen-organic charge transfer complex JPL-926	B66-10682	02	Dc to ac converter operates efficiency at low input voltages GSFC-130	B65-10178	01
<b>ORIFICE</b>			Voltage variable oscillator has high phase stability LANGLEY-123	B65-10204	01
Elastic orifice automatically regulates gas bearings JPL-135	B63-10123	05	Oscillator circuit measures liquid level in tanks M-FS-245	B65-10209	01
Modified gas bearing is adjustable to optimum stiffness ratio M-FS-145	B64-10050	05	Voltage controlled oscillator is easily aligned, has low phase noise JPL-510	B65-10223	01
Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	Electrostatically driven dynamic capacitor employs capacitive feedback JPL-771	B65-10293	01
<b>ORTHOGONAL FUNCTION</b>			Frequency correction device uses digital circuitry GSFC-268	B65-10307	01
Developmental instrument supplies accurate attitude and attitude-rate data HQ-57	B66-10607	01	Hybrid circuit achieves pulse regeneration with low power drain GSFC-382	B65-10314	01
Twin helix system produces fast scan in infrared detector M-FS-1598	B66-10638	02	A conceptual design for squeeze film bearings M-FS-573	B66-10226	05
<b>OSCILLATING CYLINDER</b>			Single-sideband modulator accurately reproduces phase information in 2-mc signals M-FS-664	B66-10437	01
Problem of oscillating cone in supersonic flow is solved by small perturbation techniques M-FS-869	B66-10700	02	Optical superheterodyne receiver uses laser for local oscillator M-FS-1605	B66-10584	01
<b>OSCILLATION</b>			<b>OSCILLOGRAPH</b>		
Device enables measurement of moments of inertia about three axes GSFC-49	B65-10176	05	Manual-feed adapter permits microfilming of continuous oscillograph output NU-0029	B65-10249	01
<b>OSCILLATION FREQUENCY</b>			Lamp automatically switches to new filament on burnout M-FS-498	B66-10046	01
Circuit converts AM signals to FM for magnetic recording GSFC-227	B65-10001	01	<b>OSCILLOSCOPE</b>		
<b>OSCILLATOR</b>			Parallel line raster eliminates ambiguities in reading timing of pulses less than 500 microseconds apart JPL-805	B66-10386	01
Increased performance reliability obtained with dual /redundant/ oscillator system GSFC-36	B63-10027	01	Semiconductors can be tested without removing them from circuitry M-FS-1163	B66-10447	01
Frequency-shift-keyer circuit improves PCM conversion for radio transmission GSFC-80	B63-10511	01	<b>OUTPUT</b>		
Transistorized trigger circuit is frequency- controllable GSFC-111	B63-10553	01	Double-throw microwave device switches two lines quickly JPL-410	B63-10258	01
Highly efficient square-wave oscillator oper- ator at high power levels GSFC-112	B63-10554	01	Simple circuit provides adjustable voltage with linear temperature variation JPL-W00-029	B63-10537	01
Computer determines high-frequency phase stability GSFC-113	B63-10555	01	Transistorized converter provides nondissipa- tive regulation GSFC-238	B64-10305	01
Blocking oscillator uses low triggering voltage MSC-58	B64-10017	01	Voltage generator sweeps oscillator frequency linearly with time M-FS-219	B64-10320	01
Electronic device simulates respiration rate and depth MSC-89	B64-10255	01			
Voltage generator sweeps oscillator frequency linearly with time M-FS-219	B64-10320	01			
FM oscillator uses tetrode transistor JPL-82	B65-10055	01			
Feedback oscillator functions as low-level					

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## PAIN SENSITIVITY

Stepping motor drive circuit designed for low power drain GSFC-198	B65-10026	01	feature ARC-1	B65-10369	01
Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01	Oxygen-hydrogen torch is a small-scale steam generator NU-0042	B66-10120	03
Sensitive electrometer features digital output GSFC-288	B65-10206	01	OXYGEN BREATHING Respiratory transfer value has fail-safe feature ARC-1	B65-10369	01
Frequency divider is free of spurious outputs GSFC-308	B65-10334	01	OXYGEN DETECTOR Fuel cell serves as oxygen level detector JPL-SC-072	B65-10066	01
Binary counter uses fluid logic elements M-FS-323	B65-10377	01	OXYGEN REGULATOR Plant respirometer enables high resolution of oxygen consumption rates HQ-47	B66-10406	04
Dual-voltage power supply has increased efficiency LEWIS-107A	B66-10002	01	OXYGEN TREATMENT Process reduces pore diameters to produce superior filters WDD-093	B66-10037	03
Automatic gain control circuit handles wide input range MSC-166	B66-10089	01	OZONE Porous glass makes effective substrate for ozone-sensing reagent GSFC-388	B65-10364	03
Improved system measures output energy of pyrotechnic devices WDD-256	B66-10159	01	<b>P</b>		
Microphone multiplex system provides multiple outlets from single source GSFC-426	B66-10308	01			
<b>OVERVOLTAGE</b> Circuit protects regulated power supply against overload current GSFC-453	B66-10292	01	P-N-P JUNCTION Two-stage emitter follower is temperature stabilized MSC-20	B63-10493	01
Trisphere spark gap actuates overvoltage relay ARC-68	B66-10557	01	PACKAGING Modular chassis simplifies packaging and interconnecting of circuit boards JPL-236A	B63-10174	01
<b>OXIDATION</b> Cryopumping of hydrogen in vacuum chambers is aided by catalytic oxidation of hydrogen LEWIS-15	B63-10340	05	New package for Belleville spring permits rate change, easy disassembly JPL-392	B63-10247	05
Tool provides constant purge during tube welding M-FS-547	B66-10093	05	Lightweight magnesium-lithium alloys show promise M-FS-17	B63-10389	03
Device removes hydrogen gas from enclosed spaces GSFC-495	B66-10340	03	Use of tear ring permits repair of sealed module circuitry M-FS-210	B65-10014	05
<b>OXIDE</b> Reference black body is compact, convenient to use ARC-3	B63-10004	03	Library of documents compressed into lap-held display kit MSC-125	B65-10030	01
Removable preheater elements improve oxide induction furnace JPL-288	B63-10193	01	Hollow plastic hoops protect thermocouple in storage and handling NU-0023	B65-10256	05
Improved thermal insulation materials made of foamed refractory oxides M-FS-735	B66-10288	03	Frequency discriminator with binary output eliminates tuned circuits M-FS-376	B65-10349	01
Apparatus enables accurate determination of alkali oxides in alkali metals LEWIS-256	B66-10296	03	Rugged microelectronic module package supports circuitry on heat sink MSC-81A	B66-10245	01
<b>OXIDIZER</b> Fuel and oxidizer valve assembly employs single solenoid actuator MSC-1046	B66-10648	05	Critical parts are stored and shipped in environmentally controlled reusable container M-FS-703	B66-10258	05
<b>OXYGEN</b> Miniature oxygen-hydrogen cutting torch constructed from hypodermic needle JPL-545	B63-10517	05	Packaging of electronic modules JPL-801	B66-10664	01
Cold trap increases sensitivity of gas chromatograph M-FS-1617	B66-10517	03	PACKING DENSITY PCM magnetic tape system efficiently records and reproduces data GSFC-375	B65-10311	01
<b>OXYGEN APPARATUS</b> Respiratory transfer value has fail-safe			PAIN SENSITIVITY Modified algometer provides accurate depth measurements MSC-616	B66-10647	04



## PAINT

Inorganic paint is durable, fireproof, easy to apply  
GSFC-366 B65-10156 03

Aluminum alloys protected against stress-corrosion cracking  
M-FS-235 B65-10172 03

Special coatings control temperature of structures  
GSFC-444 B65-10337 03

Inexpensive infrared source improvised from flashlight  
M-FS-494 B66-10096 02

## PANEL

Portable display paneling has wide use, easy take down and assembly  
ARC-17 B63-10435 05

Electronic assembly rack panels snap on and off  
GSFC-59 B64-10121 05

Instrument adjustment knob locks to prevent accidental maladjustment  
M-FS-190 B64-10249 05

Transducer senses displacements of panels subjected to vibration  
ARC-37 B65-10085 01

Galvanic corrosion reduced in aluminum fabrications  
M-FS-272 B65-10140 03

Integral ribs formed in metal panels by cold-press extrusion  
M-FS-230 B65-10141 05

Concealed hinge permits flush mounting of doors and hatches  
MSC-623 B66-10336 05

Versatile machine mills, saws light materials  
M-FS-827 B66-10364 05

Impact- and puncture-resistant material protects parts from damage  
MSC-747 B66-10375 05

Mylar film eliminates silk screening of equipment panels  
MSC-798 B66-10455 05

Optical monitor panel provides flexible test panel configurations  
KSC-66-18 B66-10494 01

## PAPER

Expandable takeup reel facilitates paper tape removal  
WOO-271 B66-10399 05

## PARABOLIC REFLECTOR

Unique construction makes interferometer insensitive to mechanical stresses  
JPL-725 B65-10295 02

Small, high-intensity flasher permits continuous close-in photography  
NU-0043 B66-10119 03

## PARABOLOIDAL MIRROR

Wide-aperture solar energy collector is light in weight  
JPL-SC-055 B65-10046 02

## PARACHUTE

Nylon shock absorber prevents injury to parachute jumpers  
MSC-226 B66-10080 05

## PARACHUTING INJURY

Nylon shock absorber prevents injury to parachute jumpers  
MSC-226 B66-10080 05

## PARTICLE

Fine-mesh screen made by simplified method  
WOO-104 B64-10282 03

## PARTICLE ACCELERATOR

Dust particle injector for hypervelocity accelerators provides high charge-to-mass ratio  
GSFC-509 B66-10347 01

## PARTICLE DETECTOR

Microparticle impact sensor measures energy directly  
GSFC-252 B65-10048 01

Multiaxial analyzer detects low-energy electrons  
GSFC-329 B65-10213 01

Boron trifluoride nuclear detector preamplifier uses single-cable connection  
LEWIS-178 B65-10255 01

## PARTICLE MASS

Microparticle impact sensor measures energy directly  
GSFC-252 B65-10048 01

## PARTICLE PRODUCTION

Process for preparing dispersions of alkali metals  
JPL-734 B66-10639 03

## PARTICLE PROPERTY

Probe samples components of rocket engine exhaust  
M-FS-485 B65-10384 03

## PARTICLE SIZE

Photographic method measures particle size and velocity in fluid stream  
M-FS-1536 B66-10668 01

## PARTICULATE FILTER

Fine-particle filter prevents damage to vacuum pumps  
LEWIS-106 B63-10489 05

## PATH

Copper foil provides uniform heat sink path  
MSC-262 B66-10004 02

## PATIENT

Buoyant Stokes litter assembly used for sea rescue operations  
MSC-131 B66-10019 05

## PAYLOAD

Speed-sensing device aids crane operators  
WS-4 B64-10006 05

## PENDULUM

Seismic transducer measures small horizontal displacements  
M-FS-81 B65-10029 05

## PENDULUM APPARATUS

Viscous-pendulum damper suppresses structural vibrations  
LANGLEY-45 B64-10272 05

Device enables measurement of moments of inertia about three axes  
GSFC-49 B65-10176 05

Shock-operated valve would automatically protect fluid systems  
M-FS-801 B66-10335 05

Automatic system determines moments of inertia of asymmetrical objects  
M-FS-1769 B66-10636 01

## PENETRATING PARTICLE

Improved sensor counts micrometeoroid penetrations  
LEWIS-76 B63-10443 01

<b>PENETROMETER</b> Extendable mast used in one shot soil penetrometer JPL-685	B66-10146	05	moistureproof MSC-212	B66-10314	04
<b>PENNING GAUGE</b> Rod and dish cathode improves Penning-type vacuum gauge GSFC-447	B66-10082	01	<b>PHOSPHORIC ACID</b> Electrolytic etching process provides effective bonding surface on stainless steel GSFC-484	B66-10299	03
<b>PERFORMANCE PREDICTION</b> Human transfer functions used to predict system performance parameters LANGLEY-203	B66-10379	01	<b>PHOTOCONDUCTIVE CELL</b> Solar-angle sensor has no moving parts JPL-418	B63-10260	02
<b>PERMEABILITY</b> New energy storage concept uses tapes LEWIS-239	B66-10098	02	Photocell shadowing technique improves light source detector JPL-809	B66-10564	01
Special treatment reduces helium permeation of glass in vacuum systems HQ-25	B66-10372	02	<b>PHOTOCONDUCTOR</b> Light-sensitive potentiometer measures product of two variables GSFC-240	B65-10076	01
<b>PERSONNEL SUBSYSTEM</b> Emergency escape system protects personnel from explosion and fire KSC-66-12	B66-10634	05	<b>PHOTODETECTOR</b> Sensor detects hydrocarbon oil contaminants in fluid lines M-FS-522	B66-10068	01
<b>PERTURBATION</b> Problem of oscillating cone in supersonic flow is solved by small perturbation techniques M-FS-869	B66-10700	02	Optical device enables small detector to see large field of view WOO-253	B66-10263	02
<b>PHASE</b> Computer determines high-frequency phase stability GSFC-113	B63-10555	01	Photocell shadowing technique improves light source detector JPL-809	B66-10564	01
<b>PHASE DEMODULATOR</b> Pn acquisition demodulator achieves automatic synchronization of a telemetry channel JPL-612	B66-10271	01	Blackbody cavity radiometer has rapid response JPL-521	B66-10679	01
<b>PHASE DETECTOR</b> Phase detector circuit synthesizes own reference signal M-FS-247	B65-10080	01	<b>PHOTODIODE</b> Simple circuit positions film frames in projector JPL-508	B65-10132	02
<b>PHASE LOCK</b> Electronic phase-locked-loop speed control system is stable JPL-SC-084	B66-10232	01	Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01
An investigation of phase-lock loop swept- frequency synchronization M-FS-656	B66-10423	01	Laser beam transmits electric power GSFC-293	B65-10158	01
<b>PHASE SHIFT</b> Phase shift frequency synthesizer is efficient, small in size M-FS-250	B65-10169	01	Photoresistance analog multiplier has wide range GSFC-360	B65-10287	01
Mechanical device accurately measures RF phase differences in VHF or UHF ranges M-FS-1738	B66-10694	05	<b>PHOTOELASTIC STRESS MEASUREMENT</b> Servo system facilitates photoelastic strain measurements on resins JPL-504	B64-10280	01
<b>PHASE-SHIFT KEYING</b> Pn acquisition demodulator achieves automatic synchronization of a telemetry channel JPL-612	B66-10271	01	<b>PHOTOELECTRIC APPARATUS</b> Liquid-level meter has no moving parts M-FS-3	B63-10378	03
<b>PHENOL</b> Improved method facilitates debulking and curing of phenolic impregnated asbestos MSC-949	B66-10459	05	Photoelectric semiconductor switch operates with low level inputs JPL-SC-068	B65-10033	01
<b>PHENOL RESIN</b> Insulation for cryogenic tanks has reduced thickness and weight M-FS-326	B66-10183	02	Photoelectric scanner makes detailed work function maps of metal surface JPL-SC-176	B66-10440	01
<b>PHONOCARDIOGRAPHY</b> Phonocardiograph system monitors heart sounds MSC-185	B66-10154	04	<b>PHOTOELECTRIC CELL</b> Solar-angle sensor has no moving parts JPL-418	B63-10260	02
Phonocardiograph microphone is rugged and			New method used to fabricate gallium arsenide photovoltaic device WOO-062	B64-10019	01
			Sensitive level sensor made with spirit level, gives electrical output LANGLEY-49	B65-10067	01
			Photoelectric system continuously monitors liquid level M-FS-417	B65-10382	01
			Direction indicator system does not require complicated optics WOO-305	B66-10407	01

## PHOTOGRAPH

## SUBJECT INDEX

Remote preamplifier circuit maintains stability over wide temperature range WOO-278	B66-10432	01	Dot patterns provide reproducible flaw areas for study of adhesive bonds M-FS-862	B66-10367	05
<b>PHOTOGRAPH</b> Built-in templates speed up process for making accurate models LANGLEY-23	B63-10526	05	Exposure valve /eV/ system expanded to include filter factors and transmittance LANGLEY-190	B66-10602	02
Use of photographs speeds inspection of printed-circuit boards MSC-72	B64-10118	01	<b>PHOTOLYSIS</b> Polymer film exhibits thermal and radiation stability LANGLEY-100	B66-10043	03
<b>PHOTOGRAPH INTERPRETATION</b> Laser measuring system accurately locates point coordinates on photograph ARG-74	B66-10560	02	<b>PHOTOMETER</b> Scanning photometer system automatically determines atmospheric layer height MSC-245	B66-10170	01
<b>PHOTOGRAPHIC APPARATUS</b> New low-level Ac amplifier provides adjustable noise cancellation and automatic temperature compensation MSC-108	B65-10003	05	Solvent residue content measured by light scattering technique M-FS-850	B66-10320	01
Nulling pyrometer uses Kerr cell shutter for fast responses NU-0010	B65-10050	01	<b>PHOTOMETRY</b> PTFE-aluminum films serve as neutral density filters LANGLEY-189	B66-10017	02
Rotating filters permit wide range of optical pyrometry LANGLEY-33	B65-10100	02	<b>PHOTOMICROGRAPHY</b> Inspection of fine wires simplified by capillary tube wire holder MSC-358	B66-10329	05
Simple circuit positions film frames in projector JPL-508	B65-10132	02	<b>PHOTOMULTIPLIER</b> Variable light source with a million-to-one intensity ratio JPL-WOO-008	B63-10424	03
Planetary camera control improves microfiche production HQ-1	B65-10313	01	System selects framing rate for spectrograph camera LANGLEY-55	B65-10086	01
Beam splitter used in dual filming technique M-FS-501	B66-10072	02	Plastic scintillator converts standard photomultiplier to ultraviolet range ERC-9	B66-10108	02
Ultraviolet photographic pyrometer used in rocket exhaust analysis M-FS-499	B66-10095	02	Improved design provides faster response time in photomultiplier GSFC-451	B66-10526	01
Small, high-intensity flasher permits continuous close-in photography NU-0043	B66-10119	03	<b>PHOTON</b> Offset lenses add versatility to phototypesetting machine HQ-9	B66-10173	02
Automated drafting system uses computer techniques M-FS-788	B66-10362	01	<b>PHOTON ABSORPTION</b> Optically driven switch turn-off time reduced by opaque coatings JPL-SC-107	B66-10141	01
<b>PHOTOGRAPHIC DEVELOPER</b> Modified developer increases line resolution in photosensitive resist GSFC-386	B65-10278	01	<b>PHOTORESISTIVITY</b> System for etching thick aluminum layers minimizes bridging and undercutting M-FS-1366	B66-10400	03
<b>PHOTOGRAPHIC FILM</b> Commercial film produces positive X-ray photo in ten seconds M-FS-521	B66-10307	02	<b>PHOTOTRANSISTOR</b> Electrically controlled optical latch and switch requires less current JPL-SC-111	B66-10414	01
Mylar film eliminates silk screening of equipment panels MSC-798	B66-10455	05	<b>PHOTOVOLTAGE</b> Cuprous selenide and sulfide form improved photovoltaic barriers WOO-212	B66-10025	01
Gas pressure feeds film into camera at high speed ARG-97	B66-10474	02	<b>PHOTOVOLTAIC EFFECT</b> Pressure transducer 3/8-inch in size can be faired into surface WOO-065	B64-10021	05
<b>PHOTOGRAPHIC MEASUREMENT</b> Photographic method measures particle size and velocity in fluid stream M-FS-1536	B66-10668	01	<b>PHYSICAL CHEMISTRY</b> Apparatus presents visual display of semiconductor surface characteristics JPL-665	B66-10200	01
Slide rule-type color chart predicts reproduced photo tones MSC-1227	B66-10680	01	<b>PHYSICAL FITNESS</b> Simulator effects partial gravity conditions MSC-152	B66-10339	05
<b>PHOTOGRAPHY</b> Front and back printed circuit layouts presented on single sheet GSFC-93	B63-10596	01			

## PHYSICAL PROPERTY

Tiny sensor-transmitter can withstand extreme acceleration, gives digital output  
ARC-22 B63-10561 01

Silazane elastomer remains resilient at 400 deg C  
M-FS-1144 B66-10667 05

## PHYSIOLOGICAL TELEMETRY

Analog device simulates physiological waveforms  
MSC-51 B64-10109 01

## PHYSIOLOGY

Test monkeys anesthetized by routine procedure  
HQ-18 B65-10332 04

Computer circuit calculates cardiac output  
MSC-274 B66-10006 01

## PIEZOELECTRIC CRYSTAL

Piezoresistive gage tests pin-connector sockets  
JPL-675 B65-10128 01

Crystal measures short-term, large-magnitude forces  
JPL-77 B65-10187 01

Acceleration-compensated pressure transducer has fast response  
LANGLEY-113 B66-10353 01

## PIEZOELECTRICITY

Device calibrates vibration transducers at amplitudes up to 20g.  
M-FS-86 B63-10572 01

Ultra-sensitive transducer advances micro-measurement range  
ARC-26 B64-10004 01

Pressure transducer 3/8-inch in size can be faired into surface  
WOO-065 B64-10021 05

Damping technique gives accelerometer flat frequency response  
M-FS-471 B66-10293 01

Method permits mechanical and electrical checkout of piezoelectric transducers while installed in a system  
ARC-73 B66-10533 01

## PIEZORESISTIVE DEVICE

Pressure transducer 3/8-inch in size can be faired into surface  
WOO-065 B64-10021 05

Miniature stress transducer has directional capability  
JPL-591 B65-10023 01

## PIGMENT

Pigmented coating resists thermal shock  
JPL-SC-083 B65-10354 03

## PIPE

Spring loaded beaded cable makes efficient wire puller  
WOO-108 B65-10031 05

Portable tool removes burrs from pipe and tubing  
MSC-237 B65-10360 05

Portable tool cleans pipes and tubing  
MSC-238 B65-10375 05

Pipe cutting tool is useful in limited space  
MSC-36 B66-10102 05

Studies reveal effects of pipe bends on fluid flow cavitation  
M-FS-516 B66-10228 05

Spherical pipe joint delivers loads equally

to mating flange  
M-FS-807 B66-10665 05

## PIPELINE

Special pliers connect hose containing liquid under pressure  
JPL-IT-1003 B63-10291 05

Blade valve isolates compartment in pipe, opens to allow free flow  
JPL-585 B64-10188 05

Portable power tool machines weld joints in field  
M-FS-258 B66-10145 05

Computer program determines gas flow rates in piping systems  
M-FS-443 B66-10300 01

External linkage tie permits reduction in ducting system flange thickness  
M-FS-823 B66-10326 05

Inexpensive insulation is effective for cryogenic transfer lines  
MSC-618 B66-10348 02

Leak locator for vacuum jacketed pipelines eliminates need for removal of outer jacket  
M-FS-888 B66-10412 01

Teflon sheet permits valve and valve operator to move as a single unit in a cryogenic pipe line  
NU-0077 B66-10702 05

## PISTON

Vented piston seal prevents fluid leakage between two chambers  
JPL-179 B63-10141 05

Inexpensive check valve is installed in standard AN fittings  
JPL-2A B65-10222 05

Labyrinth-type valve seat increases valve life by decreasing fluid velocity  
M-FS-1051 B66-10424 05

Device accurately measures and records low gas-flow rates  
M-FS-1077 B66-10569 01

Check valve installation in pilot operated relief valve prevents reverse pressurization  
M-FS-1925 B66-10655 05

## PIVOT

Solenoid permits remote control of stop watch and assures restarting  
FRC-17 B63-10024 01

## PLANETARY ATMOSPHERE

High intensity radiation heat source is capable of sustained operation  
ARC-61 B66-10547 02

## PLANT /BIOL/

Plant respirometer enables high resolution of oxygen consumption rates  
HQ-47 B66-10406 04

## PLASMA

Microwave technique measures plasma characteristics  
LANGLEY-134 B65-10122 02

## PLASMA ACCELERATION

Gas-injection valve operates at high speed  
HQ-49 B66-10381 05

## PLASMA ACCELERATOR

Pulsed plasma accelerator operates repetitively without complex controls  
LANGLEY-48 B65-10062 01

## PLASMA ARC

Protective coating withstands high temperature

in oxidizing atmosphere M-FS-529	B66-10044	03	A technique for making animal restraints ARC-25	B63-10564	05
Suppressor plate eliminates undesired arcing during electron beam welding M-FS-1126	B66-10357	05	Plastic molds reduce cost of encapsulating electric cable connectors M-FS-69	B63-10568	05
Intergranular metal phase increases thermal shock resistance of ceramic coating M-FS-1862	B66-10651	03	Cryogenic waveguide window is sealed with plastic foam JPL-559	B63-10613	01
<b>PLASMA COMPOSITION</b> Concept for using laser beams to measure electron density in plasmas M-FS-965	B66-10645	01	Mechanical properties of plastics predetermined by empirical method ARC-28	B64-10068	03
<b>PLASMA JET</b> Carbon arc ignition improved by simple auxiliary circuit MSC-103	B65-10018	01	New low-level Ac amplifier provides adjustable noise cancellation and automatic temperature compensation MSC-108	B65-10003	05
<b>PLASMA POTENTIAL</b> Computer programs calculate potential and charge distributions in a plasma M-FS-871	B66-10553	01	Vapor pressure measured with inflatable plastic bag GSFC-281	B65-10136	03
<b>PLASTIC</b> Mechanical properties of plastics predetermined by empirical method ARC-28	B64-10068	03	Inexpensive electrical connector is moisture and corrosionproof MSC-164	B65-10196	01
Improved holder protects crystal during high acceleration and impact JPL-463	B65-10037	05	Inert-gas welding and brazing enclosure fabricated from sheet plastic LEWIS-220	B65-10338	05
Epoxy-resin patterns speed shell-molding of aluminum parts M-FS-303	B65-10177	05	Flexible plastic ring assembly makes durable shaft seal WOO-227	B65-10367	05
Organic reactants rapidly produce plastic foam LANGLEY-37	B65-10288	03	Plastic plus stainless-steel fibers make resilient, impermeable material WOO-246	B65-10374	03
Drill bit design assures clean holes in laminated materials WOO-098	B65-10386	05	Device detects unbonded areas in plastic laminates WOO-206	B65-10380	01
Corrosion of metal samples rapidly measured NU-0041	B66-10140	03	Shrinkable sleeve eliminates shielding gap in RF cable WOO-207	B65-10387	01
Plastic tubing protects flexible copper hose M-FS-772	B66-10588	05	Bench vise adapter grips tubing securely and safely MSC-279	B66-10056	05
<b>PLASTIC COATING</b> Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application LANGLEY-6A	B63-10318	03	Rotating mandrel speeds assembly of plastic inflatables LANGLEY-155	B66-10137	05
Flexible magnetic planning boards are easily transported M-FS-340	B65-10219	05	Thermoplastic rubberlike material produced at low cost JPL-793	B66-10453	03
<b>PLASTIC DEFORMATION</b> Plastic plus stainless-steel fibers make resilient, impermeable material WOO-246	B65-10374	03	Thin plastic sheet eliminates need for expensive plating M-FS-1896	B66-10681	03
Treatment increases stress-corrosion resistance of aluminum alloys M-FS-1840	B66-10595	05	<b>PLASTICIZER</b> Mechanical properties of plastics predetermined by empirical method ARC-28	B64-10068	03
<b>PLASTIC FILM</b> Plastic films for reflective surfaces reproduced from masters GSFC-188	B64-10151	03	<b>PLATE</b> Device transmits rotary motion through hermetically sealed wall JPL-303	B63-10198	05
Thermistor connector assembly increases accuracy of measurements LANGLEY-62	B65-10045	01	Lightweight universal joint transmits both torque and thrust JPL-375	B63-10236	05
Process produces accurate registry between circuit board prints LANGLEY-288	B66-10660	02	Simple mechanism combines positive locking and quick-release features WOO-4	B63-10420	05
<b>PLASTIC MATERIAL</b> Portable flooring protects finished surfaces, is easily moved M-FS-15	B63-10387	05	Unmanned seismometer levels self, corrects drift errors GSFC-100	B63-10551	01
			Splice plate design assures structural separation by mild explosive MSC-137	B65-10166	05

