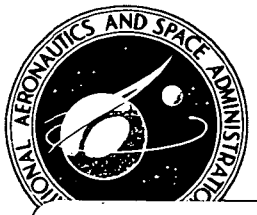


NASA SP-7039(29)
Section 1
Abstracts

(NASA-SP-7039(29)-Sect-1) NASA PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY. SECTION 1: ABSTRACTS (National Aeronautics and Space Administration) 52 p HC A04 CSCL 05B 00/82

N86-28788

Unclas 43224

NASA SP-7039(29) NASA Patent Abstracts Bibliography (Section 1 • Abstracts) JULY 1986

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY

Section 1 • Abstracts

JULY 1986

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ACCESSION NUMBER RANGES

Bibliography Number	*STAR Accession Numbers*
NASA SP-7039(04) SEC 1	N69-20701 – N73-33931
NASA SP-7039(12) SEC 1	N74-10001 – N77-34042
NASA SP-7039(13) SEC 1	N78-10001 – N78-22018
NASA SP-7039(14) SEC 1	N78-22019 – N78-34034
NASA SP-7039(15) SEC 1	N79-10001 – N79-21993
NASA SP-7039(16) SEC 1	N79-21994 – N79-34158
NASA SP-7039(17) SEC 1	N80-10001 – N80-22254
NASA SP-7039(18) SEC 1	N80-22255 – N80-34339
NASA SP-7039(19) SEC 1	N81-10001 – N81-21997
NASA SP-7039(20) SEC 1	N81-21998 – N81-34139
NASA SP-7039(21) SEC 1	N82-10001 – N82-22140
NASA SP-7039(22) SEC 1	N82-22141 – N82-34341
NASA SP-7039(23) SEC 1	N83-10001 – N83-23266
NASA SP-7039(24) SEC 1	N83-23267 – N83-37053
NASA SP-7039(25) SEC 1	N84-10001 – N84-22526
NASA SP-7039(26) SEC 1	N84-22527 – N84-35284
NASA SP-7039(27) SEC 1	N85-10001 – N85-22341
NASA SP-7039(28) SEC 1	N85-22342 – N85-36162
NASA SP-7039(29) SEC 1	N86-10001 – N86-22536

This bibliography was prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by RMS Associates.

NASA SP-7039(29)
Section 1
Abstracts

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY

Section 1 • Abstracts

Annotated references to NASA-owned inventions covered by U.S. patents and applications for patent that were announced in *Scientific and Technical Aerospace Reports (STAR)* between January 1986 and June 1986.

NASA Scientific and Technical Information Branch 1986
National Aeronautics and Space Administration
Washington, DC

This supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22161, price code A04.

INTRODUCTION

Several thousand inventions result each year from the aeronautical and space research supported by the National Aeronautics and Space Administration. The inventions having important use in government programs or significant commercial potential are usually patented by NASA. These inventions cover practically all fields of technology and include many that have useful and valuable commercial application.

NASA inventions best serve the interests of the United States when their benefits are available to the public. In many instances, the granting of nonexclusive or exclusive licenses for the practice of these inventions may assist in the accomplishment of this objective. This bibliography is published as a service to companies, firms, and individuals seeking new, licensable products for the commercial market.

The *NASA Patent Abstracts Bibliography (NASA PAB)* is a semiannual NASA publication containing comprehensive abstracts and indexes of NASA-owned inventions covered by U.S. patents and applications for patent. The citations included in *NASA PAB* were originally published in NASA's *Scientific and Technical Aerospace Reports (STAR)* and cover *STAR* announcements made since May 1969.

For the convenience of the user, each issue of *NASA PAB* has a separately bound Abstract Section (Section 1) and Index Section (Section 2). Although each Abstract Section covers only the indicated six-month period, the Index Section is cumulative covering all NASA-owned inventions announced in *STAR* since 1969. Thus a complete set of *NASA PAB* would consist of the Abstract Sections of Issue 04 (January 1974) and Issue 12 (January 1978) and the Abstract Section for all subsequent issues and the Index Section for the most recent issue.

The 115 citations published in this issue of the Abstract Section cover the period January 1986 through June 1986. The Index Section references over 4400 citations covering the period May 1969 through June 1986.

ABSTRACT SECTION (SECTION 1)

This *PAB* issue incorporates the 1975 *STAR* category revisions which include 10 major subdivisions divided into 74 specific categories and one general category/division. (See Table of Contents for the scope note of each category under which are grouped appropriate NASA inventions.) This new scheme was devised in lieu of the 34 category divisions which were utilized in *PAB* supplements (01) through (06) covering *STAR* abstracts from May 1969 through January 1974. Each entry in the Abstract Section consists of a *STAR* citation accompanied by an abstract and a key illustration taken from the patent or application for patent drawing. Entries are arranged in subject category in order of the ascending NASA Accession Number originally assigned in *STAR* to the invention. The range of NASA Accession Numbers within each issue is printed on the inside front cover.

Abstract Citation Data Elements: Each of the abstract citations has several data elements useful for identification and indexing purposes, as follows:

NASA Accession Number
NASA Case Number
Inventor's Name
Title of Invention
U.S. Patent Application Serial Number
U.S. Patent Number (for issued patents only)
U.S. Patent Office Classification Number(s)
(for issued patents only)

These data elements are identified in the Typical Citation and Abstract and in the indexes.

INDEX SECTION (SECTION 2)

The Index Section is divided into five indexes. These indexes are cross-indexed and are used to locate a single invention or groups of inventions.

Subject Index: Lists all inventions according to appropriate alphabetized technical term and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Inventor Index: Lists all inventions according to alphabetized names of inventors and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Source Index: Lists all inventions according to alphabetized source of invention (i.e., name of contractor or government installation where invention was made) and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Number Index: Lists inventions in order of ascending (1) NASA Case Number, (2) U.S. Patent Application Serial Number, (3) U.S. Patent Classification Number, and (4) U.S. Patent Number and indicates the related Subject Category Number and the Accession Number.

Accession Number Index: Lists all inventions in order of ascending Accession Number and indicates the related Subject Category Number, the NASA Case Number, the U.S. Patent Application Serial Number, the U.S. Patent Classification Number, and the U.S. Patent Number.

HOW TO USE THIS PUBLICATION TO IDENTIFY NASA INVENTIONS

To identify one or more NASA inventions within a specific technical field or subject, several techniques are possible with the flexibility incorporated into the *NASA PAB.*

(1) *Using Subject Category:* To identify all NASA inventions in any one of the subject categories in this issue of *NASA PAB,* select the desired Subject Category in the Abstract Section (Section 1) and find the inventions abstracted thereunder.

(2) *Using Subject Index:* To identify all NASA inventions listed under a desired technical subject index term, (A) turn to the cumulative Subject Index in the Index Section and find the invention(s) listed under the desired technical subject term. (B) Note the indicated Accession Number and the Subject Category Number. (C) Using the indicated Accession Number, turn to the inside front cover of the Index Section to determine which issue of the Abstract Section includes the Accession Number desired. (D) To find the abstract of the particular invention in the issue of the Abstract Section selected, (i) use the Subject Category Number to locate the Subject Category and (ii) use the Accession Number to locate the desired invention within the Subject Category listing.

(3) *Using Patent Classification Index:* To identify all inventions covered by issued NASA patents (does not include applications for patent) within a desired Patent Classification, (A) turn to the Patent Classification Number in the Number Index of Section 2 and find the associated invention(s), and (B) follow the instructions outlined in (2)(B), and (D) above.

TYPICAL CITATION AND ABSTRACT

ON MICROFICHE

NASA SPONSORED

ACCESSION NUMBER → **N86-20470*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. ← CORPORATE SOURCE

TITLE → **TELESCOPING SPACE STATION MODULES Patent Application**

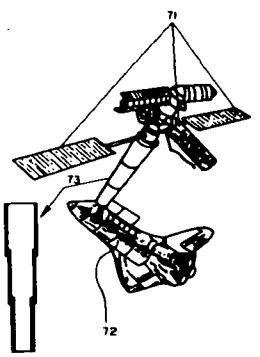
INVENTORS → R. D. WITCOFSKI, inventor (to NASA) 31 Jul. 1985 15 p

NASA CASE NUMBER → (NASA-CASE-LAR-13330-1; NAS 1.71:LAR-13330-1;

US PATENT APPLICATIONS SERIAL NUMBER → US-PATENT-APPL-SN-761233) Avail: NTIS HC A02/MF A01 ← PRICE CODE

COSATI CODE → CSCL 22B ← AVAILABILITY SOURCE

A space station module consisting of a cylindrical can within a can is presented. The outer can, which has one open end, encloses the inner can. The inner can has one tapered end with a hatch and one untapered end with a hatch. The outer can has one tapered end with a hatch. The overall length of the outer can is 25 ft, and its outer diameter is 14 ft. Two such assemblies easily fit end to end in the Shuttle Orbiter payload bay. With a shuttle payload capability of 65,000 pounds and an approximate weight of each twin can assembly of 16,000 pounds, 33,000 pounds of payload are available for instrumenting the cans. Only the inner can can be instrumented prior to launch. Once in orbit, the module is expanded to provide twice the usable space, approximately 48 ft total length. NASA ← ABSTRACT



KEY ILLUSTRATION

TABLE OF CONTENTS

Section 1 • Abstracts

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics.*

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **N.A.**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **N.A.**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **N.A.**
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **N.A.**
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **N.A.**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **32**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **N.A.**

89 ASTRONOMY **33**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **N.A.**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **N.A.**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **N.A.**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **N.A.**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

GENERAL

99 GENERAL **N.A.**

Note: N.A. means that no abstracts were assigned to this category for this issue.

Section 2 • Indexes

JULY 1986 (Supplement 29)

NASA Patent Abstracts Bibliography

A Semiannual Publication of the National Aeronautics and Space Administration

04

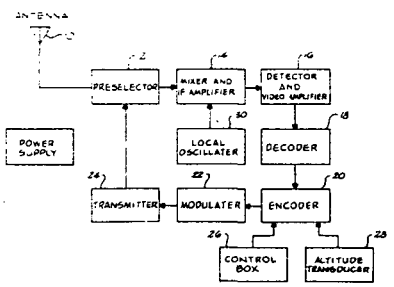
AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

N86-19304* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
VIDEO PROCESSOR FOR AIR TRAFFIC CONTROL BEACON SYSTEM Patent
F. BYRNE, inventor (to NASA) 10 Sep. 1985 5 p Filed 28 Sep. 1982
(NASA-CASE-KSC-11155-1; US-PATENT-4,540,986; US-PATENT-APPL-SN-425201; US-PATENT-CLASS-343-6.8-R)
Avail: US Patent and Trademark Office CSCL 17G

A circuit is disclosed for use in a transponder located in an aircraft or the like for identifying a true side lobe suppression signal being transmitted by a ground located transmitted system. The true side lobe suppression signal includes at least pulses P1 and P2. The circuit causes the transponder to produce reply signal upon the amplitude of the P1 pulse being a predetermined ratio to said P2 pulse. The circuit includes a pair of transistors with a capacitor connected to the output of the second transistor. The pulses P1 and P2 are supplied to the base electrode of the first transistor. Pulse P1 turns on the two transistors and charges the capacitor to a predetermined level so that when the second pulse P2 arrives, it does not turn on a transistor when it is equal to or less than the first pulse P1.

Official Gazette of the U.S. Patent and Trademark Office



05

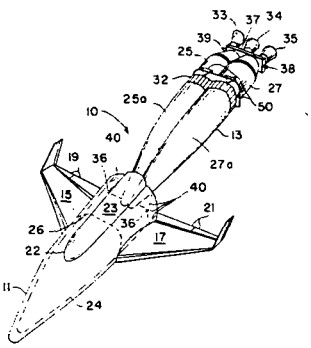
AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

N86-19310* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AEROSPACE VEHICLE Patent
L. R. JACKSON and A. H. TAYLOR, inventors (to NASA) 10 Dec. 1985 10 p Filed 9 Jan 1984
(NASA-CASE-LAR-13155-1; US-PATENT-4,557,444; US-PATENT-APPL-SN-469371; US-PATENT-CLASS-244-172; US-PATENT-CLASS-244-158-R; US-PATENT-CLASS-244-158-A)
Avail: US Patent and Trademark Office

A dual structure aerospace vehicle is described which has an aeroshell structure and an internally disposed separable and reusable integral tank/thrust structure. The tank/thrust structure is inuslated for cryogenic fuels and the cavity within aeroshell is insulated from the tank/thrust structure. An internal support ring within the cavity serves as an attachment for lugs on the tank/thrust structure via double hinges. The aft end of tank/thrust structure is provided with rocket engines and exit nozzles with a trunnion supporting the tank/thrust structure within the aeroshell.

Official Gazette of the U.S. Patent and Trademark Office



07

AIRCRAFT PROPULSION AND POWER

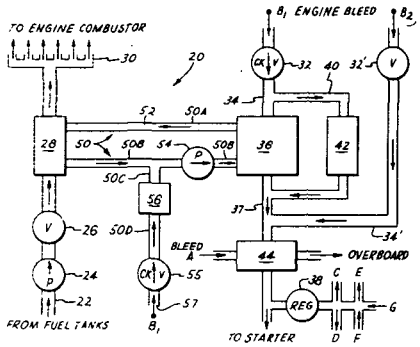
Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

N86-20389* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
METHOD FOR IMPROVING THE FUEL EFFICIENCY OF A GAS TURBINE ENGINE Patent
G. A. COFFINBERRY, inventor (to NASA) (General Electric Co., Cincinnati, Ohio) 5 Nov. 1985 8 p 30 Aug. 1982
(NASA-CASE-LEW-13142-2; US-PATENT-4,550,561; US-PATENT-APPL-SN-413101; US-PATENT-CLASS-60-39.02; US-CLASS-60-39.07; US-PATENT-CLASS-60-736) Avail: US Patent and Trademark Office CSCL 21E

An energy recovery system is provided for an aircraft gas turbine engine of the type in which some of the pneumatic energy developed by the engine is made available to support systems such as an environmental control system. In one such energy recovery system, some of the pneumatic energy made available to but not utilized by the support system is utilized to heat the engine fuel immediately prior to the consumption of the fuel by the engine. Some of the recovered energy may also be utilized to

heat the fuel in the fuel tanks. Provision is made for multiengine applications wherein energy recovered from one engine may be utilized by another one of the engines or systems associated therewith.

Official Gazette of the U.S. Patent and Trademark Office



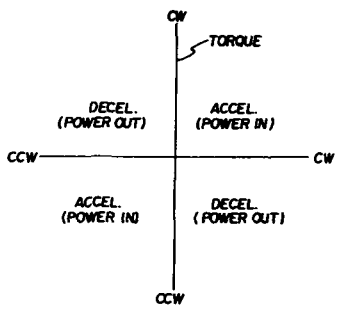
08

AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

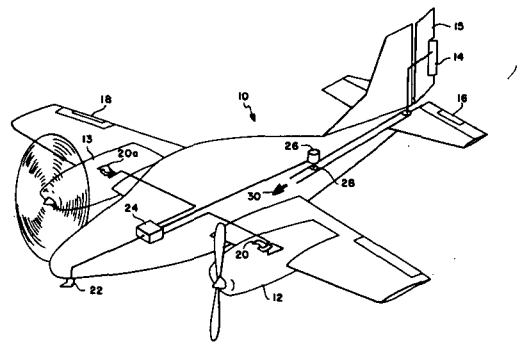
N86-20396*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THREE AXIS ATTITUDE CONTROL SYSTEM Patent Application
P. A. STUDER, inventor (to NASA) 7 Nov. 1985 22 p
(NASA-CASE-GSC-12970-1; NAS 1.71:GSC-12970-1;
US-PATENT-APPL-SN-795805) Avail: NTIS HC A02/MF A01
CSCL 01C

A three axis attitude control system for an orbiting body comprised of a motor driven flywheel supported by a torque producing active magnetic bearing is described. Free rotation of the flywheel is provided about its central axis and together with limited angular torsional deflections of the flywheel about two orthogonal axes which are perpendicular to the central axis. The motor comprises an electronically commutated dc motor, while the magnetic bearing comprises a radially servoed permanent magnet biases magnetic bearing capable of producing cross-axis torques on the flywheel. Three body attitude sensors for pitch, yaw and roll generate respective command signals along three mutually orthogonal axes (x, y, z) which are coupled to circuit means for energizing a set of control coils for producing torques about two of the axes (x and y) and speed control of the flywheel about the third (z) axis. An energy recovery system, which is operative during motor deceleration, is also included which permits the use of a high speed motor to perform effectively as a reaction wheel suspended in the magnetic bearing. NASA



N86-20397*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AIRPLANE AUTOMATIC CONTROL FORCE TRIMMING DEVICE FOR ASYMMETRIC ENGINE FAILURES Patent application
E. C. STEWART, inventor (to NASA) 23 Oct. 1985 14 p
(NASA-CASE-LAR-13280-1; NAS 1.71:LAR-13280-1;
US-PATENT-APPL-SN-790556) Avail: NTIS HC A02/MF A01
CSCL 01C

The difference in dynamic pressure in the propeller slipstreams as measured by sensors is divided by the freestream dynamic pressure generating a quantity proportional to the differential thrust coefficient. This quantity is used to command an electric trim motor to change the position of trim tab thereby retrimming the airplane to the new asymmetric power condition. The change in position of the trim tab produced by the electric trim motor is summed with the pilot's input to produce the actual trim tab position. NASA



17

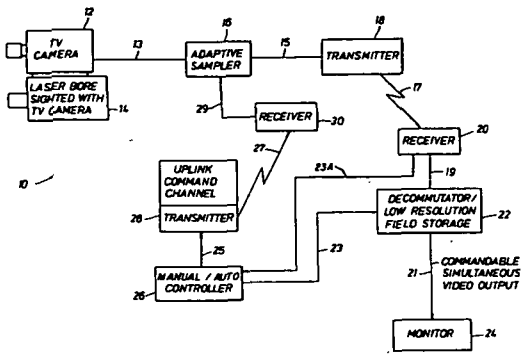
SPACECRAFT COMMUNICATION, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