<b>PLATFORM</b>				<b>PLUME</b>			
Apparatus measures very small thrusts				Predicting surface heating rates and pressures resulting from hot exhaust gases			
WOO-048	B64-10284	05		MSC-971	B66-10633	05	
Interior servicing platform simplifies maintenance of storage tanks				<b>PNEUMATIC CONTROL</b>			
M-FS-1300	B66-10425	05		Electropneumatic transducer automatically limits motor current			
<b>PLATING</b>				LEWIS-253	B66-10160	01	
Adherent protective coatings plated on magnesium-lithium alloy				Spool valve cycles at controlled frequency			
M-FS-365	B65-10294	03		MSC-143	B66-10495	05	
Plated nickel wire mesh makes superior catalyst bed				<b>PNEUMATIC EQUIPMENT</b>			
MSC-216	B65-10321	03		Pneumatic power is transmitted through air bearing			
Improved memory word line configuration allows high storage density				MSC-8	B64-10141	05	
GSFC-559	B66-10617	01		Electropneumatic rheostat regulates high current			
<b>PLATINUM BLACK</b>				ARC-44	B65-10299	01	
Blackbody cavity radiometer has rapid response				Pneumatic shutoff and time-delay valve operates at controlled rate			
JPL-521	B66-10679	01		M-FS-602	B66-10189	05	
<b>PLENUM CHAMBER</b>				Pneumatic separator gives quick release to heavy loads			
Averaging probe reduces static-pressure sensing errors				KSC-66-10	B66-10294	05	
LANGLEY-36	B65-10114	05		Automatic protective vent has fail-safe feature			
<b>PLOTTING</b>				LANGLEY-218	B66-10369	05	
Veitch diagram plotter simplifies Boolean functions				Pneumatic binary encoder replaces multiple solenoid system			
JPL-385	B63-10241	05		M-FS-665	B66-10374	01	
Polychart contour plotter enables data extrapolation from multiple plotting charts				Pneumatic wrench retains or discharges nuts or bolts as desired			
M-FS-37	B64-10406	05		NU-0085	B66-10707	05	
Computer routine adds plotting capabilities to existing programs				<b>PNEUMOGRAPHY</b>			
GSFC-490	B66-10511	01		Electronic device simulates respiration rate and depth			
<b>PLOTTING INSTRUMENT</b>				MSC-89	B64-10255	01	
Polychart contour plotter enables data extrapolation from multiple plotting charts				Pneumotachometer counts respiration rate of human subject			
M-FS-37	B64-10406	05		MSC-92	B64-10259	01	
Variable load automatically tests dc power supplies				<b>POINT SOURCE</b>			
GSFC-291	B65-10105	01		Point-source detection system rejects spatially extended radiation sources			
Simple scale interpolator facilitates reading of graphs				GSFC-486	B66-10622	01	
LEWIS-92	B66-10302	05		<b>POLARIZATION</b>			
<b>PLUG</b>				Circuit switches latching relay in response to signals of different polarity			
Design of valve permits sealing even if the stem is misaligned				WOO-055	B63-10508	01	
LEWIS-38	B63-10341	05		Nulling pyrometer uses Kerr cell shutter for fast responses			
Circuit reliability boosted by soldering pins of disconnect plugs to sockets				NU-0010	B65-10050	01	
JPL-447	B64-10002	01		Magnetic field controls carbon arc tail flame			
Keyed plugs and sockets prevent improper connections				MSC-139	B65-10108	01	
MSC-231	B65-10381	01		<b>POLARIZATION CHARACTERISTICS</b>			
Electron beam seals outer surfaces of porous bodies				Antenna configurations provide polarization diversity			
M-FS-562	B66-10033	03		GSFC-74	B66-10066	01	
Plugged hollow shaft makes fatigue-resistant shear pin				<b>POLE</b>			
LANGLEY-195	B66-10077	05		Threading hook facilitates safe recovery of heavy loads			
Expandable rubber plug seals openings for pressure testing				MSC-46	B64-10185	05	
NU-0048	B66-10229	05		<b>POLISHED METAL</b>			
Shock-operated valve would automatically protect fluid systems				Metallographic holding fixture permits polishing of soft metals on vibratory lapping machine			
M-FS-801	B66-10335	05		ARC-42	B66-10562	05	
Plug replaces weld filler as seal in complex casting				<b>POLISHING</b>			
NU-0049	B66-10489	05		Improved technique for localizing electro-polishing features novel nozzles			
				WOO-101	B64-10271	01	

Portable tool cleans pipes and tubing MSC-238	B65-10375	05	activated by heat LANGLEY-187	B66-10111	03
<b>POLYAMIDE</b>			Process produces chlorinated aromatic isocyanate in high yield M-FS-1658	B66-10646	03
Aluminum alloys protected against stress- corrosion cracking M-FS-235	B65-10172	03	<b>POROSITY</b>		
<b>POLYCARBONATE</b>			Apparatus facilitates pressure-testing of metal tubing LEWIS-174	B65-10131	05
One-piece transparent shell improves design of helmet assembly MSC-187	B66-10390	05	<b>POROUS MATERIAL</b>		
Thermocouple-flexible cable connector insulator is highly reliable NU-0082	B66-10709	01	Porous glass makes effective substrate for ozone-sensing reagent GSFC-388	B65-10364	03
<b>POLYESTER</b>			Process reduces pore diameters to produce superior filters WOO-093	B66-10037	03
Irradiation improves properties of an aromatic polyester LANGLEY-115	B65-10164	03	<b>PORTABILITY</b>		
<b>POLYESTER RESIN</b>			Portable flooring protects finished surfaces, is easily moved M-FS-15	B63-10387	05
Modified filter prevents conduction of micro- wave signals along high-voltage power supply leads JPL-63	B63-10091	01	Portable display paneling has wide use, easy take down and assembly ARC-17	B63-10435	05
Adhesive for polyester films cures at room temperature, has high initial tack M-FS-938	B66-10487	03	Seismometer designed for remote operation in random orientation JPL-320	B66-10085	01
<b>POLYMER</b>			Mount makes liquid nitrogen-cooled gamma ray detector portable LEWIS-259	B66-10103	01
Metals plated on fluorocarbon polymers JPL-544	B63-10612	03	Ultrasonic recording scanner used for nondestructive weld inspection M-FS-284	B66-10220	01
Encapsulation process sterilizes and preserves surgical instruments JPL-484	B64-10066	05	<b>POSITION INDICATOR</b>		
Low-cost seal compensates for surface irregularities NU-0016	B65-10160	05	Direction indicator system does not require complicated optics WOO-305	B66-10407	01
Electronic modules easily separated from heat sink MSC-142	B65-10186	02	Analog solar system model relates celestial bodies spatially JPL-195	B66-10413	01
Polymer film exhibits thermal and radiation stability LANGLEY-100	B66-10043	03	Shaft encoder presents digital output JPL-SC-191	B66-10436	01
Polymer deformation gauge measures thickness change in tensile tests JPL-745	B66-10147	01	<b>POSITION SERVO</b>		
Composite gaskets are compatible with liquid oxygen, resist compression set M-FS-455	B66-10395	03	Rotary valve controls multiple hydraulic leveling cylinders M-FS-361	B66-10402	05
<b>POLYMETHYL METHACRYLATE</b>			<b>POSITIONING</b>		
Spherical model provides visual aid for cubic crystal study LEWIS-108	B65-10065	03	Three-position rocker switch actuator has positive centering MSC-261	B65-10376	01
Small, high-intensity flasher permits continuous close-in photography NU-0043	B66-10119	03	Device facilitates centering of workpieces in lathe chuck M-FS-685	B66-10277	05
<b>POLYSTYRENE</b>			<b>POSITIONING EQUIPMENT</b>		
Small foamed polystyrene shield protects low- frequency microphones from wind noise M-FS-123	B63-10579	01	Screw locking cups quickly and neatly crimped NU-0009	B65-10049	05
Cryogenic waveguide window is sealed with plastic foam JPL-559	B63-10613	01	Sheet metal strip unrolls to form circular boom GSFC-423	B66-10032	05
<b>POLYTETRAFLUOROETHYLENE</b>			Thermal motor positions magnetometer sensors ARC-51	B66-10078	05
PTFE-aluminum films serve as neutral density filters LANGLEY-189	B66-10017	02	Adjustable cutting guide aligns and positions stacks of material MSC-321	B66-10210	05
Polytetrafluoroethylene lubricates ball bearings in vacuum environment M-FS-379	B66-10081	03	Inflatable holding fixture permits X-rays to be taken of inner weld areas M-FS-856	B66-10327	03
<b>POLYURETHANE FOAM</b>			Alignment tool facilitates pin placement on irregular horizontal surfaces		
Storage-stable foamable polyurethane is					

## SUBJECT INDEX

## PRESSING

LANGLEY-219	B66-10410	05	GSFC-262	B65-10097	01
Heavy duty precision leveling jacks expedite setup time on horizontal boring mill			Variable load automatically tests dc power supplies		
M-FS-1084	B66-10411	05	GSFC-291	B65-10106	01
POTASSIUM SILICATE			Dc to ac converter operates efficiently at low input voltages		
Inorganic paint is durable, fireproof, easy to apply			GSFC-130	B65-10178	01
GSFC-366	B65-10156	03	Modular thermoelectric cell is easily packaged in various arrays		
POTENTIAL COLLECTOR			GSFC-339	B65-10199	01
Collector/collector guard ring balancing circuit eliminates edge effects			Improved wire memory matrix uses very little power		
JPL-SC-143	B66-10563	01	JPL-SC-167	B65-10359	01
POTENTIOMETER			Low-power ring counter drives high-level loads		
Tension is servo controlled in film advance system			GSFC-431	B66-10106	01
LANGLEY-54	B65-10075	05	Economical and maintenance-free gas system operates railroad switches		
Light-sensitive potentiometer measures product of two variables			NU-0045	B66-10124	05
GSFC-240	B65-10076	01	Linear signal noise summer accurately determines and controls S/N ratio		
Simple circuit reduces transistor switching time			JPL-SC-152	B66-10433	01
GSFC-314	B65-10234	01	Standard arc welders provide high amperage direct current source		
High voltage potential divider calibrated by simple device			LANGLEY-267	B66-10441	01
ARG-83	B66-10497	01	Rectilinear accelerometer possesses self-calibration feature		
POTTING COMPOUND			M-FS-1480	B66-10452	01
Bismuth alloy potting seals aluminum connector in cryogenic application			Simple, one transistor circuit boosts pulse amplitude		
WOO-260	B66-10138	03	GSFC-501	B66-10480	01
Study made of destructive sectioning of complex structures for examination			Preregulator feedback circuit utilizes Light Actuated Switch		
LEWIS-341	B66-10676	05	M-FS-1180	B66-10542	01
Study made to control depth of potting compound for honeycomb sandwich fasteners			POWER TRANSMISSION		
LEWIS-370	B66-10677	05	Laser beam transmits electric power		
POWDERED METAL			GSFC-293	B65-10158	01
Modified filter prevents conduction of microwave signals along high-voltage power supply leads			System transmits mechanical vibration into hazardous environment		
JPL-63	B63-10091	01	NU-0025	B65-10248	05
POWER CONVERSION			PREAMPLIFIER		
Compact microwave mixer has high conversion efficiency			Auxiliary circuit enables automatic monitoring of EKG		
GSFC-197	B66-10625	01	MSC-106	B65-10142	01
POWER EFFICIENCY			Boron trifluoride nuclear detector preamplifier uses single-cable connection		
Circuit exhibits power efficiency greater than 75 percent			LEWIS-178	B65-10255	01
MSC-254	B66-10034	01	Electrometer preamplifier has drift correction feedback		
Complementary monostable circuits achieve low power drain and high reliability			JPL-SC-074	B65-10267	01
GSFC-433	B66-10179	01	Remote preamplifier circuit maintains stability over wide temperature range		
Control circuit maintains unity power factor of reactive load			WOO-278	B66-10432	01
MSC-192	B66-10431	01	Miniature electrometer preamplifier effectively compensates for input capacitance		
POWER GAIN			ARC-69	B66-10549	01
New apparatus increases ion beam power density			PRECIPITATION		
LEWIS-73	B63-10440	01	Crack detection method is safe in presence of liquid oxygen		
POWER SUPPLY			M-FS-236	B65-10107	03
Igniting system for mercury vapor lamps protects transistorized sustaining supply			Process for preparing dispersions of alkali metals		
JPL-421	B63-10262	01	JPL-734	B66-10639	03
PTC thermistor protects multiloaded power supplies			PRESSING		
GSFC-236	B64-10281	01	Rapid billet loader aids extrusion of refrac-		
Zener diode is starter for transistor-regulated power supply					
NU-0015	B65-10052	01			
Variable voltage supply uses zener diode as reference					



- Heavy metals  
 LEWIS-50 B63-10354 05
- PRESSURE**  
 High-pressure regulating system prevents pressure surges  
 JPL-231 B63-10170 05  
 Special pliers connect hose containing liquid under pressure  
 JPL-IT-1003 B63-10291 05  
 Device induces lungs to maintain known constant pressure  
 MSC-50 B64-10108 04  
 Pulsed plasma accelerator operates repetitively without complex controls  
 LANGLEY-48 B65-10062 01  
 Electrically heated diaphragm eliminates use of pyrotechnics  
 MSC-241 B65-10400 01
- PRESSURE APPARATUS**  
 Upsetting butt edge increases weld-joint strength  
 M-FS-175 B64-10164 05  
 Apparatus facilitates pressure-testing of metal tubing  
 LEWIS-174 B65-10131 05  
 Inflatable bladder provides accurate calibration of pressure switch  
 M-FS-367 B65-10279 01  
 Diffusion bonding makes strong seal at flanged connector  
 M-FS-637 B66-10250 05  
 Closed loop operation eliminates need for auxiliary gas in high pressure pumping station  
 M-FS-893 B66-10408 05  
 Design concept for pressure switch calibrator  
 HQ-36 B66-10598 01
- PRESSURE CHAMBER**  
 Vented piston seal prevents fluid leakage between two chambers  
 JPL-179 B63-10141 05
- PRESSURE DISTRIBUTION**  
 Calibrated clamp facilitates pressure application  
 MSC-298 B66-10059 05
- PRESSURE DROP**  
 Universal bellows joint restraint permits angular and offset movement  
 WOO-102 B65-10371 05  
 Selective tube roughening increases heat transfer capability  
 M-FS-599 B66-10610 05
- PRESSURE EFFECT**  
 Pressure responsive seal handles static and dynamic loads  
 GSFC-441 B65-10327 05
- PRESSURE FIELD**  
 Volume-ratio calibration system for vacuum gages  
 LEWIS-303 B66-10640 01
- PRESSURE GAUGE**  
 Rapid helium-air analyzer can measure other binary gas mixtures  
 LANGLEY-16 B63-10557 03  
 Pickup device reads pressures from ports in rotating mechanisms  
 LEWIS-158 B65-10021 05  
 Differential pressure gauge has fast response
- M-FS-358 B65-10265 05
- PRESSURE GRADIENT**  
 Packless valve with all-metal seal handles wide temperature, pressure range  
 JPL-361 B63-10228 05  
 Density trace made with computer printout  
 GSFC-322 B65-10200 02
- PRESSURE MEASUREMENT**  
 Improved variable-reluctance transducer measures transient pressures  
 LANGLEY-10 B63-10321 01  
 Fluid-pressure meter can be calibrated without removal from flow line  
 M-FS-98 B63-10502 05  
 Precision gage measures ultrahigh vacuum levels  
 GSFC-114 B63-10597 01  
 Multiple port pressure scanner valve features greater accuracy, quicker data  
 JPL-555 B64-10031 05  
 Fluid-pressure measurement apparatus uses short-length manometer tubes  
 LEWIS-28 B65-10027 05  
 Apparatus measures swelling of membranes in electrochemical cells  
 GSFC-280 B65-10087 01  
 Averaging probe reduces static-pressure sensing errors  
 LANGLEY-36 B65-10114 05  
 Vapor pressure measured with inflatable plastic bag  
 GSFC-281 B65-10136 03  
 Differential pressure gauge has fast response  
 M-FS-358 B65-10285 05  
 Remote rapidly varying pressures accurately measured  
 FRC-28 B65-10301 01  
 Cold cathode ionization gauge has rigid metal housing  
 GSFC-445 B66-10041 01  
 Transmission system isolates pressure transducer from severe environment  
 WOO-239 B66-10064 01  
 Rod and dish cathode improves Penning-type vacuum gauge  
 GSFC-447 B66-10082 01  
 Colloidal suspension simulates linear dynamic pressure profile  
 WOO-266 B66-10214 05  
 Modified McLeod gage records automatically  
 LEWIS-290 B66-10290 02  
 Acceleration-compensated pressure transducer has fast response  
 LANGLEY-113 B66-10353 01
- PRESSURE PROBE**  
 Pressure probe compensates for dimensional tolerance variations  
 LEWIS-302 B66-10599 01
- PRESSURE RECORDER**  
 Pressure transducer system is force-balanced, has digital output  
 M-FS-154 B65-10174 05
- PRESSURE REGULATOR**  
 High-pressure regulating system prevents pressure surges  
 JPL-231 B63-10170 05  
 Pressure transducer system is force-balanced,

has digital output M-FS-154	B65-10174	05	Miniature telemetry system accurately measures pressure ARC-74	B66-10624	01
Ring valve responds to differential pressure changes WOO-247	B66-10022	05	<b>PRESSURE TUBE</b> Remote rapidly varying pressures accurately measured FRC-28	B65-10301	01
Dual regulator controls two gases from a single reference MSC-227	B66-10167	05	O-rings with Mylar back-up provide high- pressure cryogenic seal M-FS-603	B66-10278	05
Pressure seal ring may be effective over wide temperature range M-FS-486	B66-10211	05	High pressure cryogenic liquid flow sight assembly provides streamlined flow for easy observation LEWIS-310	B66-10394	01
Magnetic latches provide positive overpressure control NU-0057	B66-10279	05	<b>PRESSURE VESSEL</b> Method of welding joint in closed vessel improves quality of seam JPL-170	B63-10139	05
Gas diffuser facilitates withdrawal of cryogenic liquids from tanks M-FS-915	B66-10342	05	Lightweight door seals cryogenic container against diaphragm type loading M-FS-476	B65-10402	05
Spool valve cycles at controlled frequency MSC-143	B66-10495	05	Pressure vessels fabricated with high-strength wire and electroformed nickel M-FS-580	B66-10218	05
Check valve installation in pilot operated relief valve prevents reverse pressurization M-FS-1925	B66-10655	05	Preformed stiffeners used to fabricate structural components for pressurized tanks M-FS-1796	B66-10688	05
<b>PRESSURE RELIEF VALVE</b> One-shot valve may be remotely actuated WOO-195	B65-10266	05	<b>PRESSURIZATION</b> Low-cost insulation system for cryostats eliminates need for a vacuum LEWIS-64	B63-10365	03
<b>PRESSURE TRANSDUCER</b> Improved variable-reluctance transducer meas- ures transient pressures LANGLEY-10	B63-10321	01	Adapter assembly prevents damage to tubing during high pressure tests MSC-563	B66-10330	05
Welded pressure transducer made as small as 1/8th-inch in diameter ARC-11	B63-10429	03	Portable lightweight cell provides controlled environment MSC-648	B66-10370	05
Fluid-pressure meter can be calibrated without removal from flow line M-FS-98	B63-10502	05	<b>PRIMER</b> White primer permits a corrosion-resistant coating of minimum weight M-FS-304	B66-10207	03
Pressure transducer 3/8-inch in size can be faired into surface WOO-065	B64-10021	05	<b>PRINTED CIRCUIT</b> Modular chassis simplifies packaging and interconnecting of circuit boards JPL-236A	B63-10174	01
Multiple port pressure scanner valve features greater accuracy, quicker data JPL-555	B64-10031	05	Front and back printed circuit layouts presented on single sheet GSFC-93	B63-10596	01
Metal diaphragm used to calibrate miniature transducers M-FS-207	B65-10059	01	Compact coaxial connector for printed circuit adds reliability MSC-57	B64-10016	01
Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	Use of photographs speeds inspection of printed-circuit boards MSC-72	B64-10118	01
Pressure transducer system is force-balanced, has digital output M-FS-154	B65-10174	05	Handtool bends component leads accurately M-FS-308	B65-10181	05
Pressure sensor responds only to shock wave M-FS-238	B65-10184	01	Tool forms right angles in component leads M-FS-722	B66-10346	05
Direct force-measuring transducer used in blood pressure research ARC-53	B65-10325	01	Process produces accurate registry between circuit board prints LANGLEY-288	B66-10660	02
Special mount improves remote transducer accuracy LEWIS-269	B66-10021	01	<b>PRINTER</b> Density trace made with computer printout GSFC-322	B65-10200	01
Pressure transducers dynamically tested with sinusoidal pressure generator LEWIS-268	B66-10031	01	Uppercase and lowercase computer printout increases readability HQ-12	B65-10286	01
Transmission system isolates pressure transducer from severe environment WOO-239	B66-10064	01			
Indicator system provides complete data of engine cylinder pressure variation LEWIS-291	B66-10470	05			

One-count memory circuit prevents machine mode interaction ARG-90	B66-10559	01	atmosphere LEWIS-211	B65-10117	03
<b>PRISM</b> Liquid-level meter has no moving parts M-FS-3	B63-10378	03	Self-contained clothing system provides protection against hazardous environments M-FS-536	B66-10201	05
<b>PROBABILITY DISTRIBUTION</b> Hybrid computer technique yields random signal probability distributions ARC-34	B65-10208	01	Flexible fastener effects airtight material closure JPL-684	B66-10304	05
<b>PROBE</b> Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02	<b>PROTECTIVE COATING</b> Solder flux leaves corrosion-resistant coating on metal JPL-611	B64-10206	03
<b>PROBLEM SOLVING</b> Computational procedure for finite difference solution of one-dimensional heat conduction problems reduces computer time MSC-1120	B66-10566	01	Burnishing technique improves lubrication of threaded fasteners LEWIS-217	B65-10302	03
<b>PRODUCT DEVELOPMENT</b> Large seals fabricated from small segments reduce procurement lead time M-FS-1117	B66-10464	05	Flexible protective coatings made from silicon-nitrogen materials M-FS-528	B66-10027	03
<b>PROGRAM MANAGEMENT</b> Logic system aids in evaluation of project readiness MSC-753	B66-10457	05	Epoxy blanket protects milled part during explosive forming M-FS-307	B66-10029	03
<b>PROGRAMMING</b> Fortran program flowchart is automatically produced M-FS-369	B66-10062	01	Protective coating withstands high temperature in oxidizing atmosphere M-FS-529	B66-10044	03
<b>PROJECTION</b> Use of photographs speeds inspection of printed-circuit boards MSC-72	B64-10118	01	Run-in with chemical additive protects gear surface M-FS-548	B66-10069	05
Disk calculator indicates legible lettering size for slide projection GSFC-409	B65-10339	05	Refractory coating protects intricate graphite elements from high-temperature hydrogen NU-0027	B66-10084	01
Optical projectors simulate human eyes to establish operator's field of view WOO-250	B66-10010	02	Vapor grown silicon dioxide improves transistor base-collector junctions GSFC-389	B66-10091	01
Single projector accommodates slides of different size and format GSFC-439	B66-10016	02	Coating permits use of strain gage in water and liquid hydrogen M-FS-594	B66-10192	01
<b>PROPAGATION MODE</b> Novel horn antenna reduces side lobes, improves radiation pattern JPL-425	B63-10264	01	Electroless nickel plating on stainless steels and aluminum GSFC-533	B66-10479	03
<b>PROPAGATION VELOCITY</b> Improved circuit minimizes generation of pseudonoise check bits JPL-698	B65-10275	01	<b>PROTRACTOR</b> Setting of angles on machine tools speeded by magnetic protractor ARC-5	B63-10006	01
<b>PROPELLANT TANK</b> Insulation for cryogenic tanks has reduced thickness and weight M-FS-326	B66-10183	02	<b>PULLEY</b> Chain friction system gives positive, reversible drive ARC-8	B63-10009	05
<b>PROTECTION</b> Compact retractor protects cabling loops M-FS-561	B66-10018	05	Apparatus alters position of objects to facilitate demagnetization GSFC-234	B64-10277	05
Seal surfaces protected during assembly NU-0067	B66-10266	05	Mechanism continuously measures static and dynamic cable loads MSC-217	B66-10107	05
Impact- and puncture-resistant material protects parts from damage MSC-747	B66-10375	05	<b>PULSE</b> Pulsed plasma accelerator operates repetitively without complex controls LANGLEY-48	B65-10062	01
Metal oxide silicon /MOS/ transistors protected from destructive damage by wire device ARC-65	B66-10419	01	Auxiliary circuit enables automatic monitoring of EKG MSC-106	B65-10142	01
<b>PROTECTIVE CLOTHING</b> Double gloves reduce contamination of dry box			<b>PULSE AMPLITUDE</b> Simple device produces accelerometer calibration pulse M-FS-363	B65-10269	01
			Pulse stretcher has improved dynamic range and linearity ARG-82	B66-10509	01

**PULSE CODE MODULATION /PCM/**

Frequency-shift-keyer circuit improves PCM conversion for radio transmission  
GSFC-80 B63-10511 01

PCM magnetic tape system efficiently records and reproduces data  
GSFC-375 B65-10311 01

Pn acquisition demodulator achieves automatic synchronization of a telemetry channel  
JPL-612 B66-10271 01

Digital system detects binary code patterns containing errors  
GSFC-541 B66-10516 01

**PULSE DURATION MODULATION /PDM/**

Novel circuit combines pulse stretcher with NOR gate  
GSFC-187 B64-10150 01

Circuit exhibits power efficiency greater than 75 percent  
MSC-254 B66-10034 01

**PULSE FREQUENCY MODULATION /PFM/**

Simple circuit functions as frequency discriminator for PFM signals  
GSFC-267 B65-10102 01

Circuit exhibits power efficiency greater than 75 percent  
MSC-254 B66-10034 01

**PULSE HEIGHT**

Pulse height analyzer operates at high repetition rates, low power  
WOO-046 B65-10041 01

Instrument performs nondestructive chemical analysis, data can be telemetered  
JPL-SC-078 B65-10317 01

Circuit provides accurate four-quadrant multiplication  
WOO-272 B66-10331 01

Single channel pulse-height analyzer operates in subnanosecond range  
LEWIS-267 B66-10377 01

**PULSE MODULATION**

Efficient circuit triggers high-current, high-voltage pulses  
MSC-14 B64-10024 01

Frequency divider is free of spurious outputs  
GSFC-308 B65-10334 01

Digitally controlled pulse-level discriminator operates over wide voltage range  
GSFC-324 B66-10129 01

Large capacitor performs as a distributed parameter pulse line  
LEWIS-176 B66-10291 01

**PULSE MOTOR**

Magnetic-shift-register circuit controls step motor operations  
GSFC-340 B65-10226 01

**PULSE RECORDER**

Simple BCD circuit accurately counts to 24  
GSFC-317 B65-10225 01

**PULSE TRANSMISSION SYSTEM**

Tiny sensor-transmitter can withstand extreme acceleration, gives digital output  
ARC-22 B63-10561 01

Simple pulse counting circuit computes sum of squares  
GSFC-391 B65-10260 01

Frequency correction device uses digital

circuitry  
GSFC-268 B65-10307 01

**PULSE WIDTH**

Simple circuit produces high-speed, fixed duration pulses  
GSFC-285 B65-10228 01

Threshold detector produces narrow pulses at high repetition rates  
GSFC-383 B65-10310 01

Circuit provides accurate four-quadrant multiplication  
WOO-272 B66-10331 01

**PULSED GENERATOR**

Pulse generator permits nondestructive testing of component breakdown voltage  
MSC-122 B65-10054 01

Synchronized pulse generator needs no external power  
GSFC-274 B65-10072 01

Hybrid circuit achieves pulse regeneration with low power drain  
GSFC-382 B65-10314 01

Multiphase clock-pulse generator uses simplified circuitry  
M-FS-297 B65-10353 01

**PUMP**

Level of super-cold liquids automatically maintained by levelometer  
JPL-397 B63-10250 01

Fine-particle filter prevents damage to vacuum pumps  
LEWIS-106 B63-10489 05

Heater decomposes oil backstreaming from high-vacuum pumps  
GSFC-356 B65-10224 02

Flexible plastic ring assembly makes durable shaft seal  
WOO-227 B65-10367 05

Closed loop operation eliminates need for auxiliary gas in high pressure pumping station  
M-FS-893 B66-10408 05

**PUNCH**

Die and telescoping punch form convolutions in thin diaphragm  
JPL-SC-135 B65-10393 05

Forming tool improves quality of tubing flares  
WOO-231 B66-10001 05

**PURIFICATION**

Cryogenic filter method produces super-pure helium and helium isotopes  
JPL-374 B63-10235 03

Ceramic materials purified by experimental method  
LEWIS-225 B65-10270 03

**PYROLYSIS**

Nitrogen dioxide produced by self-sustained pyrolysis of nitrous oxide  
LANGLEY-32 B65-10074 05

**PYROMETER**

Nulling pyrometer uses Kerr cell shutter for fast responses  
NU-0010 B65-10050 01

A radiometer-pyrometer  
LEWIS-284 B66-10606 01

**PYROMETRY**

Rotating filters permit wide range of optical pyrometry

LANGLEY-33 B65-10100 02

**PYROTECHNICS**  
Electrically heated diaphragm eliminates use of pyrotechnics  
MSC-241 B65-10400 01

Improved system measures output energy of pyrotechnic devices  
WOO-256 B66-10159 01

**Q**

**QUALITY CONTROL**  
Design reliability goal developed from small sample  
M-FS-403 B66-10405 05

Quality control criteria for acceptance testing of cross-wire welds  
MSC-627 B66-10587 05

Study made of destructive sectioning of complex structures for examination  
LEWIS-341 B66-10676 05

**QUARTZ**  
Radon gas, useful for medical purposes, safely fixed in quartz  
ARG-2 B66-10468 04

**QUATERNARY ALLOY**  
Braze alloy holds bonding strength over wide temperature range  
LEWIS-337 B66-10519 03

**QUEUE**  
Queueing register uses fluid logic elements  
M-FS-317 B66-10100 05

**R**

**RACE FACTOR**  
Improved rolling element bearings provide low torque and small temperature rise in ultrahigh vacuum environment  
LEWIS-359 B66-10678 05

**RADAR EQUIPMENT**  
Circuit converts AM signals to FM for magnetic recording  
GSFC-227 B65-10001 01

**RADAR RANGE**  
Precision CW laser automatic tracking system investigated  
M-FS-1606 B66-10629 01

**RADAR SYSTEM**  
FM/CW system measures aircraft attitude  
M-FS-276 B65-10290 01

**RADIAL DISTRIBUTION**  
Radial coolant channels fabricated by simplified method  
NU-0070 B66-10267 05

**RADIANT ENERGY**  
Wide-angle sensor measures radiant heat energy in corrosive atmospheres  
M-FS-228 B65-10019 05

**RADIANT HEATING**  
Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss  
LEWIS-39 B63-10342 01

Graphite element serves as radiant heat source  
M-FS-105 B65-10218 01

**RADIATION ABSORPTION**  
Flange on microwave antenna subreflector cuts ground noise  
JPL-362 B63-10229 01

Technique for measuring absorptance and emittance by using cyclic incident radiation  
LEWIS-321 B66-10630 02

**RADIATION DETECTOR**  
Radiation detector-optical hanging device is of simplified construction  
GSFC-251 B64-10299 01

Mount makes liquid nitrogen-cooled gamma ray detector portable  
LEWIS-259 B66-10103 01

Plastic scintillator converts standard photomultiplier to ultraviolet range  
ERC-9 B66-10108 02

**RADIATION DISTRIBUTION**  
Novel horn antenna reduces side lobes, improves radiation pattern  
JPL-425 B63-10264 01

Polychart contour plotter enables data extrapolation from multiple plotting charts  
M-FS-37 B64-10406 05

**RADIATION EFFECT**  
Irradiation improves properties of an aromatic polyester  
LANGLEY-115 B65-10164 03

Dielectrometer design permits measurement in vacuum under irradiation  
M-FS-359 B66-10401 01