N86-20466*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
METHOD AND APPARATUS FOR TELEMETRY ADAPTIVE BANDWIDTH COMPRESSION Patent Application
O. L. GRAHAM, inventor (to NASA) 13 Sep. 1985 25 p
(NASA-CASE-MSC-20821-1; NAS 1.71:MSC-20821-1;
US-PATENT-APPL-SN-775990) Avail: NTIS HC A02/MF A01
CSCL 09F

Methods and apparatus are provided for automatic and/or manual adaptive bandwidth compression of telemetry. An adaptive sampler samples a video signal from a scanning sensor and generates a sequence of sampled fields. Each field and range rate information from the sensor are hence sequentially transmitted to and stored in a multiple adaptive field storage means. The field storage means then, in response to an automatic or manual control signal, transfers the stored sampled field signals to a video monitor in a form for sequential or simultaneous display of a desired number of stored field signals. The sampling ratio of the adaptive sampler, the relative proportion of available communication bandwidth allocated respectively to transmitted data and video information, and the number of fields are manually or automatically selectively adjustable in functional relation to each other and detected range rate. In one embodiment, when relatively little or no scene motion is detected, the control signal maximizes sampling ratio and cause simultaneous display of all stored fields, thrus maximizing display resolution and bandwidth available or data transmission. When

increased scene motion is detected, the control signal is adjusted accordingly to cause display of fewer fields. If greater resolution is desired, the control signal is adjusted to increase sampling ratio. NASA



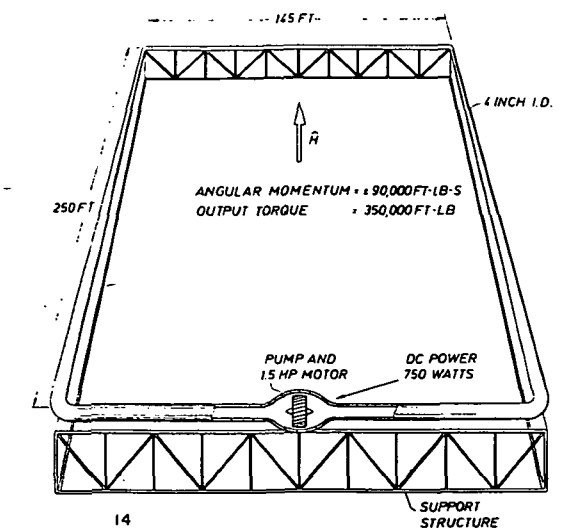
18

SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

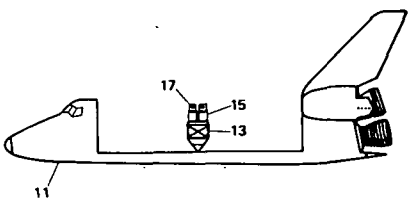
N86-19344*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
FLUIDIC MOMENTUM CONTROLLER Patent Application
R. S. MAYNARD, inventor (to NASA) 24 Sep. 1985 33 p
(NASA-CASE-MSC-20906-1; NAS 1.71:MSC-20906-1;
US-PATENT-APPL-SN-779742) Avail: NTIS HC A03/MF A01
CSCL 22B

Large angular control moments and torques are developed by controllably circulating a relatively small mass of liquid through small diameter pipes describing a large diameter loop. The loop, by thus generating and storing angular momentum, can thereby provide efficient cancellation of periodic, nonaccumulating, externally induced rotational disturbances. The loop is preferably located on or near the periphery of a structure which is to be thus stabilized. NASA



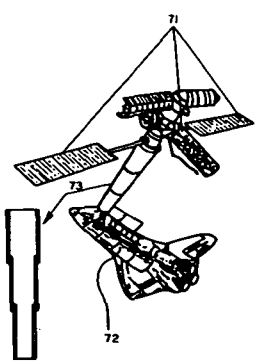
N86-20469* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPACE PROBE/SATELLITE EJECTION APPARATUS FOR SPACECRAFT Patent
H. M. SMYLY, C. D. MILLER, R. A. CLOYD, and C. HELLER, inventors(to NASA) 26 Nov. 1985 13 p Filed 5 Apr. 1984
(NASA-CASE-MFS-25429-1; US-PATENT-4,554,905;
US-PATENT-APPL-SN-596959; US-PATENT-CLASS-124-56;
US-PATENT-CLASS-244-158-R; US-PATENT-CLASS-403-328)
Avail: US Patent and Trademark Office CSCL 22B

An ejection apparatus for spinning and propelling objects for ejection from a spacecraft at a desired velocity and rotational speed is discussed. The apparatus includes a launch cradle on which the space object to be ejected rests. The cradle is rotatably supported by a central hub secured to the upper end of the pneumatic cylinder piston shaft. Release mechanisms consisting of a retractable pin and locking lug is utilized to hold the cradle and object to be ejected. The release mechanism has a fixed barrier member which holds the retractable pin in engagement with the locking lug until release by upward movement of the launch cradle beyond the barrier height.
Official Gazette of the U.S. Patent and Trademark Office



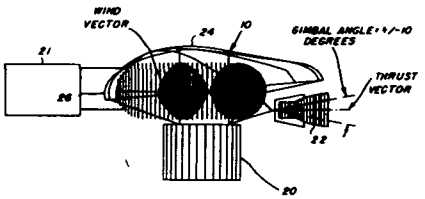
N86-20470*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
TELESCOPING SPACE STATION MODULES Patent Application
R. D. WITCOFSKI, inventor (to NASA) 31 Jul. 1985 15 p
(NASA-CASE-LAR-13330-1; NAS 1.71:LAR-13330-1;
US-PATENT-APPL-SN-761233) Avail: NTIS HC A02/MF A01
CSCL 22B

A space station module consisting of a cylindrical can within a can is presented. The outer can, which has one open end, encloses the inner can. The inner can has one tapered end with a hatch and one untapered end with a hatch. The outer can has one tapered end with a hatch. The overall length of the outer can is 25 ft, and its outer diameter is 14 ft. Two such assemblies easily fit end to end in the Shuttle Orbiter payload bay. With a shuttle payload capability of 65,000 pounds and an approximate weight of each twin can assembly of 16,000 pounds, 33,000 pounds of payload are available for instrumenting the cans. Only the inner can can be instrumented prior to launch. Once in orbit, the module is expanded to provide twice the usable space, approximately 48 ft total length. NASA



N86-20471*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
AEROBRAKING ORBITAL TRANSFER VEHICLE Patent Application
C. D. SCOTT, K. NAGY, B. B. ROBERTS, R. C. RIED, K. R. KROLL, and J. D. GAMBLE, inventors (to NASA) 18 Jun. 1985 15 p
(NASA-CASE-MSC-20921-1; NAS 1.71:MSC-20921-1; US-PATENT-APPL-SN-746162) Avail: NTIS HC A02/MF A01 CSCL 22B

An aerobraking orbital transfer vehicle is described. The vehicle includes an aerobraking device which also serves as a heat shield in the shape of a raked-off elliptic or circular cone with a circular or elliptical base, and with an ellipsoid or other blunt shape nose. The aerobraking device is fitted with a toroid-like skirt and is integral with the support structure of the propulsion system and other systems of the space vehicle. The vehicle is intended to be transported in components to a space station in low earth orbit where it is assembled for use as a transportation system from low earth orbit to geosynchronous earth orbit and return. Conventional guidance means are included for autonomous flight. NASA



23

CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N86-19376* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
MALEIMIDO SUBSTITUTED AROMATIC CYCLOTRIPHOSPHAZENES Patent
D. KUMAR, G. M. FOHLEN, and J. A. PARKER, inventors (to NASA) 29 Oct. 1985 22 p Filed 11 Apr. 1984
(NASA-CASE-ARC-11428-1; US-PATENT-4,550,177; US-PATENT-APPL-SN-499126; US-PATENT-CLASS-548-413; US-PATENT-CLASS-260-927-N; US-PATENT-CLASS-564-113; US-PATENT-CLASS-428-410; US-PATENT-CLASS-528-310)
Avail: US Patent and Trademark Office CSCL 07C

4-Aminophenoxy cyclotriphosphazenes are reacted with maleic anhydride to produce maleamic acids which are converted to the maleimides. The maleimides are polymerized. By selection of starting materials (e.g., hexakis amino or trisaminophenoxy trisphenoxy cyclo triphosphazenes), selection of molar proportions of reactants, use of mixtures of anhydrides and use of dianhydrides as bridging groups a variety of maleimides and polymers are produced. The polymers have high limiting oxygen indices, high char yields and other useful heat and fire resistnat properties making them useful as, for example, impregnants of fabrics.
Official Gazette of the U.S. Patent and Trademark Office

N86-20499*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE 1-(DIORGANOOXPHOSPHONYL)METHYL-2, 4- AND -2, 6-DINITRO AND DIAMINO BENZENES AND THEIR DERIVATIVES Patent Application
J. A. MIKROYANNIDIS and D. A. KOURTIDES, inventors (to NASA) 16 Aug. 1984 19 p
(NASA-CASE-ARC-11425-2; NAS 1.71:ARC-11425-2; US-PATENT-APPL-SN-641152) Avail: NTIS HC A02/MF A01 CSCL 07C

The 1-Diorganooxyphosphonyl)methyl] -2,4- and -2,6-dinitro- and diamino benzenes are prepared by nitrating an (organophosphonyl)methyl benezene to produce the dinitro compounds which are then reduced to the diamino compounds. The organo groups (alkyl, haloalkyl, aryl) on the phosphorus may be removed to give the free acids (HO)2P(=O)-. The diamino compounds may be polymerized with dianhydrides or diacyl halides to produce fire and flame resistant polymers which are useful in the manufacture of aircraft structures. NASA

N86-21582* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PERFLUORO (IMIDOYLAMIDINE) DIAMIDINES Patent
R. W. ROSSER, T. S. CHEN (San Jose State Univ., Calif.), and C. H. CHENG, inventors (to NASA) (San Jose State Univ., Calif.) 28 Jan. 1986 6 p Filed 5 Jun. 1985 Continuation of US-Patent-Appl-SN-528777, filed 2 Sep. 1983, abandoned, which is a division of US-Patent-Appl-SN-366025, filed 6 Apr. 1982, US-Patent-4,434,106
(NASA-CASE-ARC-11402-3; US-PATENT-4,567,301; US-PATENT-APPL-SN-741405; US-PATENT-CLASS-564-243)
Avail: US Patent and Trademark Office CSCL 07C

Perfluoroether triazine elastomers having improved properties are prepared from oligomeric imidoylamidines that were in turn, prepared by the process of: (1) reacting a perfluorodinitrile with liquid ammonia to yield a perfluorodiamidine, (2) isolating the perfluorodiamidine, (3) reacting the isolated diamidine with a perfluorodinitrile to yield a perfluoro(imidoylamidine) dinitrile, and then repeating the steps to sequentially grow an oligomer of desired molecular size. The isolated amidine and nitrile intermediates are also disclosed. The elastomers can be fashioned into seals, gaskets, and sealing components and the like.
Official Gazette of the U.S. Patent and Trademark Office

24

COMPOSITE MATERIALS

Includes laminates.

N86-19380* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
TOUGHENING REINFORCED EPOXY COMPOSITES WITH BROMINATED POLYMERIC ADDITIVES Patent
Z. NIR (National Academy of Sciences/National Research Council, Washington, D.C.) and W. J. GILWEE, JR., inventors (to NASA) 29 Oct. 1985 12 p Filed 12 May 1983 Sponsored by NASA
(NASA-CASE-ARC-11427-1; US-PATENT-4,550,129; US-PATENT-APPL-SN-493865; US-PATENT-CLASS-523-433;

US-PATENT-CLASS-523-445; US-PATENT-CLASS-523-66468;
US-PATENT-CLASS-525-527; US-PATENT-CLASS-525-423;
US-PATENT-CLASS-528-102; US-PATENT-CLASS-528-103)
Avail: US Patent and Trademark Office CSCL 11D

Cured polyfunctional epoxy resins including tris (hydroxyphenyl) methane triglycidyl ether are toughened by addition of polybrominated polymeric additives having an EE below 1500 to the pre-cure composition. Carboxy terminated butadiene acrylonitrile rubber is optionally present in the precure mixture as such or as a pre-formed copolymer with other reactants. Reinforced composites, particularly carbon reinforced composites, of these resins are disclosed and shown to have improved toughness.

Official Gazette of the U.S. Patent and Trademark Office

N86-21590* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

HIGH PERFORMANCE MIXED BISIMIDE RESINS AND COMPOSITES BASED THEREON Patent

J. A. PARKER, A. H. HEIMBUCH, M. T. S. HSU (HC Chem Research and Service Corp., San Jose, Calif.), and T. S. CHEN, inventors (to NASA) (HC Chem Research and Service Corp., San Jose, Calif.) 4 Feb. 1986 8 p
(NASA-CASE-ARC-11538-1SB; US-PATENT-4,568,733;
US-PATENT-APPL-SN-719796; US-PATENT-CLASS-526-262)
Avail: US Patent and Trademark Office CSCL 11D

Mixtures of bismaleimide/biscitraconirnide resins produces materials which have better handling, processing or mechanical and thermal properties, particularly in graphite composites, than materials made with the individual resins. The mechanical strength of cured graphite composites prepared from a 1:1 copolymer of such bisimide resins is excellent at both ambient and elevated temperatures. The copolymer mixture provides improved composites which are lighter than metals and replace metals in many aerospace applications.

Official Gazette of the U.S. Patent and Trademark Office

25

INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

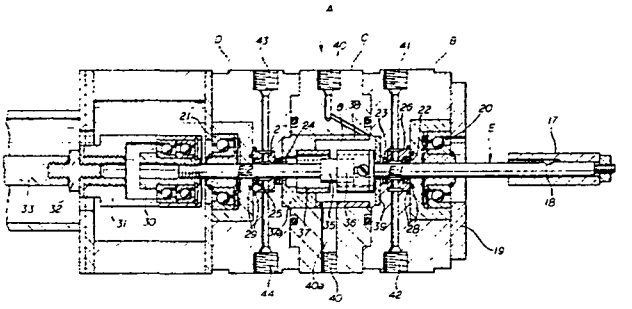
N86-19413* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

DEVICE AND METHOD FOR FRICTIONALLY TESTING MATERIALS FOR IGNITABILITY Patent

F. J. BENZ (Lockheed Engineering and Management Services, Inc., Las Cruces, N. Mex.), R. C. SHAW (Lockheed Engineering and Management Services, Inc., Las Cruces, N. Mex.), and D. S. DIXON, inventors (to NASA) 31 Dec. 1985 7 p Filed 17 Jan. 1984 Sponsored by NASA
(NASA-CASE-MSC-20622-1; US-PATENT-4,561,784;
US-PATENT-APPL-SN-571616; US-PATENT-CLASS-374-8;
US-PATENT-CLASS-73-7; US-PATENT-CLASS-374-46;
US-PATENT-CLASS-422-78; US-PATENT-CLASS-436-155)
Avail: US Patent and Trademark Office CSCL 21B

Test apparatus for determining ignition characteristics of various metal in oxidizer environments simulating operating conditions for materials is invented. The test apparatus has a chamber through which the oxidizing agent flows, and means for mounting a stationary test sample therein, a powered, rotating shaft in the chamber rigidly mounts a second test sample. The shaft is axially movable to bring the samples into frictional engagement and heated to the ignition point. Instrumentation connected to the apparatus provides for observation of temperatures, pressures, loads on and speeds of the rotating shaft, and torques whereby components of stressed oxygen systems can be selected which will avoid accidental fires under working conditions.

Official Gazette of the U.S. Patent and Trademark Office



27

NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N86-19455* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

METAL PHTHALOCYANINE INTERMEDIATES FOR THE PREPARATION OF POLYMERS Patent

B. N. ACHAR (National Academy of Sciences/National Research Council, Washington, D.C.), G. M. FOHLEN (National Academy of Sciences/National Research Council, Washington, D.C.), and J. A. PARKER (National Academy of Sciences/National Research Council, Washington, D.C.) 11 Jun. 1985 10 p Filed 15 Sep. 1983 Sponsored by NASA Division of US-Patent-Appl-SN-415880, US-Patent-4,456,268, filed 8 Sep. 1982
(NASA-CASE-ARC-11405-2; US-PATENT-4,522,755;
US-PATENT-APPL-SN-514117; US-PATENT-CLASS-260-245.75;
US-PATENT-CLASS-260-245.9; US-PATENT-CLASS-528-327)
Avail: US Patent and Trademark Office CSCL 11B

Metal 4, 4', 4",-tetracarboxylic phthalocyanines (MPTC) are prepared by reaction of trimellitic anhydride, a salt or hydroxide of the desired metal (or the metal in powdered form), urea and a catalyst. A purer form of MPTC is prepared than heretofore. These tetracarboxylic acids are then polymerized by heat to sheet polymers which have superior heat and oxidation resistance. The metal is preferably a divalent metal having an atomic radius close to 1.35A.

Official Gazette of the U.S. Patent and Trandemark Office

N86-19456* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

PROCESS OF END-CAPPING A POLYIMIDE SYSTEM Patent

T. L. STCLAIR and H. D. BURKS, inventors (to NASA) 12 Nov. 1985 5 p Filed 11 Sep. 1984
(NASA-CASE-LAR-13135-1; US-PATENT-4,552,931;
US-PATENT-APPL-SN-649328; US-PATENT-CLASS-525-432;
US-PATENT-CLASS-525-436; US-PATENT-CLASS-528-179;
US-PATENT-CLASS-528-182; US-PATENT-CLASS-528-185;
US-PATENT-CLASS-528-352; US-PATENT-CLASS-528-353)
Avail: US Patent and Trademark Office CSCL 07D

A process of endcapping a polyimide system with an endcapping agent in order to achieve a controlled decrease in molecular weight and melt viscosity along with predictable fracture resistance of

the molded products is disclosed. The uncapped system is formed by combining an equimolar ratio of 4,4'-bis(3,4-dicarboxyphenoxy) diphenylsulfide dianhydride (BDSDA) and 1,-bis (aminophenoxy) benzene (APB) dissolved in bis (2-methoxyethyl) ether. The end-capped system is formed by dissolving APB in bis-(2-methoxyethyl) ether, adding the BDSDA. By varying the amount of endcapping from 0 to 4%, molecular weight is decreased from 13,900 to 8660. At a processing temperature of 250 C, there is a linear relationship between molecular weight and viscosity, with the viscosity decreasing by two orders of magnitude as the molecular weight decreased from 13,900 to 8660.