**RADIATION EXPOSURE**  
Radiation used to temperature compensate semiconductor strain gages  
LANGLEY-207 B66-10186 02

**RADIATION FIELD**  
Fluid pressure used to test turbopump bearings  
NU-0001 B65-10024 03

**RADIATION MEASUREMENT**  
Ion chambers simplify absolute intensity measurements in the vacuum ultraviolet  
ERC-10 B66-10439 01

Detector measures power in 50 to 30,000 GHz radiation band  
ERC-26 B66-10581 01

**RADIATION SHIELDING**  
Refractory metal shielding /insulation/ increases operating range of induction furnace  
LEWIS-202 B65-10188 02

Carriage system remotely moves drawer over extended distance  
NU-0092 B66-10711 05

Simple motor drive system operates heavy hinged door  
NU-0093 B66-10712 05

Swing-out rail system separates overhead crane rails  
NU-0094 B66-10713 05

**RADIATION SOURCE**  
Multiple element soft X-ray source produces wide range of radiation  
GSFC-286 B65-10082 02

Radon gas, useful for medical purposes, safely fixed in quartz  
ARG-2 B66-10468 04

High intensity radiation heat source is capable of sustained operation  
ARC-61 B66-10547 02

A continuously operating source of vacuum ultraviolet below 500 angstrom  
GSFC-545 B66-10576 01

**RADIATOR**  
Graphite element serves as radiant heat source  
M-FS-105 B65-10218 01

Ultraviolet photographic pyrometer used in rocket exhaust analysis

## SUBJECT INDEX

## RECORDING INSTRUMENT

M-FS-499	B66-10095	02	<b>RADON</b> Radon gas, useful for medical purposes, safely fixed in quartz ARG-2	B66-10468	04
<b>RADIO COMMUNICATION</b> Comfortable, lightweight safety helmet holds radio transmitter, receiver MSC-53	B64-10015	05	<b>RAFT</b> New inflatable liferaft is nontippable MSC-4A	B64-10001	05
<b>RADIO EQUIPMENT</b> Added diodes increase output of balanced mixer circuit GSFC-354	B65-10276	01	<b>RANDOM PROCESS</b> Computer program performs statistical analysis for random processes M-FS-723	B66-10525	01
<b>RADIO FILTER</b> Helical coaxial-resonator makes excellent RF filter GSFC-243	B65-10012	01	<b>RANDOM SIGNAL</b> Hybrid computer technique yields random signal probability distributions ARC-34	B65-10208	01
<b>RADIO FREQUENCY</b> Modified rf coaxial connector ends vacuum chamber wiring problem GSFC-150	B64-10010	01	<b>RARE EARTH</b> Improved carbon electrode reduces arc sputtering MSC-219	B66-10026	01
Solid-state laser transmitter is amplitude modulated MSC-121	B65-10238	01	<b>RARE GAS</b> Tool provides constant purge during tube welding M-FS-547	B66-10093	05
Auxiliary coil controls temperature of RF induction heater GSFC-428	B66-10067	01	<b>RAY TRACING</b> Computer programs simplify optical system analysis GSFC-306	B65-10093	01
<b>RADIO FREQUENCY DISCHARGE</b> Ferroelectric bolometer measures RF absolute power at submillimeter wavelengths GSFC-422	B66-10051	01	<b>RC NETWORK</b> High-performance rc bandpass filter is adapted to miniaturized construction ARC-60	B66-10309	01
<b>RADIO FREQUENCY MONITORING</b> Mechanical device accurately measures RF phase differences in VHF or UHF ranges M-FS-1738	B66-10694	05	<b>REACTION CONTROL</b> Control circuit maintains unity power factor of reactive load MSC-192	B66-10431	01
<b>RADIO FREQUENCY SHIELDING</b> Shrinkable sleeve eliminates shielding gap in RF cable WOO-207	B65-10387	01	<b>REACTOR FUEL</b> Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys ARG-199	B66-10594	03
<b>RADIO NOISE</b> Low input voltage converter/regulator minimizes external disturbances GSFC-527	B66-10689	01	<b>READOUT</b> Optics used to measure torque at high rotational speeds LEWIS-13	B63-10338	01
<b>RADIO RECEIVER</b> Comfortable, lightweight safety helmet holds radio transmitter, receiver MSC-53	B64-10015	05	Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01
Automatic gain control circuit handles wide input range MSC-166	B66-10089	01	Compact cartridge drives coded tape at constant readout speed JPL-472	B64-10222	01
<b>RADIO TRANSMITTER</b> Comfortable, lightweight safety helmet holds radio transmitter, receiver MSC-53	B64-10015	05	Simple pulse counting circuit computes sum of squares GSFC-391	B65-10260	01
<b>RADIOACTIVE MATERIAL</b> Radioactive method enables determination of surface areas rapidly and accurately NU-0088	B66-10710	03	Digital frequency counter permits readout without disturbing counting process JPL-906	B66-10658	01
<b>RADIOACTIVITY</b> Radioactive tracer system detects oil contaminants in fluid lines M-FS-512	B66-10090	03	<b>RECEIVER</b> Tunnel-diode circuit features zero-level clipping GSFC-241	B65-10002	01
<b>RADIOLOGY</b> Radon gas, useful for medical purposes, safely fixed in quartz ARG-2	B66-10468	04	Helical coaxial-resonator makes excellent RF filter GSFC-243	B65-10012	01
<b>RADIOLYSIS</b> Polymer film exhibits thermal and radiation stability LANGLEY-100	B66-10043	03	System locates randomly placed remote objects LANGLEY-209	B66-10315	01
<b>RADIOMETER</b> A radiometer-pyrometer LEWIS-284	B66-10606	01	<b>RECORDING INSTRUMENT</b> Small digital recording head has parallel bit channels, minimizes cross talk JPL-0029	B63-10284	01
			Improved electrode gives high-quality		

## RECOVERY

## SUBJECT INDEX

biological recordings MSC-17	B64-10025	04	REENTRY SHIELD Sensors measure surface ablation rate of reentry vehicle heat shield LANGLEY-287	B66-10592	01
Manual-feed adapter permits microfilming of continuous oscillograph output NU-0029	B65-10249	01	REFERENCE SYSTEM Reference black body is compact, convenient to use ARC-3	B63-10004	03
Tester periodically registers dc amplifier characteristics MSC-190	B66-10148	01	Instrument quickly transposes ground reference target to eye level MSC-275	B66-10061	05
Ultrasonic recording scanner used for nondestructive weld inspection M-FS-284	B66-10220	01	Multiple temperatures sampled using only one reference junction GSFC-485	B66-10260	01
Modified McLeod gage records automatically LEWIS-290	B66-10290	02	REFLECTED WAVE Concept for using laser beams to measure electron density in plasmas M-FS-965	B66-10645	01
Film coating permits low-force scribing MSC-990	B66-10609	03	REFLECTION Attachment converts microscope to point source autocollimator JPL-499	B64-10124	05
RECOVERY Organic reactants rapidly produce plastic foam LANGLEY-37	B65-10288	03	REFLECTOR Flange on microwave antenna subreflector cuts ground noise JPL-362	B63-10229	01
Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys ARG-199	B66-10594	03	Test device prevents molecular bounce-back GSFC-82	B63-10546	03
Silver-palladium braze alloy recovered from masking materials M-FS-1845	B66-10631	03	Ellipsoidal optical reflectors reproduced by electroforming GSFC-92	B63-10547	05
RECOVERY DEVICE Scoop attachment makes helicopter recoveries easier and safer MSC-130	B65-10229	05	Plastic films for reflective surfaces reproduced from masters GSFC-188	B64-10151	03
System locates randomly placed remote objects LANGLEY-209	B66-10315	01	Optical arrangement increases useful light output of semiconductor diodes JPL-SC-064	B65-10020	05
RECTIFIER Emission tester for high-power vacuum tubes JPL-628	B64-10158	01	Oil-damped mercury pool makes precise optical alignment tool GSFC-353	B65-10253	02
Dual-voltage power supply has increased efficiency LEWIS-107A	B66-10002	01	Nickel solution prepared for precision electroforming WOO-070	B65-10303	03
Thin-film semiconductor rectifier has improved properties MSC-207	B66-10012	01	Communication system uses modulated laser beam GSFC-377	B65-10333	01
Substituting transistor for diode improves rectifying means GSFC-474	B66-10295	01	Reflective insulator layers separated by bonded silica beads MSC-215	B66-10070	03
Feedback loop compensates for rectifier nonlinearity M-FS-384	B66-10382	01	REFRACTORY ALLOY New cobalt alloys have high-temperature strength and long life in vacuum environments LEWIS-47	B63-10351	03
REDUNDANT SYSTEM Logic redundancy improves digital system reliability JPL-SC-069	B65-10025	01	New tungsten alloy has high strength at elevated temperatures LEWIS-336	B66-10551	03
REEL Dispensing system eliminates torsion in deployed hoses MSC-80	B65-10185	05	REFRACTORY MATERIAL Apparatus facilitates high-temperature tensile testing in vacuum LEWIS-42	B63-10345	03
Automatic reel controls filler wire in welding machines MSC-416	B66-10236	05	Refractory ceramic has wide usage, low fabrication cost M-FS-67	B63-10481	03
Expandable takeup reel facilitates paper tape removal WOO-271	B66-10399	05	Refractory thermal insulation for smooth metal surfaces M-FS-160	B64-10099	03
REENTRY CONDITION Colloidal suspension simulates linear dynamic pressure profile WOO-266	B66-10214	05	Refractory oxides evaluated for high-temperature use LANGLEY-121	B65-10167	03
REENTRY EFFECT Accurate depth control provided for thermocouple junction locations LANGLEY-289	B66-10632	01			

# SUBJECT INDEX

## RELIABILITY

Refractory coating protects intricate graphite elements from high-temperature hydrogen NU-0027	B66-10084	01	REINFORCING FIBER		
Fibers of newly developed refractory ceramics produced by improved process W00-169	B66-10196	03	Boron carbide whiskers produced by vapor deposition HQ-24	B65-10261	03
Improved thermal insulation materials made of foamed refractory oxides M-FS-735	B66-10288	03	REJECTION		
Crucible cast from beryllium oxide and refractory cement is impervious to flux and molten metal ARG-22	B66-10527	03	Simple circuit provides reliable multiple signal average and reject capability NU-0069	B66-10282	01
Multilayer refractory nozzles produced by plasma-spray process W00-318	B66-10611	05	Composite filter steepens rejection slopes in microwave application GSFC-480	B66-10393	01
REFRACTORY METAL			RELAY		
Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss LEWIS-39	B63-10342	01	Circuit switches latching relay in response to signals of different polarity W00-055	B63-10508	01
Rapid billet loader aids extrusion of refractory metals LEWIS-50	B63-10354	05	Solid state detectors monitor relay contacts JPL-785	B66-10396	01
Ceramic-coated boat is chemically inert, provides good heat transfer LANGLEY-90	B65-10063	05	Solid-state switch increases switching speed W00-298	B66-10430	01
Apparatus facilitates pressure-testing of metal tubing LEWIS-174	B65-10131	05	Trisphere spark gap actuates overvoltage relay ARC-68	B66-10557	01
Brazing method produces solid-solution bond between refractory metals LEWIS-212	B65-10370	05	Electronic circuit provides accurate sensing and control of dc voltage NU-0089	B66-10591	01
Copper-acrylic enamel serves as lubricant for cold drawing of refractory metals ARG-54	B66-10471	05	Magnetoresistor monitors relay performance M-FS-1754	B66-10650	01
Hydraulic fluid serves as mandrel for small diameter refractory tube drawing ARG-44	B66-10523	05	RELEASE DEVICE		
Combustion chamber struts can be effectively transpiration cooled M-FS-1830	B66-10643	03	Simple mechanism combines positive locking and quick-release features W00-4	B63-10420	05
REFRIGERATION			Instrument adjustment knob locks to prevent accidental maladjustment M-FS-190	B64-10249	05
New nut and sleeve improve flared connections M-FS-194	B65-10180	05	One-shot valve may be remotely actuated W00-195	B65-10266	05
REGENERATION			Cylindrical claw clamp has quick release feature M-FS-513	B66-10213	05
Chemical regeneration of emitter surface increases thermionic diode life LEWIS-17	B66-10435	02	Fastener provides for bolt misalignment and quick release of flange NU-0074	B66-10275	05
REGENERATOR			Pneumatic separator gives quick release to heavy loads KSC-66-10	B66-10294	05
Hybrid circuit achieves pulse regeneration with low power drain GSFC-382	B65-10314	01	Flexible fastener effects airtight material closure JPL-684	B66-10304	05
REGULATOR			Quick attach and release fluid coupling assembly is self-aligning, self-sealing KSC-66-8	B66-10627	05
Elastic orifice automatically regulates gas bearings JPL-135	B63-10123	05	Controlled release device prevents damage from dynamic stresses KSC-66-14	B66-10628	05
High-pressure regulating system prevents pressure surges JPL-231	B63-10170	05	RELIABILITY		
Zener diode is starter for transistor-regulated power supply NU-0015	B65-10052	01	Increased performance reliability obtained with dual /redundant/ oscillator system GSFC-36	B63-10027	01
Electropneumatic transducer automatically limits motor current LEWIS-253	B66-10160	01	Circuit reliability boosted by soldering pins of disconnect plugs to sockets JPL-447	B64-10002	01
REINFORCEMENT			Compact coaxial connector for printed circuit adds reliability MSC-57	B64-10016	01
Reinforcement core facilitates O-ring installation W00-228	B65-10378	05	Circuit improvement produces monostable multivibrator with load-carrying capability GSFC-34A	B65-10011	01



## RELIEF VALVE

Sensitive low-pressure relief valve has positive seating against leakage  
WOO-041 B64-10278 05

Check valve installation in pilot operated relief valve prevents reverse pressurization  
M-FS-1925 B66-10655 05

## REMOTE CONTROL

Solenoid permits remote control of stop watch and assures restarting  
FRC-17 B63-10024 01

Liquid switch is remotely operated by low dc voltage  
GSFC-119 B63-10599 01

Knob linkage permits one-hand control of several operations  
MSC-30 B65-10022 05

Remotely operated clamping tool has positive grip  
NU-0020 B65-10254 05

Remote control electrical switching system has 1000-output capability  
M-FS-380 B65-10318 01

Threaded split ring connector separates structural sections  
LANGLEY-145 B65-10383 05

Economical and maintenance-free gas system operates railroad switches  
NU-0045 B66-10124 05

Electric arc heater is self starting  
LANGLEY-208 B66-10230 03

Quick-closing valve is actuated by explosive discharge  
ARC-55 B66-10233 05

Remotely controlled system couples and decouples large diameter pipes  
NU-0062 B66-10276 05

Remote preamplifier circuit maintains stability over wide temperature range  
WOO-278 B66-10432 01

## REPAIR

Inert gas spraying device aids in repair of hazardous systems  
LEWIS-8B B65-10115 05

## REPEATER

Pulsed plasma accelerator operates repetitively without complex controls  
LANGLEY-48 B65-10062 01

## REPRODUCTION

Front and back printed circuit layouts presented on single sheet  
GSFC-93 B63-10596 01

Plastic films for reflective surfaces reproduced from masters  
GSFC-188 B64-10151 03

PCM magnetic tape system efficiently records and reproduces data  
GSFC-375 B65-10311 01

## REPRODUCTIVE SYSTEM

Modified procedure speeds camera copy layout for offset printing  
GSFC-424 B65-10373 02

## RESIDUE

Solvent residue content measured by light scattering technique  
M-FS-850 B66-10320 01

Film coating permits low-force scribing  
MSC-990 B66-10609 03

## RESIN

Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application  
LANGLEY-6A B63-10318 03

Plastic molds reduce cost of encapsulating electric cable connectors  
M-FS-69 B63-10568 05

Servo system facilitates photoelastic strain measurements on resins  
JPL-504 B64-10280 01

Compact assembly generates plastic foam, inflates flotation bag  
LANGLEY-96 B65-10090 05

Self-supported aluminum thin films produced by vacuum deposition process  
ARC-58 B66-10387 03

Reusable chelating resins concentrate metal ions from highly dilute solutions  
JPL-758 B66-10451 03

## RESISTANCE

Refractory ceramic has wide usage, low fabrication cost  
M-FS-67 B63-10481 03

Adhesive for vacuum environments resists shock and vibration  
MSC-56 B65-10016 03

Selenium bond decreases on resistance of light-activated switch  
JPL-SC-101 B65-10324 01

Pigmented coating resists thermal shock  
JPL-SC-083 B65-10354 03

Minimum permissible leakage resistance established for instrumentation systems  
M-FS-848 B66-10397 01

Thermocouples electrically checked while connected to data system  
LANGLEY-182 B66-10623 01

## RESISTANCE COEFFICIENT

Radiation used to temperature compensate semiconductor strain gages  
LANGLEY-207 B66-10186 02

Resistance thermometer has linear resistance-temperature coefficient at low temperatures  
WOO-190 B66-10612 01

## RESISTANCE DEVICE

High voltage potential divider calibrated by simple device  
ARG-83 B66-10497 01

## RESISTANCE HEATING

Removable preheater elements improve oxide induction furnace  
JPL-288 B63-10193 01

Apparatus facilitates high-temperature tensile testing in vacuum  
LEWIS-42 B63-10345 03

Electrically heated diaphragm eliminates use of pyrotechnics  
MSC-241 B65-10400 01

Electrical upsetting of metal sheet forms weld edge  
M-FS-720 B66-10248 05

## RESISTIVITY

Aluminum doping improves silicon solar cells  
LEWIS-206 B66-10181 02

## RESISTOR

Highly efficient square-wave oscillator operator at high power levels  
GSFC-112 B63-10554 01

Temperature-sensitive network drives astable multivibrator  
GSFC-137 B63-10609 01

Efficient circuit triggers high-current, high-voltage pulses  
MSC-14 B64-10024 01

Field effect transistors used as voltage-controlled resistors  
M-FS-174 B64-10163 01

Microparticle impact sensor measures energy directly  
GSFC-252 B65-10048 01

Electropneumatic rheostat regulates high current  
ARC-44 B65-10299 01

Thin-film resistors used in functional electronic blocks  
GSFC-380 B65-10305 01

Diffusion technique stabilizes resistor values  
MSC-205 B66-10142 01

Concept for passive system to control gas flow independently of temperature  
M-FS-982 B66-10343 05

Resistor monitors transfer of liquid helium  
LANGLEY-229 B66-10580 01

## RESOLUTION

Modified developer increases line resolution in photosensitive resist  
GSFC-386 B65-10278 01

## RESONANT FREQUENCY

Welded pressure transducer made as small as 1/8th-inch in diameter  
ARC-11 B63-10429 03

Friction device damps linear motion of rotating shaft  
WOO-214 B66-10030 05

Pressure transducers dynamically tested with sinusoidal pressure generator  
LEWIS-268 B66-10031 01

Resonant frequency can be adjusted on vibration mount  
JPL-SC-134 B66-10672 05

## RESPIRATION

Device induces lungs to maintain known constant pressure  
MSC-50 B64-10108 04

## RESPIRATORY RATE

Pneumotachometer counts respiration rate of human subject  
MSC-92 B64-10259 01

Plant respirometer enables high resolution of oxygen consumption rates  
HQ-47 B66-10406 04

## RESTRAINT

A technique for making animal restraints  
ARC-25 B63-10564 05

Safety restrainer prevents whipping of ruptured high-pressure hose  
LEWIS-99 B64-10348 05

Lightweight hinged bellows restraint has high load capacity  
WOO-151 B65-10341 03

Universal bellows joint restraint permits

angular and offset movement  
WOO-102 B65-10371 05

## RETAINER

New package for belleville spring permits rate change, easy disassembly  
JPL-392 B63-10247 05

Simple mechanism combines positive locking and quick-release features  
WOO-4 B63-10420 05

## REVERSED FLOW

Check valve installation in pilot operated relief valve prevents reverse pressurization  
M-FS-1925 B66-10655 05

## REVERSER

Novel clamps align large rocket cases, eliminate back-up bars  
M-FS-1 B63-10376 05

## RHENIUM

High temperature thermocouple operates in reduction atmosphere  
NU-0046 B66-10134 01

## RHENIUM ALLOY

Lower-cost tungsten-rhenium alloys  
LEWIS-332 B66-10528 03

## RHENIUM COMPOUND

Tungsten wire and tubing joined by nickel brazing  
M-FS-394 B65-10391 05

## RIGID MOUNTING

Compact actuator converts rotary to linear motion  
JPL-786 B66-10265 05

Electrically conductive fibers thermally isolate temperature sensor  
GSFC-456 B66-10349 01

## RIGID STRUCTURE

Bellows design features low spring rate and long life  
MSC-521 B66-10190 05

## RIGIDITY

Extendible column can be stowed on drum  
JPL-686 B65-10191 05

## RING

Hot-air soldering technique prevents overheating of electrical components  
GSFC-91 B63-10536 01

Ring counter may be advanced or retarded by command signal  
GSFC-101 B64-10144 01

Ring valve responds to differential pressure changes  
WOO-247 B66-10022 05

Angular acceleration measured by deflection in sensing ring  
MSC-250 B66-10105 01

Intermediate rotating ring improves reliability of dynamic shaft seal  
M-FS-575 B66-10197 05

Pressure seal ring may be effective over wide temperature range  
M-FS-486 B66-10211 05

Electron beam welding of copper-MONEL facilitated by circular magnetic shields  
M-FS-569 B66-10215 05

Flow ring valve is simple, quick-acting  
M-FS-752 B66-10255 05

Differential expansion provides pressure for diffusion bonding of large diameter rings  
M-FS-588 B66-10269 05

O-rings with Mylar back-up provide high-pressure cryogenic seal M-FS-603	B66-10278	05	of flame-detector rods M-FS-555	B66-10150	05
Lateral ring metal elastic wheel absorbs shock loading M-FS-1312	B66-10663	05	Bypass rod transfers heat developed in thermionic diode JPL-SC-136	B66-10303	05
<b>RING STRUCTURE</b>			Ultrasonic water column probe speeds up testing of welds HQ-58	B66-10577	01
Combination spacer and gasket provides effective static seal M-FS-1397	B66-10485	05	<b>ROLL FORMING</b>		
High-reluctance rotor rings improve homopolar generator performance ARG-104	B66-10543	01	Metal bellows custom-fabricated from tubing LEWIS-192	B65-10150	05
<b>RIVET</b>			<b>ROLLER BEARING</b>		
Jig and fixture aid fabrication of tungsten rivets LEWIS-185	B65-10101	05	Apparatus of small size can be extended into long, rigid boom JPL-305	B63-10200	05
<b>RLC CIRCUIT</b>			Control of component differential hardness increases bearing life LEWIS-190	B65-10251	05
Voltage variable oscillator has high phase stability LANGLEY-123	B65-10204	01	<b>ROLLING</b>		
<b>ROCK</b>			Apparatus of small size can be extended into long, rigid boom JPL-305	B63-10200	05
Rock bit requires no flushing medium to maintain drilling speed JPL-W00-031	B65-10109	05	<b>ROOM TEMPERATURE</b>		
<b>ROCKET</b>			Improved adhesive for cryogenic applications cures at room temperature W00-132	B66-10185	03
Novel clamps align large rocket cases, eliminate back-up bars M-FS-1	B63-10376	05	<b>ROTARY DRIVE</b>		
<b>ROCKET CHAMBER</b>			Device transmits rotary motion through hermetically sealed wall JPL-303	B63-10198	05
New method used to fabricate light-weight heat exchanger for rocket motor LEWIS-43	B63-10346	02	Fine-particle filter prevents damage to vacuum pumps LEWIS-106	B63-10489	05
<b>ROCKET EXHAUST</b>			Braking mechanism is self actuating and bidirectional M-FS-1299	B66-10484	05
Air-cured ceramic coating insulates against high heat fluxes M-FS-150	B65-10357	03	<b>ROTATING BODY</b>		
Ultraviolet photographic pyrometer used in rocket exhaust analysis M-FS-499	B66-10095	02	Dispensing system eliminates torsion in deployed hoses MSC-80	B65-10185	05
Predicting surface heating rates and pressures resulting from hot exhaust gases MSC-971	B66-10633	05	Cryostat modified to aid rotating beam fatigue test M-FS-435	B66-10083	03
<b>ROCKET MOTOR CASE</b>			Rotary valve controls multiple hydraulic leveling cylinders M-FS-361	B66-10402	05
New method used to fabricate light-weight heat exchanger for rocket motor LEWIS-43	B63-10346	02	Rotational fluid coupling eliminates hose entanglements MSC-312	B66-10585	05
Novel clamps align large rocket cases, eliminate back-up bars M-FS-1	B63-10376	05	<b>ROTATING MACHINE</b>		
<b>ROCKET NOZZLE</b>			Shock absorber protects motive components against overloads W00-092	B65-10008	05
Multilayer refractory nozzles produced by plasma-spray process W00-318	B66-10611	05	Pickup device reads pressures from ports in rotating mechanisms LEWIS-158	B65-10021	05
<b>ROCKET TEST STATION</b>			Rotating holder permits accurate grinding of metallurgical microsamples LEWIS-131	B65-10262	05
Computer program determines performance efficiency of remote measuring systems M-FS-1137	B66-10503	01	<b>ROTATING MIRROR</b>		
<b>ROCKET THRUST</b>			Twin helix system produces fast scan in infrared detector M-FS-1598	B66-10638	02
Device measures reaction engine thrust vector deviations JPL-SC-163	B66-10642	05	<b>ROTATING SHAFT</b>		
<b>ROD</b>			Apparatus alters position of objects to facilitate demagnetization GSFC-234	B64-10277	05
Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02	Flexible plastic ring assembly makes durable shaft seal		
Threading hook facilitates safe recovery of heavy loads MSC-46	B64-10185	05			
Mounting facilitates removal and installation					

## SUBJECT INDEX

## SAFETY FACTOR

WOO-227	B65-10367	05	WOO-102	B65-10371	05
Friction device damps linear motion of rotating shaft					
WOO-214	B66-10030	05			
Noncontacting transducer measures shaft torque					
M-FS-474	B66-10048	01			
Intermediate rotating ring improves reliability of dynamic shaft seal					
M-FS-575	B66-10197	05			
Flexible arms provide constant force for pressure switch calibration					
HQ-38	B66-10317	05			
Rocket engine vibration accurately measured by photography					
M-FS-1916	B66-10652	02			
<b>ROTATION</b>					
Bearing transmits rotary and axial motion					
LANGLEY-27	B64-10130	05			
Ring counter circuit switches multiphase motor direction of rotation					
JPL-SC-166	B66-10101	01			
Compact actuator converts rotary to linear motion					
JPL-786	B66-10265	05			
<b>ROTOR</b>					
Rotor position sensor switches currents in brushless dc motors					
GSFC-315	B65-10151	01			
Brushless dc motor uses electron beam switching tube as commutator					
GSFC-345	B65-10237	01			
Hollow spherical rotors fabricated by electroplating					
JPL-SC-117	B66-10366	05			
Valve effectively controls amount of contaminant in flow stream					
M-FS-1771	B66-10683	05			
<b>ROTOR BLADE</b>					
Simple key locks turbine rotor blades					
WOO-103	B66-10023	05			
<b>ROTOR SYSTEM</b>					
Switching mechanism senses angular acceleration					
GSFC-462	B66-10158	01			
High-reluctance rotor rings improve homopolar generator performance					
ARG-104	B66-10543	01			
<b>RUBBER</b>					
Frictional wedge shock mount is inexpensive, has good damping characteristics					
JPL-IT-1001	B63-10289	05			
Rubber-coated bellows improves vibration damping in vacuum lines					
LEWIS-273	B66-10187	02			
Thermoplastic rubberlike material produced at low cost					
JPL-793	B66-10453	03			
<b>RUBIDIUM</b>					
Magnetometer measures orthogonal components of magnetic fields					
GSFC-395	B65-10315	01			
<b>RUPTURE</b>					
Safety restrainer prevents whipping of ruptured high-pressure hose					
LEWIS-99	B64-10348	05			
Universal bellows joint restraint permits angular and offset movement					

## S

## SAFETY DEVICE

Self-balancing beam permits safe, easy load handling under overhang					
M-FS-84	B63-10571	05			
Comfortable, lightweight safety helmet holds radio transmitter, receiver					
MSC-53	B64-10015	05			
Safety restrainer prevents whipping of ruptured high-pressure hose					
LEWIS-99	B64-10348	05			
Fluid check valve has fail-safe feature					
JPL-0019	B65-10207	05			
Single connector provides safety fuses for multiple lines					
MSC-199	B66-10050	01			
Nylon shock absorber prevents injury to parachute jumpers					
MSC-226	B66-10080	05			
Dispenser leak-tests and sterilizes rubber gloves					
MSC-285	B66-10166	03			
Safety switch permits emergency bridge crane shutdown					
M-FS-549	B66-10168	05			
Lifting clamp positively grips structural shapes					
M-FS-593	B66-10176	05			
Self-inflating lifevest stores in small package					
MSC-5A	B66-10184	04			
Body-fitted harness provides safe and easy component handling					
M-FS-533	B66-10202	05			
Adjustable cutting guide aligns and positions stacks of material					
MSC-321	B66-10210	05			
Key-locked guard prevents accidental switch actuation					
MSC-419	B66-10235	05			
Lathe chuck key incorporates safety feature					
MSC-506	B66-10243	05			
Magnetic latches provide positive overpressure control					
NU-0057	B66-10279	05			
Adapter assembly prevents damage to tubing during high pressure tests					
MSC-563	B66-10330	05			
Sniffer used as portable hydrogen leak detector					
M-FS-846	B66-10356	01			
One-piece transparent shell improves design of helmet assembly					
MSC-187	B66-10390	05			
Emergency escape system protects personnel from explosion and fire					
KSC-66-12	B66-10634	05			
<b>SAFETY FACTOR</b>					
Self-contained clothing system provides protection against hazardous environments					
M-FS-536	B66-10201	05			
Nonhazardous acid etches weld samples					
M-FS-975	B66-10378	05			

## SALT

Crucible cast from beryllium oxide and refractory cement is impervious to flux and molten metal  
ARG-22 B66-10527 03

## SAMPLING

Design reliability goal developed from small sample  
M-FS-403 B66-10405 05

## SAMPLING DEVICE

Rock bit requires no flushing medium to maintain drilling speed  
JPL-W00-031 B65-10109 05

Plastic bags in evacuated chamber make lightweight gas sampling system  
FRC-31 B65-10264 01

Frequency correction device uses digital circuitry  
GSFC-268 B65-10307 01

Probe samples components of rocket engine exhaust  
M-FS-485 B65-10384 03

Multiple temperatures sampled using only one reference junction  
GSFC-485 B66-10260 01

Cryogenic fluid sampling device permits testing under hazardous conditions  
M-FS-1927 B66-10654 02

## SANDWICH CONSTRUCTION

Apparatus permits flexure testing of specimens at cryogenic temperatures  
M-FS-257 B65-10129 02

Fastener distributes stress evenly from sandwich-panel-hung items  
MSC-236 B65-10358 05

## SATELLITE COMMUNICATION

Communication system uses modulated laser beam  
GSFC-377 B65-10333 01

## SCALE

Simple scale interpolator facilitates reading of graphs  
LANGLEY-88 B65-10070 05

Simple scale interpolator facilitates reading of graphs  
LEWIS-92 B66-10302 05

## SCALE MODEL

Built-in templates speed up process for making accurate models  
LANGLEY-23 B63-10526 05

## SCANNING DEVICE

Multiple port pressure scanner valve features greater accuracy, quicker data  
JPL-555 B64-10031 05

Distant objects detected visually with optical filters  
LANGLEY-166 B65-10252 02

Scanning photometer system automatically determines atmospheric layer height  
MSC-245 B66-10170 01

Ultrasonic recording scanner used for nondestructive weld inspection  
M-FS-284 B66-10220 01

Multicolor stroboscope pinpoints resonances in vibrating components  
JPL-0033 B66-10223 01

Ultrasonic hand tool allows convenient scanning of spot welds  
M-FS-539 B66-10289 02

Instrument calculates moments of inertia of

complex plane figures  
MSC-628 B66-10306 01

Parallel line raster eliminates ambiguities in reading timing of pulses less than 500 microseconds apart  
JPL-805 B66-10386 01

Photoelectric scanner makes detailed work function maps of metal surface  
JPL-SC-176 B66-10440 01

Thermionic scanner pinpoints work function of emitter surfaces  
JPL-SC-177 B66-10444 01

Electrical continuity scanner facilitates identification of wires for soldering to connectors  
MSC-626 B66-10605 01

Twin helix system produces fast scan in infrared detector  
M-FS-1598 B66-10638 02

## SCINTILLATION COUNTER

Cesium iodide crystals fused to vacuum tube faceplates  
GSFC-67 B63-10476 03

## SCINTILLATOR

Plastic scintillator converts standard photomultiplier to ultraviolet range  
ERC-9 B66-10108 02

## SCREEN

Fine-mesh screen made by simplified method  
W00-104 B64-10282 03

Screening technique makes reliable bond at room temperature  
M-FS-227 B65-10004 03

Library of documents compressed into lap-held display kit  
MSC-125 B65-10030 01

## SEA WATER

Emergency solar still desalts seawater  
MSC-135 B65-10214 03

Sea dye marker provides visibility for 20 hours  
MSC-714 B66-10313 03

## SEALANT

Packless valve with all-metal seal handles wide temperature, pressure range  
JPL-361 B63-10228 05

Elastomers bonded to metal surfaces seal electrochemical cells  
GSFC-168 B64-10113 03

Liquid trap seals thermocouple leads  
M-FS-688 B66-10212 05

## SEALING

Vented piston seal prevents fluid leakage between two chambers  
JPL-179 B63-10141 05

Device transmits rotary motion through hermetically sealed wall  
JPL-303 B63-10198 05

Packless valve with all-metal seal handles wide temperature, pressure range  
JPL-361 B63-10228 05

Design of valve permits sealing even if the stem is misaligned  
LEWIS-38 B63-10341 05

Vacuum-type backup bar speeds weld repairs  
M-FS-12 B63-10384 05

Tool facilitates sealing of metal fill tubes  
MSC-24 B63-10519 05

# SUBJECT INDEX

# SEMICONDUCTOR

Connector seals fluid lines at cryogenic temperatures and high vacuums GSFC-253	B64-10327	05	M-FS-1117	B66-10464	05
Use of tear ring permits repair of sealed module circuitry M-FS-210	B65-10014	05	Combination spacer and gasket provides effective static seal M-FS-1397	B66-10485	05
Seal allows blind assembly and thermal expansion of components NU-0005	B65-10053	05	Plug replaces weld filler as seal in complex casting NU-0049	B66-10489	05
Low-cost seal compensates for surface irregularities NU-0016	B65-10160	05	Feed-thru flange is useful in vacuum applications to cryogenic temperatures JPL-846	B66-10615	02
Improved poppet valve provides positive damageproof seal M-FS-293	B65-10346	05	Silver plating technique seals leaks in thin wall tubing joints NU-0090	B66-10703	05
Electron beam seals outer surfaces of porous bodies M-FS-562	B66-10033	03	SEAT Valve designed with elastic seat JPL-442	B65-10040	05
Rotating mandrel speeds assembly of plastic inflatables LANGLEY-155	B66-10137	05	SECONDARY EMISSION Lightweight coaxial cable connector reduces signal loss JPL-720	B65-10244	01
Bismuth alloy potting seals aluminum connector in cryogenic application WOO-260	B66-10138	03	SECURITY Security warning system monitors up to fifteen remote areas simultaneously KSC-66-39	B66-10548	01
Intermediate rotating ring improves reliability of dynamic shaft seal M-FS-575	B66-10197	05	SEISMOMETER Unmanned seismometer levels self, corrects drift errors GSFC-100	B63-10551	01
Special tool seals conductors with combination of plastic sleeves M-FS-579	B66-10209	05	Seismic transducer measures small horizontal displacements M-FS-81	B65-10029	05
Pressure seal ring may be effective over wide temperature range M-FS-486	B66-10211	05	Seismometer designed for remote operation in random orientation JPL-320	B66-10085	01
Soft-seal valve holds hazardous fluids safely LEWIS-275	B66-10216	05	SELENIDE Cuprous selenide and sulfide form improved photovoltaic barriers WOO-212	B66-10025	01
Pressure-welded flange assembly provides leaktight seal at reduced bolt loads M-FS-640	B66-10247	05	SELENIUM Selenium bond decreases on resistance of light-activated switch JPL-SC-101	B65-10324	01
Fluid damping reduces bellows seal fatigue failures M-FS-565	B66-10249	05	SELF-SEALING Self sealing disconnect for tubing forms metal seal after breakaway JPL-354	B63-10226	05
Diffusion bonding makes strong seal at flanged connector M-FS-637	B66-10250	05	Quick attach and release fluid coupling assembly is self-aligning, self-sealing KSC-66-8	B66-10627	05
Seal surfaces protected during assembly NU-0067	B66-10266	05	SEMICONDUCTOR Radiation detector-optical hanging device is of simplified construction GSFC-251	B64-10299	01
Bimetallic devices help maintain constant sealing forces down to cryogenic temperatures M-FS-800	B66-10325	02	Optical arrangement increases useful light output of semiconductor diodes JPL-SC-064	B65-10020	05
External linkage tie permits reduction in ducting system flange thickness M-FS-823	B66-10326	05	Impurity diffusion process for silicon semiconductors is fast and precise GSFC-397	B65-10300	01
Portable lightweight cell provides controlled environment MSC-648	B66-10370	05	Single-crystal semiconductor films grown on foreign substrates WOO-076	B66-10225	01
Electroplating eliminates gas leakage in brazed areas M-FS-923	B66-10415	05	System for etching thick aluminum layers minimizes bridging and undercutting M-FS-1366	B66-10400	03
Large diameter metal ring seal prevents gas leakage at 5000 psi M-FS-1064	B66-10422	05	Semiconductors can be tested without removing them from circuitry M-FS-1163	B66-10447	01
Seal-off assembly permits rapid evacuation of air from containers GSFC-513	B66-10446	05			
Large seals fabricated from small segments reduce procurement lead time					

Computer program searches characteristic data of diodes and transistors GSFC-493	B66-10529	01	eyeball movements M-FS-274	B65-10079	01
Simple technique determines ac properties of hard superconductive materials M-FS-1818	B66-10657	02	Transducer senses displacements of panels subjected to vibration ARC-37	B65-10085	01
<b>SEMICONDUCTOR DEVICE</b>			Rotor position sensor switches currents in brushless dc motors GSFC-315	B65-10151	01
Thermocompression bonding produces efficient surface-barrier diode JPL-SC-066	B65-10007	05	Internal cooling increases range of immersion-type temperature probe LEWIS-171	B65-10157	02
Photoelectric semiconductor switch operates with low level inputs JPL-SC-068	B65-10033	01	Pressure sensor responds only to shock wave M-FS-238	B65-10184	01
Thin-film semiconductor rectifier has improved properties MSC-207	B66-10012	01	Frequency correction device uses digital circuitry GSFC-268	B65-10307	01
Radiation used to temperature compensate semiconductor strain gages LANGLEY-207	B66-10186	02	Photosensors used to maintain welding electrode-to-joint alignment MSC-243	B65-10401	05
Apparatus presents visual display of semiconductor surface characteristics JPL-665	B66-10200	01	Control system maintains selected liquid level M-FS-470	B66-10039	01
<b>SENSING</b>			Sensor detects hydrocarbon oil contaminants in fluid lines M-FS-522	B66-10068	01
Transistor voltage comparator performs own sensing GSFC-228	B65-10028	01	Thermal motor positions magnetometer sensors ARC-51	B66-10078	05
Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	New television camera eliminates vidicon tube M-FS-472	B66-10112	01
<b>SENSITIVITY</b>			Optical gyro pickoff operates at cryogenic temperatures M-FS-407	B66-10128	01
Ultra-sensitive transducer advances micro-measurement range ARC-26	B64-10004	01	Sniffer used as portable hydrogen leak detector M-FS-846	B66-10356	01
Noncontacting vibration transducer has constant sensitivity LANGLEY-99	B65-10392	01	Heat flux sensor design reduces extraneous source effects MSC-400	B66-10531	01
<b>SENSOR</b>			Sensors measure surface ablation rate of reentry vehicle heat shield LANGLEY-287	B66-10592	01
Solar-angle sensor has no moving parts JPL-418	B63-10260	02	<b>SEPARATION</b>		
Improved sensor counts micrometeoroid penetrations LEWIS-76	B63-10443	01	Self sealing disconnect for tubing forms metal seal after breakaway JPL-354	B63-10226	05
Tiny sensor-transmitter can withstand extreme acceleration, gives digital output ARC-22	B63-10561	01	Splice plate design assures structural separation by mild explosive MSC-137	B65-10166	05
Simple circuit continuously monitors thermocouple sensor M-FS-61	B63-10567	01	Threaded split ring connector separates structural sections LANGLEY-145	B65-10383	05
Speed-sensing device aids crane operators WS-4	B64-10006	05	<b>SEPARATOR</b>		
Dmmeter senses depletion of lubricant in journal bearings LEWIS-37	B64-10042	01	Centrifugal device separates liquid from gas MSC-282	B65-10394	05
Apparatus measures very small thrusts WOO-048	B64-10284	05	Automatic fluid separator supplies own driving power WOO-085	B66-10008	02
Explosives actuate nonmagnetic indexing device GSFC-237	B65-10017	05	Tool separates sleeve-type unions without heat MSC-497	B66-10253	05
Wide-angle sensor measures radiant heat energy in corrosive atmospheres M-FS-228	B65-10019	05	Pneumatic separator gives quick release to heavy loads KSC-66-10	B66-10294	05
Microparticle impact sensor measures energy directly GSFC-252	B65-10048	01	<b>SEQUENTIAL CONTROL</b>		
Sensitive level sensor made with spirit level, gives electrical output LANGLEY-49	B65-10067	01	Ring counter may be advanced or retarded by command signal GSFC-101	B64-10144	01
Photoelectric sensor output controlled by					

## SEQUENTIAL DETECTION

Binary sequence detector uses minimum number  
of decision elements  
JPL-673 B66-10264 01

## SERVOAMPLIFIER

Apparatus measures very small thrusts  
WOO-048 B64-10284 05

Tension is servo controlled in film advance  
system  
LANGLEY-54 B65-10075 05

Servo calorimeter measures material heating  
rate  
NU-0024 B65-10247 01

## SERVOCONTROL

Crystal measures short-term, large-magnitude  
forces  
JPL-77 B65-10187 01

Quick-response servo amplifies small  
hydraulic pressure differences  
ARG-99 B66-10498 05

## SERVOMECHANISM

Optics used to measure torque at high  
rotational speeds  
LEWIS-13 B63-10338 01

Servo system facilitates photoelastic strain  
measurements on resins  
JPL-504 B64-10280 01

High-gain amplifier has excellent stability  
and low power consumption  
GSFC-272 B65-10138 01

## SERVOMOTOR

Hydraulic device provides accurate  
displacements to microinches  
MSC-112 B65-10230 05

## SEXTANT

Sextant measures spacecraft altitude without  
gravitational reference  
MSC-200 B66-10143 02

## SHAFT

Device transmits rotary motion through hermet-  
ically sealed wall  
JPL-303 B63-10198 05

Bearing transmits rotary and axial motion  
LANGLEY-27 B64-10130 05

Shock absorber protects motive components  
against overloads  
WOO-092 B65-10008 05

New coupling compensates for shaft  
misalignment  
NU-0013 B65-10077 05

Plugged hollow shaft makes fatigue-resistant  
shear pin  
LANGLEY-195 B66-10077 05

Torque wrench allows readings from  
inaccessible locations  
M-FS-598 B66-10204 05

Extensometer automatically measures  
elongation in elastomers  
M-FS-517 B66-10284 05

Shaft encoder presents digital output  
JPL-SC-191 B66-10436 01

## SHEATH

Metal sheath improves thermocouple using  
graphite in one leg  
NU-0011 B65-10051 01

## SHEET

Vacuum forming of thermoplastic sheet results  
in low-cost investment casting patterns  
ARC-7 B63-10008 05

Machine tests crease durability of sheet  
materials  
JPL-604 B64-10178 05

## SHEET METAL

Apparatus of small size can be extended into  
long, rigid boom  
JPL-305 B63-10200 05

Built-in templates speed up process for making  
accurate models  
LANGLEY-23 B63-10526 05

Collar positions strip stock used to form coil  
on mandrel  
JPL-198 B65-10130 05

Metal bellows custom-fabricated from tubing  
LEWIS-192 B65-10150 05

Infrared shield facilitates optical pyrometer  
measurements  
LANGLEY-133 B65-10272 02

Sheet metal strip unrolls to form circular  
boom  
GSFC-423 B66-10032 05

Bellows design features low spring rate and  
long life  
MSC-521 B66-10190 05

Electrical upsetting of metal sheet forms weld  
edge  
M-FS-720 B66-10248 05

Strippable grid facilitates removal of  
grid-surfaced conical workpiece from die  
M-FS-716 B66-10334 05

Gage of 6.5 per cent Si-Fe sheet is  
chemically reduced  
MSC-537 B66-10454 03

## SHELL

A technique for making animal restraints  
ARC-25 B63-10564 05

Fiberglass container shells form  
contamination-free storage units  
WOO-275 B66-10217 05

## SHIELDING

Small foamed polystyrene shield protects low-  
frequency microphones from wind noise  
M-FS-123 B63-10579 01

Flexible curtain shields equipment from  
intense heat fluxes  
M-FS-48 B65-10044 03

Infrared shield facilitates optical pyrometer  
measurements  
LANGLEY-133 B65-10272 02

Superconductor shields test chamber from  
ambient magnetic fields  
JPL-627 B65-10297 02

Logic circuitry used to automatically test  
shielded cables  
HQ-60 B66-10659 01

## SHIFT REGISTER

Ring counter may be advanced or retarded by  
command signal  
GSFC-101 B64-10144 01

Magnetic-shift-register circuit controls step  
motor operations  
GSFC-340 B65-10226 01

## SHOCK

Frictional wedge shock mount is inexpensive,  
has good damping characteristics  
JPL-IT-1001 B63-10289 05

Adhesive for vacuum environments resists shock  
and vibration



MSC-56	B65-10016	03	WOO-055	B63-10508	01
Tensile-strength apparatus applies high strain-rate loading with minimum shock			Computer determines high-frequency phase stability		
JPL-28	B66-10063	05	GSFC-113	B63-10555	01
Perforations in jet engine supersonic inlet increase shock stability			Ring counter may be advanced or retarded by command signal		
NEO-8	B66-10530	05	GSFC-101	B64-10144	01
<b>SHOCK ABSORBER</b>			<b>SIGNAL DETECTION</b>		
Thermally conductive metal wool-silicone rubber material can be used as shock and vibration damper			Gapped toroid provides infinite resolution of delay-line pickup		
JPL-321	B63-10207	03	GSFC-370	B65-10258	01
Frictional wedge shock mount is inexpensive, has good damping characteristics			<b>SIGNAL DETECTOR</b>		
JPL-IT-1001	B63-10289	05	Detector circuit compensates for vidicon beam current variations		
Break-up of metal tube makes one-time shock absorber, bars rebound			GSFC-310	B65-10212	01
LANGLEY-1A	B63-10304	05	Instrument automatically selects peak acceleration signal from several accelerometers		
Novel shock absorber features varying yield strengths			JPL-816	B66-10462	01
MSC-63A	B64-10138	03	<b>SIGNAL DISCRIMINATOR</b>		
Shock absorber protects motive components against overloads			Frequency discriminator with binary output eliminates tuned circuits		
WOO-092	B65-10008	05	M-FS-376	B65-10349	01
Shock mount isolates pressure transducers from vibration			Digitally controlled pulse-level discriminator operates over wide voltage range		
JPL-631	B65-10113	05	GSFC-324	B66-10129	01
Wire mesh isolator protects sensitive electronic components			Simple circuit provides reliable multiple signal average and reject capability		
GSFC-347	B65-10216	05	NU-0069	B66-10282	01
Nylon shock absorber prevents injury to parachute jumpers			Electronic circuit delivers pulse of high interval stability		
MSC-226	B66-10080	05	MSC-673	B66-10501	01
Lateral ring metal elastic wheel absorbs shock loading			<b>SIGNAL DISTORTION</b>		
M-FS-1312	B66-10663	05	Frequency offset in linear FM/CW transponder eliminates clutter		
<b>SHOCK LOAD</b>			M-FS-249	B65-10146	01
Design concept for pressure switch calibrator			Detector circuit compensates for vidicon beam current variations		
HQ-36	B66-10598	01	GSFC-310	B65-10212	01
<b>SHOCK WAVE</b>			Electronic bidirectional valve circuit prevents crossover distortion and threshold effect		
Pressure sensor responds only to shock wave			MSC-193	B66-10420	01
M-FS-238	B65-10184	01	<b>SIGNAL ENCODING</b>		
<b>SHUTTER</b>			Optical output enhances flowmeter accuracy		
Nulling pyrometer uses Kerr cell shutter for fast responses			M-FS-482	B65-10395	02
NU-0010	B65-10050	01	<b>SIGNAL FADEOUT</b>		
Magnetic latches provide positive overpressure control			Lightweight coaxial cable connector reduces signal loss		
NU-0057	B66-10279	05	JPL-720	B65-10244	01
<b>SIDELobe REDUCTION</b>			<b>SIGNAL MIXING</b>		
Novel horn antenna reduces side lobes, improves radiation pattern			Linear signal noise summer accurately determines and controls S/N ratio		
JPL-425	B63-10264	01	JPL-SC-152	B66-10433	01
<b>SIEVE</b>			<b>SIGNAL NOISE</b>		
Strainer fits inside flared-tube fittings			Variable word length encoder reduces TV bandwidth requirements		
LANGLEY-180	B65-10388	05	LANGLEY-87	B65-10345	01
<b>SIGHT LINE</b>			Damper reduces effects of resonance on force transducer		
Mirror device aligns machine surface perpendicular to sight lines			WSD-321	B66-10550	05
WOO-5	B63-10421	02	<b>SIGNAL PROCESSING</b>		
<b>SIGNAL</b>			System proportions fluid-flow in response to demand signals		
Modified filter prevents conduction of microwave signals along high-voltage power supply leads			GSFC-457	B66-10094	01
JPL-63	B63-10091	01	Feedback loop compensates for rectifier nonlinearity		
Circuit switches latching relay in response to signals of different polarity			M-FS-384	B66-10382	01
			Video signal processing system uses gated		

## SUBJECT INDEX

## SILICONE RUBBER

current mode switches to perform high speed multiplication and digital-to-analog conversion MSC-781	B66-10429	01	Solid state circuit controls direction, speed, and braking of dc motor JPL-757	B66-10486	01
Single-sideband modulator accurately reproduces phase information in 2-mc signals M-FS-664	B66-10437	01	<b>SILICON JUNCTION</b> Impurity diffusion process for silicon semiconductors is fast and precise GSFC-397	B65-10300	01
<b>SIGNAL TO NOISE RATIO</b> Linear signal noise summer accurately determines and controls S/N ratio JPL-SC-152	B66-10433	01	<b>SILICON OXIDE</b> Refractory ceramic has wide usage, low fabrication cost M-FS-67	B63-10481	03
<b>SIGNAL TRANSMISSION</b> Modified filter prevents conduction of microwave signals along high-voltage power supply leads JPL-63	B63-10091	01	Lead oxide ceramic makes excellent high-temperature lubricant LEWIS-144	B64-10116	03
Digital system accurately controls velocity of electromechanical drive GSFC-287	B65-10096	01	Reflective insulator layers separated by bonded silica beads MSC-215	B66-10070	03
Added diodes increase output of balanced mixer circuit GSFC-354	B65-10276	01	Vapor grown silicon dioxide improves transistor base-collector junctions GSFC-389	B66-10091	01
<b>SILAZANE</b> Silazane polymers show promise for high-temperature application M-FS-466	B66-10194	03	<b>SILICON POLYMER</b> Flexible protective coatings made from silicon-nitrogen materials M-FS-528	B66-10027	03
Silazane elastomer remains resilient at 400 deg C M-FS-1144	B66-10667	05	Silazane polymers show promise for high-temperature application M-FS-466	B66-10194	03
<b>SILICATE</b> Standards for electron probe microanalysis of silicates prepared by convenient method GSFC-469	B66-10234	03	Substituted silane-diol polymers have improved thermal stability M-FS-469	B66-10259	03
<b>SILICON</b> Computer circuit will fit on single silicon chip JPL-513	B63-10514	01	<b>SILICON TRANSISTOR</b> Zener diode is starter for transistor-regulated power supply NU-0015	B65-10052	01
Solid-state switching used to speed up capacitive integrator LANGLEY-104	B65-10159	01	Temperature transducer has high output, is time stable GSFC-446	B65-10362	01
Aluminum doping improves silicon solar cells LEWIS-206	B66-10181	02	Vapor grown silicon dioxide improves transistor base-collector junctions GSFC-389	B66-10091	01
<b>SILICON ALLOY</b> Brazing process using Al-Si filler alloy reliably bonds aluminum parts MSC-448	B66-10241	05	Transistor circuit increases range of logarithmic current amplifier NU-0018	B66-10350	01
Gage of 6.5 per cent Si-Fe sheet is chemically reduced MSC-537	B66-10454	03	Metal oxide silicon /MOS/ transistors protected from destructive damage by wire device ARC-65	B66-10419	01
<b>SILICON COMPOUND</b> Refractory ceramic has wide usage, low fabrication cost M-FS-67	B63-10481	03	Miniature electrometer preamplifier effectively compensates for input capacitance ARC-69	B66-10549	01
<b>SILICON CONTROL RECTIFIER /SCR/</b> Circuit controls transients in SCR inverters GSFC-120	B63-10600	01	<b>SILICONE</b> Lightweight load support serves as vibration damper JPL-661	B65-10144	05
Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01	<b>SILICONE RUBBER</b> Thermally conductive metal wool-silicone rubber material can be used as shock and vibration damper JPL-321	B63-10207	03
Simple circuit reduces transistor switching time GSFC-314	B65-10234	01	Pressure molding of powdered materials improved by rubber mold insert WOO-100	B64-10270	03
Compact SCR trigger circuit for ignitron switch operates efficiently M-FS-371	B65-10347	01	Flexible curtain shields equipment from intense heat fluxes M-FS-48	B65-10044	03
Pulse generator using transistors and silicon controlled rectifiers produces high current pulses with fast rise and fall times MSC-405	B66-10456	01	Shock mount isolates pressure transducers from vibration JPL-631	B65-10113	05

Copper foil provides uniform heat sink path MSC-262	B66-10004	02	Combustion chamber struts can be effectively transpiration cooled M-FS-1830	B66-10643	03
Split glass tube assures quality in electron beam brazing M-FS-564	B66-10151	05	<b>SINUSOID</b> Pressure transducers dynamically tested with sinusoidal pressure generator LEWIS-268	B66-10031	01
Rubber and alumina gaskets retain vacuum seal in high temperature emf cell ARG-17	B66-10472	05	<b>SKIN</b> Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05
<b>SILVER</b> Improved molybdenum disulfide-silver motor brushes have extended life M-FS-64	B63-10479	03	<b>SKIN /BIOL/</b> Improved electrode gives high-quality biological recordings MSC-17	B64-10025	04
Connector for thermocouple leads saves costly wire, makes reliable connectors LANGLEY-26	B63-10529	01	Improved conductive paste secures biomedical electrodes MSC-107	B65-10015	03
Improved electrode gives high-quality biological recordings MSC-17	B64-10025	04	Integral skin electrode for electrocardiography is expendable MSC-299	B66-10118	04
Gelatin coated electrodes allow prolonged bioelectronic measurements MSC-153	B66-10088	01	<b>SKIN RESISTANCE</b> Improved electrode paste provides reliable measurement of galvanic skin response MSC-146	B66-10049	04
Copper wire plated with nickel and silver resists corrosion M-FS-761	B66-10421	03	<b>SLEEVE</b> Self sealing disconnect for tubing forms metal seal after breakaway JPL-354	B63-10226	05
<b>SILVER ALLOY</b> New brazing alloy eliminates metal-stress cracking WOO-249	B65-10397	03	Sleeve and cutter simplify disconnecting welded joint in tubing JPL-384	B63-10240	05
Silver-base ternary alloy proves superior for slip ring lead wires M-FS-1540	B66-10540	03	New coupling compensates for shaft misalignment NU-0013	B65-10077	05
Silver-palladium braze alloy recovered from masking materials M-FS-1845	B66-10631	03	New nut and sleeve improve flared connections M-FS-194	B65-10180	05
<b>SILVER CHLORIDE</b> Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03	Shrinkable sleeve eliminates shielding gap in RF cable WOO-207	B65-10387	01
<b>SILVER-ZINC BATTERY</b> Auxiliary silver electrode eliminates two-step voltage discharge characteristic of silver- zinc cells GSFC-169	B64-10114	01	Noncontacting transducer measures shaft torque M-FS-474	B66-10048	01
<b>SIMULATOR</b> Electronic device simulates respiration rate and depth MSC-89	B64-10255	01	Single connector provides safety fuses for multiple lines MSC-199	B66-10050	01
Simulator produces physiological waveforms MSC-94	B65-10091	01	Insert sleeve prevents tube soldering contamination MSC-552	B66-10238	05
Optical projectors simulate human eyes to establish operator's field of view WOO-250	B66-10010	02	<b>SLIP BAND</b> Contact stresses calculated for miniature slip rings M-FS-280	B65-10098	05
Antenna simulator permits preinstallation system checkout GSFC-522	B66-10518	01	Silver-base ternary alloy proves superior for slip ring lead wires M-FS-1540	B66-10540	03
<b>SIMULATOR TRAINING</b> Technique simulates effect of reduced gravity LANGLEY-44	B64-10146	04	<b>SLOPE</b> Composite filter steepens rejection slopes in microwave application GSFC-480	B66-10393	01
<b>SINE WAVE</b> Field effect transistor presents high input impedance in ac amplifier JPL-500	B65-10232	01	<b>SLOT</b> V-slotted screw head and matching driving tool facilitate insertion and removal of screw fasteners FRC-16	B63-10023	05
<b>SINTERING</b> Improved molybdenum disulfide-silver motor brushes have extended life M-FS-64	B63-10479	03	<b>SLURRY</b> Vapor condensation process produces slurry of magnesium particles in liquid hydrocarbons LEWIS-263	B66-10104	03
New sintering process adjusts magnetic value of ferrite cores GSFC-129	B63-10606	01	<b>SMOOTHING</b> Device spot-laps spheres to very close		