Official Gazette of the U.S. Patent and Trademark Office

N86-19457* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

HIGH TEMPERATURE RESISTANT POLYIMIDE FROM TETRA ESTER, DIAMINE, DIESTER AND N-ARYLNADIMIDE Patent

R. H. PATER, inventor (to NASA) 24 Dec. 1985 8 p Filed 13 Oct. 1982

(NASA-CASE-LEW-13864-1; US-PATENT-4,560,742; US-PATENT-APPL-SN-434087; US-PATENT-CLASS-528-342; US-PATENT-CLASS-528-229; US-PATENT-CLASS-528-322; US-PATENT-CLASS-528345) Avail: US Patent and Trademark Office CSCL 11B

The invention described relates to improved polyimide resins which are noted for their high thermal and oxidative stability, high strength at elevated temperatures and which exhibit many other outstanding physical and chemical properties, especially useful in high temperature applications. The polyimides are prepared by the reaction, with application of heat of a mixture of monomers comprising: (1) a dialkyl or tetraalkyl ester of an aromatic tetracarboxylic acid, (2) and aromatic diamine, (3) a monoalkyl or dialky ester of a dicarboxylic acid, and (4) a N-arylnadimide such as N-phenylnadimide. Polyimides of monomers (1), (2) and (3) are known. Official Gazette of the U.S. Patent and Trademark Office

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N86-19458* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

OXIDATION PROTECTION COATINGS FOR POLYMERS Patent

M. J. MIRTICH, J. S. SOVEY, and B. A. BANKS, inventors (to NASA) 24 Dec. 1985 6 p Filed 11 Sep. 1984

(NASA-CASE-LEW-14072-1; US-PATENT-4,560,577; US-PATENT-APPL-SN-649330; US-PATENT-CLASS-427-38; US-PATENT-CLASS-427-248.1; US-PATENT-CLASS-204/298; US-PATENT-CLASS-204-192-R; US-PATENT-CLASS-204-192-C; US-PATENT-CLASS-204-192-D; US-PATENT-CLASS-428-702; US-PATENT-CLASS-428-473.5; US-PATENT-CLASS-428-446) Avail: US Patent and Trademark Office CSCL 11B

A polymeric substrate is coated with a metal oxide film to provide oxidation protection in low Earth orbital environments. The film contains about 4 volume percent polymer to provide flexibility. A coil of polymer material moves through an ion beam as it is fed between reels. The ion beam first cleans the polymer material surface and then sputters the film material from a target onto this surface.

Official Gazette of the U.S. Patent and Trademark Office

N86-19461*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

PROCESS FOR PREPARING PHTHALOCYANINE POLYMERS Patent Application

B. N. ACHAR (NAS-NRC, Washington, D.C.), G. M. FOHLEN, and J. A. PARKER, inventors (to NASA) 12 Jul. 1985 22 p

(NASA-CASE-ARC-11511-2; NAS 1.71:ARC-11511-2; US-PATENT-APPL-SN-754362) Avail: NTIS HC A02/MF A01 CSCL 11B

Imide-linked bisphthalonitrile compounds are prepared by combining a dicyano aromatic diamine and an organic dianhydride to produce an amic acid linked bisphthalonitrile compound. The amic acid linked bisphthalonitrile compound is dehydrocyclized to produce the imide-linked bisphthalonitrile compounds. The imide-linked bisphthalonitrile compounds may be polymerized to produce a phthalocyanine polymer by heating the imide-linked bisphthalonitrile compound, either alone or in the presence of a metal powder or a metal salt. These compounds are useful in the coating, laminating and molding arts. The polymers are useful in composite matrix resins where increased fire resistance, toughness and resistance to moisture are required, particularly as secondary structures in aircraft and spacecraft. NASA

N86-19462*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

POLYENAMINES FROM AROMATIC DIACETYLENIC DIKETONES AND DIAMINES Patent Application

P. M. HERGENROTHER, R. G. BASS (Virginia Commonwealth Univ., Richmond), J. W. CONNELL (Virginia Commonwealth Univ., Richmond), and M. S. SINSKY, inventors (to NASA) (Virginia Commonwealth Univ., Richmond) 15 May 1985 17 p

(NASA-CASE-LAR-13444-1-CU; NAS 1.71:LAR-13444-1-CU; US-PATENT-APPL-SN-734366) Avail: NTIS HC A02/MF A01 CSCL 11B

The synthesis and characterization of several polyenamine ketones are discussed wherein conjugated diacetylenic diketones and aromatic diamines are used as a route to the formation of high molecular weight polyenamine ketones which exhibit good mechanical properties and can be cast into creasible films. Typical polymerization conditions involved the reaction of stoichiometric amounts of 1,4- or 1,3-PPPO and a diamine at 60 to 130 C in M-cresol at (w/w) solids content of 8 to 26% for a specified period of time under a nitrogen atmosphere. Novel polyenamine ketones were prepared with inherent viscosities as high as 1.99 d1/g and tough, clear amber films with tensile strengths of 12,400 psi and tensile moduli of 397,000 psi were cast from solutions of the polymers in chloroform. In most cases, the elemental analyses for the polynamine ketones, shown, agree within + or - 0.3% of the theoretical values. NASA

N86-19463*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

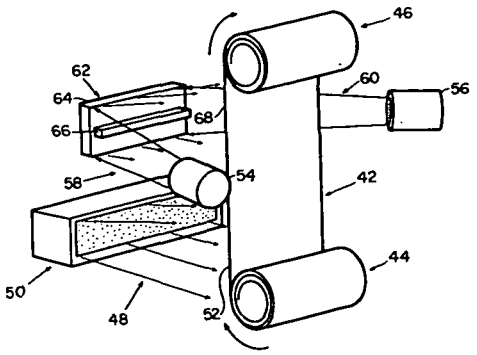
OXIDATION PROTECTING COATINGS FOR POLYMERS Patent Application

M. J. MIRTICH, J. S. SOVEY, and B. A. BANKS, inventors (to NASA) 31 Jul. 1985 11 p

(NASA-CASE-LEW-14072-2; NAS 1.71:LEW-14072-2; US-PATENT-APPL-SN-761235) Avail: NTIS HC A02/MF A01 CSCL 11B

A polymeric substrate is coated with a metal oxide film to provide oxidation protection in low Earth orbital environments. The film contains about 4 volume percent polymer to provide flexibility. A coil of polymer material moves through an ion beam as it is fed between reels. The ion beam first cleans the polymer material

surface and then sputters the film material from a target onto this surface. NASA



N86-20560* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

COPOLYMERS OF VINYL STYRYLPYRIDINES OR VINYL STILBAZOLES WITH BISMALEIMIDE Patent

J. A. PARKER, A. H. HEIMBUCH, M. T. S. HSU, and T. S. CHEN, inventors (to NASA) 2 Jul. 1985 11 p Filed 18 Nov. 1983 (NASA-CASE-ARC-11429-1-CU; US-PATENT-4,526,925; US-PATENT-APPL-SN-553339; US-PATENT-CLASS-524-548; US-PATENT-CLASS-525-186; US-PATENT-CLASS-526-262; US-PATENT-526-265) Avail: US Patent and Trademark Office CSCL 11B

Vinyl pyridines including vinyl stilbazole materials and vinyl styrylpyridine oligomer materials are disclosed. These vinylpyridines form copolymers with bismaleimides which copolymers have good fire retardancy and decreased brittleness. The cure temperatures of the copolymers are substantially below the cure temperatures of the bismaleimides alone. Reinforced composites made from the cured copolymers are disclosed as well.

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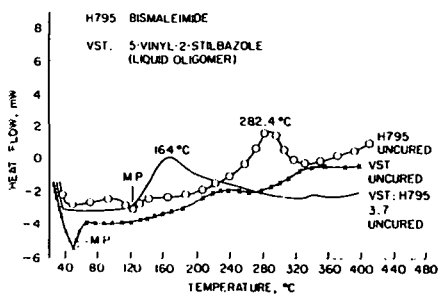
DSC OF BISMALEIMIDE AND VST/BISMALEIMIDE COPOLYMERS



N86-20561* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

HIGH TEMPERATURE POLYIMIDE FILM LAMINATES AND PROCESS FOR PREPARATION THEREOF Patent

A. K. STCLAIR and T. L. STCLAIR, inventors (to NASA) 24 Sep. 1985 15 p Filed 24 Oct. 1984 Continuation-in-part of abandoned US-Patent-Appl-SN-189234, filed 22 Sep. 1980 (NASA-CASE-LAR-13384-1; US-PATENT-4,543,295; US-PATENT-APPL-SN-663840; US-PATENT-CLASS-428-458; US-PATENT-CLASS-156-307; US-PATENT-CLASS-256-308.2; US-PATENT-CLASS-156-309.9; US-PATENT-CLASS-156-331.5; US-PATENT-CLASS-427-385.5; US-PATENT-CLASS-427-388.1; US-PATENT-CLASS-428-473.5) Avail: US Patent and Trademark Office CSCL 11D

High temperature polyimide film laminates and a process for fabricating large-area, void-free polyimide laminate structures wherein multiple-ply polyimide film laminates may be constructed without decreasing the indiviudal film strength and wherein layers of metal foil may be laminated between polyimide film layers to yield a flexible high temperature resistant structure having capabilities for use as flexible electric circuits, in aerospace applications, and the like.

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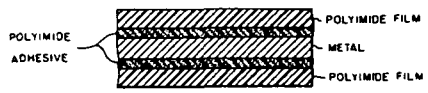
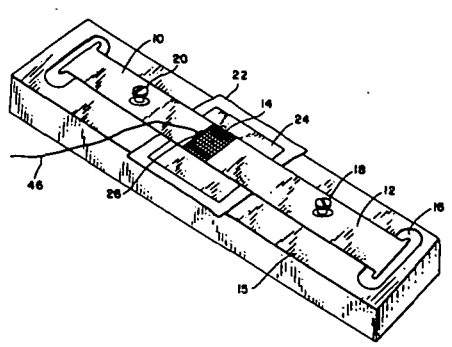


N86-20564*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

THERMOPLASTICS/THERMOSETTING ADHESIVE SPECIMEN BONDING Patent Application

B. A. STELN, R. L. FOX, J. D. BUCKLEY, L. G. BURCHER, J. R. TYERYAR, S. E. STERLING, JR., inventors (to NASA), S. V. INGE, JR., and R. E. WRIGHT, JR. 29 May 1985 37 p (NASA-CASE-LAR-13066-1; NAS 1.71:LAR:13066-1; US-PATENT-APPL-SN-738816) Avail: NTIS HC A03/MF A01 CSCL 11A

An induction heating, pressure bonding apparatus for bonding specimens of similar or dissimilar material compositions is disclosed. Specimens are sandwiched about an adhesive impregnated susceptor, and then placed within a specimen fixture. The fixture is inserted into a press, and power is supplied to a toroid induction heater. The induction heater emits electromagnetic energy which passes through a susceptor, thereby heating the susceptor and melting the impregnating adhesive. Pressure is simultaneously applied via a hydraulic jack, and the melted adhesive thoroughly wets the inner bonding surfaces of the specimens. Either thermosetting or thermoplastic adhesives may be used, and short bonding times are obtained due to the utilization of induction heater. NASA



N86-20565*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
POLYIMIDES CONTAINING ATBN ELASTOMETERS AND THE PROCESS FOR PREPARING SAME Patent Application
A. K. ST.CLAIR, S. A. EZZELL, T. L. STCLAIR, and J. A. HINKLEY, inventors (to NASA) 23 Aug. 1985 22 p
(NASA-CASE-LAR-13178-1; NAS 1.71:13178-1;
US-PATENT-APPL-SN-768771) Avail: NTIS HC A02/MF A01
CSCL 11B

High temperature linear aromatic polyimides and the process for preparing same through a solvent solution or by molten reaction are disclosed. By incorporation of relatively small amounts (1 to 25% by weight) of amine terminated butadiene/acrylonitrite (ATBN) elastomer into the linear polyimide backbone, an otherwise hard to process polymer is rendered readily processable. Cast films of the polyamic acid solution exhibit improved tear resistance with 1 to 15% by weight of the ATBN elastomer. NASA

N86-20566*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COPOLYIMIDES WITH A COMBINATION OF FLEXIBILIZING GROUPS Patent Application
T. L. ST.CLAIR, H. D. BURKS, and D. J. PROGAR, inventors (to NASA) 20 Jun. 1985 23 p
(NASA-CASE-LAR-13354-1; NAS 1.71:LAR-13354-1;
US-PATENT-APPL-SN-746901) Avail: NTIS HC A02/MF A01
CSCL 11B

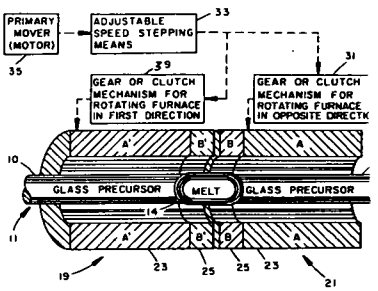
Novel copolyimides are prepared by reacting one or more aromatic dianhydrides with a metasubstiuted phenylene diamine and an aromatic bridged diamine. The incorporation of metasubstituted phenylene diamine derived units and bridged aromatic diamine derived units into the linear aromatic polymer backbone results in a copolyimide of improved flexibility, processability, and melt-flow characteristics. The novel copolyimides are especially useful as thermoplastic hot-melt adhesives. NASA

N86-21675* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ETHYNYL AND SUBSTITUTED ETHYNYL-TERMINATED POLYSULFONES Patent
P. M. HERGENROTHER, inventor (to NASA) 21 Jan. 1986 5 p
Division of US-Patent-4,431,761 US-Patent-Appl-SN-433598, filed 8 Oct. 1982
(NASA-CASE-LAR-12931-2; US-PATENT-4,565,886;
US-PATENT-APPL-SN-527914; US-PATENT-CLASS-556-436;
US-PATENT-CLASS-585-24; US-PATENT-CLASS-260-544-D)
Avail: US Patent and Trademark Office CSCL 06C

Ethynyl and substituted ethynyl-terminated polysulfones and their synthesis are disclosed. These polysulfones are thermally cured to induce cross-linking and chain extension, producing a polymer system with improved solvent resistance and use temperatures. Also disclosed are substituted 4-ethynylbenzoyl chlorides as precursors to the substituted ethynyl-terminated polysulfones and a process for preparing the same.
Official Gazette of the U.S. Patent and Trademark Office

N86-21684*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
QUASI-CONTAINERLESS GLASS FORMATION METHOD AND APPARATUS Patent Application
R. J. NAUMANN and E. C. ETHRIDGE, inventors (to NASA) 5 Dec. 1985 18 p
(NASA-CASE-MFS-28090-1; NAS 1.71:MFS-28090-1;
US-PATENT-APPL-SN-805012) Avail: NTIS HC A02/MF A01
CSCL 11B

In the method of the invention glass rods or fibers are prepared from a polycrystalline rod by heating a short section of the rod in a first furnace to form a molten zone of the rod, heating a second short section of the rod in a second furnace to form a second molten zone and gradually moving the furnaces apart from one another to form an elongated molten float zone, which is cooled in its midsection to produce a glass rod between the molten zones. In another embodiment a single moving furnace assembly and a precursor rod with compositional gradient sections, are used, and the moving furnace traverses the rod so that the molten portion moves through various sections of the rod enabling preparation of glass from reluctant glass-forming compositions. A method and apparatus for producing glass fiber by pulling from molten sections are also disclosed. Novelty of the invention is believd to reside in formation of a molten zone that remains out of contact with container walls during glass formation. This enables preparation of high purity glasses and glasses of novel compositions that are not amenable to preparation by previous methods. NASA



N86-21685*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ACETYLENE (ETHYNYL) TERMINATED POLYIMIDE SILOXANE AND PROCESS FOR PREPARATION THEREOF Patent Application
T. L. ST.CLAIR and S. MAUDGAL, inventors (to NASA) (National Research Foundation) 30 Sep. 1985 14 p
(NASA-CASE-LAR-13318-1; NAS 1.71:LAR-13318-1;
US-PATENT-APPL-SN-781813) Avail: NTIS HC A02/MF A01
CSCL 11B

Siloxane containing addition polyimides having improved physical property characteristics of flexibility, drape, tack and toughness and the process for preparing and utilizing same are disclosed. The novelty of this invention appears to reside in the composition and process of preparing addition type polyimides useful as structural adhesives as well as composite matrix materials and the process of preparing same. NASA

N86-21686*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AMINOPHENOXYCYCLOTRIPHOSPHAZENE CURED EPOXY RESINS AND THE COMPOSITES, LAMINATES AND STRUCTURES THEREOF Patent Application
D. KUMAR (NRC-NAS), G. M. FOHLEN, and J. A. PARKER, inventors (to NASA) 21 Nov. 1985 22 p
(NASA-CASE-ARC-11548-1; NAS 1.71:ARC-11548-1;
US-PATENT-APPL-SN-806572) Avail: NTIS HC A02/MF A01
CSCL 11B

Aminophenoxycyclotriphosphazenes such as hexakis (4-aminophenoxy) cyclotriphosphazene and tris (4-aminophenoxy)-tris

phenoxycyclotriphosphazene are used as curing agents for epoxy resins. These 1,2-epoxy resins are selected from di- or polyepoxide containing organic moieties of the formula (CH2-CHO-CH2)m-W-R-W-(CH2CH-CH2O)m where R is diphenyldimethylmethane, diphenylmethane, bis (dibromophenyl) dimethylmethane. W is a nitrogen or oxygen atom; and m is 1 when W is oxygen and 2 when W is nitrogen. The resins are cured thermally in stages at between about 110 to 135 C for between about 1 and 10 min, then at between about 175 to 185 C for between about 0.5 to 10 hr and post-cured at between about 215 and 235 C for between about 01. and 2 hr. These resins are useful for making fire resistant elevated temperature stable composites, laminates (e.g., graphite fiber or fiberglass), molded parts, and adhesives and structures, usually for aircraft secondary structures and for spacecraft construction. NASA

31

ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N86-19479* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SEQUENTIALLY DEPLOYABLE MANEUVERABLE TETRAHEDRAL BEAM Patent
M. M. MIKULAS, JR. (General Research Corp., Santa Barbara, Calif.) and R. F. CRAWFORD, inventors (to NASA) (General Research Corp., Santa Barbara, Calif.) 10 Dec. 1985 9 p Filed 8 Sep. 1983 Sponsored by NASA
(NASA-CASE-LAR-13098-1; US-PATENT-4,557,097; US-PATENT-APPL-SN-530339; US-PATENT-CLASS-52-646; US-PATENT-CLASS-52-632; US-PATENT-CLASS-52-637; US-PATENT-CLASS-52-648; US-PATENT-CLASS-16-242; US-PATENT-CLASS-16-390; US-PATENT-CLASS-403-64; US-PATENT-CLASS-403-171) Avail: US Patent and Trademark Office CSCL 20K

A tetrahedral beam that can be compactly stowed, sequentially deployed, and widely manipulated to provide a structurally sound yet highly maneuverable truss structure is comprised of a number of repeating units of tandem tetralhedral sharing common sides. Fixed length battens are jointed into equilateral triangles called batten frames. Apexes of adjacent triangles are interconnected by longerons having a mid-point folding hinge. Joints, comprised of gussets pivotabley connected by links, permit two independent degrees of rotational freedom between joined adjacent batten frames, and provide a stable structure from packaged configuration to complete deployment. The longerons and joints can be actuated in any sequence, independently of one another. The beam is suited to remote actuation. Longerons may be provided with powered mid-point hinges enabling beam erection and packaging under remote control. Providing one or more longerons with powered telescoping segments permits the shape of the beam central axis to be remotely manipulated so that the beam may function as a remote manipulator arm.