# SUBJECT INDEX

# SOLID LUBRICANT

tolerances JPL-SC-119	B66-10175	05	Telescoping of instrumentation tubing eliminates swaging M-FS-546	B66-10116	05
Improved method facilitates debulking and curing of phenolic impregnated asbestos MSC-949	B66-10459	05	<b>SOLDERING</b> Hot-air soldering technique prevents overheating of electrical components GSFC-91	B63-10536	01
<b>SOAP</b> Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01	Compact coaxial connector for printed circuit adds reliability MSC-57	B64-10016	01
<b>SOIL</b> Microorganisms detected by enzyme-catalyzed reaction JPL-782	B66-10117	04	Solder flux leaves corrosion-resistant coating on metal JPL-611	B64-10206	03
Extendable mast used in one shot soil penetrometer JPL-685	B66-10146	05	Feed-through has polyterminal feature M-FS-25	B65-10057	01
<b>SOLAR CELL</b> New method used to fabricate gallium arsenide photovoltaic device WOO-062	B64-10019	01	High permeability semiconductors permit close-tolerance soldering GSFC-319	B65-10134	05
Assembly jig assures reliable solar cell modules GSFC-455	B66-10040	05	Assembly jig assures reliable solar cell modules GSFC-455	B66-10040	05
Aluminum doping improves silicon solar cells LEWIS-206	B66-10181	02	Soldering tool heats workpieces and applies solder in one operation LEWIS-247	B66-10115	05
Tool permits damage-free removal of solar cell GSFC-467	B66-10219	05	Fixture aids soldering of electronic components on circuit board ARC-56	B66-10162	01
Solar cell submodule design facilitates assembly of lightweight arrays JPL-728	B66-10231	02	Soldering iron temperature is automatically reduced ARC-57	B66-10203	01
<b>SOLAR ENERGY</b> Wide-aperture solar energy collector is light in weight JPL-SC-055	B65-10046	02	Tool permits damage-free removal of solar cell GSFC-467	B66-10219	05
Modular thermoelectric cell is easily packaged in various arrays GSFC-339	B65-10199	01	Insert sleeve prevents tube soldering contamination MSC-552	B66-10238	05
Emergency solar still desalts seawater MSC-135	B65-10214	03	Modified soldering iron speeds cutting of synthetic materials M-FS-725	B66-10246	05
<b>SOLAR RADIATION</b> Simple control device senses solar position JPL-638	B65-10061	01	<b>SOLENOID</b> Solenoid permits remote control of stop watch and assures restarting FRC-17	B63-10024	01
Multiple element soft X-ray source produces wide range of radiation GSFC-286	B65-10082	02	Electromechanically operated camera shutter provides uniform exposure JPL-357	B63-10227	01
<b>SOLAR SENSOR</b> Solar-angle sensor has no moving parts JPL-418	B63-10260	02	Camera shutter is actuated by electric signal ARC-20	B63-10560	05
<b>SOLAR SYSTEM</b> Analog solar system model relates celestial bodies spatially JPL-195	B66-10413	01	Improved magnetometer uses toroidal gating coil GSFC-249	B65-10103	01
<b>SOLDER</b> Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03	Force controlled solenoid drives microweld tester WOO-125	B65-10182	01
Hot-air soldering technique prevents overheating of electrical components GSFC-91	B63-10536	01	Circuit exhibits power efficiency greater than 75 percent MSC-254	B66-10034	01
Improved solderless connector is easily disconnected JPL-SC-060	B65-10197	01	Solenoid magnetic fields calculated from superposed semi-infinite solenoids LEWIS-184	B66-10490	01
<b>SOLDERED JOINT</b> Circuit reliability boosted by soldering pins of disconnect plugs to sockets JPL-447	B64-10002	01	Monitoring circuit accurately measures movement of solenoid valve M-FS-1829	B66-10568	01
Soldering tool heats workpieces and applies solder in one operation LEWIS-247	B66-10115	05	Fuel and oxidizer valve assembly employs single solenoid actuator MSC-1046	B66-10648	05
			<b>SOLID LUBRICANT</b> Lead oxide ceramic makes excellent high-		

temperature lubricant LEWIS-144	B64-10116	03	Solid state annunciator facilitates complex system troubleshooting M-FS-1258	B66-10505	01
Fluoride coatings make effective lubricants in molten sodium environment LEWIS-229	B66-10005	03	Solid-state recoverable fuse functions as circuit breaker GSFC-560	B66-10691	01
Polytetrafluoroethylene lubricates ball bearings in vacuum environment M-FS-379	B66-10081	03	<b>SOLID SUSPENSION</b> Colloidal suspension simulates linear dynamic pressure profile WOO-266	B66-10214	05
Solid-film lubricant is effective at high temperatures in vacuum LEWIS-228	B66-10087	03	<b>SOLVENT</b> Method of welding joint in closed vessel improves quality of seam JPL-170	B63-10139	05
<b>SOLID PROPELLANT ROCKET ENGINE</b> Study of vortex valve for medium temperature solid propellants LANGLEY-204	B66-10524	01	Soluble undercoating facilitates removal of foamed-in-place insulation LEWIS-193	B65-10344	03
Cold solid propellant motor has stop-restart capability JPL-836	B66-10673	03	Surfactant for dye-penetrant inspection is insensitive to liquid oxygen M-FS-475	B66-10131	03
<b>SOLID SOLUTION</b> Brazing method produces solid-solution bond between refractory metals LEWIS-212	B65-10370	05	Solvent residue content measured by light scattering technique M-FS-850	B66-10320	01
<b>SOLID STATE</b> Primary cells utilize halogen-organic charge transfer complex JPL-926	B66-10682	02	Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys ARG-199	B66-10594	03
<b>SOLID STATE DEVICE</b> Digital cardiometer computes and displays heartbeat rate MSC-93	B64-10258	01	<b>SONAR</b> System locates randomly placed remote objects LANGLEY-209	B66-10315	01
Logarithmic amplifier uses field effect transistors JPL-509	B65-10145	01	<b>SPACE ENVIRONMENT</b> Unique gear design provides self-lubrication JPL-SC-079	B65-10366	03
Analog-to-digital converter has increased reliability and reduced power consumption GSFC-246	B65-10194	01	<b>SPACE RADIATOR</b> A design procedure for the weight optimization of straight finned radiators GSFC-547	B66-10618	05
Thin-film resistors used in functional electronic blocks GSFC-380	B65-10305	01	<b>SPACE SUIT</b> Portable lightweight cell provides controlled environment MSC-648	B66-10370	05
Threshold detector produces narrow pulses at high repetition rates GSFC-383	B65-10310	01	<b>SPACE SYSTEMS ENGINEERING</b> Pressure transducer system is force-balanced, has digital output M-FS-154	B65-10174	05
Ring counter circuit switches multiphase motor direction of rotation JPL-SC-166	B66-10101	01	<b>SPACE VEHICLE CONTROL</b> Plated nickel wire mesh makes superior catalyst bed MSC-216	B65-10321	03
New television camera eliminates vidicon tube M-FS-472	B66-10112	01	<b>SPACECRAFT</b> High purity electroforming yields superior metal models ARC-6	B63-10007	05
Optical gyro pickoff operates at cryogenic temperatures M-FS-407	B66-10128	01	Kinetic-energy absorber employs frictional force between mating cylinders LEWIS-75	B63-10442	05
Solid state thermostat has integral probe and circuitry M-FS-434	B66-10193	01	Ultra-sensitive transducer advances micro- measurement range ARC-26	B64-10004	01
Solid state detectors monitor relay contacts JPL-785	B66-10396	01	Special coatings control temperature of structures GSFC-444	B65-10337	03
Solid-state switch increases switching speed WOO-298	B66-10430	01	<b>SPACECRAFT COMPONENT</b> Apparatus alters position of objects to facilitate demagnetization GSFC-234	B64-10277	05
Single-sideband modulator accurately reproduces phase information in 2-mc signals M-FS-664	B66-10437	01	<b>SPACECRAFT ENVIRONMENT</b> Phonocardiograph system monitors heart sounds MSC-185	B66-10154	04
Instrument automatically selects peak acceleration signal from several accelerometers JPL-816	B66-10462	01			
Solid state circuit controls direction, speed, and braking of dc motor JPL-757	B66-10486	01			

**SPRING**

**I-113**

Apparatus measures very small thrusts WOO-048	B64-10284	05	Remote preamplifier circuit maintains stability over wide temperature range WOO-278	B66-10432	01
Gage measures electrical connector pin retention force JPL-SC-071	B65-10034	03	Electronic circuit delivers pulse of high interval stability MSC-673	B66-10501	01
Leaf-spring suspension provides accurate parallel displacements JPL-480	B65-10104	05	<b>STABILIZER</b> New inflatable liferaft is nontippable MSC-4A	B64-10001	05
Collapsible truss structure is automatically expandable GSFC-265	B65-10126	05	<b>STAINLESS STEEL</b> Apparatus facilitates high-temperature tensile testing in vacuum LEWIS-42	B63-10345	03
Coiled spring makes self-locking device for threaded fasteners MSC-149	B65-10135	05	Ellipsoidal optical reflectors reproduced by electroforming GSFC-92	B63-10547	05
Lightweight load support serves as vibration damper JPL-661	B65-10144	05	Stainless-steel elbows formed by spin forging M-FS-122	B63-10590	05
Bidirectional torque filter eliminates backlash GSFC-335	B65-10148	05	Screening technique makes reliable bond at room temperature M-FS-227	B65-10004	03
Spiral heater coils hand-formed with fixture LEWIS-208	B65-10192	05	New alloy brazes titanium to stainless steel MSC-102	B65-10060	05
Mounting improves heat-sink contact with beryllia washer MSC-194	B66-10144	01	New nut and sleeve improve flared connections M-FS-194	B65-10180	05
Device facilitates centering of workpieces in lathe chuck M-FS-685	B66-10277	05	Coating method enables low-temperature brazing of stainless steel NU-0030	B65-10250	03
Bellows joint absorbs torsional deflections in duct system M-FS-882	B66-10332	05	Plastic plus stainless-steel fibers make resilient, impermeable material WOO-246	B65-10374	03
Spiral spring/strain gage combination accurately measures shock induced deflection MSC-789	B66-10488	01	New brazing alloy eliminates metal-stress cracking WOO-249	B65-10397	03
Resonant frequency can be adjusted on vibration mount JPL-SC-134	B66-10672	05	Cold cathode ionization gauge has rigid metal housing GSFC-445	B66-10041	01
Gage accurately controls force for placing chips on substrates M-FS-1941	B66-10675	01	Telescoping of instrumentation tubing eliminates swaging M-FS-546	B66-10116	05
<b>SPUTTERING</b> Improved carbon electrode reduces arc sputtering MSC-219	B66-10026	01	Differential expansion provides pressure for diffusion bonding of large diameter rings M-FS-588	B66-10269	05
<b>SQUIB</b> Quick-closing valve is actuated by explosive discharge ARC-55	B66-10233	05	Electrolytic etching process provides effective bonding surface on stainless steel GSFC-484	B66-10299	03
<b>STABILITY</b> Computer determines high-frequency phase stability GSFC-113	B63-10555	01	Brazing process provides high-strength bond between aluminum and stainless steel M-FS-803	B66-10352	05
Monostable circuit with tunnel diode has fast recovery GSFC-132	B63-10603	01	Nonhazardous acid etches weld samples M-FS-975	B66-10378	05
Irradiation improves properties of an aromatic polyester LANGLEY-115	B65-10164	03	Electroless nickel plating on stainless steels and aluminum GSFC-533	B66-10479	03
Refractory oxides evaluated for high-temperature use LANGLEY-121	B65-10167	03	Braze alloy holds bonding strength over wide temperature range LEWIS-337	B66-10519	03
Cuprous selenide and sulfide form improved photovoltaic barriers WOO-212	B66-10025	01	Gas chromatographic column enables analysis of propellant hydrazines MSC-1161	B66-10586	03
Binary fluid amplifier solves stability and load problems ERC-15	B66-10177	01	Improved rolling element bearings provide low torque and small temperature rise in ultrahigh vacuum environment LEWIS-359	B66-10678	05
			<b>STANDARDIZATION</b> Standards for electron probe microanalysis of		

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# STORAGE DEVICE

silicates prepared by convenient method GSFC-469	B66-10234	03	Impact- and puncture-resistant material protects parts from damage MSC-747	B66-10375	05
<b>STAR TRACKING</b> Point-source light sensor circuit is insensitive to background light JPL-778	B66-10502	01	Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys ARG-199	B66-10594	03
<b>STARTER</b> Zener diode is starter for transistor- regulated power supply NU-0015	B65-10052	01	<b>STEEL STRUCTURE</b> Flexible magnetic planning boards are easily transported M-FS-340	B65-10219	05
Compact SCR trigger circuit for ignitron switch operates efficiently M-FS-371	B65-10347	01	Computer program simplifies selection of structural steel columns NU-0044	B66-10097	01
Electric arc heater is self starting LANGLEY-208	B66-10230	03	Combination spacer and gasket provides effective static seal M-FS-1397	B66-10485	05
<b>STARTING</b> Circuit controls transients in SCR inverters GSFC-120	B63-10600	01	Nondestructive test method accurately sorts mixed bolts M-FS-1426	B66-10574	01
<b>STATIC LOADING</b> Pressure responsive seal handles static and dynamic loads GSFC-441	B65-10327	05	<b>STEP FUNCTION</b> Stepping switch with simple actuator provides many contacts in small space JPL-122	B63-10118	01
<b>STATIC PRESSURE</b> Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	<b>STEREOSCOPIC PHOTOGRAPHY</b> Screen of cylindrical lenses produces stereoscopic television pictures M-FS-273	B66-10086	02
Combination spacer and gasket provides effective static seal M-FS-1397	B66-10485	05	<b>STEREOSCOPIC VISION</b> Study made of application of stereoscopic display system to analog computer simulation M-FS-1263	B66-10590	01
Pressure probe compensates for dimensional tolerance variations LEWIS-302	B66-10599	01	<b>STERILIZATION</b> Dispenser leak-tests and sterilizes rubber gloves MSC-285	B66-10166	03
<b>STATISTICAL ANALYSIS</b> Computer program performs statistical analysis for random processes M-FS-723	B66-10525	01	<b>STIFF STRUCTURE</b> Friction loading device enables accurate testing of brittle materials NU-0051	B66-10345	05
Computer programs perform spectral analyses of up to seven time series M-FS-1133	B66-10539	01	Preformed stiffeners used to fabricate structural components for pressurized tanks M-FS-1796	B66-10688	05
<b>STATOR</b> Brushless dc motor uses electron beam switching tube as commutator GSFC-345	B65-10237	01	<b>STIMULUS</b> Subminiature biotelemetry unit permits remote physiological investigations ARC-39	B64-10171	01
<b>STEADY STATE</b> Improved variable-reluctance transducer meas- ures transient pressures LANGLEY-10	B63-10321	01	<b>STOPWATCH CONTROL</b> Solenoid permits remote control of stop watch and assures restarting FRC-17	B63-10024	01
<b>STEADY STATE FLOW</b> Computer program determines gas flow rates in piping systems M-FS-443	B66-10300	01	<b>STORAGE</b> Stepping switch with simple actuator provides many contacts in small space JPL-122	B63-10118	01
New computer program solves wide variety of heat flow problems M-FS-421	B66-10404	01	Metal strip forms 21 foot boom, rolls up for compact storage GSFC-151	B64-10011	05
<b>STEAM GENERATOR</b> Oxygen-hydrogen torch is a small-scale steam generator NU-0042	B66-10120	03	Tool pre-tensions covers prior to lacing MSC-631	B66-10301	05
<b>STEEL</b> Lightweight universal joint transmits both torque and thrust JPL-375	B63-10236	05	<b>STORAGE DEVICE</b> Metal strip forms 21 foot boom, rolls up for compact storage GSFC-151	B64-10011	05
Etching process mills pH 14-8 Mo alloy steel to precise tolerances MSC-270	B66-10110	03	Special tool kit aids heavily garmented workers MSC-163	B66-10403	05
Aluminum/steel wire composite plates exhibit high tensile strength M-FS-401	B66-10262	05	Large diameter metal ring seal prevents gas leakage at 5000 psi M-FS-1064	B66-10422	05



## STORAGE STABILITY

Storage-stable foamable polyurethane is activated by heat  
LANGLEY-187

B66-10111 03

## STORAGE TANK

Helical tube separates nitrogen gas from liquid nitrogen  
JPL-398

B63-10251 05

Capacitive system detects and locates fluid leaks  
M-FS-478

B66-10099 01

Interior servicing platform simplifies maintenance of storage tanks  
M-FS-1300

B66-10425 05

Preformed stiffeners used to fabricate structural components for pressurized tanks  
M-FS-1796

B66-10688 05

## STORAGE UNIT

Compact cartridge drives coded tape at constant readout speed  
JPL-472

B64-10222 01

Critical parts are stored and shipped in environmentally controlled reusable container  
M-FS-703

B66-10258 05

## STORE

Dispensing system eliminates torsion in deployed hoses  
MSC-80

B65-10185 05

## STRAIN

Dispensing system eliminates torsion in deployed hoses  
MSC-80

B65-10185 05

Sprayable birefringent coating enables strain measurements on large surfaces  
M-FS-1484

B66-10578 03

## STRAIN GAUGE

Rapid helium-air analyzer can measure other binary gas mixtures  
LANGLEY-16

B63-10557 03

Forming blocks speed production of strain gage grids  
LEWIS-182

B65-10009 05

Differential pressure gauge has fast response  
M-FS-358

B65-10285 05

Mechanism continuously measures static and dynamic cable loads  
MSC-217

B66-10107 05

Radiation used to temperature compensate semiconductor strain gages  
LANGLEY-207

B66-10186 02

Coating permits use of strain gage in water and liquid hydrogen  
M-FS-594

B66-10192 01

Strain gage network distinguishes between thermal and mechanical deformations  
GSFC-478

B66-10280 01

Spiral spring/strain gage combination accurately measures shock induced deflection  
MSC-789

B66-10488 01

Miniature telemetry system accurately measures pressure  
ARC-74

B66-10624 01

## STRAIN GAUGE ACCELEROMETER

Angular acceleration measured by deflection in sensing ring  
MSC-250

B66-10105 01

## STRAIN RATE

Tensile-strength apparatus applies high

strain-rate loading with minimum shock  
JPL-28

B66-10063 05

## STREAM

Valve effectively controls amount of contaminant in flow stream  
M-FS-1771

B66-10683 05

## STRESS

Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss  
LEWIS-39

B63-10342 01

Stringent cleaning technique assures reliable epoxy bond  
GSFC-161

B64-10142 03

New brazing alloy eliminates metal-stress cracking  
WOO-249

B65-10397 03

Universal transloader moves delicate equipment without stress  
MSC-654

B66-10384 05

## STRESS /BIOL/

Helmet system broadcasts electroencephalograms of wearer  
ARC-70

B66-10536 01

## STRESS AND LOAD

Contact stresses calculated for miniature slip rings  
M-FS-280

B65-10098 05

Torus elements used in effective shock absorber  
WOO-114

B66-10318 05

## STRESS CORROSION

Aluminum alloys protected against stress-corrosion cracking  
M-FS-235

B65-10172 03

Treatment increases stress-corrosion resistance of aluminum alloys  
M-FS-1840

B66-10595 05

## STRESS DISTRIBUTION

Lightweight hinged bellows restraint has high load capacity  
WOO-151

B65-10341 03

Resilient clamp holds fuel cell stack through thermal cycle  
MSC-313

B66-10035 05

## STRESS MEASUREMENT

Miniature stress transducer has directional capability  
JPL-591

B65-10023 01

## STRESS RATIO

Testing device subjects elastic materials to biaxial deformations  
JPL-616

B65-10189 03

## STRESS RELAXATION

Thermal stress-relief treatments for 2219 aluminum alloy are evaluated  
M-FS-1213

B66-10448 03

## STRESS RUPTURE

Apparatus facilitates pressure-testing of metal tubing  
LEWIS-174

B65-10131 05

## STRESSED-SKIN CONSTRUCTION

Flexible fastener allows thermal expansion  
LANGLEY-40

B64-10145 05

## STRETCHER

Buoyant Stokes litter assembly used for sea rescue operations  
MSC-131

B66-10019 05

Orthopedic stretcher with average-sized person can pass through 18-inch opening  
M-FS-811

B66-10573 05

## SUPERSONIC FLOW

## power at submillimeter wavelengths

GSFC-422 B66-10051 01

### SUBSTRATE

Thin transparent films formed from powdered glass

Tool permits damage-free removal of solar cell  
GSFC-467 B66-10219 05

Single-crystal semiconductor films grown on  
foreign substrates  
W00-076 B66-10225 01

## SUBSURFACE

Oceanborne transponder platform has good stability  
M-FS-171 B65-10035 05

## SUCTION

Calibrated clamp facilitates pressure application	B66-10059	05
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## SULFIDE

Cuprous selenide and sulfide form improved  
photovoltaic barriers  
WOO-212 B66-10025 01

## SULFUR

Chemical milling solution produces smooth  
surface finish on aluminum  
MSC-549 B66-10312 03

**SUNLIGHT**

Pigmented coating resists thermal shock  
JPL-SC-083 B65-10354 03

## SUPERALLOY

Nickel-base superalloys developed for high-temperature applications  
LEWIS-226 B66-10222 03

## SUPERCONDUCTING MAGNET

Superconductor magnets used for stagger-tuning  
traveling-wave maser  
GSFC-292 B65-10165 01

## SUPERCONDUCTOR

Supercold technique duplicates magnetic field  
in second superconductor  
JPL-376 B63-10237 05

Shaped superconductor cylinder retains intense  
magnetic field  
JPL-381 B63-10238 01

Superconductor shields test chamber from  
ambient magnetic fields  
JPL-627 B65-10297 02

Niobium thin films are superconductive in  
strong magnetic fields at low temperatures  
JPL-SC-174 B66-10122 02

## SUPERCOOLING

Supercold technique duplicates magnetic field  
in second superconductor  
JPL-376 B63-10237 05

## SUPERFLUIDITY

Cryogenic filter method produces super-pure  
helium and helium isotopes  
JPL-374 863-10235 03

## SUPERHETERODYNE RECEIVER

Optical superheterodyne receiver uses laser  
for local oscillator  
M-FS-1605 866-10584 01

## SUPERSONIC FLOW

Problem of oscillating cone in supersonic flow is solved by small perturbation techniques

### FERROELECTRIC BOLOMETER MEASURES RF ABSOLUTE

# SUPERSONIC INLET

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M-FS-869	B66-10700	02	Apparatus presents visual display of semiconductor surface characteristics JPL-665	B66-10200	01
<b>SUPERSONIC INLET</b>			<b>SURFACE DISTORTION</b>		
Perforations in jet engine supersonic inlet increase shock stability NEO-8	B66-10530	05	Electromagnetic hammer removes weld distortions from aluminum tanks M-FS-287	B65-10342	05
<b>SUPPORT</b>			<b>SURFACE EROSION</b>		
Mounting for diodes provides efficient heat sink M-FS-197	B64-10283	01	Sensors measure surface ablation rate of reentry vehicle heat shield LANGLEY-287	B66-10592	01
Simulator effects partial gravity conditions MSC-152	B66-10339	05	<b>SURFACE FINISH</b>		
Universal transloader moves delicate equipment without stress MSC-654	B66-10384	05	Portable flooring protects finished surfaces, is easily moved M-FS-15	B63-10387	05
Device measures reaction engine thrust vector deviations JPL-SC-163	B66-10642	05	Device measures curved surface finish on gear teeth WOO-112	B65-10064	05
<b>SUPPORT SYSTEM</b>			Rotating holder permits accurate grinding of metallurgical microsamples LEWIS-131	B65-10262	05
Nonresonant support facilitates vibration testing of structures M-FS-224	B65-10039	05	Chemical milling solution produces smooth surface finish on aluminum MSC-549	B66-10312	03
Flexure support system protects thermally and dynamically loaded models LANGLEY-39	B65-10042	05	Study shows effect of surface preparations on improving thermionic emission JPL-SC-140	B66-10493	01
Lightweight load support serves as vibration damper JPL-661	B65-10144	05	<b>SURFACE GEOMETRY</b>		
Heat exchanger tubes supported in high vibration environment M-FS-1401	B66-10567	05	Instrument calculates moments of inertia of complex plane figures MSC-628	B66-10306	01
Teflon sheet permits valve and valve operator to move as a single unit in a cryogenic pipe line NU-0077	B66-10702	05	Dot patterns provide reproducible flaw areas for study of adhesive bonds M-FS-862	B66-10367	05
Air bearing provides friction-free support for shaker system slip table NU-0086	B66-10708	05	<b>SURFACE IONIZATION</b>		
<b>SUPPRESSOR</b>			Highly sensitive solids mass spectrometer uses inert-gas ion source ERC-11	B66-10114	02
Suppressor plate eliminates undesired arcing during electron beam welding M-FS-1126	B66-10357	05	<b>SURFACE REACTION</b>		
Basic suppression techniques are evaluated M-FS-867	B66-10449	01	Radioactive method enables determination of surface areas rapidly and accurately NU-0088	B66-10710	03
<b>SURFACE</b>			<b>SURFACE ROUGHNESS</b>		
Portable flooring protects finished surfaces, is easily moved M-FS-15	B63-10387	05	Rough surface improves stability of air-sounding balloons M-FS-320	B65-10326	05
Kinetic-energy absorber employs frictional force between mating cylinders LEWIS-75	B63-10442	05	<b>SURFACE ROUGHNESS EFFECT</b>		
Pressure transducer 3/8-inch in size can be faired into surface WOO-065	B64-10021	05	Universal transloader moves delicate equipment without stress MSC-654	B66-10384	05
Stringent cleaning technique assures reliable epoxy bond GSFC-161	B64-10142	03	Selective tube roughening increases heat transfer capability M-FS-599	B66-10610	05
Connector seals fluid lines at cryogenic temperatures and high vacuums GSFC-253	B64-10327	05	<b>SURFACE TEMPERATURE</b>		
Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	Pyrometry handbook describes practical aspects of surface temperature measurements of opaque materials LEWIS-349	B66-10520	01
Portable tool cleans pipes and tubing MSC-238	B65-10375	05	Instrument accurately measures small temperature changes on test surface LANGLEY-174	B66-10637	01
<b>SURFACE CHEMISTRY</b>			<b>SURFACE TENSION</b>		
Instrument performs nondestructive chemical analysis, data can be telemetered JPL-SC-078	B65-10317	01	Tool pre-tensions covers prior to lacing MSC-631	B66-10301	05
			<b>SURFACE TREATMENT</b>		
			Device spot-laps spheres to very close tolerances JPL-SC-119	B66-10175	05
			Dry film lubricant is effective at extreme loads		

## SUBJECT INDEX

## SWITCHING CIRCUIT

M-FS-628	B66-10256	03	W00-054	B64-10349	01
Seal surfaces protected during assembly			Photoelectric semiconductor switch operates		
NU-0067	B66-10266	05	with low level inputs		
Valve seat pores sealed with thermosetting monomer			JPL-SC-068	B65-10033	01
M-FS-900	B66-10322	03	Automatic thermal switch accelerates cooling-down of cryogenic system		
Sprayable birefringent coating enables strain measurements on large surfaces			JPL-655	B65-10068	01
M-FS-1484	B66-10578	03	Rotor position sensor switches currents in brushless dc motors		
<b>SURFACE VEHICLE</b>			GSFC-315	B65-10151	01
Vehicle walks on varied terrain, can assist handicapped persons			Inflatable bladder provides accurate calibration of pressure switch		
W00-005	B64-10274	05	M-FS-367	B65-10279	01
<b>SURFACTANT</b>			Selenium bond decreases on resistance of light-activated switch		
Surfactant for dye-penetrant inspection is insensitive to liquid oxygen			JPL-SC-101	B65-10324	01
M-FS-475	B66-10131	03	Three-position rocker switch actuator has positive centering		
Ultrasonic cleaning restores depth-type filters			MSC-261	B65-10376	01
M-FS-540	B66-10298	03	Economical and maintenance-free gas system operates railroad switches		
<b>SURGE</b>			NU-0045	B66-10124	05
High-pressure regulating system prevents pressure surges			Optically driven switch turn-off time reduced by opaque coatings		
JPL-231	B63-10170	05	JPL-SC-107	B66-10141	01
<b>SURGICAL INSTRUMENT</b>			Switching mechanism senses angular acceleration		
Encapsulation process sterilizes and preserves surgical instruments			GSFC-462	B66-10158	01
JPL-484	B64-10066	05	Safety switch permits emergency bridge crane shutdown		
<b>SURVIVAL</b>			M-FS-549	B66-10168	05
Self-inflating lifevest stores in small package			Soldering iron temperature is automatically reduced		
MSC-5A	B66-10184	04	ARC-57	B66-10203	01
<b>SUSPENSION</b>			Key-locked guard prevents accidental switch actuation		
Device enables measurement of moments of inertia about three axes			MSC-419	B66-10235	05
GSFC-49	B65-10176	05	Magnetically operated limit switch has improved reliability, minimizes arcing		
Vacuum chamber provides improved insulation and support for cryostat			MSC-422	B66-10270	01
M-FS-415	B65-10368	02	Flexible arms provide constant force for pressure switch calibration		
<b>SUSPENSION SYSTEM</b>			HQ-38	B66-10317	05
Leaf-spring suspension provides accurate parallel displacements			Design concept for pressure switch calibrator		
JPL-480	B65-10104	05	HQ-36	B66-10598	01
<b>SWAGING</b>			Low rate flow switch can be used for gas or liquid		
Telescoping of instrumentation tubing eliminates swaging			JPL-879	B66-10696	01
M-FS-546	B66-10116	05	<b>SWITCHING</b>		
Low power heating element provides thermal control during swaging operations			Zener diode controls switching of large direct currents		
M-FS-457	B66-10206	05	MSC-188	B65-10350	01
<b>SWEEP FREQUENCY</b>			Lamp automatically switches to new filament on burnout		
An investigation of phase-lock loop swept-frequency synchronization			M-FS-498	B66-10046	01
M-FS-656	B66-10423	01	<b>SWITCHING CIRCUIT</b>		
<b>SWITCH</b>			Double-throw microwave device switches two lines quickly		
Stepping switch with simple actuator provides many contacts in small space			JPL-410	B63-10258	01
JPL-122	B63-10118	01	Solid-state switching used to speed up capacitive integrator		
Coincident switch closing reduces error in motor-driven timer			LANGLEY-104	B65-10159	01
JPL-182	B63-10143	05	Simple circuit reduces transistor switching time		
Liquid switch is remotely operated by low dc voltage			GSFC-314	B65-10234	01
GSFC-119	B63-10599	01			
Digital logic elements provide additional functions from analog input					
MSC-64	B64-10064	01			
Bandwidth switching is transient-free, avoids loss of loop lock					

## SWITCHING ELEMENT

## SUBJECT INDEX

Improved circuit minimizes generation of pseudonoise check bits  
JPL-698 B65-10275 01

Cam-operated limit switch features safe fuse replacement  
MSC-218 B65-10322 01

Tester periodically registers dc amplifier characteristics  
MSC-190 B66-10148 01

Junction connectors permit strategic placement of television cameras  
KSC-66-22 B66-10391 01

Electrically controlled optical latch and switch requires less current  
JPL-SC-111 B66-10414 01

Electronic bidirectional valve circuit prevents crossover distortion and threshold effect  
MSC-193 B66-10420 01

Video signal processing system uses gated current mode switches to perform high speed multiplication and digital-to-analog conversion  
MSC-781 B66-10429 01

Solid-state switch increases switching speed  
WOO-298 B66-10430 01

Basic suppression techniques are evaluated  
M-FS-867 B66-10449 01

Solid state circuit switches ac load  
JPL-798 B66-10465 01

**SWITCHING ELEMENT**  
Dc to ac converter operates efficiency at low input voltages  
GSFC-130 B65-10178 01

Efficient dc to dc converter eliminates large stray magnetic fields  
GSFC-463 B66-10376 01