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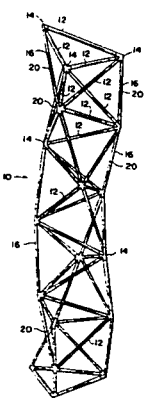
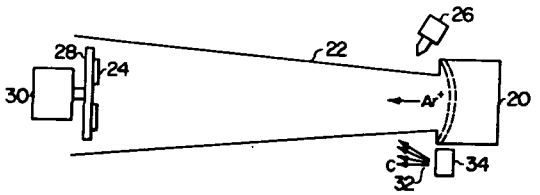


N86-20587*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ION BEAM SPUTTER ETCHING Patent Application
B. A. BANKS and S. K. RUTLEDGE, inventors (to NASA) 13 Sep. 1985 12 p
(NASA-CASE-LEW-13899-1; NAS 1.71:LEW-13899-1; US-PATENT-APPL-SN-775968) Avail: NTIS HC A02/MF A01 CSCL 13H

An ion beam etching process which forms extremely high aspect ratio surfce microstructures using thin sputter masks is utilized in the fabrication of integrated circuits. A carbon rich sputter mask together with unmasked portions of a substrate is bombarded with inert gas ions while simultaneous carbon deposition occurs. The arrival of the carbon deposit is adjusted to enable the sputter mask to have a near zero or even slightly positive increase in thickness with time while the unmasked portions have a high net sputter etch rate. NASA



N86-21718* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
CONTAINERLESS HIGH PURITY PULLING PROCESS AND APPARATUS FOR GLASS FIBER Patent
R. J. NAUMANN and E. C. ETHRIDGE, inventors (to NASA) 21 Jan. 1986 6 p Filed 19 Apr. 1984 Continuation-in-part of US-Patent-Appl-SN-526754, filed 26 Aug. 1983, abandonded
(NASA-CASE-MFS-25905-2; US-PATENT-4,565,557; US-PATENT-APPL-SN-601130; US-PATENT-CLASS-65-1; US-PATENT-CLASS-65-2; US-PATENT-CLASS-65-11.1; US-PATENT-CLASS-65-12) Avail: US Patent and Trademark Office CSCL 13H

Apparatus and method for pulling optical glass fibers in a containerless environment is disclosed which includes a single axis acoustical levitation furnace in which a specimen is levitated and melted. A reflector unit is carried in the interior of the furnace and includes a reflector disposed centrally about the acoustical axis of the levitator. The reflector unit includes a circular shroud of insulation and a copper sleeve inserted in the unit which is hollow at for receiving a cooling medium. A fiber pulling bore is formed centrally in the reflector unit surrounded by cooling jacket to enhance solidification and formation of a fiber. A starting fiber strand is introduced into the melt and pulled outwardly through bore whereby the specimen fiber is started and formed as pulled therethrough. In order to replenish the melt and thus enable a continous process, a movable secondary reflector is provided which captures a supplemental specimen pellet and by movement of the reflector transfers it to the melt.

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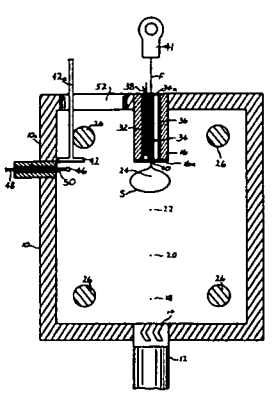

32

COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

N86-20647* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
WIND DYNAMIC RANGE VIDEO CAMERA Patent
G. D. CRAIG, inventor (to NASA) 8 Oct. 1985 7 p Filed 8 Sep. 1983
(NASA-CASE-MFS-25750-1; US-PATENT-4,546,248; US-PATENT-APPL-SN-530-185; US-PATENT-CLASS-250-225; US-PATENT-CLASS-350-354; US-PATENT-CLASS-358-168)
Avail: US Patent and Trademark Office

A television camera apparatus is disclosed in which bright objects are attenuated to fit within the dynamic range of the system, while dim objects are not. The apparatus receives linearly polarized light from an object scene, the light being passed by a beam splitter and focused on the output plane of a liquid crystal light valve. The light valve is oriented such that, with no excitation from the cathode ray tube, all light is rotated 90 deg and focused on the input plane of the video sensor. The light is then converted to an electrical signal, which is amplified and used to excite the CRT. The resulting image is collected and focused by a lens onto the light valve which rotates the polarization vector of the light to an extent proportional to the light intensity from the CRT. The overall effect is to selectively attenuate the image pattern focused on the sensor.

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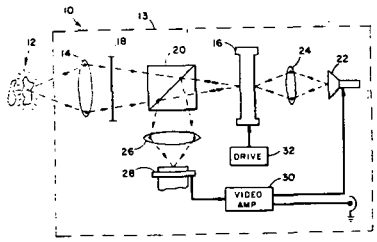

33

ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

N86-19515* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
JFET REFLECTION OSCILLATOR Patent
L. L. KLEINBERG, inventor (to NASA) 12 Nov. 1985 6 p Filed 27 May 1980
(NASA-CASE-GSC-12555-1; US-PATENT-4,553,110; US-PATENT-APPL-SN-153240; US-PATENT-CLASS-331-116-FE; US-PATENT-CLASS-331-117-FE) Avail: US Patent and Trademark Office CSCL 09C

A high frequency oscillator circuit is provided using a low cost junction type field effect transistor (T sub 1) with a tuned circuit connected to its gate. The frequency of operation is determined by the tuned circuit and the capacitance reflected from the source to the gate. The transistor is matched to the frequency of operation so that this frequency falls within the roll-off portion of the transistor's transconductance verses frequency curve, preferably somewhat above the 3 db point in frequency. Phase shift necessary to sustain oscillation occurs due to the operation of the transistor in the roll-off portion of the curve and the addition of a phase shifting network (R sub 1, C sub 1) at the source.

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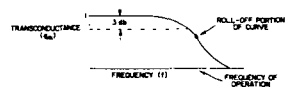

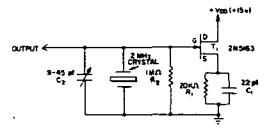

N86-19516* National Aeronautics and Space Administration. Pasadena Office, Calif.
LASER ACTIVATED MTOS MICROWAVE DEVICE Patent
J. MASERJIAN, inventor (to NASA) (California Inst. of Tech., Pasadena, Calif.) 23 Jul. 1985 5 p Filed 14 Oct. 1983
(NASA-CASE-NPO-16112-1; US-PATENT-4,531,143; US-PATENT-APPL-SN-542232; US-PATENT-CLASS-357-23.6; US-PATENT-CLASS-357-30; US-PATENT-CLASS-357-58; US-PATENT-CLASS-357-59) Avail: US Patent and Trademark Office CSCL 09A

A light-activated semiconductor device usable as an optoelectronic switch, pulse generator or optical detector is provided. A semiconductor device is disclosed which provides back-to-back metal-thin oxide-silicon (MTOS) capacitors. Each capacitor includes a thin, light-absorptive aluminum electrode which overlies a thin oxide layer and a lightly doped region implanted in an intrinsic silicon substrate.

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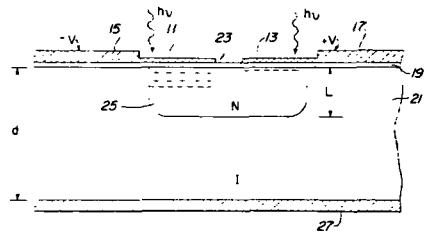
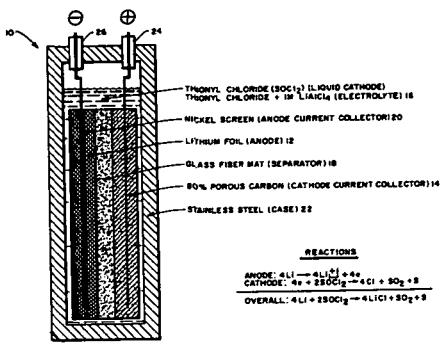


N86-19517*# National Aeronautics and Space Administration. Pasadena Office, Calif.
CATHODE FOR PRIMARY BATTERY Patent Application
S. P. S. YEN, inventor (to NASA) (JPL, Pasadena, Calif.) 24 May 1985 21 p
(Contract NAS7-918)
(NASA-CASE-NPO-16397-1-CU; NAS 1.71:NPO-16397-1-CU; US-PATENT-APPL-SN-751643) Avail: NTIS HC A02/MF A01 CSCL 10C

A composite electrode for a Li-SOCl2 primary battery is formed of a porous layer of an elastomer binder such as chlorinated polyethylene containing a dispersion of conductive carbon particles. Primary Li-SOCl2 cells containing the porous chlorinated polyethylene binder-carbon electrode provide much higher capacity than cells containing polytetrafluorethylene-carbon electrodes probably due to the presence of more pores with more uniform size in the chlorinated polyethylene composite electrode. NASA



N86-20668* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AUTOMATIC OSCILLATOR FREQUENCY CONTROL SYSTEM Patent
S. F. SMITH, inventor (to NASA) (Smith (Stephen F.), Knoxville, Tenn.) 29 Oct. 1985 15 p Filed 6 Sep. 1983 Sponsored by NASA
(NASA-CASE-GSC-12804-1; US-PATENT-4,550,292; US-PATENT-APPL-SN-529803; US-PATENT-CLASS-331-2; US-PATENT-CLASS-331-1-A) Avail: US Patent and Trademark Office CSCL 09C

A frequency control system makes an initial correction of the frequency of its own timing circuit after comparison against a frequency of known accuracy and then sequentially checks and corrects the frequencies of several voltage controlled local oscillator circuits. The timing circuit initiates the machine cycles of a central processing unit which applies a frequency index to an input register in a modulo-sum frequency divider stage and enables a multiplexer to clock an accumulator register in the divider stage with a cyclical signal derived from the oscillator circuit being checked. Upon expiration of the interval, the processing unit compares the remainder held as the contents of the accumulator against a stored zero error constant and applies an appropriate correction word to a correction stage to shift the frequency of the oscillator being checked. A signal from the accumulator register may be used to drive a phase plane ROM and, with periodic shifts in the applied frequency index, to provide frequency shift keying of the resultant output signal. Interposition of a phase adder between the accumulator register and phase plane ROM permits phase shift keying of the output signal by periodic variation in the value of a phase index applied to one input of the phase adder.
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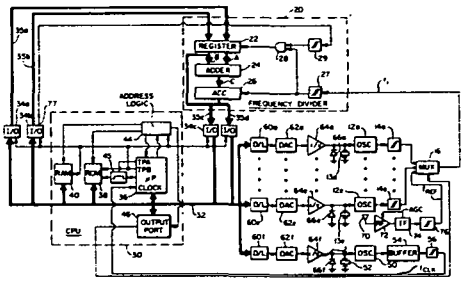
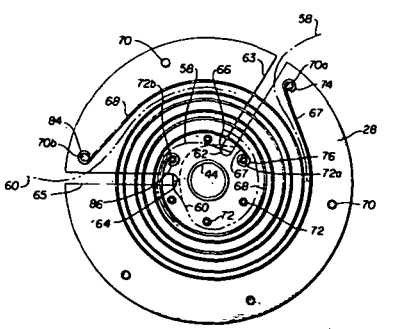


N86-20669* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ROTATABLE ELECTRIC CABLE CONNECTING SYSTEM Patent
D. R. MANGES, inventor (to NASA) 24 Sep. 1985 9 p Filed 23 May 1984
(NASA-CASE-GSC-12899-1; US-PATENT-4,542,858; US-PATENT-APPL-SN-613140; US-PATENT-CLASS-242-54-R; US-PATENT-CLASS-242-107; US-PATENT-CLASS-191-12.2-R)
Avail: US Patent and Trademark Office CSCL 09A

A cable reel assembly is described which is particularly adapted for, but not limited to, a system for providing electrical connection of power and data signals between an orbiter vehicle, such as a space shuttle, and a recovered satellite. The assembly is comprised of two mutually opposing ring type structures having 180 deg relative rotation with one of the structures being held in fixed position while the other structure is rotatable. Motor controlled berthing latches and umbilical cable connectors for the satellite are located on the rim of the rotatable ring structure. The electrical cable assembly is fed in two sections from the orbiter vehicle into the outer rim portion of the fixed ring structure where they are directed inwardly and attached to two concentrically coiled metal bands whose respective ends are secured to inner and outer post members of circular sets of guide pins located on opposing circular plate members, one rotatable and one fixed. The cable sections are fed out as three output cable sections through openings in the central portion of the circular plate of the rotatable ring structure where they are directed to the latches and connectors located on its rim.
Official Gazette of the U.S. Patent and Trademark Office



N86-20670* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
AMPLIFIER FOR MEASURING LOW-LEVEL SIGNALS IN THE PRESENCE OF HIGH COMMON MODE VOLTAGE Patent
F. E. LUKENS, inventor (to NASA) (Martin Marietta Corp., Denver, Colo.) 5 Nov. 1985 7 p Filed 7 Aug. 1984 Sponsored by NASA
(NASA-CASE-MFS-25868-1; US-PATENT-4,551,687; US-PATENT-APPL-SN-638584; US-PATENT-CLASS-330-258; US-PATENT-CLASS-330-311; US-PATENT-CLASS-330-261)
Avail: US Patent and Trademark Office

A high common mode rejection differential amplifier wherein two serially arranged Darlington amplifier stages are employed and any common mode voltage is divided between them by a resistance network. The input to the first Darlington amplifier stage is coupled to a signal input resistor via an amplifier which isolates the input and presents a high impedance across this resistor. The output of the second Darlington stage is transposed in scale via an amplifier stage which has its input a biasing circuit which effects a finite biasing of the two Darlington amplifier stages.

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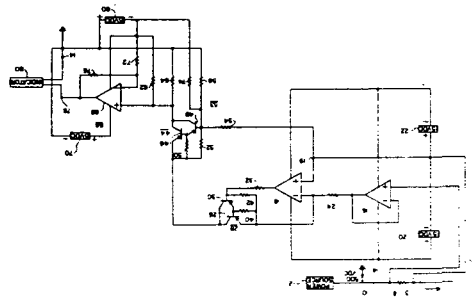

N86-20671* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PIEZOELECTRIC DEICING DEVICE Patent
R. C. FINKE and B. A. BANKS, inventors (to NASA) 8 Oct. 1985 5 p Filed 7 Aug. 1984 Continuation of abandoned US-Patent-Appl-SN-469867, filed 25 Feb. 1983
(NASA-CASE-LEW-13773-2; US-PATENT-4,545,553; US-PATENT-APPL-SN-638541; US-PATENT-CLASS-244-134-D; US-PATENT-CLASS-39-25.35; US-PATENT-CLASS-310-324)
Avail: US Patent and Trademark Office CSCL 09A

A fast voltage pulse is applied to a transducer which comprises a composite of multiple layers of alternately polarized piezoelectric material. These layers are bonded together and positioned over the curved leading edge of an aircraft wing structure. Each layer is relatively thin and metallized on both sides. The strain produced in the transducer causes the composite to push forward resulting in detachment and breakup of ice on the leading edge of the aircraft wing.

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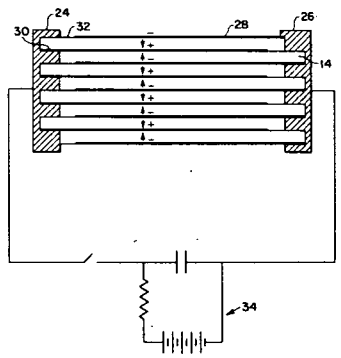

N86-20672* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
HYBRID POWER SEMICONDUCTOR Patent
D. Y. CHEN 15 Oct. 1985 5 p Filed 30 Sep. 1983
(NASA-CASE-LEW-13922-1; US-PATENT-4,547,686; US-PATENT-APPL-SN-537614; US-PATENT-CLASS-307-570; US-PATENT-CLASS-307-264; US-PATENT-CLASS-307-270; US-PATENT-CLASS-307-566; US-PATENT-CLASS-307-572)
Avail: US Patent and Trademark Office CSCL 09A

The voltage rating of a bipolar transistor may be greatly extended while at the same time reducing its switching time by operating it in conjunction with FETs in a hybrid circuit. One FET is used to drive the bipolar transistor while the other FET is connected in series with the transistor and an inductive load. Both FETs are turned on or off by a single drive signal of load power, the second FET upon ceasing conductions, rendering one power electrode of the bipolar transistor open. Means are provided to dissipate currents which flow after the bipolar transistor is rendered nonconducting.

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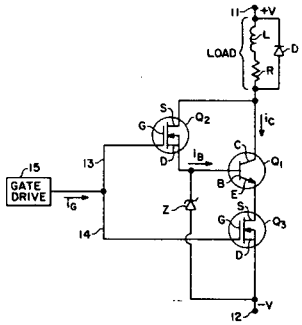
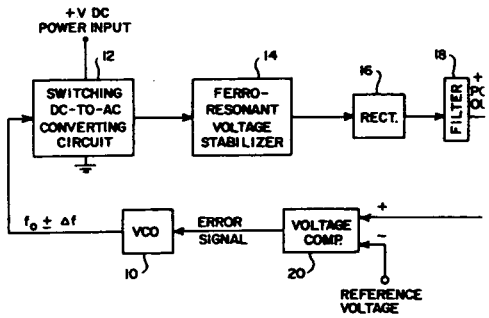


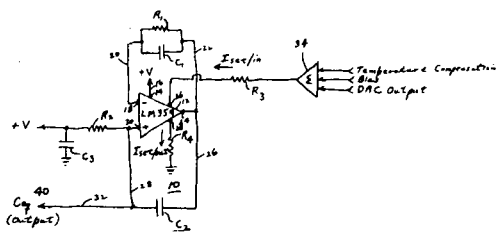
N86-20673*# National Aeronautics and Space Administration. Pasadena Office, Calif.
FERRORESONANT REGULATED POWER SUPPLY Patent Application
W. T. MCLYMAN, inventor (to NASA) (JPL, Pasadena, Calif.) 24 Dec. 1984 12 p
(Contract NAS7-918)
(NASA-CASE-NPO-15977-1-CU; NAS 1.71:NPO-15977-1-CU; US-PATENT-APPL-SN-692740) Avail: NTIS HC A02/MF A01 CSCL 10B

A voltage controlled oscillator which drives a switching circuit for dc-to-ac conversion of dc power is presented. The dc-to-ac converter operates into a ferroresonant voltage stabilizer which limits the amplitude of ac voltage that is then rectified and filtered. A sample of the dc voltage output is compared with a reference and fed back as an error signal to alter the frequency of the oscillator, and thus alter the voltage limiting level of the ferroresonant voltage stabilizer as a linear function of frequency for tight control of the output voltage. NASA



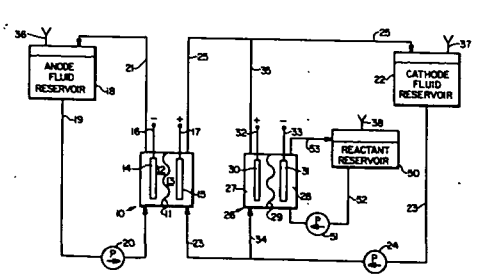
N86-20679*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PROGRAMMABLE ELECTRONIC SYNTHESIZED CAPACITANCE Patent Application
L. L. KLEINBERG, inventor (to NASA) 15 Jul. 1985 15 p
(NASA-CASE-GSC-12961-1; NAS 1.71:GSC-12961-1;
US-PATENT-APPL-SN-754707) Avail: NTIS HC A02/MF A01
CSCL 09A

A predetermined and veriable synthesized capacitance which may be incorporated into the resonant portion of an electronic oscillator for the purpose of tuning the oscillator comprises a programmable operational amplifier circuit. The operational amplifier circuit has its output connected to its inverting input, in a follower configuration, by a network which is low impedance at the operational frequency of the circuit. The output of the operational amplifier is also connected to the noninverting input by a capacitor. The noninverting input appears as a synthesized capacitance which may be varied with a variation in gain-bandwidth product of the operational amplifier circuit. The gain-bandwidth product may, in turn, be varied with a variation in input set current with a digital to analog converter whose output is varied with a command word. The output impedance of the circuit may also be varied by the output set current. This circuit may provide very small ranges in oscillator frequency with relatively large control votages unaffected by noise. NASA



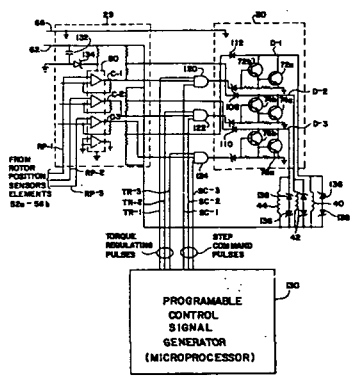
N86-20680*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
METHOD AND APPARATUS FOR REBALANCING A REDOX FLOW CELL SYSTEM Patent Application
R. F. GAHN, inventor (to NASA) 25 Jun. 1985 11 p
(NASA-CASE-LEW-14127-1; NAS 1.71:LEW-14127-1;
US-PATENT-APPL-SN-748536) Avail: NTIS HC A02/MF A01
CSCL 09A

A rebalance cell is provided for a REDOX electrochemical system of the type with anode and cathode fluids which are aqueous HC1 solutions with two metal species in each. The rebalance cell has a cathode compartment and a chlorine compartment separated by an ion permeable membrane. By applying an electrical potential to the rebalance cell while circulating cathode fluid through the cathode compartment and while circulating an identical fluid through the chlorine compartment, any significant imbalance of the REDOX system is prevented. NASA



N86-20681*# National Aeronautics and Space Administration. Pasadena Office, Calif.
BRUSHLESS DC MOTOR CONTROL SYSTEM RESPONSIVE TO CONTROL SIGNALS GENERATED BY A COMPUTER OR THE LIKE Patent Application
D. T. PACKARD, inventor (to NASA) (JPL, Pasadena, Calif.) 26 Apr. 1985 39 p
(Contract NAS7-100)
(NASA-CASE-NPO-16420-1; NAS 1.71:NPO-16420-1;
US-PATENT-APPL-SN-727838) Avail: NTIS HC A03/MF A01
CSCL 09A

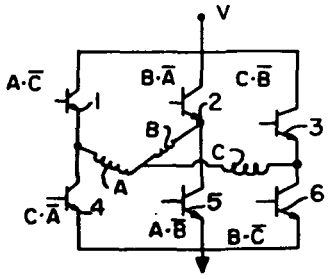
A control system for a brushless DC motor responsive to digital control signals is disclosed. The motor includes a multiphase wound stator and a permanent magnet rotor. The motor is arranged so that each phase winding, when energized from a DC source, will drive the rotor through a predetermined angular position or step. A commutation signal generator responsive to the shaft position provides a commutation signal for each winding. A programmable control signal generator such as a computer or microprocessor produces individual digital control signals for each phase winding. The control signals and commutation signals associated with each winding are applied to an AND gate for that phase winding. Each gate controls a switch connected in series with the associated phase winding and the DC source so that each phase winding is energized only when the commutation signal and the control signal associated with that phase winding are present. The motor shaft may be advanced one step at a time to a desired position by applying a predetermined number of control signals in the proper sequence to the AND gates and the torque generated by the motor be regulated by applying a separate control signal and each AND gate which is pulse width modulated to control the total time that each switch connects its associated winding to the DC source during each commutation period. NASA



N86-20682*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
FOUR QUADRANT CONTROL CIRCUIT FOR A BRUSHLESS THREE PHASE DC MOTOR Patent Application
F. NOLA, inventor (to NASA) 13 Sep. 1985 30 p
(NASA-CASE-MFS-28080-1; NAS 1.71:MFS-28080-1;
US-PATENT-APPL-SN-775548) Avail: NTIS HC A03/MF A01
CSCL 09A

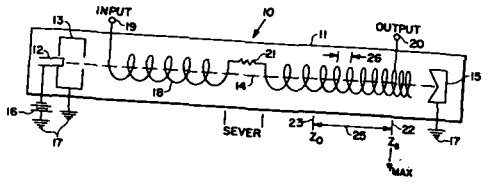
A control circuit is provided for a brushless three-phase dc motor which affords four quadrant control a single command. The control circuit probes acceleration of the motor in both clockwise and counterclockwise directions and braking and generation in both clockwise and counterclockwise directions. In addition to turning on individual transistors of the transistor pairs connected to the phase windings of the motor for 120 deg periods while the other transistor of that pair is off, the control circuit also provides, in a further mode of operation, turning the two transistors of each pair on and off alternately at a phase modulation frequency during such a 120 deg period. A feedback signal is derived which is

proportional to the motor current and which has a polarity consistent with the command signal, such that negative feedback results.
NASA



N86-21742* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LINEARIZED TRAVELING WAVE AMPLIFIER WITH HARD LIMITER CHARACTERISTICS Patent
H. G. KOSMAHL, inventor (to NASA) 14 Jan. 1986 7 p Filed 20 Mar. 1985 Continuation-in-part of US-Patent-Appl-SN-492522, filed 9 May 1983, abandonded
(NASA-CASE-LEW-13981-2; US-PATENT-4,564,787; US-PATENT-APPL-SN-714051; US-PATENT-CLASS-315-3.6; US-PATENT-CLASS-315-3.5; US-PATENT-CLASS-315-39.3; US-PATENT-CLASS-330-43) Avail: US Patent and Trademark Office CSCL 09A

A dynamic velocity taper is provided for a traveling wave tube with increased linearity to avoid intermodulation of signals being amplified. In a traveling wave tube, the slow wave structure is a helix including a sever. A dynamic velocity taper is provided by gradually reducing the spacing between the repeating elements of the slow wave structure which are the windings of the helix. The reduction which takes place coincides with the ouput point of helix. The spacing between the repeating elements of the slow wave structure is ideally at an exponential rate because the curve increases the point of maximum efficiency and power, at an exponential rate. A coupled cavity traveling wave tube having cavities is shown. The space between apertured discs is gradually reduced from 0.1% to 5% at an exponential rate. Output power (or efficieny) versus input power for a commercial tube is shown.
Official Gazette of the U.S. Patent and Trademark Office



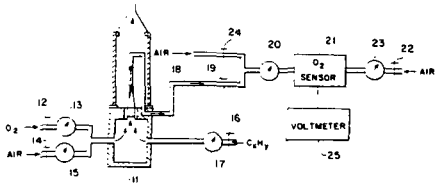
34

FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

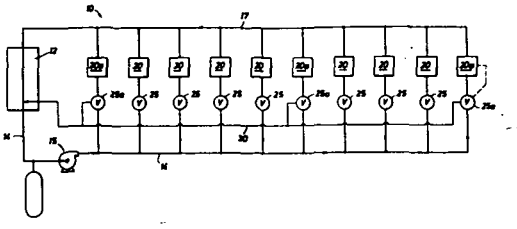
N86-12547* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
TECHNIQUE FOR MEASURING GAS CONVERSION FACTORS Patent
J. J. SINGH and D. R. SPRINKLE, inventors (to NASA) 3 Sep. 1985 6 p Filed 23 Jul. 1984 Supersedes N84-32786 (22 - 22, p 3598)
(NASA-CASE-LAR-13220-1; US-PATENT-4,538,446; US-PATENT-APPL-SN-633179; US-PATENT-CLASS-73-3; US-PATENT-CLASS-73-861.07) Avail: NTIS U.S. Patent and Trademark CSCL 20D

A method for determining hydrocarbon conversion factors for a flowmeter. A mixture of air, O2 and C sub x H sub y is burned and the partial paressure of O2 in the resulting gas is forced to equal the partial pressure of O2 in air. The flowrate of O2 flowing into the mixture is measured by flowmeter and the flowrate of C sub x H sub y flowing into the mixture is measured by the flowmeter conversion factor is to be determined. These measured values are used to calculate the conversion factor.
Official Gazette of the U.S. Patent and Trademark Office



N86-20721*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
PUMPED TWO-PHASE HEAT TRANSFER LOOP Patent Application
F. EDELSTEIN, inventor (to NASA) (Grumman Aerospace Corp., Bethpage, N.Y.) 15 Jul. 1985 16 p Sponsored by NASA
(NASA-CASE-MSC-20841-1; NAS 1.71:MSC-20841-1; US-PATENT-APPL-SN-755288) Avail: NTIS HC A02/MF A01 CSCL 20D

A pumped loop two-phase heat transfer system is presented. The system operates at a nearly constant temperature throughout, and includes a pluarity of independently operating grooved capillary heat exchanger plates supplied with working fluid through independent flow modulation valves connected to a liquid supply line, a vapor line for collecting vapor from the heat exchangers, a condenser between the vapor and the liquid lines, and a fluid circulating pump between the condenser and the heat exchanges.
NASA



35

INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

N86-19580* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TEMPERATURE AVERAGING THERMAL PROBE Patent
L. F. KALIL and V. REINHARDT, inventors (to NASA) 3 Dec. 1985 4 p Filed 31 Jan. 1983
(NASA-CASE-GSC-12795-1; US-PATENT-4,556,327; US-PATENT-APPL-SN-462508; US-PATENT-CLASS-374-115; US-PATENT-CLASS-374-120; US-PATENT-CLASS-374-163)
Avail: US Patent and Trademark Office CSCL 14B

A thermal probe to average temperature fluctuations over a prolonged period was formed with a temperature sensor embedded inside a solid object of a thermally conducting material. The solid object is held in a position equidistantly spaced apart from the interior surfaces of a closed housing by a mount made of a thermally insulating material. The housing is sealed to trap a vacuum or mass of air inside and thereby prevent transfer of heat directly between the environment outside of the housing and the solid object. Electrical leads couple the temperature sensor with a connector on the outside of the housing. Other solid objects of different sizes and materials may be substituted for the cylindrically-shaped object to vary the time constant of the probe.

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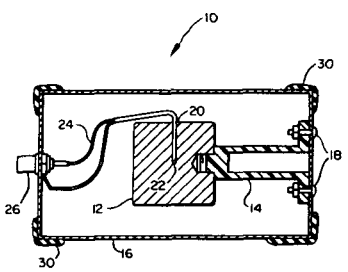

N86-19581* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PORTABLE 90 DEGREE PROOF LOADING DEVICE Patent
R. G. BIRD (Rockwell International Corp., Downey, Calif.) and L. A. BERSON, inventors (to NASA) (Rockwell International Corp., Downey, Calif.) 10 Dec. 1985 8 p Filed 3 May 1983 Sponsored by NASA
(NASA-CASE-MSC-20250-1; US-PATENT-4,557,149; US-PATENT-APPL-SN-491113; US-PATENT-CLASS-73-862.54; US-PATENT-CLASS-73-862.01) Avail: US Patent and Trademark Office CSCL 14B

A hydraulically actuated device is described for applying a test load to a bearing or the like to prove the integrity of its mounting or staking within a bore in a housing such as gear case. To accommodate limited access situations, the device is constructed in a right angle configuration in which a hydraulic cylinder applies axial pressure to a first thrust rod assemly which includes a first thrust rod through a threated spindle driving a linearly translated cam. Cam follower wheel transfers the translation to a second thrust rod assembly which includes a horizontal shaft and a spindle within a cross-arm housing portion and a tubular housing portion. The same second thrust direction applies the bearing loading in either of two directions depending upon the shape of the interface parts. The interface parts can bear on the bearing from either side with respect to the bearing mounting structural part.

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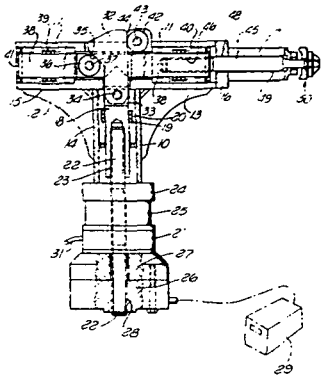

N86-20750* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
HIGH GRADIENT DIRECTIONAL SOLIDIFICATION FURNACE Patent
B. R. ALDRICH and W. D. WHITT, inventor (to NASA) 1 Oct. 1985 9 p Filed 17 Jan. 1984
(NASA-CASE-MFS-25963-1; US-PATENT-4,544,025; US-PATENT-APPL-SN-571614; US-PATENT-CLASS-165-65; US-PATENT-CLASS-165-61; US-PATENT-CLASS-165-30; US-PATENT-CLASS-219-390; US-PATENT-CLASS-219-395; US-PATENT-CLASS-219-396; US-PATENT-CLASS-432-18)
Avail: US Patent and Trademark Office CSCL 14B

A high gradient directional solidification furnace is disclosed which includes eight thermal zones throughout the length of the furnace. In the hot end of the furnace, furnace elements provide desired temperatures. These elements include Nichrome wire received in a grooved tube which is encapsulated y an outer alumina core. A booster heater is provided in the hot end of the furnace which includes toroidal tungsten/rhenium wire which has a capacity to put heat quickly into the furnace. An adiabatic zone is provided by an insulation barrier to separate the hot end of the furnace from the cold end. The old end of the furnace is defined by additional heating elements. A heat transfer plate provides a means by which heat may be extracted from the furnace and conducted away through liquid cooled jackets. By varying the input of heat via the booster heater and output of heat via the heat transfer plate, a desired thermal gradient profile may be provided.

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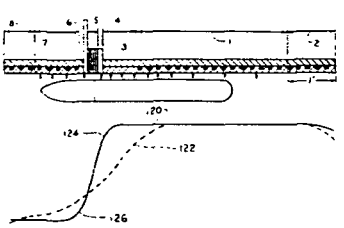

N86-20751* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
LABORATORY GLASSWARE RACK FOR SEISMIC SAFETY Patent
M. M. COHEN, inventor (to NASA) 1 Oct. 1985 10 p Filed 16 Aug. 1983
(NASA-CASE-ARC-11422-1; US-PATENT-4,544,068; US-PATENT-APPL-SN-523991; US-PATENT-CLASS-211-74; US-PATENT-CLASS-211-126) Avail: US Patent and Trademark Office CSCL 14B

A rack for laboratory bottles and jars for chemicals and medicines has been designed to provide the maximum strength and security to the glassware in the event of a significant earthquake. The rack preferably is rectangular and may be made of a variety of chemically resistant materials including polypropylene, polycarbonate, and stainless steel. It comprises a first plurality of parallel vertical walls, and a second plurality of parallel vertical walls, perpendicular to the first. These intersecting vertical walls comprise a self-supporting structure without a bottom which sits on four legs. The top surface of the rack is formed by the top edges of all the vertical walls, which are not parallel but are skewed in three dimensions. These top edges form a grid matrix having a number of intersections of the vertical walls which define a number of rectangular compartments having varying widths and lengths and varying heights.