**SWITCHING FUNCTION**  
Knob linkage permits one-hand control of several operations  
MSC-30 B65-10022 05

Exclusive-or logic circuit has useful properties  
LANGLEY-214 B66-10272 01

**SYMMETRICAL BODY**  
Automatic system determines moments of inertia of asymmetrical objects  
M-FS-1769 B66-10636 01

**SYMMETRY**  
Modified interelement spacing improves Yagi antenna array  
LANGLEY-130 B65-10183 01

**SYNCHRONIZED OSCILLATOR**  
An investigation of phase-lock loop swept-frequency synchronization  
M-FS-656 B66-10423 01

**SYNCHRONOUS DETECTOR**  
Phase detector circuit synthesizes own reference signal  
M-FS-247 B65-10080 01

**SYSTEM FAILURE**  
Safety switch permits emergency bridge crane shutdown  
M-FS-549 B66-10168 05

Simplified circuit corrects faults in parallel binary information channels  
JPL-SC-090 B66-10261 01

## SYSTEMS ANALYSIS

Human transfer functions used to predict system performance parameters  
LANGLEY-203 B66-10379 01

Solid state annunciator facilitates complex system troubleshooting  
M-FS-1258 B66-10505 01

## T

## TABLE

Gear drive automatically indexes rotary table  
M-FS-753 B66-10383 05

## TACHOMETER

Variable-capacitance tachometer eliminates troublesome magnetic fields  
GSFC-435 B66-10126 01

## TAKEOFF AND LANDING

New anemometer has fast response, measures dynamic pressure directly  
LANGLEY-28 B63-10530 05

## TANK

Two-part valve acts as quick coupling  
JPL-478 B64-10223 05

Magnets position X-ray film for weld inspection  
M-FS-253 B65-10110 05

Oscillator circuit measures liquid level in tanks  
M-FS-245 B65-10209 01

Weld leaks rapidly and safely detected  
M-FS-362 B65-10265 01

Device without electrical connections in tank measures liquid level  
WOO-235 B66-10198 01

## TANTALUM

Apparatus facilitates high-temperature tensile testing in vacuum  
LEWIS-42 B63-10345 03

Tantalum cathode improves electron-beam evaporation of tantalum  
JPL-WOO-021 B65-10175 03

Thermoelectric elements diffusion-bonded to tungsten electrodes  
GSFC-346 B65-10309 01

Bi-metallic devices help maintain constant sealing forces down to cryogenic temperatures  
M-FS-800 B66-10325 02

Nonelectrolytic tantalum capacitors developed  
M-FS-1546 B66-10552 01

Tantalum alloys resist creep deformation at elevated temperatures  
LEWIS-350 B66-10558 03

Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys  
ARG-199 B66-10594 03

## TAPE

New energy storage concept uses tapes  
LEWIS-239 B66-10098 02

Expandable takeup reel facilitates paper tape removal  
WOO-271 B66-10399 05

## TAPE RECORDER

Electronic phase-locked-loop speed control system is stable  
JPL-SC-084 B66-10232 01

## TAPERED COLUMN

Tool facilitates sealing of metal fill tubes  
MSC-24 B63-10519 05

## SUBJECT INDEX

## TEMPERATURE EFFECT

<b>TARGET</b>				JPL-805	B66-10386	01
Simplified fixture permits precision alignment of an optical target						
M-FS-1181	B66-10556	01		<b>TELEVISION TRANSMISSION</b>		
				Variable word length encoder reduces TV bandwidth requirements		
<b>TEFLON</b>				LANGLEY-87	B65-10345	01
Insert sleeve prevents tube soldering contamination				<b>TELLURIUM COMPOUND</b>		
MSC-852	B66-10238	05		IR-transmission glasses formed from oxides of bismuth and tellurium		
Teflon sheet permits valve and valve operator to move as a single unit in a cryogenic pipe line				M-FS-279	B65-10190	03
NU-0077	B66-10702	05		<b>TEMPERATURE</b>		
<b>TELEMETER</b>				Two-stage emitter follower is temperature stabilized		
Device measures fluid drag on test vehicles				MSC-20	B63-10493	01
LANGLEY-34	B65-10195	01		<b>TEMPERATURE COMPENSATION</b>		
<b>TELEMETRY</b>				New low-level a-c amplifier provides adjustable noise cancellation and automatic temperature compensation		
Circuit converts AM signals to FM for magnetic recording				ARC-2	B63-10003	04
GSFC-227	B65-10001	01		Simple circuit provides adjustable voltage with linear temperature variation		
Simple circuit functions as frequency discriminator for PFM signals				JPL-W00-029	B63-10537	01
GSFC-267	B65-10102	01		<b>TEMPERATURE CONTROL</b>		
Variable frequency transistor inverters use multiple core transformers				Variable-transparency wall regulates temperatures of structures		
GSFC-183	B65-10119	01		LANGLEY-25	B63-10528	03
Circuit reduces distortion of FM modulator				Simple control device senses solar position		
GSFC-257	B65-10152	01		JPL-638	B65-10061	01
Instrument performs nondestructive chemical analysis, data can be telemetered				Closed fluid system without moving parts controls temperature		
JPL-SC-078	B65-10317	01		LEWIS-222	B65-10331	02
Solid state thermostat has integral probe and circuitry				Special coatings control temperature of structures		
M-FS-434	B66-10193	01		GSFC-444	B65-10337	03
Miniature capacitive accelerometer is especially applicable to telemetry				Auxiliary coil controls temperature of RF induction heater		
ARC-72	B66-10491	01		GSFC-428	B66-10067	01
Digital system detects binary code patterns containing errors				Control system maintains compartment at constant temperature		
GSFC-541	B66-10516	01		JPL-SC-145	B66-10188	05
Miniature telemetry system accurately measures pressure				Soldering iron temperature is automatically reduced		
ARC-74	B66-10624	01		ARC-57	B66-10203	01
<b>TELESCOPE</b>				High-speed furnace uses infrared radiation for controlled brazing		
Attachment converts microscope to point source autocollimator				NU-0047	B66-10268	02
JPL-499	B64-10124	05		Mixer conditions temperature of liquified gas streams		
<b>TELEVISION CAMERA</b>				M-FS-1784	B66-10565	02
Raster linearity of video cameras calibrated with precision tester				<b>TEMPERATURE DIFFERENCE</b>		
GSFC-200	B64-10209	01		Temperature-compensation circuit stabilizes performance of vidicons		
Screen of cylindrical lenses produces stereoscopic television pictures				JPL-486	B64-10226	01
M-FS-273	B66-10086	02		Feed-through connector withstands high temperatures in vacuum environment		
Circular, explosion-proof lamp provides uniform illumination				GSFC-442	B65-10328	01
MSC-382	B66-10156	02		<b>TEMPERATURE DISTRIBUTION</b>		
Junction connectors permit strategic placement of television cameras				Computer program simplifies transient and steady-state temperature prediction for complex body shapes		
KSC-66-22	B66-10391	01		MSC-989	B66-10619	01
Security warning system monitors up to fifteen remote areas simultaneously				<b>TEMPERATURE EFFECT</b>		
KSC-66-39	B66-10548	01		Hot-air soldering technique prevents overheating of electrical components		
<b>TELEVISION EQUIPMENT</b>				GSFC-91	B63-10536	01
Unijunction frequency divider is free of backward loading				Coiled sheet metal strip opens into tubular configuration		
JPL-W00-010	B65-10112	01		GSFC-425	B66-10009	03
Parallel line raster eliminates ambiguities in reading timing of pulses less than 500 microseconds apart				Angular acceleration measured by deflection in sensing ring		

## TEMPERATURE FIELD

## SUBJECT INDEX

MSC-250	B66-10105	01	TEMPLATE		
Concept for passive system to control gas flow independently of temperature			Lathe converted for grinding aspheric surfaces		
M-FS-982	B66-10343	05	GSFC-115	B63-10556	05
TEMPERATURE FIELD			TENSILE STRENGTH		
Hydrogen-atmosphere induction furnace has increased temperature range			Mechanism continuously measures static and dynamic cable loads		
LEWIS-153	B66-10055	05	MSC-217	B66-10107	05
Remote preamplifier circuit maintains stability over wide temperature range			Aluminum/steel wire composite plates exhibit high tensile strength		
WOO-278	B66-10432	01	M-FS-401	B66-10262	05
TEMPERATURE GRADIENT			New tungsten alloy has high strength at elevated temperatures		
Packless valve with all-metal seal handles wide temperature, pressure range			LEWIS-336	B66-10551	03
JPL-361	B63-10228	05	Tungsten fiber-reinforced copper composites form high strength electrical conductors		
Simple circuit provides adjustable voltage with linear temperature variation			LEWIS-338	B66-10572	03
JPL-WOO-029	B63-10537	01	Study made to control depth of potting compound for honeycomb sandwich fasteners		
Simple transducer measures low heat-transfer rates			LEWIS-370	B66-10677	05
JPL-466	B64-10122	01	TENSILE STRESS		
Seal allows blind assembly and thermal expansion of components			Ultrasonic emission method enables testing of adhesive bonds		
NU-0005	B65-10053	05	M-FS-799	B66-10341	01
TEMPERATURE INDICATOR			TENSILE TESTING MACHINE		
Braze alloys used as temperature indicators			Apparatus facilitates high-temperature tensile testing in vacuum		
NU-0063	B66-10274	01	LEWIS-42	B63-10345	03
TEMPERATURE MEASUREMENT			Peel resistance of adhesive bonds accurately measured		
Thermistor connector assembly increases accuracy of measurements			GSFC-320	B65-10173	03
LANGLEY-62	B65-10045	01	Testing device subjects elastic materials to biaxial deformations		
Infrared shield facilitates optical pyrometer measurements			JPL-616	B65-10189	03
LANGLEY-133	B65-10272	02	Tensile-strength apparatus applies high strain-rate loading with minimum shock		
Miniature bioelectric device accurately measures and telemeters temperature			JPL-28	B66-10063	05
ARC-52	B66-10057	01	Friction loading device enables accurate testing of brittle materials		
Multiple temperatures sampled using only one reference junction			NU-0051	B66-10345	05
GSFC-485	B66-10260	01	TENSION		
Strain gage network distinguishes between thermal and mechanical deformations			Buckle joins web straps quickly, adjusts easily		
GSFC-478	B66-10280	01	LANGLEY-21	B64-10119	05
Accurate depth control provided for thermocouple junction locations			Cantilever springs maintain tension in thermally expanded wires		
LANGLEY-289	B66-10632	01	LEWIS-136	B65-10149	05
TEMPERATURE PROBE			TERMINAL		
Internal cooling increases range of immersion-type temperature probe			Feed-through has polyterminal feature		
LEWIS-171	B65-10157	02	M-FS-25	B65-10057	01
TEMPERATURE PROFILE			Standoff tool speeds placement of friction-fit electrical terminals		
Density trace made with computer printout			WOO-029	B65-10348	05
GSFC-322	B65-10200	01	Adhesive-backed terminal board eliminates mounting screws		
TEMPERATURE TRANSDUCER			MSC-173	B65-10396	01
Transducer measures temperature differentials in presence of strong electromagnetic fields			Semiautomatic device tests components with biaxial leads		
ARC-27	B65-10089	01	MSC-516	B66-10337	05
Temperature transducer has high output, is time stable			TERNARY ALLOY		
GSFC-446	B65-10362	01	Silver-base ternary alloy proves superior for slip ring lead wires		
Heat flux sensor design reduces extraneous source effects			M-FS-1540	B66-10540	03
MSC-400	B66-10531	01	TEST CHAMBER		
Study of theory and application of long duration heat flux transducers			Test device prevents molecular bounce-back		
M-FS-1265	B66-10614	01	GSFC-82	B63-10546	03
			Multiple test chamber exposes materials to various environments		
			MSC-179	B65-10268	01

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## THERMAL EXPANSION

Superconductor shields test chamber from ambient magnetic fields JPL-627	B65-10297	02	shielded cables HQ-60	B66-10659	01
Materials physically tested in variable-environment chamber JPL-789	B66-10130	01	<b>TEST FACILITY</b> Monitoring circuit accurately measures movement of solenoid valve M-FS-1829	B66-10568	01
Improved system measures output energy of pyrotechnic devices WOO-256	B66-10159	01	<b>TEST METHOD</b> Continuity tester screens out faulty socket connections JPL-596	B64-10065	01
Expandable rubber plug seals openings for pressure testing NU-0048	B66-10229	05	Improved insertion-loss tester JPL-358	B64-10080	01
Vacuum test fixture improves leakage rate measurements MSC-271	B66-10286	01	Electronic device simulates respiration rate and depth MSC-89	B64-10255	01
Feed-thru flange is useful in vacuum applications to cryogenic temperatures JPL-846	B66-10615	02	Apparatus facilitates pressure-testing of metal tubing LEWIS-174	B65-10131	05
Volume-ratio calibration system for vacuum gages LEWIS-303	B66-10640	01	Weld leaks rapidly and safely detected M-FS-362	B65-10265	01
<b>TEST EQUIPMENT</b> Test device prevents molecular bounce-back GSFC-82	B63-10546	03	Test strips detect different CO2 concentrations in closed compartments MSC-210	B65-10390	03
Machine tests crease durability of sheet materials JPL-604	B64-10178	05	Vibration tests on vidicons made by improved method JPL-SC-115	B66-10042	01
Circuit converts AM signals to FM for magnetic recording GSFC-227	B65-10001	01	Rectilinear accelerometer possesses self-calibration feature M-FS-1480	B66-10452	01
Fluid pressure used to test turbopump bearings NU-0001	B65-10024	03	Method for predicting frictional loss in metal bellows and flexible hose M-FS-883	B66-10662	05
Circuit detects errors in address currents for magnetic core arrays M-FS-234	B65-10047	01	<b>THERAPY</b> Simulator effects partial gravity conditions MSC-152	B66-10339	05
Piezoresistive gage tests pin-connector sockets JPL-675	B65-10128	01	<b>THERMAL CONDUCTOR</b> Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02
Force controlled solenoid drives microweld tester WOO-125	B65-10182	01	Simple transducer measures low heat-transfer rates JPL-466	B64-10122	01
Testing device subjects elastic materials to biaxial deformations JPL-616	B65-10189	03	<b>THERMAL EFFECT</b> Magnetic field test coils are temperature compensated GSFC-294	B65-10081	02
Novel probe simplifies electronic component testing GSFC-342	B65-10243	01	Light ray modulation controls optical system alignment GSFC-171	B65-10211	02
Pressure transducers dynamically tested with sinusoidal pressure generator LEWIS-268	B66-10031	01	Resilient clamp holds fuel cell stack through thermal cycle MSC-313	B66-10035	05
Extendable mast used in one shot soil penetrometer JPL-685	B66-10146	05	<b>THERMAL ENERGY</b> Polymer film exhibits thermal and radiation stability LANGLEY-100	B66-10043	03
Dispenser leak-tests and sterilizes rubber gloves MSC-285	B66-10166	03	<b>THERMAL ENVIRONMENT</b> Electrically conductive fibers thermally isolate temperature sensor GSFC-456	B66-10349	01
Matching flow characteristics of standard shutoff valves eliminates need for custom fabricated valves M-FS-1069	B66-10416	05	<b>THERMAL EXPANSION</b> Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05
Semiconductors can be tested without removing them from circuitry M-FS-1163	B66-10447	01	Fastener provides cooling and compensates for thermal expansion NU-0003	B65-10038	05
Device measures reaction engine thrust vector deviations JPL-SC-163	B66-10642	05	Flexure support system protects thermally and dynamically loaded models		
Logic circuitry used to automatically test					



## THERMAL EXPANSION COEFFICIENT

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LANGLEY-39	B65-10042	05	LANGLEY-173	B66-10058	02
Seal allows blind assembly and thermal expansion of components NU-0005	B65-10053	05	Chromium oxide coatings improve thermal emissivity of alumina WOO-263	B66-10227	03
Cantilever springs maintain tension in thermally expanded wires LEWIS-136	B65-10149	05	<b>THERMAL SHOCK</b> Refractory ceramic has wide usage, low fabrication cost M-FS-67	B63-10481	03
Differential expansion provides pressure for diffusion bonding of large diameter rings M-FS-588	B66-10269	05	Pigmented coating resists thermal shock JPL-SC-083	B65-10354	03
<b>THERMAL EXPANSION COEFFICIENT</b> Bimetallic devices help maintain constant sealing forces down to cryogenic temperatures M-FS-800	B66-10325	02	Multilayer refractory nozzles produced by plasma-spray process WOO-318	B66-10611	05
Glass formulation has high coefficient of thermal expansion NU-0084	B66-10705	03	Intergranular metal phase increases thermal shock resistance of ceramic coating M-FS-1862	B66-10651	03
<b>THERMAL INSULATION</b> Variable-transparency wall regulates temperatures of structures LANGLEY-25	B63-10528	03	<b>THERMAL STRESS</b> Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05
Aluminized fiberglass insulation conforms to curved surfaces M-FS-477	B66-10024	03	Thermal stress-relief treatments for 2219 aluminum alloy are evaluated M-FS-1213	B66-10448	03
Spray-on technique simplifies fabrication of complex thermal insulation blanket M-FS-497	B66-10053	03	<b>THERMIONIC CONVERTER</b> Collector/collector guard ring balancing circuit eliminates edge effects JPL-SC-143	B66-10563	01
Insulation for cryogenic tanks has reduced thickness and weight M-FS-326	B66-10183	02	<b>THERMIONIC DIODE</b> Bypass rod transfers heat developed in thermionic diode JPL-SC-136	B66-10303	05
Improved thermal insulation materials made of foamed refractory oxides M-FS-735	B66-10288	03	Chemical regeneration of emitter surface increases thermionic diode life LEWIS-17	B66-10435	02
Inexpensive insulation is effective for cryogenic transfer lines MSC-618	B66-10348	02	<b>THERMIONIC EMISSION</b> Thermionic scanner pinpoints work function of emitter surfaces JPL-SC-177	B66-10444	01
<b>THERMAL POWER</b> Thermal motor positions magnetometer sensors ARC-51	B66-10078	05	Study shows effect of surface preparations on improving thermionic emission JPL-SC-140	B66-10493	01
<b>THERMAL PROPERTY</b> Indium foil with beryllia washer improves transistor heat dissipation GSFC-42	B63-10033	01	<b>THERMISTOR</b> Temperature-compensation circuit stabilizes performance of vidicons JPL-486	B64-10226	01
Copper foil provides uniform heat sink path MSC-262	B66-10004	02	Electronic device simulates respiration rate and depth MSC-89	B64-10255	01
Silazane elastomer remains resilient at 400 deg C M-FS-1144	B66-10667	05	PTC thermistor protects multiloaded power supplies GSFC-236	B64-10281	01
<b>THERMAL PROTECTION</b> Flexible curtain shields equipment from intense heat fluxes M-FS-48	B65-10044	03	Thermistor connector assembly increases accuracy of measurements LANGLEY-62	B65-10045	01
Predicting surface heating rates and pressures resulting from hot exhaust gases MSC-971	B66-10633	05	Wedge immersed thermistor bolometer measures infrared radiation GSFC-443	B65-10330	02
Study of fast response thermocouple measurement of temperatures in cryogenic gases M-FS-1659	B66-10661	01	Solid state thermostat has integral probe and circuitry M-FS-434	B66-10193	01
<b>THERMAL RADIATION</b> Variable-transparency wall regulates temperatures of structures LANGLEY-25	B63-10528	03	Electrically conductive fibers thermally isolate temperature sensor GSFC-456	B66-10349	01
Refractory metal shielding /insulation/ increases operating range of induction furnace LEWIS-202	B65-10188	02	<b>THERMOCONDUCTIVITY</b> Apparatus measures thermal conductivity of honeycomb-core panels LANGLEY-202	B66-10127	01
Calorimeter accurately measures thermal radiation energy			<b>THERMOCOUPLE</b> Connector for thermocouple leads saves costly		

wire, makes reliable connectors LANGLEY-26	B63-10529	01	<b>THERMOELECTRIC MATERIAL</b> Thermoelectric elements diffusion-bonded to tungsten electrodes GSFC-346	B65-10309	01
Simple circuit continuously monitors thermocouple sensor M-FS-61	B63-10567	01	<b>THERMOMETRY</b> Apparatus measures concentration of suspended droplets in gas streams LANGLEY-31	B64-10237	01
Wide-angle sensor measures radiant heat energy in corrosive atmospheres M-FS-228	B65-10019	05	<b>THERMOPLASTIC</b> Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns ARC-7	B63-10008	05
Metal sheath improves thermocouple using graphite in one leg NU-0011	B65-10051	01	Thermoplastic rubberlike material produced at low cost JPL-793	B66-10453	03
Transducer measures temperature differentials in presence of strong electromagnetic fields ARC-27	B65-10089	01	<b>THERMOPLASTIC FILM</b> Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns ARC-7	B63-10008	05
Thermocouple-to-instrumentation connector features quick assembly NU-0022	B65-10246	05	<b>THERMOSETTING</b> Valve seat pores sealed with thermosetting monomer M-FS-900	B66-10322	03
Hollow plastic hoops protect thermocouple in storage and handling NU-0023	B65-10256	05	<b>THERMOSTABILITY</b> Substituted silane-diol polymers have improved thermal stability M-FS-469	B66-10259	03
Compound improves thermal interface between thermocouple and sensed surface NU-0028	B66-10121	02	<b>THERMOSTAT</b> Solid state thermostat has integral probe and circuitry M-FS-434	B66-10193	01
Liquid trap seals thermocouple leads M-FS-688	B66-10212	05	<b>THICKNESS RATIO</b> Opposed arcs permit deep weld penetration with only one pass M-FS-1696	B66-10513	05
Multiple temperatures sampled using only one reference junction GSFC-485	B66-10260	01	<b>THIN FILM</b> Efficient thin film heating element takes minimum space GSFC-289	B65-10123	01
Modified thermocouple is effective from minus 250 deg to 5000 deg F MSC-420	B66-10461	01	High permeability semiconductors permit close-tolerance soldering GSFC-319	B65-10134	05
Microminiature thermocouple monitors own installation M-FS-1111	B66-10463	05	Modified developer increases line resolution in photosensitive resist GSFC-386	B65-10278	01
Thermocouples electrically checked while connected to data system LANGLEY-182	B66-10623	01	Improved wire memory matrix uses very little power JPL-SC-167	B65-10359	01
Accurate depth control provided for thermocouple junction locations LANGLEY-289	B66-10632	01	Thin-film semiconductor rectifier has improved properties MSC-207	B66-10012	01
Thermocouples easily installed in hard-to-get-to places M-FS-1946	B66-10653	01	Thin carbon film serves as UV bandpass filter ERC-8	B66-10060	02
Study of fast response thermocouple measurement of temperatures in cryogenic gases M-FS-1659	B66-10661	01	Submicron holes in thin films increase sampling range of mass spectrometers JPL-SC-097	B66-10380	03
Thermocouple-flexible cable connector insulator is highly reliable NU-0082	B66-10709	01	Self-supported aluminum thin films produced by vacuum deposition process ARC-58	B66-10387	03
<b>THERMOCOUPLE PYROMETER</b> High temperature thermocouple operates in reduction atmosphere NU-0046	B66-10134	01	Thin-film ferrites vapor deposited by one-step process in vacuum MSC-259	B66-10398	03
<b>THERMODYNAMIC EQUILIBRIUM</b> Computer program determines chemical composition of physical system at equilibrium MSC-1119	B66-10670	01	Thin plastic sheet eliminates need for expensive plating M-FS-1896	B66-10681	03
<b>THERMODYNAMIC PROPERTY</b> Closed fluid system without moving parts controls temperature LEWIS-222	B65-10331	02	<b>THORIUM OXIDE</b> Thoriated nickel bonded by solid-state diffusion method LANGLEY-116	B65-10220	03
<b>THERMOELECTRIC CONVERSION SYSTEM</b> Modular thermoelectric cell is easily packaged in various arrays GSFC-339	B65-10199	01			

## THREE-BODY PROBLEM

Study compares methods for the numerical solution of ordinary differential equations  
M-FS-830 B66-10466 01

## THRESHOLD

New sintering process adjusts magnetic value of ferrite cores  
GSFC-129 B63-10606 01

Blocking oscillator uses low triggering voltage  
MSC-58 B64-10017 01

## THRESHOLD DETECTOR

Circuit maintains digital decision threshold at preset level  
M-FS-331 B65-10281 01

Constant-current regulator improves tunnel diode threshold-detector performance  
GSFC-239 B65-10282 01

Threshold detector produces narrow pulses at high repetition rates  
GSFC-383 B65-10310 01

Digitally controlled pulse-level discriminator operates over wide voltage range  
GSFC-324 B66-10129 01

## THRUST

Lightweight universal joint transmits both torque and thrust  
JPL-375 B63-10236 05

## THRUST MEASUREMENT

Apparatus measures very small thrusts  
W00-048 B64-10284 05

Damper reduces effects of resonance on force transducer  
WSO-321 B66-10550 05

## THRUST VECTOR CONTROL /TVC/

Study of vortex valve for medium temperature solid propellants  
LANGLEY-204 B66-10524 01

## THRUSTOR

Plated nickel wire mesh makes superior catalyst bed  
MSC-216 B65-10321 03

## TIME DELAY

Simple circuit functions as frequency discriminator for PFM signals  
GSFC-267 B65-10102 01

Pneumatic shutoff and time-delay valve operates at controlled rate  
M-FS-602 B66-10189 05

## TIME FACTOR

Computer modification reduces time of performing iterative division  
M-FS-166 B65-10005 01

Temperature transducer has high output, is time stable  
GSFC-446 B65-10362 01

Binary counter accumulates time by complementary preset  
MSC-242 B65-10399 01

## TIME RESPONSE

Optically driven switch turn-off time reduced by opaque coatings  
JPL-SC-107 B66-10141 01

Improved design provides faster response time in photomultiplier  
GSFC-451 B66-10526 01

Study of fast response thermocouple measurement of temperatures in cryogenic gases  
M-FS-1659 B66-10661 01

## TIME SERIES

Computer programs perform spectral analyses of up to seven time series  
M-FS-1133 B66-10539 01

## TIME SHARING

Nixie tube display unit employs time-shared logic  
ARG-117 B66-10512 01

## TIMING

Single channel pulse-height analyzer operates in subnanosecond range  
LEWIS-267 B66-10377 01

## TIMING APPARATUS

Coincident switch closing reduces error in motor-driven timer  
JPL-182 B63-10143 05

Unijunction frequency divider is free of backward loading  
JPL-W00-010 B65-10112 01

Modified McLeod gage records automatically  
LEWIS-290 B66-10290 02

Parallel line raster eliminates ambiguities in reading timing of pulses less than 500 microseconds apart  
JPL-805 B66-10386 01

## TIN

Nickel/tin coating protects threaded fasteners in corrosive environment  
MSC-253 B65-10398 03

Jig protects transistors from heat while tinning leads  
MSC-515 B66-10240 05

## TIN ALLOY

Improved rolling element bearings provide low torque and small temperature rise in ultrahigh vacuum environment  
LEWIS-359 B66-10678 05

## TIN TELLURIDE

Thermoelectric elements diffusion-bonded to tungsten electrodes  
GSFC-346 B65-10309 01

## TITANIUM

New alloy brazes titanium to stainless steel  
MSC-102 B65-10060 05

Titanium treatment improves brazed joints  
MSC-127 B65-10153 05

Titanium diaphragm makes excellent amplatron cathode support  
GSFC-394 B65-10298 01

Auxiliary titanium sublimation pump produces ultrahigh /10 to the minus 11 torr/ vacuum  
LANGLEY-212 B66-10388 02

## TITANIUM ALLOY

Galvanic corrosion reduced in aluminum fabrications  
M-FS-272 B65-10140 03

## TONOMETRY

Direct force-measuring transducer used in blood pressure research  
ARC-53 B65-10325 01

## TOOL

V-slotted screw head and matching driving tool facilitate insertion and removal of screw fasteners  
FRC-16 B63-10023 05

Special pliers connect hose containing liquid under pressure  
JPL-IT-1003 B63-10291 05

Heavy-duty staple remover operated by hand  
JPL-IT-1004 B63-10292 05

## SUBJECT INDEX

## TORCH

Miniature oxygen-hydrogen cutting torch constructed from hypodermic needle JPL-545	B63-10517	05	Special tool seals conductors with combination of plastic sleeves M-FS-579	B66-10209	05
Tool facilitates sealing of metal fill tubes MSC-24	B63-10519	05	Tool permits damage-free removal of solar cell GSFC-467	B66-10219	05
Forming blocks speed production of strain gage grids LEWIS-182	B65-10009	05	Automatic reel controls filler wire in welding machines MSC-416	B66-10236	05
Spring loaded beaded cable makes efficient wire puller WOO-108	B65-10031	05	Adjustable knife cuts honeycomb material to specified depth MSC-475	B66-10237	05
Screw locking cups quickly and neatly crimped NU-0009	B65-10049	05	Hand tool permits shrink sizing of assembled tubing MSC-504	B66-10239	05
Cutter and stripper reduces coaxial cable connection time ARC-40	B65-10094	05	Portable sandblaster cleans small areas MSC-523	B66-10242	05
Low-cost tool minimizes damage to O-rings during installation MSC-140	B65-10116	05	Hollow needle used to cut metal honeycomb structures MSC-486	B66-10244	05
Lathe attachment used to machine elliptical cones MSC-100	B65-10168	05	Modified soldering iron speeds cutting of synthetic materials M-FS-725	B66-10246	05
Spiral heater coils hand-formed with fixture LEWIS-208	B65-10192	05	Ultrasonic hand tool allows convenient scanning of spot welds M-FS-539	B66-10289	02
Self-aligning fixture used in lathe chuck jaw refacing FRC-21	B65-10198	05	Tool pre-tensions covers prior to lacing MSC-631	B66-10301	05
Handtool facilitates extraction of circuit modules LANGLEY-38	B65-10231	05	Tool forms right angles in component leads M-FS-722	B66-10346	05
Standoff tool speeds placement of friction-fit electrical terminals WOO-029	B65-10348	05	Welds chilled by liquid coolant manifold M-FS-679	B66-10354	05
Portable tool removes burrs from pipe and tubing MSC-237	B65-10360	05	Special tool kit aids heavily garmented workers MSC-163	B66-10403	05
Portable tool cleans pipes and tubing MSC-238	B65-10375	05	Alignment tool facilitates pin placement on irregular horizontal surfaces LANGLEY-219	B66-10410	05
Drill bit design assures clean holes in laminated materials WOO-098	B65-10386	05	Modified pliers facilitate coupling of bayonet-type connectors M-FS-1344	B66-10417	05
Improved tool easily removes brazed tube connectors MSC-263	B66-10003	05	Bearing puller facilitates removal and replacement of bearing assemblies M-FS-1538	B66-10418	05
Torque wrench designed for restricted areas LEWIS-246	B66-10011	05	Heat treatment stabilizes welded aluminum jig and tool structures MSC-800	B66-10458	03
Bench vise adapter grips tubing securely and safely MSC-279	B66-10056	05	Hole saw drill attachment has zero force reaction MSC-543	B66-10604	05
Shoulder adapter steadies spot welding gun M-FS-321	B66-10076	05	Pneumatic wrench retains or discharges nuts or bolts as desired NU-0085	B66-10707	05
Tool provides constant purge during tube welding M-FS-547	B66-10093	05	TOOLING		
Hand drill adapter limits holes to desired depth MSC-346	B66-10123	05	Insulated weld tooling permits uniform, high-quality weld MSC-42	B64-10058	05
Device spot-laps spheres to very close tolerances JPL-SC-119	B66-10175	05	Fiberglass dies speed forming of large metal sheets M-FS-214	B65-10210	05
Torque wrench allows readings from inaccessible locations M-FS-598	B66-10204	05	Cork is used to make tooling patterns and molds MSC-425	B66-10328	05
Tool enables proper mating of accelerometer and cable connector M-FS-611	B66-10208	05	TORCH		
			Miniature oxygen-hydrogen cutting torch constructed from hypodermic needle JPL-545	B63-10517	05

Oxygen-hydrogen torch is a small-scale steam generator NU-0042	B66-10120	03			
Argon purge gas cooled by chill box M-FS-560	B66-10153	02			
<b>TOROID</b>					
Improved magnetometer uses toroidal gating coil GSFC-249	B65-10103	01			
Gapped toroid provides infinite resolution of delay-line pickup GSFC-370	B65-10258	01			
High frequency wide-band transformer uses coax to achieve high turn ratio and flat response ARG-107	B66-10600	01			
<b>TORQUE</b>					
Device transmits rotary motion through hermetically sealed wall JPL-303	B63-10198	05			
Lightweight universal joint transmits both torque and thrust JPL-375	B63-10236	05			
Shock absorber protects motive components against overloads WOO-092	B65-10008	05			
Slit feeds reduce unbalanced torques in gas-lubricated bearings JPL-264	B65-10099	05			
Bidirectional torque filter eliminates backlash GSFC-335	B65-10148	05			
Torque wrench designed for restricted areas LEWIS-246	B66-10011	05			
Modified power tool rapidly drives series torque bolts MSC-221	B66-10054	05			
T-handle wrench has torque-limiting action MSC-280	B66-10065	05			
Torque wrench allows readings from inaccessible locations M-FS-598	B66-10204	05			
<b>TORQUE MEASURING APPARATUS</b>					
Optics used to measure torque at high rotational speeds LEWIS-13	B63-10338	01			
Device enables measurement of moments of inertia about three axes GSFC-49	B65-10176	05			
Air brake-dynamometer accurately measures torque LEWIS-163	B65-10312	05			
Miniature servo accelerometer is force-balanced JPL-155	B65-10340	01			
Noncontacting transducer measures shaft torque M-FS-474	B66-10048	01			
<b>TORQUE MOTOR</b>					
Hydraulic drive system prevents backlash JPL-371	B65-10351	05			
<b>TORSION</b>					
Dispensing system eliminates torsion in deployed hoses MSC-80	B65-10185	05			
Resilient clamp holds fuel cell stack through thermal cycle MSC-313	B66-10035	05			
<b>TORSIONAL STRESS</b>					
Bellows joint absorbs torsional deflections in duct system M-FS-882	B66-10332	05			
<b>TRACE CONTAMINANT</b>					
Trace levels of metallic corrosion in water determined by emission spectrography MSC-1193	B66-10701	03			
<b>TRACER</b>					
Radioactive tracer system detects oil contaminants in fluid lines M-FS-512	B66-10090	03			
<b>TRACKING</b>					
Direction indicator system does not require complicated optics WOO-305	B66-10407	01			
Photocell shadowing technique improves light source detector JPL-809	B66-10564	01			
<b>TRACKING SYSTEM</b>					
An investigation of phase-lock loop swept-frequency synchronization M-FS-656	B66-10423	01			
Point-source detection system rejects spatially extended radiation sources GSFC-486	B66-10622	01			
<b>TRAILER</b>					
Compressed gas system operates semitrailer brakes during winching operation JPL-0036	B64-10306	05			
<b>TRANSDUCER</b>					
Improved variable-reluctance transducer measures transient pressures LANGLEY-10	B63-10321	01			
Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02			
Device calibrates vibration transducers at amplitudes up to 20g. M-FS-86	B63-10572	01			
Ultra-sensitive transducer advances micro-measurement range ARC-26	B64-10004	01			
Simple transducer measures low heat-transfer rates JPL-466	B64-10122	01			
Miniature stress transducer has directional capability JPL-591	B65-10023	01			
Seismic transducer measures small horizontal displacements M-FS-81	B65-10029	05			
Vibrating-membrane electrometer has high conversion gain ARC-38	B65-10056	01			
Noncontacting vibration transducer has constant sensitivity LANGLEY-99	B65-10392	01			
Noncontacting transducer measures shaft torque M-FS-474	B66-10048	01			
Apparatus measures thermal conductivity of honeycomb-core panels LANGLEY-202	B66-10127	01			
Electropneumatic transducer automatically limits motor current LEWIS-253	B66-10160	01			
Transducer measures force in vacuum environment LEWIS-218	B66-10161	01			

Device without electrical connections in tank measures liquid level WOO-235	B66-10198	01	TRANSISTOR		
Wide-range instrument monitors flow rates of chemically active fluids MSC-186	B66-10205	01	Indium foil with beryllia washer improves transistor heat dissipation GSFC-42	B63-10033	01
Phonocardiograph microphone is rugged and moistureproof MSC-212	B66-10314	04	Two-stage emitter follower is temperature stabilized MSC-20	B63-10493	01
Acceleration-compensated pressure transducer has fast response LANGLEY-113	B66-10353	01	Transistorized trigger circuit is frequency-controllable GSFC-111	B63-10553	01
Method permits mechanical and electrical checkout of piezoelectric transducers while installed in a system ARC-73	B66-10533	01	Highly efficient square-wave oscillator operator at high power levels GSFC-112	B63-10554	01
Damper reduces effects of resonance on force transducer WSO-321	B66-10550	05	Low-power transistorized circuit provides staircase waveform GSFC-48	B64-10007	01
Ultrasonic water column probe speeds up testing of welds HQ-58	B66-10577	01	Temperature-compensation circuit stabilizes performance of vidicons JPL-486	B64-10226	01
TRANSFER FUNCTION			Transistorized converter provides nondissipative regulation GSFC-238	B64-10305	01
Cryogenic liquid transfer system reduces residual boiloff LEWIS-274	B66-10157	02	Pulse generator permits nondestructive testing of component breakdown voltage MSC-122	B65-10054	01
Human transfer functions used to predict system performance parameters LANGLEY-203	B66-10379	01	Feedback oscillator functions as low-level pulse stretcher GSFC-261	B65-10069	01
Carriage system remotely moves drawer over extended distance NU-0092	B66-10711	05	Unijunction frequency divider is free of backward loading JPL-WOO-010	B65-10112	01
TRANSFER VEHICLE			Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01
Dispensing system eliminates torsion in deployed hoses MSC-80	B65-10185	05	Constant-current regulator improves tunnel diode threshold-detector performance GSFC-239	B65-10282	01
TRANSFORMER			Boron nitride housing cools transistors WOO-079	B65-10289	01
Improved insertion-loss tester JPL-358	B64-10080	01	Insulator-holder protects transistors in dense electronic assemblies MSC-214	B65-10389	01
Variable frequency transistor inverters use multiple core transformers GSFC-183	B65-10119	01	Low-power ring counter drives high-level loads GSFC-431	B66-10106	01
Complementary system vaporizes subcooled liquid, improves transformer efficiency M-FS-550	B66-10045	02	Jig protects transistors from heat while tinning leads MSC-515	B66-10240	05
Two-light circuit continuously monitors ac ground, phase, and neutral wires MSC-356	B66-10163	01	Semiconductors can be tested without removing them from circuitry M-FS-1163	B66-10447	01
High frequency wide-band transformer uses coax to achieve high turn ratio and flat response ARG-107	B66-10600	01	Pulse generator using transistors and silicon controlled rectifiers produces high current pulses with fast rise and fall times MSC-405	B66-10456	01
TRANSIENT HEATING			Simple, one transistor circuit boosts pulse amplitude GSFC-501	B66-10480	01
New computer program solves wide variety of heat flow problems M-FS-421	B66-10404	01	Computer program searches characteristic data of diodes and transistors GSFC-493	B66-10529	01
TRANSIENT LOAD			TRANSISTOR AMPLIFIER		
Circuit controls transients in SCR inverters GSFC-120	B63-10600	01	New low-level a-c amplifier provides adjustable noise cancellation and automatic temperature compensation ARC-2	B63-10003	04
TRANSIENT PRESSURE			High-gain amplifier has excellent stability and low power consumption		
Improved variable-reluctance transducer measures transient pressures LANGLEY-10	B63-10321	01			
Burst diaphragm protects vacuum vessel from internal pressure transients JPL-687	B65-10236	05			
Special mount improves remote transducer accuracy LEWIS-269	B66-10021	01			

## TRANSISTOR CIRCUIT

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GSFC-272	B65-10138	01	NU-0018	B66-10350	01
Tiny biomedical amplifier combines high performance, low power drain			Equivalent circuit for a field effect transistor established for computer simulation		
ARC-41	B65-10203	01	M-FS-1752	B66-10690	01
Field effect transistor presents high input impedance in ac amplifier			TRANSIT TIME		
JPL-500	B65-10232	01	Instrument calibrates low gas-rate flowmeters	B65-10137	01
Phase inverter provides variable reference push-pull output			TRANSITION POINT		
HQ-23	B66-10344	01	Lower-cost tungsten-rhenium alloys	B66-10528	03
TRANSISTOR CIRCUIT			LEWIS-332		
Igniting system for mercury vapor lamps protects transistorized sustaining supply			Elimination of rocket engine asymmetric loads during tests at sea level		
JPL-421	B63-10262	01	M-FS-1730	B66-10674	05
Two-stage emitter follower is temperature stabilized			TRANSMISSION		
MSC-20	B63-10493	01	Lightweight universal joint transmits both torque and thrust	B63-10236	05
Transistorized trigger circuit is frequency-controllable			JPL-375		
GSFC-111	B63-10553	01	IR-transmission glasses formed from oxides of bismuth and tellurium	B65-10190	03
Highly efficient square-wave oscillator operator at high power levels			M-FS-279		
GSFC-112	B63-10554	01	TRANSMISSION LINE		
Low-power transistorized circuit provides staircase waveform			Double-throw microwave device switches two lines quickly	B63-10258	01
GSFC-48	B64-10007	01	JPL-410		
Inexpensive, stable circuit measures heart rate			Plastic molds reduce cost of encapsulating electric cable connectors	B63-10568	05
MSC-95	B65-10010	01	M-FS-69		
Transistor voltage comparator performs own sensing			High-pass rf coaxial filter rejects dc and low frequency signals	B64-10173	01
GSFC-228	B65-10028	01	GSFC-73		
Pulse height analyzer operates at high repetition rates, low power			Electrical cable connector-clamp has smooth exterior surface	B65-10201	05
WOO-046	B65-10041	01	MSC-154		
Variable voltage supply uses zener diode as reference			Oscillator circuit measures liquid level in tanks	B65-10209	01
GSFC-262	B65-10097	01	M-FS-245		
Transistorized circuit clamps voltage with 0.1 percent error			Electrical cabling withstands severe environmental conditions	B66-10427	01
GSFC-196	B65-10118	01	M-FS-1585		
Sensitive electrometer features digital output			Pulse technique provides more accurate checkout of exploding bridge wire device	B66-10561	01
GSFC-288	B65-10206	01	HQ-62		
High-speed square-wave current limiter operates efficiently			Improved memory word line configuration allows high storage density	B66-10617	01
JPL-SC-073	B65-10233	01	GSFC-559		
Simple circuit reduces transistor switching time			TRANSMITTANCE		
GSFC-314	B65-10234	01	Calculation of infrared spectral transmittances of inhomogeneous gases	B66-10554	02
Increased junction lead inductance ballasts high-frequency transistors			M-FS-1563		
GSFC-387	B65-10259	01	Exposure valve /eV/ system expanded to include filter factors and transmittance	B66-10602	02
Hybrid circuit achieves pulse regeneration with low power drain			LANGLEY-190		
GSFC-382	B65-10314	01	TRANSMITTER		
High-intensity flashing beacon powered by mercury cells			Tiny sensor-transmitter can withstand extreme acceleration, gives digital output	B63-10561	01
LANGLEY-80	B65-10361	01	ARC-22		
Improved chopper circuit uses parallel transistors			Subminiature biotelemetry unit permits remote physiological investigations	B64-10171	01
M-FS-468	B66-10113	01	ARC-39		
Substituting transistor for diode improves rectifying means			Helical coaxial-resonator makes excellent RF filter	B65-10012	01
GSFC-474	B66-10295	01	GSFC-243		
Transistor circuit increases range of logarithmic current amplifier			Solid-state laser transmitter is amplitude modulated	B65-10238	01
			MSC-121		
			System locates randomly placed remote objects		

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## TUBING

LANGLEY-209	B66-10315	01	welding M-FS-547	B66-10093	05
TRANSPARENCY			Plastic scintillator converts standard photomultiplier to ultraviolet range ERC-9	B66-10108	02
Variable-transparency wall regulates tempera- tures of structures					
LANGLEY-25	B63-10528	03			
TRANSPARENT MATERIAL			Bypass rod transfers heat developed in thermionic diode JPL-SC-136	B66-10303	05
One-piece transparent shell improves design of helmet assembly MSC-187	B66-10390	05			
TRANSPiration COOLING			Inspection of fine wires simplified by capillary tube wire holder MSC-358	B66-10329	05
Combustion chamber struts can be effectively transpiration cooled M-FS-1830	B66-10643	03			
TRANSPONDER			Metal tube can be folded for compact storage, is self-erecting LEWIS-288	B66-10450	05
Oceanborne transponder platform has good stability M-FS-171	B65-10035	05			
Frequency offset in linear FM/CW transponder eliminates clutter M-FS-249	B65-10146	01	Selective tube roughening increases heat transfer capability M-FS-599	B66-10610	05
TRANSPORT			Metal boot permits fabrication of hermetically sealed splices in metal sheathed instrumentation cables NU-0083	B66-10704	05
Universal transloader moves delicate equipment without stress MSC-654	B66-10384	05			
TRAVELING WAVE MASER			TUBING		
Superconductor magnets used for stagger-tuning traveling-wave maser GSFC-292	B65-10165	01	Sleeve and cutter simplify disconnecting welded joint in tubing JPL-384	B63-10240	05
TRAVELING WAVE TUBE			Helical tube separates nitrogen gas from liquid nitrogen JPL-398	B63-10251	05
Traveling-wave tube circuit simplifies microwave relay GSFC-299	B65-10127	01	Special pliers connect hose containing liquid under pressure JPL-IT-1003	B63-10291	05
TRICHLOROETHANE			Connector for vacuum-jacketed lines cuts tubing system cost LEWIS-66	B63-10367	05
Organic reactants rapidly produce plastic foam LANGLEY-37	B65-10288	03	Composite, vacuum-jacketed tubing replaces bellows in cryogenic systems LEWIS-67	B63-10368	05
TRIGONOMETRIC FUNCTION			Apparatus facilitates pressure-testing of metal tubing LEWIS-174	B65-10131	05
Circuit operates as sine function generator MSC-255	B66-10038	01	Metal bellows custom-fabricated from tubing LEWIS-192	B65-10150	05
TRUSS			Dispensing system eliminates torsion in deployed hoses MSC-80	B65-10185	05
Collapsible truss structure is automatically expandable GSFC-265	B65-10126	05	Angular glass tubing drawn from round tubing HQ-20	B65-10235	05
TUBE			Portable tool removes burrs from pipe and tubing MSC-237	B65-10360	05
Self sealing disconnect for tubing forms metal seal after breakaway JPL-354	B63-10226	05	Tungsten wire and tubing joined by nickel brazing M-FS-394	B65-10391	05
Filter for high-pressure gases has easy take- down, assembly JPL-373	B63-10234	03	Forming tool improves quality of tubing flares WOO-231	B66-10001	05
Helical tube separates nitrogen gas from liquid nitrogen JPL-398	B63-10251	05	Portable self-powered device detects internal flaws in tubular structures NU-0019	B66-10028	01
Break-up of metal tube makes one-time shock absorber, bars rebound LANGLEY-1A	B63-10304	05	Bench vise adapter grips tubing securely and safely MSC-279	B66-10056	05
Tool facilitates sealing of metal fill tubes MSC-24	B63-10519	05	Telescoping of instrumentation tubing eliminates swaging M-FS-546	B66-10116	05
Metal strip forms 21 foot boom, rolls up for compact storage GSFC-151	B64-10011	05	Aluminum oxide filler prevents obstructions in tubing during welding MSC-222	B66-10125	05
New nut and sleeve improve flared connections M-FS-194	B65-10180	05			
Strainer fits inside flared-tube fittings LANGLEY-180	B65-10388	05			
Coiled sheet metal strip opens into tubular configuration GSFC-425	B66-10009	03			
Tool provides constant purge during tube					



Split glass tube assures quality in electron beam brazing M-FS-564	B66-10151	05	tungsten electrodes GSFC-346	B65-10309	01
Hand tool permits shrink sizing of assembled tubing MSC-504	B66-10239	05	Tungsten wire and tubing joined by nickel brazing M-FS-394	B65-10391	05
Tool separates sleeve-type unions without heat MSC-497	B66-10253	05	Heated die facilitates tungsten forming LEWIS-25A	B66-10047	05
High pressure tube coupling requires no threads or flares MSC-600	B66-10285	05	High temperature thermocouple operates in reduction atmosphere NU-0046	B66-10134	01
Union would facilitate joining of tubing, minimize braze contamination MSC-777	B66-10311	05	Tungsten insulated susceptor cup for high temperature induction furnace eliminates contamination LEWIS-283	B66-10538	03
Torus elements used in effective shock absorber WOO-114	B66-10318	05	Tungsten fiber-reinforced copper composites form high strength electrical conductors LEWIS-338	B66-10572	03
Special mandrel permits uniform welding of out-of-round tubing M-FS-706	B66-10323	05	<b>TUNGSTEN ALLOY</b> Lower-cost tungsten-rhenium alloys LEWIS-332	B66-10528	03
Adapter assembly prevents damage to tubing during high pressure tests MSC-563	B66-10330	05	New tungsten alloy has high strength at elevated temperatures LEWIS-336	B66-10551	03
Electrochemical milling removes burrs and solder from tubing ends M-FS-714	B66-10358	03	<b>TUNGSTEN INERT GAS /TIG/ WELDING</b> Refractory metals welded or brazed with tungsten inert gas equipment LEWIS-219	B65-10319	05
Copper-acrylic enamel serves as lubricant for cold drawing of refractory metals ARG-54	B66-10471	05	Tungsten wire and tubing joined by nickel brazing M-FS-394	B65-10391	05
Hydraulic fluid serves as mandrel for small diameter refractory tube drawing ARG-44	B66-10523	05	Argon purge gas cooled by chill box M-FS-560	B66-10153	02
Ductile mandrel and parting compound facilitate tube drawing ARG-43	B66-10571	05	<b>TUNNEL DIODE</b> Monostable circuit with tunnel diode has fast recovery GSFC-132	B63-10603	01
Rotational fluid coupling eliminates hose entanglements MSC-312	B66-10585	05	Tunnel-diode circuit features zero-level clipping GSFC-241	B65-10002	01
Plastic tubing protects flexible copper hose M-FS-772	B66-10588	05	Simple circuit produces high-speed, fixed duration pulses GSFC-285	B65-10228	01
Lightweight, all-metal hose assembly has high flexibility and strength over wide range of temperature and pressure M-FS-1831	B66-10635	05	Constant-current regulator improves tunnel diode threshold-detector performance GSFC-239	B65-10282	01
Mechanical gauge accurately checks tubing flare, roundness, and concentricity M-FS-1822	B66-10656	05	<b>TURBINE BLADE</b> Turbine blade root design concept promises superior alignment M-FS-1685	B66-10620	05
Method for predicting frictional loss in metal bellows and flexible hose M-FS-883	B66-10662	05	<b>TURBINE WHEEL</b> Ball bearing used in design of rugged flow-meter LEWIS-159	B64-10170	05
<b>TUNGSTEN</b> Apparatus facilitates high-temperature tensile testing in vacuum LEWIS-42	B63-10345	03	Simple key locks turbine rotor blades WOO-103	B66-10023	05
Novel clamps align large rocket cases, eliminate back-up bars M-FS-1	B63-10376	05	Turbine blade root design concept promises superior alignment M-FS-1685	B66-10620	05
Pressure molding of powdered materials improved by rubber mold insert WOO-100	B64-10270	03	<b>TURBOMACHINE</b> Computer program performs flow analysis through turbines LEWIS-236	B66-10496	01
Jig and fixture aid fabrication of tungsten rivets LEWIS-185	B65-10101	05	<b>TURBOPUMP</b> Fluid pressure used to test turbopump bearings NU-0001	B65-10024	03
Tantalum cathode improves electron-beam evaporation of tantalum JPL-WOO-021	B65-10175	03	Run-in with chemical additive protects gear surface		
Thermoelectric elements diffusion-bonded to					

M-FS-548	B66-10069	05	ultraviolet light ARG-91	B66-10475	03
<b>TURBULENT BOUNDARY LAYER</b>			<b>ULTRAVIOLET PHOTOMETRY</b>		
Thin-film gage measures low heat-transfer rates			Ultraviolet photographic pyrometer used in rocket exhaust analysis		
LANGLEY 205	B66-10180	01	M-FS-499	B66-10095	02
<b>TURBULENT FLOW</b>			<b>ULTRAVIOLET RADIATION</b>		
Stationary device produces homogeneous mixture of fluids			Plastic scintillator converts standard photomultiplier to ultraviolet range		
M-FS-525	B66-10570	05	ERC-9	B66-10108	02
Study of hot wire techniques in low density flows with high turbulence levels			A continuously operating source of vacuum ultraviolet below 500 angstrom		
M-FS-1269	B66-10687	01	GSFC-545	B66-10576	01
<b>TWO-PHASE FLOW</b>			<b>ULTRAVIOLET REFLECTION</b>		
Mixer conditions temperature of liquified gas streams			Uniform reflective films deposited on large surfaces		
M-FS-1784	B66-10565	02	GSFC-507	B66-10483	02
<b>U</b>					
<b>ULTRAHIGH VACUUM</b>			<b>ULTRAVIOLET SPECTROGRAPH</b>		
Precision gage measures ultrahigh vacuum levels			Thin carbon film serves as UV bandpass filter		
GSFC-114	B63-10597	01	ERC-8	B66-10060	02
Ion pump provides increased vacuum pumping speed			<b>UNDERWATER VEHICLE</b>		
NEO-13	B65-10239	02	Device measures fluid drag on test vehicles		
Baking enables McLeod gauge to measure in ultrahigh vacuum range			LANGLEY-34	B65-10195	01
GSFC-440	B65-10329	01	<b>UNMANNED SPACECRAFT</b>		
Auxiliary titanium sublimation pump produces ultrahigh /10 to the minus 11 torr/ vacuum			Rotor position sensor switches currents in brushless dc motors		
LANGLEY-212	B66-10388	02	GSFC-315	B65-10151	01
<b>ULTRASONIC AGITATION</b>			<b>URANIUM</b>		
High purity electroforming yields superior metal models			Crucible cast from beryllium oxide and refractory cement is impervious to flux and molten metal		
ARC-6	B63-10007	05	ARG-22	B66-10527	03
Ultrasonic cleaning restores depth-type filters			<b>V</b>		
M-FS-540	B66-10298	03	<b>VACUUM</b>		
<b>ULTRASONIC MACHINING</b>			New cobalt alloys have high-temperature strength and long life in vacuum environments		
High purity electroforming yields superior metal models			LEWIS-47	B63-10351	03
ARC-6	B63-10007	05	Connector seals fluid lines at cryogenic temperatures and high vacuums		
<b>ULTRASONIC TESTING</b>			GSFC-253	B64-10327	05
Ultrasonic recording scanner used for nondestructive weld inspection			<b>Transducer measures force in vacuum environment</b>		
M-FS-284	B66-10220	01	LEWIS-218	B66-10161	01
Ultrasonic hand tool allows convenient scanning of spot welds			Gallium alloy films investigated for use as boundary lubricants		
M-FS-539	B66-10289	02	LEWIS-245	B66-10165	03
Ultrasonic quality inspection of bonded honeycomb assemblies is automated			Brushless dc motor has high efficiency, long life		
MSC-859	B66-10544	01	GSFC-181	B66-10355	01
Ultrasonic water column probe speeds up testing of welds			Rubber and alumina gaskets retain vacuum seal in high temperature emf cell		
HQ-58	B66-10577	01	ARG-17	B66-10472	05
<b>ULTRAVIOLET FILTER</b>			Study made of destructive sectioning of complex structures for examination		
PTFE-aluminum films serve as neutral density filters			LEWIS-341	B66-10676	05
LANGLEY-189	B66-10017	02	<b>VACUUM CHAMBER</b>		
Thin carbon film serves as UV bandpass filter			Cryopumping of hydrogen in vacuum chambers is aided by catalytic oxidation of hydrogen		
ERC-8	B66-10060	02	LEWIS-15	B63-10340	05
<b>ULTRAVIOLET LIGHT</b>			Apparatus facilitates high-temperature tensile testing in vacuum		
Oil-smeared models aid wind tunnel measurements			LEWIS-42	B63-10345	03
LANGLEY-4	B63-10311	03	Modified rf coaxial connector ends vacuum chamber wiring problem		
Sensor detects hydrocarbon oil contaminants in fluid lines			GSFC-150	B64-10010	01
M-FS-522	B66-10068	01	Vapor pressure measured with inflatable plastic bag		
Borate glass efficiently transmits			GSFC-281	B65-10136	03