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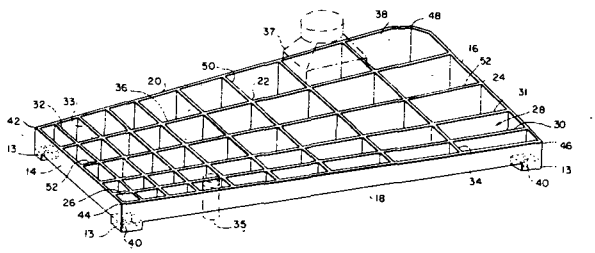

N86-20752* National Aeronautics and Space Administration. Pasadena Office, Calif.
VIBRATING-CHAMBER LEVITATION SYSTEMS Patent
M. B. BARMATZ, D. GRANETT, and M. C. LEE, inventors (to NASA) 29 Oct. 1985 6 p Filed 14 Dec. 1983
(NASA-CASE-NPO-16142-1-CU; US-PATENT-4,549,435; US-PATENT-APPL-SN-561433; US-PATENT-CLASS-73-505)
Avail: US Patent and Trademark Office CSCL 14B

Systems are described for the acoustic levitation of objects, which enable the use of a sealed rigid chamber to avoid contamination of the levitated object. The apparatus includes a housing forming a substantially closed chamber, and means for vibrating the entire housing at a frequency that produces an acoustic standing wave pattern within the chamber.

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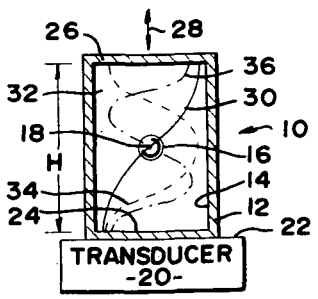
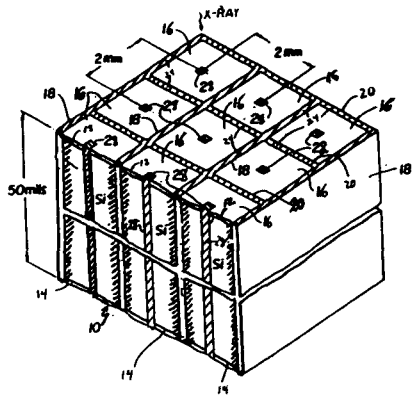


N86-20754*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
METHOD OF FABRICATING AN IMAGING X-RAY SPECTROMETER Patent Application
G. E. ALCORN and A. S. BURGESS, inventors (to NASA) 18 Jun. 1985 11 p
(NASA-CASE-GSC-12956-1; NAS 1.71:GSC-12956-1; US-PATENT-APPL-SN-745977) Avail: NTIS HC A02/MF A01 CSCL 14B

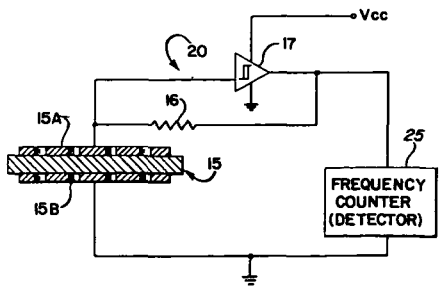
A process for fabricating an X-ray spectrometer having imaging and energy resolution of X-ray sources is discussed. The spectrometer has an array of adjoining rectangularly shaped detector cells formed in a silicon body. The walls of the cells are created by laser drilling holes completely through the silicon body and diffusing n(+) phosphorous doping material therethrough. A thermally migrated aluminum electrode is formed centrally through each of the cells. NASA



N86-20755*# National Aeronautics and Space Administration. Pasadena Office, Calif.
A WATER-ABSORBING CAPACITOR SYSTEM FOR MEASURING RELATIVE HUMIDITY Patent Application
E. G. LAUE, inventor (to NASA) (JPL, Pasadena, Calif.) 20 Jun. 1985 12 p
(NASA-CASE-NPO-16544-1-CU; NAS 1.71:NPO-16544-1-CU; US-PATENT-APPL-SN-746809) Avail: NTIS HC A02/MF A01 CSCL 14B

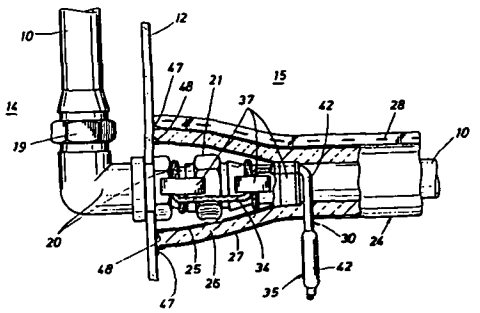
A method and apparatus using a known water-absorbent polymer as a capacitor which is operated at a DC voltage for measuring relative humidity is presented. When formed as a layer between porous electrically-conductive electrodes and operated in an RC oscillator circuit, the oscillator frequency varies inversely with the partial pressure of the moisture to be measured. In a preferred embodiment, the capacitor is formed from Nafion and is operated at a low DC voltage wih a resistor as an RC circuit in an RC oscillator. At the low voltage, the leakage current is proper for oscillation over a satisfactory range. The frequency of oscillation varies in an essentially linear fashion with relative humidity which is represented by the moisture being absorbed into the Nafion. The oscillation frequency is detected by a frequency detector.

NASA



N86-20756*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
FLUID LEAK INDICATOR Patent Application
G. E. ANDERSON (Rockwell International Corp., Pittsburg, Pa.) and S. LOO, inventors (to NASA) (Rockwell International Corp., Pittsburg, Pa.) 29 May 1985 14 p
(NASA-CASE-MSC-20783-1; NAS 1.71:MSC-20783-1; US-PATENT-APPL-SN-738931) Avail: NTIS HC A02/MF A01 CSCL 14B

A fluid leak indicator for detecting and indicating leaks in visually inaccessible fluid tubing joints, such as those obstructed by insulation includes a bag system and a wicking system surrounding or wrapping the joints under the visual obstructing material. Leaking fluid is collected in the bag or on the wicking material where it is conducted along the wicking material to a visily accessible capturing transparent indicator bulb for providing a visual indication of the leak without requiring a chemical change in the capturing indicator bulb. NASA



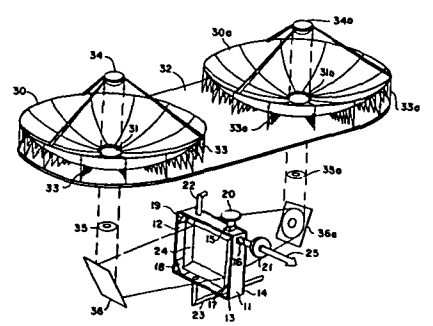
36

LASERS AND MASERS

Includes parametric amplifiers.

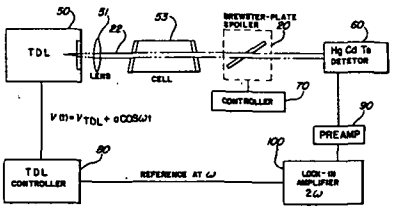
N86-19596*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LONG GAIN LENGTH SOLAR PUMPED BOX LASER Patent Application
R. J. DEYOUNG, inventor (to NASA) 18 Jun. 1985 9 p
(NASA-CASE-LAR-13256-1; NAS 1.71:LAR-13256-1; US-PATENT-APPL-SN-745973) Avail: NTIS HC A02/MF A01 CSCL 20E

A solar pumped laser has its lasing path lengthened by forming a square loop in the lasing path by means of bending mirrors. Solar radiation is collected and concentrated into a donut shaped intensity pattern. This intensity pattern is directed onto the lasing path such that there is a maximum fit of the solar intensity pattern to the square loop laser cavity. NASA



N86-20777*# National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD AND APPARATUS FOR ENHANCING LASER ABSORPTION SENSITIVITY Patent Application
C. R. WEBSTER, inventor (to NASA) (JPL, Pasadena, Calif.) 31 Jul. 1985 33 p
(Contract NAS7-918)
(NASA-CASE-NPO-16567-1-CU; NAS 1.71:NPO-16567-1-CU; US-PATENT-APPL-SN-760790) Avail: NTIS HC A03/MF A01 CSCL 20E

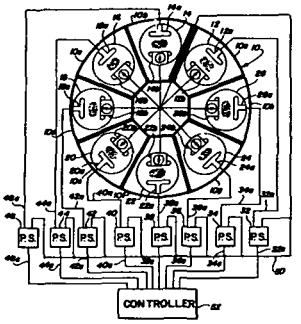
A simple optomechanical method and apparatus is described for substantially reducing the amplitude of unwanted multiple interference fringes which often limit the sensitivities of tunable laser absorption spectrometers. An exterior cavity is defined by partially transmissible surfaces such as a laser exit plate, a detector input, etc. That cavity is spoiled by placing an oscillating plate in the laser beam. For tunable diode laser spectroscopy in the mid-infrared region, a Brewster plate spoiler allows the harmonic detection of absorptances of .0001 in a single laser scan. Improved operation is achieved without subtraction techniques, without complex laser frequency modulation and without distortion of the molecular lineshape signal. The technique is applicable to tunable lasers operating from UV to IR wavelengths and in spectrometers which employ either short or long pathlengths, including the use of retroreflectors or multipass cells. NASA



N86-20778*# National Aeronautics and Space Administration. Pasadena Office, Calif.
MULTIPLEX ELECTRIC DISCHARGE GAS LASER SYSTEM Patent Application
T. J. PACALA and J. B. LAUDENSLAGER, inventors (to NASA) 23 Oct. 1985 22 p
(Contract NAS7-100)
(NASA-CASE-NPO-16433-1; NAS 1.71:NPO-16433-1; US-PATENT-APPL-SN-790594) Avail: NTIS HC A02/MF A01 CSCL 20E

A multiple pulse electric discharge gas laser system is described in which a plurality of pulsed electric discharge gas lasers are supported in a common housing. Each laser is supplied with excitation pulses from a separate power supply. A controller, which may be a microprocessor, is connected to each power supply for controlling the application of excitation pulses to each laser so that the lasers can be fired simultaneously or in any desired sequence. The output light beams from the individual lasers may be combined or utilized independently, depending upon the desired application. The individual lasers may include multiple pairs of discharge electrodes with a separate power supply connected across each electrode pair so that multiple light output beams

can be generated from a single laser tube and combined or utilized separately. NASA



N86-20779*# National Aeronautics and Space Administration. Pasadena Office, Calif.

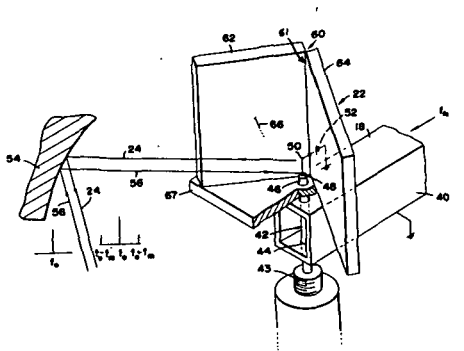
METHOD AND MEANS FOR GENERATION OF TUNABLE LASER SIDEBANDS IN THE FAR-INFRARED REGION Patent Application

H. M. PICKETT (JPL, Pasadena, Calif.) and J. FARHOOMAND, inventors (to NASA) (JPL, Pasdena, Calif.) 3 Oct. 1985 13 p

(Contract NAS7-918)

(NASA-CASE-NPO-16497-1-CU; NAS 1.71:NPO-16497-1-CU; US-PATENT-APPL-SN-783887) Avail: NTIS HC A02/MF A01 CSCL 20E

A method for generating tunable far-infrared radiation is described. The apparatus includes a Schottky-barrier diode which has one side coupled through a conductor to a waveguide that carries a tunable microwave frequency, the diode has an opposite side which is coupled through a radiating whisker to a bias source. Infrared light is directed at the diode, and infrared light with tunable sidebands is radiated by the whisker through an open space to a reflector. The original infrared is separated from a tunable infrared sideband by a polarizing Michelson interferometer. NASA



N86-20780*# National Aeronautics and Space Administration. Pasadena Office, Calif.

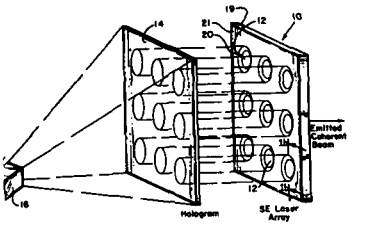
MEANS FOR PHASE LOCKING THE OUTPUTS OF A SURFACE EMITTING LASER DIODE ARRAY Patent Application

J. R. LESH, inventor (to NASA) (JPL, Pasadena, Calif.) 30 Sep. 1985 14 p

(Contract NAS7-918)

(NASA-CASE-NPO-16542-1-CU; NAS 1.71:NPO-16542-1-CU; US-PATENT-APPL-SN-781812) Avail: NTIS HC A02/MF A01 CSCL 20E

An array of diode lasers, either a two-dimensional array of surface emitting lasers, or a linear array of stripe lasers, is phase locked by a diode laser through a hologram which focuses the output of the diode laser into a set of distinct, spatially separated beams, each one foced onto the back facet of a separated diode laser of the array. The outputs of the diode lasers thus form an emitted coherent beam out of the front of the array. NASA



37

MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N86-19603* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

APPARATUS FOR ADAPTING AN END EFFECTOR DEVICE REMOTELY CONTROLLED MANIPULATOR ARM Patent

K. H. CLARK, inventor (to NASA) 8 Oct. 1985 7 p Filed 30 Sep. 1983

(NASA-CASE-MFS-25949-1; US-PATENT-4,545,723; US-PATENT-APPL-SN-538063; US-PATENT-CLASS-414-730; US-PATENT-CLASS-901-31; US-PATENT-CLASS-901-50) Avail: US Patent and Trademark Office CSCL 13I

Apparatus for adapting a general purpose and effector device to a special purpose and effector is disclosed which includes an adapter bracket assembly which provides a mechanical and electrical interface between the end effector devices. The adapter bracket assembly includes an adapter connector post which interlocks with a diamond shaped gripping channel formed in closed jaws of the general purpose end effector. The angularly intersecting surfaces of the connector post and gripping channel prevent any relative movement there between. Containment webs constrain the outer finger plates of the general purpose jaws to prevent pitch motion. Electrical interface is provided by conical, self aligning

electrical connector components carried by respective ones of said end effectors.

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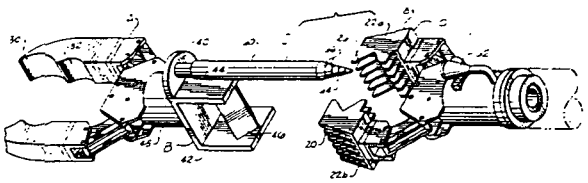


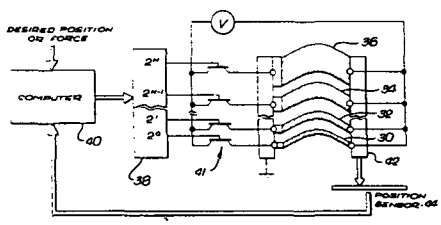
N86-19604* National Aeronautics and Space Administration. Pasadena Office, Calif.

MEMORY METAL ACTUATOR Patent

C. F. RUOFF, inventor (to NASA) (JPL, Pasadena, Calif.) 19 Nov. 1985 7 p Filed 26 Aug. 1983 Sponsored by NASA (NASA-CASE-NPO-15960-1; US-PATENT-4,553,393; US-PATENT-APPL-SN-527613; US-PATENT-CLASS-60-528; US-PATENT-CLASS-60-527; US-PATENT-CLASS-337-140) Avail: US Patent and Trademark Office CSCL 13I

A mechanical actuator can be constructed by employing a plurality of memory metal actuator elements in parallel to control the amount of actuating force. In order to facilitate direct control by digital control signals provided by a computer or the like, the actuating elements may vary in stiffness according to a binary relationship. The cooling or reset time of the actuator elements can be reduced by employing Peltier junction cooling assemblies in the actuator.

Official Gazette of the U.S. Patent and Trademark Office



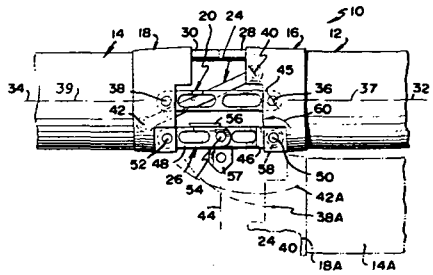
N86-19605* National Aeronautics and Space Administration. Pasadena Office, Calif.

JOINT FOR DEPLOYABLE STRUCTURES Patent

N. D. CRAIGHEAD, II (JPL, Pasadena, Calif.), R. J. PRELIASCO (JPL, Pasadena, Calif.), and T. D. HULT, inventors (to NASA) (JPL, Pasadena, Calif.) 17 Dec. 1985 6 p Sponsored by NASA (NASA-CASE-NPO-16038-1; US-PATENT-4,558,967; US-PATENT-APPL-SN-469864; US-PATENT-CLASS-403-113; US-PATENT-CLASS-403-120; US-PATENT-CLASS-16-294) Avail: US Patent and Trademark Office

A joint is described for connecting a pair of beams to pivot them between positions in alignment or beside one another, which is of light weight and which operates in a controlled manner. The joint includes a pair of fittings and at least one center link having opposite ends pivotally connected to opposite fittings and having axes that pass through centerplates of the fittings. A control link having opposite ends pivotally connected to the different fittings controls their relative orientations, and a toggle assemly holds the fittings in the deployed configuration wherein they are aligned. The fittings have stops that lie on one side of the centerplane opposite the toggle assembly.

Official Gazette of the U.S. Patent and Trademark Office



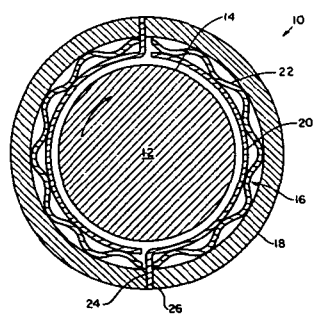
N86-19606* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

COMPLIANT HYDRODYNAMIC FLUID JOURNAL BEARING Patent

E. L. WARREN, inventor (to NASA) 12 Nov. 1985 6 p Filed 24 Apr. 1984 (NASA-CASE-LEW-13670-1; US-PATENT-4,552,466; US-PATENT-APPL-SN-603374; US-PATENT-CLASS-384-103; US-PATENT-CLASS-384-106) Avail: US Patent and Trademark Office

An air bearing structure is described that prevents destructive bending moments within the top foil. Welds are eliminated by mounting the top bearing foil in the bearing cartridge sleeve without using a space block. Tabs or pins at the end of the top bearing foil are restrained by slots or stops formed in the cartridge sleeve. These structural members are free to move in a direction normal to the shaft while being restrained from movement in the direction of shaft rotation.