Heater decomposes oil backstreaming from high-vacuum pumps GSFC-356	B65-10224	02	New cobalt alloys have high-temperature strength and long life in vacuum environments LEWIS-47	B63-10351	03
Electron bombardment improves vacuum chamber efficiency LEWIS-160	B65-10280	02	Braze alloy holds bonding strength over wide temperature range LEWIS-337	B66-10519	03
Vacuum test fixture improves leakage rate measurements MSC-271	B66-10286	01	<b>VACUUM GAUGE</b> Ionization vacuum gage starts quickly, is unaffected by spurious currents JPL-304	B65-10036	02
Thin-film ferrites vapor deposited by one-step process in vacuum MSC-259	B66-10398	03	Instrument accurately measures extremely low air densities M-FS-193	B65-10221	01
Dielectrometer design permits measurement in vacuum under irradiation M-FS-359	B66-10401	01	Modified McLeod pressure gage eliminates measurement errors ARC-62	B66-10481	01
Combination double door high-vacuum valve provides access to vacuum chamber JPL-849	B66-10697	05	Volume-ratio calibration system for vacuum gages LEWIS-303	B66-10640	01
<b>VACUUM DEPOSITION</b> Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns ARC-7	B63-10008	05	<b>VACUUM MELTING</b> Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns ARC-7	B63-10008	05
Efficient thin film heating element takes minimum space GSFC-289	B65-10123	01	<b>VACUUM PUMP</b> Fine-particle filter prevents damage to vacuum pumps LEWIS-106	B63-10489	05
Aluminized fiberglass insulation conforms to curved surfaces M-FS-477	B66-10024	03	Ion pump provides increased vacuum pumping speed NEO-13	B65-10239	02
Self-supported aluminum thin films produced by vacuum deposition process ARC-58	B66-10387	03	Automatic protective vent has fail-safe feature LANGLEY-218	B66-10369	05
Uniform reflective films deposited on large surfaces GSFC-507	B66-10483	02	Auxiliary titanium sublimation pump produces ultrahigh /10 to the minus 11 torr/ vacuum LANGLEY-212	B66-10388	02
Low rate flow switch can be used for gas or liquid JPL-879	B66-10696	01	Seal-off assembly permits rapid evacuation of air from containers GSFC-513	B66-10446	05
<b>VACUUM EFFECT</b> Bearing alloys with hexagonal crystal structures provide improved friction and wear characteristics LEWIS-320	B66-10373	03	<b>VACUUM SYSTEM</b> Instrument accurately measures extremely low air densities M-FS-193	B65-10221	01
<b>VACUUM EQUIPMENT</b> Connector for vacuum-jacketed lines cuts tubing system cost LEWIS-66	B63-10367	05	Rubber-coated bellows improves vibration damping in vacuum lines LEWIS-273	B66-10187	02
Spherical electrode eliminates high-voltage breakdown LEWIS-155	B65-10139	01	Apparatus enables accurate determination of alkali oxides in alkali metals LEWIS-256	B66-10296	03
Heater decomposes oil backstreaming from high-vacuum pumps GSFC-356	B65-10224	02	Versatile machine mills, saws light materials M-FS-827	B66-10364	05
Burst diaphragm protects vacuum vessel from internal pressure transients JPL-687	B65-10236	05	Special treatment reduces helium permeation of glass in vacuum systems HQ-25	B66-10372	02
Feed-through connector withstands high temperatures in vacuum environment GSFC-442	B65-10328	01	<b>VACUUM TUBE</b> Composite, vacuum-jacketed tubing replaces bellows in cryogenic systems LEWIS-67	B63-10368	05
Dispenser leak-tests and sterilizes rubber gloves MSC-285	B66-10166	03	Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03
Fixed vacuum plate clamps styrofoam for machining M-FS-683	B66-10283	05	Emission tester for high-power vacuum tubes JPL-628	B64-10158	01
<b>VACUUM FURNACE</b> Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss LEWIS-39	B63-10342	01	<b>VACUUM ULTRAVIOLET</b> Fresnel zone plate forms images at wavelengths below 1000 angstroms GSFC-231	B65-10171	02
			Ion chambers simplify absolute intensity		

measurements in the vacuum ultraviolet ERC-10	B66-10439	01	Teflon sheet permits valve and valve operator to move as a single unit in a cryogenic pipe line NU-0077	B66-10702	05
<b>VALVE</b>			<b>VAPOR DEPOSITION</b>		
High-pressure regulating system prevents pressure surges JPL-231	B63-10170	05	Economical fabrication process produces high- quality junction transistors JPL-SC-065	B64-10330	01
Packless valve with all-metal seal handles wide temperature, pressure range JPL-361	B63-10228	05	Tantalum cathode improves electron-beam evaporation of tantalum JPL-W00-021	B65-10175	03
Design of valve permits sealing even if the stem is misaligned LEWIS-38	B63-10341	05	Boron carbide whiskers produced by vapor deposition HQ-24	B65-10261	03
High-temperature, high-pressure spherical segment valve provides quick opening ARC-13	B63-10431	05	Automatic fluid separator supplies own driving power W00-085	B66-10008	02
Gate valve with ceramic-coated base operates at high temperatures ARC-23	B63-10562	03	Submicron holes in thin films increase sampling range of mass spectrometers JPL-SC-097	B66-10380	03
Multiple port pressure scanner valve features greater accuracy, quicker data JPL-555	B64-10031	05	Thin-film ferrites vapor deposited by one-step process in vacuum MSC-259	B66-10398	03
Blade valve isolates compartment in pipe, opens to allow free flow JPL-585	B64-10188	05	Uniform reflective films deposited on large surfaces GSFC-507	B66-10483	02
Two-part valve acts as quick coupling JPL-478	B64-10223	05	Combustion chamber struts can be effectively transpiration cooled M-FS-1830	B66-10643	03
Valve designed with elastic seat JPL-442	B65-10040	05	Mechanism facilitates coating of inner surfaces of metal cylinders GSFC-515	B66-10698	05
Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	<b>VAPOR PRESSURE</b>		
Pressure responsive seal handles static and dynamic loads GSFC-441	B65-10327	05	Vapor pressure measured with inflatable plastic bag GSFC-281	B65-10136	03
Improved poppet valve provides positive damageproof seal M-FS-293	B65-10346	05	Gallium alloy films investigated for use as boundary lubricants LEWIS-245	B66-10165	03
Respiratory transfer valve has fail-safe feature ARC-1	B65-10369	01	<b>VAPORIZATION</b>		
Tensile-strength apparatus applies high strain-rate loading with minimum shock JPL-28	B66-10063	05	Complementary system vaporizes subcooled liquid, improves transformer efficiency M-FS-550	B66-10045	02
Cryogenic trap valve has no moving parts M-FS-487	B66-10136	05	Cryogenic liquid transfer system reduces residual boiloff LEWIS-274	B66-10157	02
Soft-seal valve holds hazardous fluids safely LEWIS-275	B66-10216	05	Vapor diffusion electrode improves fuel cell operation LEWIS-187	B66-10281	03
Flow ring valve is simple, quick-acting M-FS-752	B66-10255	05	<b>VAPORIZER</b>		
Valve seat pores sealed with thermosetting monomer M-FS-900	B66-10322	03	Reaction heat used in static water removal from fuel cells M-FS-532	B66-10013	01
Matching flow characteristics of standard shutoff valves eliminates need for custom fabricated valves M-FS-1069	B66-10416	05	<b>VARIATION METHOD</b>		
Labyrinth-type valve seat increases valve life by decreasing fluid velocity M-FS-1051	B66-10424	05	Transistorized trigger circuit is frequency- controllable GSFC-111	B63-10553	01
Actuator device schedules rate of valve closure M-FS-1556	B66-10686	05	<b>VECTOR</b>		
Combination double door high-vacuum valve provides access to vacuum chamber JPL-849	B66-10697	05	Device measures reaction engine thrust vector deviations JPL-SC-163	B66-10642	05
			<b>VEITCH DIAGRAM</b>		
			Veitch diagram plotter simplifies Boolean functions JPL-385	B63-10241	05
			<b>VELOCITY</b>		
			Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01

## VELOCITY MEASUREMENT

## SUBJECT INDEX

Digital system accurately controls velocity of electromechanical drive GSFC-287	B65-10096	01	Resonant frequency can be adjusted on vibration mount JPL-SC-134	B66-10672	05
<b>VELOCITY MEASUREMENT</b>			<b>VIBRATION EFFECT</b>		
Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01	Vibration tests on vidicons made by improved method JPL-SC-115	B66-10042	01
Laser Doppler flowmeter measures gas velocity M-FS-1747	B66-10693	02	Angular acceleration measured by deflection in sensing ring MSC-250	B66-10105	01
<b>VENT</b>			Vibrator improves spark erosion cutting process NU-0071	B66-10333	05
Vented piston seal prevents fluid leakage between two chambers JPL-179	B63-10141	05	<b>VIBRATION MEASUREMENT</b>		
Cryogenic liquid transfer system reduces residual boiloff LEWIS-274	B66-10157	02	Transducer senses displacements of panels subjected to vibration ARC-37	B65-10085	01
Automatic protective vent has fail-safe feature LANGLEY-218	B66-10369	05	<b>VIBRATION MEASURING APPARATUS</b>		
<b>VENTURI TUBE</b>			Device calibrates vibration transducers at amplitudes up to 20g. M-FS-86	B63-10572	01
Mixer conditions temperature of liquified gas streams M-FS-1784	B66-10565	02	Noncontacting vibration transducer has constant sensitivity LANGLEY-99	B65-10392	01
<b>VESSEL</b>			Monitoring system determines amplitude and time of vibration channel peaks JPL-879	B66-10699	01
Method of welding joint in closed vessel improves quality of seam JPL-170	B63-10139	05	<b>VIBRATION PROTECTION</b>		
<b>VIBRATION</b>			Improved holder protects crystal during high acceleration and impact JPL-463	B65-10037	05
Adhesive for vacuum environments resists shock and vibration MSC-56	B65-10016	03	Wire mesh isolator protects sensitive electronic components GSFC-347	B65-10216	05
Nonresonant support facilitates vibration testing of structures M-FS-224	B65-10039	05	Tensile-strength apparatus applies high strain-rate loading with minimum shock JPL-28	B66-10063	05
Rack mount device quickly inserts or extracts chassis units MSC-244	B65-10385	05	Electrical cabling withstands severe environmental conditions M-FS-1585	B66-10427	01
<b>VIBRATION ABSORBER</b>			Plastic tubing protects flexible copper hose M-FS-772	B66-10588	05
Thermally conductive metal wool-silicone rubber material can be used as shock and vibration damper JPL-321	B63-10207	03	Friction brake cushions acceleration and vibration loads MSC-715	B66-10608	05
<b>VIBRATION DAMPER</b>			<b>VIBRATION TESTING</b>		
Shock mount isolates pressure transducers from vibration JPL-631	B65-10113	05	An improved method for testing performance of vidicons during vibration JPL-SC-113	B66-10442	01
Rubber-coated bellows improves vibration damping in vacuum lines LEWIS-273	B66-10187	02	Rocket engine vibration accurately measured by photography M-FS-1916	B66-10652	02
Damper reduces effects of resonance on force transducer WSO-321	B66-10550	05	<b>VIBRATION TESTING MACHINE</b>		
<b>VIBRATION DAMPING</b>			System transmits mechanical vibration into hazardous environment NU-0025	B65-10248	05
Thermally conductive metal wool-silicone rubber material can be used as shock and vibration damper JPL-321	B63-10207	03	Air bearing provides friction-free support for shaker system slip table NU-0086	B66-10708	05
Frictional wedge shock mount is inexpensive, has good damping characteristics JPL-IT-1001	B63-10289	05	<b>VIBRATIONAL STRESS</b>		
Lightweight load support serves as vibration damper JPL-661	B65-10144	05	Wire material reduces compressor blade vibration LEWIS-357	B66-10666	03
Oil-damped mercury pool makes precise optical alignment tool GSFC-353	B65-10253	02	<b>VIBRATORY FINISHING</b>		
Fluid damping reduces bellows seal fatigue failures M-FS-565	B66-10249	05	Metallographic holding fixture permits polishing of soft metals on vibratory lapping machine ARG-42	B66-10562	05

## VIBRATORY LOADING

Heat exchanger tubes supported in high vibration environment  
M-FS-1401 B66-10567 05

## VIDEO EQUIPMENT

Video signal processing system uses gated current mode switches to perform high speed multiplication and digital-to-analog conversion  
MSC-781 B66-10429 01

Security warning system monitors up to fifteen remote areas simultaneously  
KSC-66-39 B66-10548 01

Miniature electrometer preamplifier effectively compensates for input capacitance  
ARC-69 B66-10549 01

## VIDICON

Raster linearity of video cameras calibrated with precision tester  
GSFC-200 B64-10209 01

Temperature-compensation circuit stabilizes performance of vidicons  
JPL-486 B64-10226 01

Detector circuit compensates for vidicon beam current variations  
GSFC-310 B65-10212 01

Vibration tests on vidicons made by improved method  
JPL-SC-115 B66-10042 01

An improved method for testing performance of vidicons during vibration  
JPL-SC-113 B66-10442 01

## VISCOUS DAMPING

Viscous-pendulum damper suppresses structural vibrations  
LANGLEY-45 B64-10272 05

Nonresonant support facilitates vibration testing of structures  
M-FS-224 B65-10039 05

Damping technique gives accelerometer flat frequency response  
M-FS-471 B66-10293 01

Damper reduces effects of resonance on force transducer  
WSD-321 B66-10550 05

## VISUAL AID

Single projector accommodates slides of different size and format  
GSFC-439 B66-10016 02

Chart case opens to form briefing easel  
MSC-349 B66-10135 05

Sea dye marker provides visibility for 20 hours  
MSC-714 B66-10313 03

## VISUAL DISPLAY

Digital cardiometer computes and displays heartbeat rate  
MSC-93 B64-10258 01

Pneumotachometer counts respiration rate of human subject  
MSC-92 B64-10259 01

Apparatus presents visual display of semiconductor surface characteristics  
JPL-665 B66-10200 01

Multicolor stroboscope pinpoints resonances in vibrating components  
JPL-0033 B66-10223 01

Three-axis attitude and direction reference

instrument has only one moving part  
M-FS-1819 B66-10644 01

## VISUAL FIELD

Optical projectors simulate human eyes to establish operator's field of view  
WDD-250 B66-10010 02

One-piece transparent shell improves design of helmet assembly  
MSC-187 B66-10390 05

## VISUAL OBSERVATION

Use of photographs speeds inspection of printed-circuit boards  
MSC-72 B64-10118 01

Quality control criteria for acceptance testing of cross-wire welds  
MSC-627 B66-10587 05

## VISUAL PERCEPTION

Distant objects detected visually with optical filters  
LANGLEY-166 B65-10252 02

Torque wrench allows readings from inaccessible locations  
M-FS-598 B66-10204 05

Instrument transmits vanishing point to illustration point  
MSC-267A B66-10324 01

## VLASOV EQUATION

Computer programs calculate potential and charge distributions in a plasma  
M-FS-871 B66-10553 01

## VOLATILITY

New cobalt alloys have high-temperature strength and long life in vacuum environments  
LEWIS-47 B63-10351 03

## VOLT-AMPERE CHARACTERISTICS

Didymium compound improves nickel-cadmium cell  
GSFC-295 B65-10083 03

## VOLTAGE

Igniting system for mercury vapor lamps protects transistorized sustaining supply  
JPL-421 B63-10262 01

Two-stage emitter follower is temperature stabilized  
MSC-20 B63-10493 01

Simple circuit provides adjustable voltage with linear temperature variation  
JPL-WDD-029 B63-10537 01

Transistorized trigger circuit is frequency-controllable  
GSFC-111 B63-10553 01

Liquid switch is remotely operated by low dc voltage  
GSFC-119 B63-10599 01

Temperature-sensitive network drives astable multivibrator  
GSFC-137 B63-10609 01

Efficient circuit triggers high-current, high-voltage pulses  
MSC-14 B64-10024 01

Auxiliary silver electrode eliminates two-step voltage discharge characteristic of silver-zinc cells  
GSFC-169 B64-10114 01

Voltage generator sweeps oscillator frequency linearly with time  
M-FS-219 B64-10320 01

Bandwidth switching is transient-free, avoids loss of loop lock

W00-054	B64-10349	01	Preregulator feedback circuit utilizes Light Actuated Switch M-FS-1180	B66-10542	01
Transistor voltage comparator performs own sensing GSFC-228	B65-10028	01	Electronic circuit provides accurate sensing and control of dc voltage NU-0089	B66-10591	01
Variable voltage supply uses zener diode as reference GSFC-262	B65-10097	01	Low input voltage converter/regulator minimizes external disturbances GSFC-527	B66-10689	01
Variable load automatically tests dc power supplies GSFC-291	B65-10105	01	<b>VOLTMETER</b> Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01
Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01	<b>VOLUME</b> Volumetric system calibrates meters for large flow rates W00-130	B65-10323	05
Modular thermoelectric cell is easily packaged in various arrays GSFC-339	B65-10199	01	<b>VORTEX INJECTOR</b> Study of vortex valve for medium temperature solid propellants LANGLEY-204	B66-10524	01
Digitally controlled pulse-level discriminator operates over wide voltage range GSFC-324	B66-10129	01	<b>W</b>		
Standard arc welders provide high amperage direct current source LANGLEY-267	B66-10441	01	<b>WALL</b> Device transmits rotary motion through hermetically sealed wall JPL-303	B63-10198	05
<b>VOLTAGE AMPLIFIER</b> Mosfet analog memory circuit achieves long duration signal storage M-FS-860	B66-10603	01	Shaped superconductor cylinder retains intense magnetic field JPL-381	B63-10238	01
<b>VOLTAGE BREAKDOWN</b> Spherical electrode eliminates high-voltage breakdown LEWIS-155	B65-10139	01	Test device prevents molecular bounce-back GSFC-82	B63-10546	03
Cryogenic cooling reduces high voltage arcing between electrodes operating in a vacuum ARG-109	B66-10499	02	<b>WALL TEMPERATURE DISTRIBUTION</b> Variable-transparency wall regulates temperatures of structures LANGLEY-25	B63-10528	03
<b>VOLTAGE GENERATOR</b> Pressure sensor responds only to shock wave M-FS-238	B65-10184	01	<b>WARNING SYSTEM</b> Security warning system monitors up to fifteen remote areas simultaneously KSC-66-39	B66-10548	01
Dual-voltage power supply has increased efficiency LEWIS-107A	B66-10002	01	<b>WASHER</b> New package for belleville spring permits rate change, easy disassembly JPL-392	B63-10247	05
Simple, one transistor circuit boosts pulse amplitude GSFC-501	B66-10480	01	Composite seal reduces alkaline battery leakage GSFC-337	B65-10271	01
<b>VOLTAGE REGULATOR</b> Field effect transistors used as voltage-controlled resistors M-FS-174	B64-10163	01	Mounting improves heat-sink contact with beryllia washer MSC-194	B66-10144	01
Transistorized converter provides nondissipative regulation GSFC-238	B64-10305	01	Bimetallic devices help maintain constant sealing forces down to cryogenic temperatures M-FS-800	B66-10325	02
Inductor flyback characteristic gives voltage regulator fast response GSFC-361	B65-10257	01	<b>WATER</b> Reaction heat used in static water removal from fuel cells M-FS-532	B66-10013	01
Constant-current regulator improves tunnel diode threshold-detector performance GSFC-239	B65-10282	01	Coating permits use of strain gage in water and liquid hydrogen M-FS-594	B66-10192	01
Improved chopper circuit uses parallel transistors M-FS-468	B66-10113	01	Modular Porous Plate Sublimator /MPPS/ requires only water supply for coolant M-FS-1374	B66-10409	01
Soldering iron temperature is automatically reduced ARC-57	B66-10203	01	Ultrasonic water column probe speeds up testing of welds HQ-58	B66-10577	01
Circuit protects regulated power supply against overload current GSFC-453	B66-10292	01	<b>WATER CONTENT</b> Trace levels of metallic corrosion in water determined by emission spectrography MSC-1193	B66-10701	03
Circuit prevents overcharging of secondary cell batteries GSFC-454	B66-10492	01			

# SUBJECT INDEX

# WELDED STRUCTURE

**WATER FLOW**  
Low rate flow switch can be used for gas or liquid  
JPL-879 B66-10696 01

**WATER PURIFICATION**  
Emergency solar still desalts seawater  
MSC-135 B65-10214 03

**WATERPROOFING**  
Electrical cabling withstands severe environmental conditions  
M-FS-1585 B66-10427 01

**WAVE**  
Auxiliary circuit enables automatic monitoring of EKG  
MSC-106 B65-10142 01

**WAVE ATTENUATION**  
Modified filter prevents conduction of micro-wave signals along high-voltage power supply leads  
JPL-63 B63-10091 01

**WAVE GENERATION**  
Variable frequency magnetic multivibrator generates stable square-wave output  
GSFC-AE-21 B65-10124 01

**WAVE INCIDENCE CONTROL**  
Reference black body is compact, convenient to use  
ARC-3 B63-10004 03

**WAVEFORM**  
Low-power transistorized circuit provides staircase waveform  
GSFC-48 B64-10007 01

Improved electrode gives high-quality biological recordings  
MSC-17 B64-10025 04

Analog device simulates physiological waveforms  
MSC-51 B64-10109 01

Function generator eliminates necessity of series summation  
GSFC-214 B66-10351 01

**WAVEGUIDE**  
Cryogenic waveguide window is sealed with plastic foam  
JPL-559 B63-10613 01

Process reduces secondary resonant emission in electronic components  
JPL-934 B66-10685 01

**WAVELENGTH**  
A continuously operating source of vacuum ultraviolet below 500 angstrom  
GSFC-545 B66-10576 01

**WEAR**  
Improved fluid control valve extends diaphragm life  
JPL-345 B65-10147 05

Dispensing system eliminates torsion in deployed hoses  
MSC-80 B65-10185 05

Bearing alloys with hexagonal crystal structures provide improved friction and wear characteristics  
LEWIS-320 B66-10373 03

**WEB**  
Novel shock absorber features varying yield strengths  
MSC-63A B64-10138 03

**WEDGE**  
Frictional wedge shock mount is inexpensive, has good damping characteristics  
JPL-IT-1001 B63-10289 05

**WEIGHT**  
Regenerative fuel cell combines high efficiency with low cost  
WOO-090 B65-10363 01

**WEIGHTLESSNESS**  
Magnetic fluid readily controlled in zero gravity environment  
LEWIS-126 B65-10335 03

Automatic fluid separator supplies own driving power  
WOO-085 B66-10008 02

Hole saw drill attachment has zero force reaction  
MSC-543 B66-10604 05

**WELD STRENGTH**  
Probe tests microweld strength  
WOO-118 B65-10111 05

Ultrasonic recording scanner used for nondestructive weld inspection  
M-FS-284 B66-10220 01

Dot patterns provide reproducible flaw areas for study of adhesive bonds  
M-FS-862 B66-10367 05

Braze alloy holds bonding strength over wide temperature range  
LEWIS-337 B66-10519 03

Ultrasonic water column probe speeds up testing of welds  
HQ-58 B66-10577 01

**WELDED JOINT**  
Method of welding joint in closed vessel improves quality of seam  
JPL-170 B63-10139 05

Sleeve and cutter simplify disconnecting welded joint in tubing  
JPL-384 B63-10240 05

Force controlled solenoid drives microweld tester  
WOO-125 B65-10182 01

Weld leaks rapidly and safely detected  
M-FS-362 B65-10265 01

O-ring tube fittings form leakproof seal in hydraulic systems  
M-FS-481 B66-10020 05

Portable power tool machines weld joints in field  
M-FS-258 B66-10145 05

Simple device facilitates inert-gas welding of tubes  
M-FS-558 B66-10155 05

Electron beam welding of copper-MONEL facilitated by circular magnetic shields  
M-FS-569 B66-10215 05

Welds chilled by liquid coolant manifold  
M-FS-679 B66-10354 05

Electroplating eliminates gas leakage in brazed areas  
M-FS-923 B66-10415 05

Silver plating technique seals leaks in thin wall tubing joints  
NU-0090 B66-10703 05

**WELDED STRUCTURE**  
Vacuum-type backup bar speeds weld repairs  
M-FS-12 B63-10384 05

Compact coaxial connector for printed circuit adds reliability  
MSC-57 B64-10016 01



Insulated weld tooling permits uniform, high-quality weld MSC-42	B64-10058	05
Upsetting butt edge increases weld-joint strength M-FS-175	B64-10164	05
Magnets position X-ray film for weld inspection M-FS-253	B65-10110	05
Electromagnetic hammer removes weld distortions from aluminum tanks M-FS-287	B65-10342	05
Lifting clamp positively grips structural shapes M-FS-593	B66-10176	05
Heat treatment stabilizes welded aluminum jig and tool structures MSC-800	B66-10458	03
Large seals fabricated from small segments reduce procurement lead time M-FS-1117	B66-10464	05
<b>WELDING</b>		
Method of welding joint in closed vessel improves quality of seam JPL-170	B63-10139	05
Sleeve and cutter simplify disconnecting welded joint in tubing JPL-384	B63-10240	05
Novel clamps align large rocket cases, eliminate back-up bars M-FS-1	B63-10376	05
Compact coaxial connector for printed circuit adds reliability MSC-57	B64-10016	01
Welding procedure improves quality of welds, offers other advantages M-FS-32	B64-10309	01
Inert-gas welding and brazing enclosure fabricated from sheet plastic LEWIS-220	B65-10338	05
Calibrated clamp facilitates pressure application MSC-298	B66-10059	05
Tool provides constant purge during tube welding M-FS-547	B66-10093	05
Aluminum oxide filler prevents obstructions in tubing during welding MSC-222	B66-10125	05
Automatic reel controls filler wire in welding machines MSC-416	B66-10236	05
Flexible drive allows blind machining and welding in hard-to-reach areas MSC-524	B66-10428	05
New backup-bar groove configuration improves heliarc welding of 2014-T6 aluminum MSC-806	B66-10443	05
Weldable aluminum alloy has improved mechanical properties M-FS-295	B66-10445	03
New weldable high strength aluminum alloy developed for cryogenic service M-FS-737	B66-10613	05
Thermocouples easily installed in hard-to-get-to places M-FS-1946	B66-10653	01
<b>WELDING MACHINE</b>		
Refractory metals welded or brazed with tungsten inert gas equipment LEWIS-219	B65-10319	05
Fingertip current control facilitates use of arc welding gun MSC-289	B66-10092	05
Special mandrel permits uniform welding of out-of-round tubing M-FS-706	B66-10323	05
Power arc welder touch-started with consumable electrode M-FS-1485	B66-10641	05
<b>WETTING</b>		
Etching process mills pH 14-8 Mo alloy steel to precise tolerances MSC-270	B66-10110	03
<b>WHEATSTONE BRIDGE</b>		
Electronic ohmmeter provides direct digital output GSFC-363	B65-10274	01
Photoresistance analog multiplier has wide range GSFC-360	B65-10287	01
Improved strain-wire flowmeter has fast response time LEWIS-241	B65-10304	01
High voltage potential divider calibrated by simple device ARG-83	B66-10497	01
Resistance thermometer has linear resistance-temperature coefficient at low temperatures WOO-190	B66-10612	01
<b>WHEEL</b>		
Lateral ring metal elastic wheel absorbs shock loading M-FS-1312	B66-10663	05
<b>WHISKER</b>		
Boron carbide whiskers produced by vapor deposition HQ-24	B65-10261	03
<b>WIDEBAND COMMUNICATION</b>		
Omnidirectional antennas transmit and receive over large bandwidth GSFC-436	B66-10133	01
<b>WIND PROFILE</b>		
New anemometer has fast response, measures dynamic pressure directly LANGLEY-28	B63-10530	05
Rough surface improves stability of air-sounding balloons M-FS-320	B65-10326	05
<b>WIND TUNNEL</b>		
Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05
<b>WIND TUNNEL APPARATUS</b>		
Electric arc heater is self starting LANGLEY-208	B66-10230	03
<b>WIND TUNNEL MODEL</b>		
Oil-smeared models aid wind tunnel measurements LANGLEY-4	B63-10311	03
Welded pressure transducer made as small as 1/8th-inch in diameter ARC-11	B63-10429	03
Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05

## WINDOW

Cryogenic waveguide window is sealed with plastic foam  
JPL-559 B63-10613 01

High pressure cryogenic liquid flow sight assembly provides streamlined flow for easy observation  
LEWIS-310 B66-10394 01

## WIRE

Cooling method prolongs life of hot-wire transducer  
LEWIS-41 B63-10344 02

Connector for thermocouple leads saves costly wire, makes reliable connectors  
LANGLEY-26 B63-10529 01

Cantilever springs maintain tension in thermally expanded wires  
LEWIS-136 B65-10149 05

Improved solderless connector is easily disconnected  
JPL-SC-060 B65-10197 01

Improved wire memory matrix uses very little power  
JPL-SC-167 B65-10359 01

Vacuum chamber provides improved insulation and support for cryostat  
M-FS-415 B65-10368 02

Wire bundle formed into grids with minute interstices  
WOO-089 B65-10372 03

Tungsten wire and tubing joined by nickel brazing  
M-FS-394 B65-10391 05

Automatic reel controls filler wire in welding machines  
MSC-416 B66-10236 05

Inspection of fine wires simplified by capillary tube wire holder  
MSC-358 B66-10329 05

Metal oxide silicon /MOS/ transistors protected from destructive damage by wire device  
ARC-65 B66-10419 01

Silver-base ternary alloy proves superior for slip ring lead wires  
M-FS-1540 B66-10540 03

Emergency escape system uses self-braking mechanism on fixed cable  
KSC-66-44 B66-10575 05

Improved memory word line configuration allows high storage density  
GSFC-559 B66-10617 01

Wire material reduces compressor blade vibration  
LEWIS-357 B66-10666 03

Improved method of edge coating flat ribbon wire  
M-FS-902 B66-10684 03

## WIRE BRIDGE CIRCUIT

Pulse technique provides more accurate checkout of exploding bridge wire device  
HQ-62 B66-10561 01

## WIRE MESH

Wire mesh isolator protects sensitive electronic components  
GSFC-347 B65-10216 05

Three-dimensional wire-mesh capacitor system measures fluid density  
WOO-194 B65-10379 01

Strainer fits inside flared-tube fittings  
LANGLEY-180 B65-10388 05

## WIRE WINDING

Fiberglass parts cured during filament winding eliminates oven, saves time  
M-FS-14 B65-10088 03

## WIRING SYSTEM

Modified rf coaxial connector ends vacuum chamber wiring problem  
GSFC-150 B64-10010 01

Thermocouples easily installed in hard-to-get-to places  
M-FS-1946 B66-10653 01

Logic circuitry used to automatically test shielded cables  
HQ-60 B66-10659 01

## WORK FUNCTION

Photoelectric scanner makes detailed work function maps of metal surface  
JPL-SC-176 B66-10440 01

Thermionic scanner pinpoints work function of emitter surfaces  
JPL-SC-177 B66-10444 01

## X

## X-RAY

Multiple element soft X-ray source produces wide range of radiation  
GSFC-286 B65-10082 02

## X-RAY DIFFRACTION

Spherical model provides visual aid for cubic crystal study  
LEWIS-108 B65-10065 03

Specimen holder design improves accuracy of X-ray powder analysis  
JPL-SC-165 B66-10075 02

## X-RAY EQUIPMENT

Densitometer system for liquid hydrogen has high accuracy, fast response  
M-FS-909 B66-10438 01

## X-RAY INSPECTION

Magnets position X-ray film for weld inspection  
M-FS-253 B65-10110 05

## X-RAY PHOTOGRAPHY

Commercial film produces positive X-ray photo in ten seconds  
M-FS-521 B66-10307 02

## XENON COMPOUND

Xenon forms stable compound with fluorine  
ARG-4 B66-10467 03

## XENON LIGHT

High-intensity flashing beacon powered by mercury cells  
LANGLEY-80 B65-10361 01

## Y

## YAGI ANTENNA

Modified interelement spacing improves Yagi antenna array  
LANGLEY-130 B65-10183 01

## YIELD STRENGTH

Tungsten fiber-reinforced copper composites form high strength electrical conductors  
LEWIS-338 B66-10572 03

Treatment increases stress-corrosion resistance of aluminum alloys  
M-FS-1840 B66-10595 05

## Z

## ZENER DIODE

- Temperature-sensitive network drives astable  
multivibrator  
GSFC-137 B63-10609 01
- Zener diode function generator requires no  
external reference voltage  
JPL-33 B65-10013 01
- Zener diode is starter for transistor-  
regulated power supply  
NU-0015 B65-10052 01
- Variable voltage supply uses zener diode as  
reference  
GSFC-262 B65-10097 01
- Zener diode controls switching of large  
direct currents  
MSC-188 B65-10350 01

## ZERO GRAVITY

- Magnetic fluid readily controlled in zero  
gravity environment  
LEWIS-126 B65-10335 03

## ZINC

- New method used to fabricate gallium arsenide  
photovoltaic device  
WDD-062 B64-10019 01
- Adherent protective coatings plated on  
magnesium-lithium alloy  
M-FS-365 B65-10294 03

## ZINC ALLOY

- New brazing alloy eliminates metal-stress  
cracking  
WDD-249 B65-10397 03

## ZINC SELENIDE

- Thin-film semiconductor rectifier has improved  
properties  
MSC-207 B66-10012 01

## ZIRCONIUM

- Intergranular metal phase increases thermal  
shock resistance of ceramic coating  
M-FS-1862 B66-10651 03

## ZIRCONIUM COMPOUND

- Protective coating withstands high temperature  
in oxidizing atmosphere  
M-FS-529 B66-10044 03

## ZIRCONIUM OXIDE

- Refractory oxides evaluated for  
high-temperature use  
LANGLEY-121 B65-10167 03

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