Official Gazette of the U.S. Patent and Trademark Office

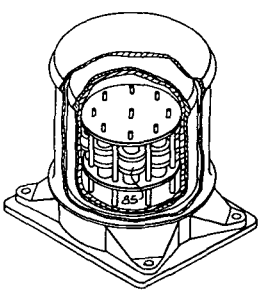


N86-19610*# National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD FOR FORMING HERMETIC SEALS Patent Application
B. D. GALLAGHER, inventor (to NASA) (JPL, Pasadena, Calif.) 15 Aug. 1985 15 p
(Contract NAS7-918)
(NASA-CASE-NPO-16423-1-CU; NAS 1.71:NPO-16423-1-CU; US-PATENT-APPL-SN-765978) Avail: NTIS HC A02/MF A01 CSCL 11A

A firmly adherent film of bondable metal, such as silver, is applied to the surface of glass or other substrate by decomposing a layer of a solution of a thermally decomposable metallo-organic deposition (MOD) compound such as silver neodecanoate in xylene. The MOD compound thermally decomposes into metal and gaseous by-products. Sealing is accomplished by depositing a layer of bonding metal, such as solder or a brazing alloy, on the metal film and then forming an assembly with another high melting point metal surface such as a layer of Kovar. When the assembly is heated above the temperature of the solder, the solder flow wets the adjacent surfaces and forms a hermetic seal between the metal film and metal surface when the assembly cools. NASA

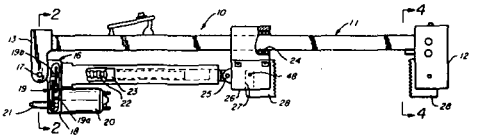
N86-19611*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DUAL MOTION VALVE WITH SINGLE MOTION INPUT Patent Application
R. R. BELEW, inventor (to NASA) 3 Jul. 1985 17 p
(NASA-CASE-MFS-28058-1; NAS 1:71:MFS-28058-1; US-PATENT-APPL-SN-751691) Avail: NTIS HC A02/MF A01 CSCL 13I

A dual motion valve (A) includes two dual motion valve assemblies with a rotary input which allows the benefits of applying both rotary and axial motion to a rotary sealing element with a plurality of ports. The motion of the rotary sealing element during actuation provides axial engagement of the rotary sealing element with a stationary valve plate which also has ports. Fluid passages are treated through the valve when the ports of the rotary sealing element are aligned with the ports of the stationary valve plate. Alignment is achieved through rotation of the rotary sealing element with respect to the stationary valve plate. The fluid passages provide direct paths which minimize fluid turbulence created in the fluid as it passes through the valve (A). NASA



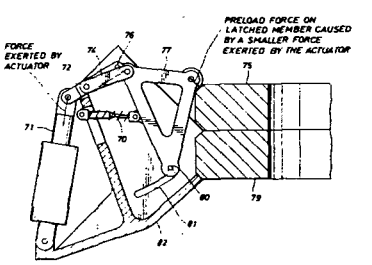
N86-19612*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
UNIVERSAL CLAMP Patent Application
J. P. CLANCY, inventor (to NASA) (McDonnell-Douglas Corp., Houston, Tex.) 23 Oct. 1985 16 p
(NASA-CASE-MSC-20549-1; NAS 1.71:MSC-20549-1; US-PATENT-APPL-SN-790596) Avail: NTIS HC A02/MF A01 CSCL 13I

A mechanical force actuator which is light weight and manipulatable and utilizes linear motion for push or pull forces is presented. The mechanical force producing mechanism comprises a linear actuator mechanism and a linear motion shaft mounted parallel to one another. The linear motion shaft is connected to a stationary or fixed housing and to a movable housing where the movable housing is mechanically actuated through actuator mechanism by either manual means or motor means. The housings are adapted to releasably receive a variety of jaw or pulling elements adapted for clamping or prying action. The stationary housing is adapted to be pivotally mounted to permit an angular position of the housing to allow the tool to adapt to skewed interfaces. The actuator mechanism is operated by through a gear train to obtain linear motion of the actuator mechanism. NASA



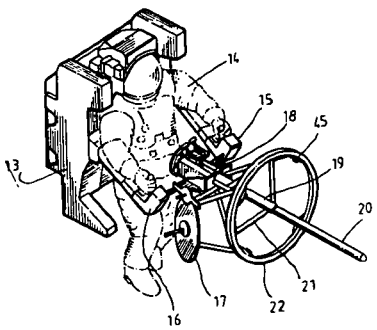
N86-19613*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
PRELOADABLE VECTOR SENSITIVE LATCH Patent Application
W. R. ACRES, inventor (to NASA) 3 Oct. 1985 21 p
(NASA-CASE-MSC-20910-1; NAS 1.71:MSC-20910-1; US-PATENT-APPL-SN-783888) Avail: NTIS HC A02/MF A01 CSCL 13E

A preloadable vector-sensitive latch which automatically releases when the force vector from a latch member reaches a specified release angle is presented. In addition, it contains means to remove clearance between the latched members and to preload the latch to prevent separation at angles less than the specified release angle. The latch comprises a triangular main link, a free link connected between a first corner of the main link and a yoke member, a housing, and an actuator connected between the yoke member and the housing. A return spring bias means connects the main link to a portion of the housing. A second corner of the main link is slidably and pivotally connected to the housing via a slot in a web portion of the housing. The latch housing has a rigid docking ring alignable with a mating locking ring which is engageable by a locking roller journalled on the third corner of the triangular main link. NASA



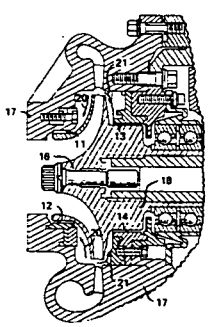
N86-19614*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
APPARATUS AND METHOD OF CAPTURING AN ORBITING SATELLITE Patent Application
W. D. HARWELL and D. A. GARDNER, inventors (to NASA) 7 Nov. 1985 24 p Div. of US-Patent-Appl-SN-132364, US-Patent-4,404,793, filed 20 Mar. 1980
(NASA-CASE-MSC-20979-1; NAS 1.71:MSC-20979-1; US-PATENT-APPL-SN-796053) Avail: NTIS HC A02/MF A01 CSCL 13E

Apparatus and method of capturing an orbiting spacecraft by attaching a grapple fixture are discussed. A probe is inserted into an opening, such as rocket nozzle, in the spacecraft until a stop on the probe mechanism contacts the spacecraft, a lever is actuated releasing a spring loaded rod which moves axially along the probe removing a covering sleeve to expose spring loaded toggle fingers which pivot open engaging the side of the opening. The probe is shortened and tensioned by turning a screw thread, pressing the fingers inside of the opening to compress the spacecraft between the toggle fingers and the stop. A grapple fixture attached to the probe, which is thus secured to the spacecraft, is engaged by appropriate retrieval means such as a remote manipulator arm. NASA



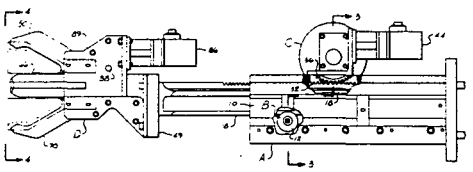
N86-20788* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DAMPING SEAL FOR TURBOMACHINERY Patent
G. L. VONPRAGENAU, inventor (to NASA) 8 Oct. 1985 5 p Filed 18 Jan. 1985
(NASA-CASE-MFS-25842-2; US-PATENT-4,545,586; US-PATENT-APPL-SN-692875; US-PATENT-CLASS-277-53; US-PATENT-CLASS-415-174) Avail: US Patent and Trademark Office CSCL 11A

A damping seal between a high speed rotor member and stator member that separates pressurized fluid compartments is described. It is characterized by the rotor member having a smooth outer surface and the stator member having its bore surface roughened by a plurality of pockets or depressions.
Official Gazette of the U.S. Patent and Trademark Office



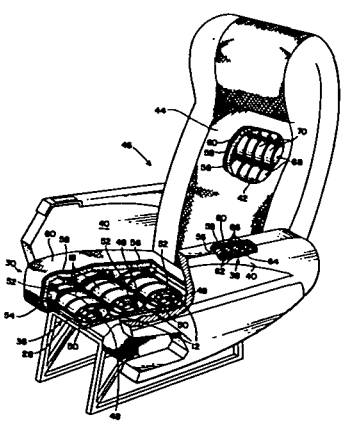
N86-20789* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SELF-LOCKING TELESCOPING MANIPULATOR ARM Patent
M. F. NESMITH, inventor (to NASA) 15 Oct. 1985 8 p Filed 30 Sep. 1983
(NASA-CASE-MFS-25906-1; US-PATENT-4,547,121; US-PATENT-APPL-SN-537757; US-PATENT-CLASS-414-753; US-PATENT-CLASS-901-31; US-PATENT-CLASS-901-25; US-PATENT-CLASS-414-718; US-PATENT-CLASS-414-4; US-PATENT-CLASS-212-230) Avail: US Patent and Trademark Office CSCL 13I

A telescoping manipulator arm and pivotable finger assembly are disclosed. The telescoping arm assembly includes a generally T-shaped arm having three outwardly extending fingers guided on grooved roller guides to compensate for environmental variations. The pivotable finger assembly includes four pivoting fingers. Arcuate teeth are formed on the ends of the fingers. A rack having teeth on four sides meshes with each one of the fingers. One surface of the rack includes teeth along its entire surface which mesh with teeth of one of the fingers. The teeth at the remote end of the rack engage teeth of a gear wheel. The wheel includes a worm which meshes with a worn drive shaft of the drive motor providing a ninety degree self-locking drive for locking the fingers in a desired position. A similar drive provides a self-locking drive for positioning the telescoping arm.
Official Gazette of the U.S. Patent and Trakemark Office



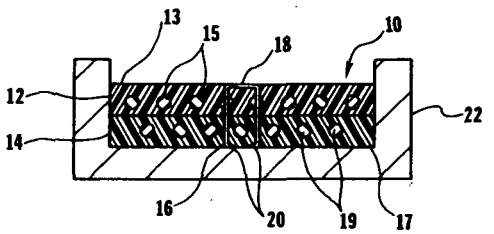
N86-20797*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SEGMENTED TUBULAR CUSHION SPRINGS AND SPRING ASSEMBLY Patent Application
L. A. HASLIM, inventor (to NASA) 18 Jun. 1985 39 p
(NASA-CASE-ARC-11349-1; NAS 1.71:ARC-11349-1; US-PATENT-APPL-SN-746160) Avail: NTIS HC A03/MF A01 CSCL 13E

A spring which includes a tube with an elliptical cross section, with the greater axial dimension extending laterally and the lesser axial dimension extending vertically is disclosed. A plurality of cuts in the form of slots passing through most of a wall of the tube extend perpendiculary to a longitudinal axis extending along the tube. An uncut portion of the tube wall extends along the tube for bonding or fastening the tube to a suitable base, such as a bottom of a seat cushion. NASA



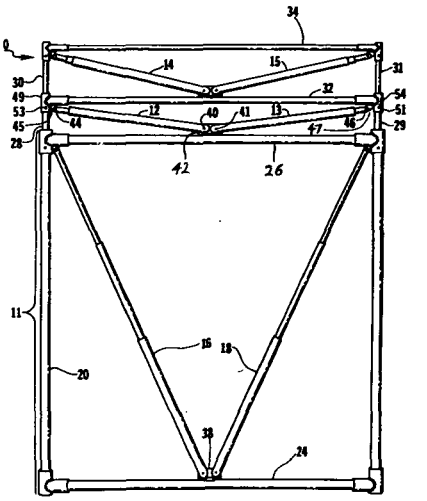
N86-20798*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CURE-IN-PLACE COMPOSITE FASTENER Patent Application
G. L. FARLEY (Department of the Army, Washington, D.C.) and W. T. FREEMAN, JR., inventors (to NASA) 25 Jun. 1985 11 p
(NASA-CASE-LAR-12939-1; NAS 1.71:LAR-12939-1; US-PATENT-APPL-SN-748532) Avail: NTIS HC A02/MF A01 CSCL 13E

The cure-in-place composite fastener embodies a method and apparatus to fasten composite components in laminate structures. At least one single or multipiece metal or fibrous cure-in-place fastener is inserted into and through at least two layers of partially cured composite material possing diverse curing properties. In the simplest case, a laminate structure is comprised of a layer which cures to a skin layer. The fastener is inserted into a flush with the surface of layer and held in place in laminate structure as the tapered ends are bent against a mold after fastener is inserted through laminate structure. When the laminate structure is completely cured with the fastener in place, the epoxy matrix of the layer flows around and over the fastener thereby making the surface of the layer a smooth surface free from cut fibers or abrubt discontinuities. NASA



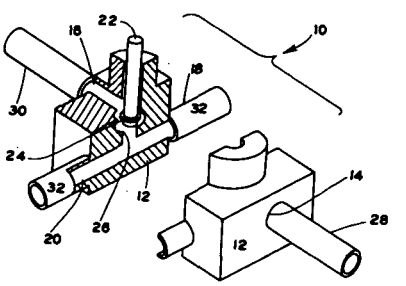
N86-20799*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DEPLOYABLE M-BRACED TRUSS STRUCTURE Patent Application
M. M. MIKULAS, JR. and M. D. RHODES, inventors (to NASA) 30 Jul. 1985 12 p
(NASA-CASE-LAR-13081-1; NAS 1.71:LAR-13081-1; US-PATENT-APPL-SN-760378) Avail: NTIS HC A02/MF A01 CSCL 13I

A deployable M-braced truss structure, efficiently packaged into a compact stowed position and expandable to an operative position at the use site is described. The M-braced configuration effectively separates tension compression and shear in the structure and permits efficient structural design. Both diagonals and longerons telescope from an M-braced base unit and deployed either pneumatically, mechanically by springs or cables, or by powered reciprocating mechanisms. Upon full deployment, the diagonals and longerons lock into place with a simple latch mechanism. NASA



N86-20800*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADVANCED VAPOR SUPPLY MANIFOLD Patent Application
I. O. CLARK, W. J. DEBNAM, JR., A. L. FRIPP, JR., and R. K. CROUCH, inventors (to NASA) 15 Jul. 1985 14 p
(NASA-CASE-LAR-13259-1; NAS 1.71:LAR-13259-1; US-PATENT-APPL-SN-754706) Avail: NTIS HC A02/MF A01 CSCL 13I

A four-port vapor supply valve to control a vapor or fluid supply to a vapor growth manifold that eliminates supply source contamination from back diffusion into the supply vapor container is disclosed. This valve greatly improves the ability to sharply add or terminate supply flow to the main manifold line. The valve is comprised of a housing with four ports. Two of the ports disposed on opposite sides of the housing are for ingress and egress of the main manifold line. The other two opposing ports are for supply input and purge outlet. The supply/purge line and main manifold line form an X when the supply valve is open and two separate lines when the valve is closed. A single valve stem plunger and seal seat against the main manifold valve inlet seat in the closed position while supply vapor flow is full intensity behind the closed valve seal flowing into the purge line. When the plunger is raised opening access to the main manifold line simultaneously with closing the purge line valve supply flow is routed directly into the manifold line arriving quickly and full strength. Closing the valve by lowering the valve stem plunger seals the main manifold line and terminates supply flow without bleed down time, thus, a staccato supply on/off is provided. NASA



N86-20801*# National Aeronautics and Space Administration. Pasadena Office, Calif.

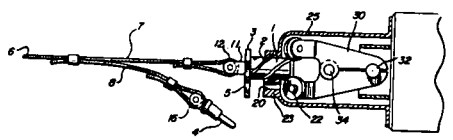
SELF-LOCKING DOUBLE RETENTION REDUNDANT FULL PIN RELEASE Patent Application

T. O. KILLGROVE, inventor (to NASA) (JPL, Pasadena, Calif.) 18 Mar. 1985 12 p

(Contract NAS7-100)

(NASA-CASE-NPO-16233-1; NAS 1.71:NPO-16233-1; US-PATENT-APPL-SN-737018) Avail: NTIS HC A02/MF A01 CSCL 13E

A double retention redundant pull pin release system is disclosed. The system responds to a single pull during an intentional release operation. A spiral threaded main pin is seated in a mating bore in a housing, which main pin has a flange fastened thereon at the part of the main pin which is exterior to the housing. Accidental release tends to rotate the main pin. A secondary pin passes through a slightly oversized opening in the flange and is seated in a second bore in the housing. The pins counteract against one another to prevent accidential release. A frictional lock is shared between the main and secondary pins to enhance further locking of the system. The secondary pin, in response to a first pull, is fully retracted from its bore and flange hole. Thereafter the pull causes the main pin to rotate free of the housing to release, for example, a parachute mechanism. NASA



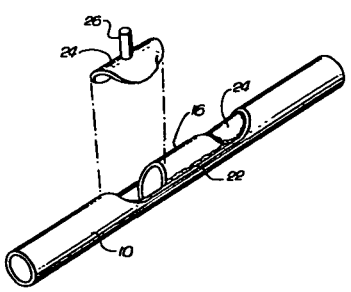
N86-20802*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

METHOD OF REPAIRING HIDDEN LEAKS IN TUBES Patent Application

J. D. DUESBURG (Rockwell International Corp., Pittsburgh, Pa.) and R. C. MILLS, inventors (to NASA) (Rockwell International Corp., Pittsburgh, Pa.) 30 Aug. 1985 11 p Sponsored by NASA

(NASA-CASE-MFS-19796-1; NAS 1.71:MFS-19796-1; US-PATENT-APPL-SN-770920) Avail: NTIS HC A02/MF A01 CSCL 13I

A method of repairing a tubular assembly in which access to a defect in the tube is limited includes the steps of cutting an opening in the tube on the side opposite the defect so as to expose the defect from the inside of the tube. A tubular insert is inserted into the tube to cover the defect and is secured in place by means of brazing or welding. The remaining space between the opening and insert is closed by means of close-out patches which are welded or brazed to both the insert and the tube. The result is a permanent repair having great structural integrity. NASA



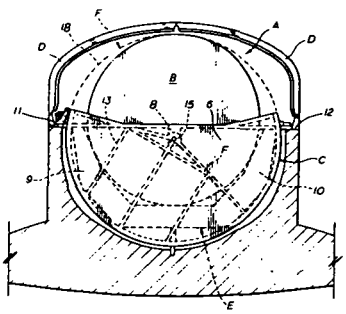
N86-20803*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

SUN SHIELD Patent Application

A. FRANK, S. F. DERESPINIS, and J. MOCKOVCIAK, JR., inventors (to NASA) 12 Aug. 1985 12 p Prepared in cooperation with Grumann Aerospace Corp., Bethpage, N.Y.

(NASA-CASE-MSC-20162-1; NAS 1.71:MSC-20162-1; US-PATENT-APPL-SN-764805) Avail: NTIS HC A02/MF A01 CSCL 13I

A shading device which is capable of compactly storing a flexible shade on a biased, window-shade type spring roller and controlled to deliver the shade selectively to either its operative shading or compact storage orientation. NASA



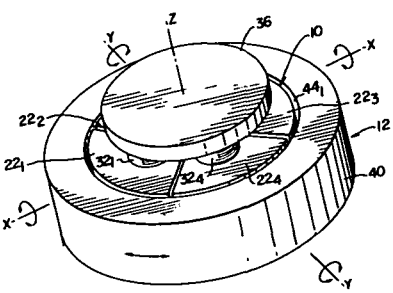
N86-20804*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

RADIAL AND TORSIONALLY CONTROLLED MAGNETIC BEARING Patent Application

P. A. STUDER, inventor (to NASA) 21 Nov. 1985 23 p

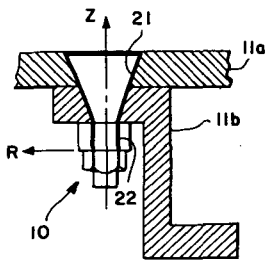
(NASA-CASE-GSC-12957-1; NAS 1.71:GSC-12957-1; US-PATENT-APPL-SN-800193) Avail: NTIS HC A02/MF A01 CSCL 13I

A magnetic bearing including a circular stator member with a plurality of circumferential pole faces and a suspended annular ring member with corresponding number of inward facing circumferential pole faces separated by respective air gaps is presented. A source of DC magnetic flux circulates flux between the circumferential pole faces of the stator and the ring to provide axial stability along a central longitudinal axis. Flux coil means are included on the stator member to provide variable flux density along predetermined radial paths to provide active radial stabilization. Flux coil means are included on the stator to actively modulate the magnitude of the magnetic forces as well as their direction by differential flux control involving the DC magnetic flux to produce torquing moments about a pair of mutually orthogonal axes which are perpendicular to the central axis. NASA



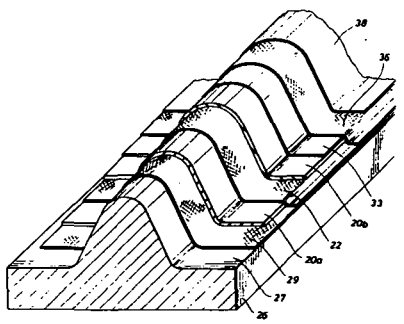
N86-20805*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THERMAL-STRESS-FREE FASTENERS Patent Application
M. L. BLOSSER, R. MCWITHEY, and T. F. KEARNS, inventors (to NASA) (Inst. for Defense Analysis, Alexandria, Va.) 18 Dec. 1984 11 p
(NASA-CASE-LAR-13325-1-SB; NAS 1.71:LAR-13325-1-SB; US-PATENT-APPL-SN-683110) Avail: NTIS HC A02/MF A01 CSCL 13E

A fastener used for connecting two or more structural elements together where the fastener and structural elements have substantially different coefficients of thermal expansion is described. The fastener head or load bearing surface is shaped according to a thermal expansion equation to form a rounded concial shape. This shape allows the fastener to maintain snug contact with the structural elements and at the same time, prevents the buildup of stresses due to thermal expansion. As a result the fastener and structural elements can be exposed to severe temperature cycles while maintaining a stress free snug fit. Particular shaping of the conical portion of the invention permits the use of specially orthotropic structural materials. NASA



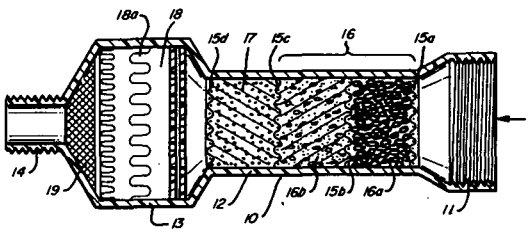
N86-20806*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
FLEXIBLE DIAPHRAGM: EXTREME TEMPERATURE USAGE Patent Application
G. LERMA, inventor (to NASA) 7 Nov. 1985 15 p
(NASA-CASE-MSC-20797-1; NAS 1.71:MSC-20797-1; US-PATENT-APPL-SN-771537) Avail: NTIS HC A02/MF A01 CSCL 13I

A diaphragm suitable for extreme temperature usage, such as encountered in critical aerospace applications, is fabricated by a unique method, and of a unique combination of materials, which include multilayered lay-ups of diaphragm materials sandwiched between layers of bleeder fabric which, after being formed in the desired shape on a mold, are vacuum sealed and then cured under pressure, in a heated autoclave, to produce a bond capable of withstanding extreme temperatures. NASA



N86-20807*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SELF-CONTAINED, SINGLE-USE HOSE AND TUBING CLEANING MODULE Patent Application
F. P. ROLLINS (Lockheed Engineering and Management Services Co., Inc., Houston, Tex.) and J. S. GLASS, inventors to NASA (Lockheed Engineering and Management Services Co., Inc., Houston, Tex.) 3 Oct. 1985 16 p
(NASA-CASE-MSC-20857-1; NAS 1.71:MSC-20857; US-PATENT-APPL-SN-783886) Avail: NTIS HC A02/MF A01 CSCL 13I

A self-contained, single-use hose and tubing cleaning module which utilizes available water supplies without requiring access to precision cleaning facilities is presented. The module is attached to the water source at the inlet side and to the hose or tubing to be cleaned at the outlet side. The water flows through a water purification zone, a detergent dispensing zone a filtration zone before the detergent-laden water flows into the tubing to clean the tubing walls. The module contains an embedded pad which is impregnated with a pH indicator to indicate to the user when the detergent has dissolved and rinsing of the tubing begins. NASA

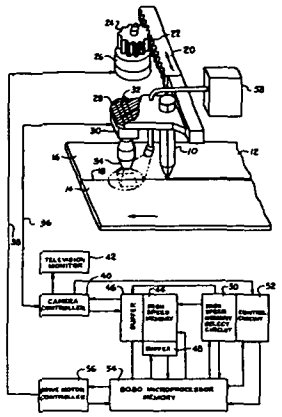


N86-21850* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
AUTOMATED WELD TORCH GUIDANCE CONTROL SYSTEM Patent
H. E. SMITH, W. A. WALL, and M. R. BURNS, JR., inventors (to NASA) 28 Jan. 1986 9 p Filed 27 Dec. 1984 Continuation-in-part of US-Patent-Appl-SN-460733, filed 25 Jan. 1983, abandonded
(NASA-CASE-MFS-25807-2; US-PATENT-4,567,348; US-PATENT-APPL-SN-685607; US-PATENT-CLASS-219-124.34; US-PATENT-CLASS-318-577; US-PATENT-CLASS-358-101; US-PATENT-CLASS-901-42; US-PATENT-CLASS-901-47) Avail: US Patent and Trademark Office CSCL 13I

A device for automatically controlling the movement of a welding torch while welding an elongated joint is described. A charge injection television camera is carried on a movable support. The camera includes a matrix of individual light sensing video elements which generate voltages responsive to light reflected off of the joint and surrounding areas of the work piece. The voltages produced by the pixels are converted to digital words which are fed to a microprocessor for generating an error signal. This error

signal is fed to a digital motor which is used to drive a movable support upon which the television camera is carried.

Official Gazette of the U.S. Patent and Trademark Office



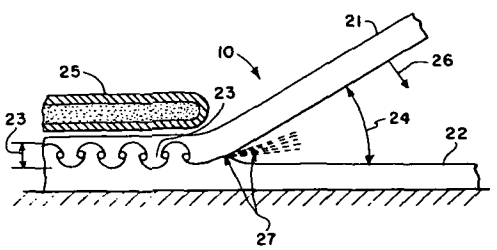
N86-21858*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

TOOL AND PROCESS FOR EXPLOSIVE JOINING OF TUBES Patent Application

L. J. BEMENT and J. W. BAILEY, inventors (to NASA) 23 Oct. 1985 14 p

(NASA-CASE-LAR-13309-1; NAS 1.71:LAR-13309-1; US-PATENT-APPL-SN-790597) Avail: NTIS HC A02/MF A01 CSCL 13I

The invention is a tool and process to be used in explosive joining of tubes. The tool consists of an inititator, a tool form and a ribbon explosive. The assembled tool is a compact, storable and safe device suitable for explosive joining of small, lightweight tubes down to 0.20 inch in diameter. The invention is inserted into a tube to be welded which tube has itself been inserted into either another tube or a tube plate. A shim or standoff between the two surfaces to be welded is necessary. Initiation of the explosive inside the tube results in a high velocity, angular collision between the mating surfaces. This collision creates surface melts and collision bonding wherein electron-sharing linkups are formed. NASA



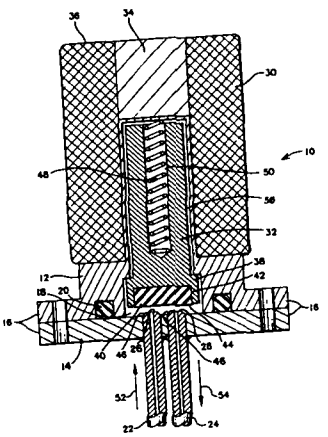
N86-21859*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

SELF-COMPENSATING SOLENOID VALVE Patent Application

F. H. WOELLER and Y. MATSUMOTO, inventors (to NASA) 7 Nov. 1985 8 p

(NASA-CASE-ARC-11620-1; NAS 1.71:ARC-11620-1; US-PATENT-APPL-SN-795945) Avail: NTIS HC A02/MF A01 CSCL 13K

The subject invention relates to a solenoid valve in which both an inlet and an outlet of the valve are sealed when the valve is closed. This double seal compensates for leakage at either the inlet or the outlet by making the other seal more effective in response to the leakage and allows the reversal of the flow direction int he valve by simply switching the inlet and outlet connections. Solenoid valve has a valve chamber within valve body. Inlet and outlet tubes extend through plate into the chamber. Movable core in a chamber extends into solenoid coil. The distal end of the core has a silicone rubber plug. Other than when the solenoid is energized, compressed spring biases the core downward so that the surface of the plug is in sealing engagement with ends of the tubes. Any leak at the ends increases pressure in the chamber, resulting in increased sealing force of the plug against the other end. Flow direction through the valves is easily reversed by changing connections to the tubes. NASA



39

STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

N86-20841* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

CRYOGENIC INSULATION STRENGTH AND BOND TESTER Patent

P. H. SCHUERER, J. H. EHL, and W. P. PRASTHOFER, inventors (to NASA) 22 Oct. 1985 11 p Filed 3 Nov. 1983

(NASA-CASE-MFS-25910-1; US-PATENT-4,548,083; US-PATENT-APPL-SN-548582; US-PATENT-CLASS-73-827; US-PATENT-CLASS-73-150-A) Avail: US Patent and Trademark Office CSCL 20K

A method and apparatus for testing the tensile strength and bonding strength of sprayed-on foam insulation attached to metal cryogenic fuel tanks is described. A circular cutter is used to cut the insulation down to the surface of the metal tank to form plugs of the insulation for testing in situ on the tank. The apparatus comprises an electromechanical pulling device powered by a belt

battery pack. The pulling device comprises a motor driving a mechanical pulling structure comprising a horizontal shaft connected to two bell cracks which are connected to a central member. When the lower end of member is attached to a fitting, which in turn is bonded to a plug, a pulling force is exerted on the plug sufficient to rupture it. The force necessary to rupture the plug or pull it loose is displayed as a digital read-out.

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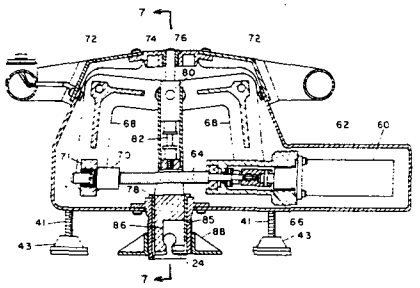

43

EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

N86-19711* National Aeronautics and Space Administration. Pasadena Office, Calif.

METHOD AND APPARATUS FOR CONTOUR MAPPING USING SYNTHETIC APERTURE RADAR Patent

R. M. GOLDSTEIN (JPL, Pasadena, Calif.), E. R. CARO (JPL, Pasadena, Calif.), and C. WU, inventors (to NASA) (JPL, Pasadena, Calif.) 5 Jan. 1985 8 p Sponsored by NASA (NASA-CASE-NPO-15939-1; US-PATENT-4,551,724; US-PATENT-APPL-SN-465365; US-PATENT-CLASS-343-5-CM; US-PATENT-CLASS-343-5-CD; US-PATENT-CLASS-343-5-VQ; US-PATENT-CLASS-367-88) Avail: US Patent and Trademark Office CSCL 08B

By using two SAR antennas spaced a known distance, B, and oriented at substantially the same look angle to illuminate the same target area, pixel data from the two antennas may be compared in phase to determine a difference delta phi from which a slant angle theta is determined for each pixel point from an equation Delta phi = (2 pi B/lambda)sin(theta - alpha), where lambda is the radar wavelength and alpha is the roll angle of the aircraft. The height, h, of each pixel point from the aircraft is determined from the equation h = R cos theta, and from the known altitude, a, of the aircraft above sea level, the altitude (elevation), a', of each point is determined from the difference a - h. This elevation data may be displayed with the SAR image by, for example, quantizing the elevation at increments of 100 feet starting at sea level, and color coding pixels of the same quantized elevation. The distance, d, of each pixel from the ground track of the aircraft used for the display may be determined more accurately from the equation d = R sin theta.

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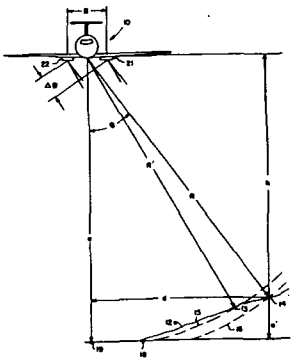

44

ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

N86-19721* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NEGATIVE ELECTRODE CATALYST FOR THE IRON CHROMIUM REDOX ENERGY STORAGE SYSTEM Patent

R. F. GAHN and N. H. HAGEDORN, inventors (to NASA) 24 Sep. 1985 7 p Filed 20 Aug. 1984 (NASA-CASE-LEW-14028-1; US-PATENT-4,543,302; US-PATENT-APPL-SN-642310; US-PATENT-CLASS-429-15; US-PATENT-CLASS-429-19; US-PATENT-CLASS-429-51; US-PATENT-CLASS-429-109) Avail: US Patent and Trademark Office CSCL 10C

A redox cell which operates at elevated temperatures and which utilizes the same two metal couples in each of the two reactant fluids is disclosed. Each fluid includes a bismuth salt and may also include a lead salt. A low cost, cation permselective membrane separates the reactant fluids.

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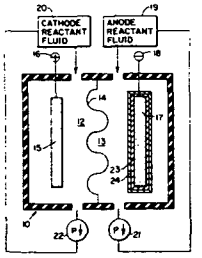
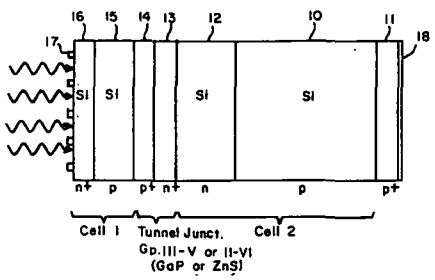


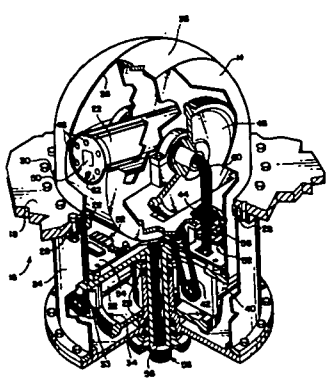
N86-21981*# National Aeronautics and Space Administration. Pasadena Office, Calif.
HIGH BAND GAP 3-5 TUNNELING JUNCTION FOR SILICON MULTIJUNCTION SOLAR CELLS Patent Application
T. DAUD (JPL, Pasadena, Calif.) and A. H. KACHARE, inventors (to NASA) (JPL, Pasadena, Calif.) 17 Dec. 1985 11 p
(Contract NAS7-918)
(NASA-CASE-NPO-16526-1CU; NAS 1.71:NPO-16526-1CU; US-PATENT-APPL-SN-809975) Avail: NTIS HC A02/MF A01 CSCL 10A

A multijunction silicon solar cell of high efficiency is provided by providing a tunnel junction between the solar cell junctions to connect them in series. The tunnel junction is comprised of p(+) and n(+) layers of high band gap 3 to 5 or 2 to 6 semiconductor materials that match the lattice structure of silicon, such as GaP (band gap 2.24 eV) or ZnS (band gap 3.6 eV), each of which has a perfect lattice match with silicon to avoid defects normally associated with lattice mismatch. NASA



N86-21982*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AIRBORNE TRACKING SUN PHOTOMETER APPARATUS AND SYSTEM Patent Application
T. MATSUMOTO, C. MINA, P. RUSSELL, and W. VANARK, inventors (to NASA) 29 Jan. 1986 17 p
(NASA-CASE-ARC-11622-1; NAS 1.71:ARC-11622-1; US-PATENT-APPL-SN-823712) Avail: NTIS HC A02/MF A01 CSCL 10A

An airborne tracking Sun photometer apparatus has a rotatable dome. An aximuth drive motor is connected to rotate the dome. The dome has an equatorial slot. A cylinderical housing is pivotally mounted inside the dome at the equatorial slot. A photometer is mounted in the housing to move in the equatorial slot as the housing pivots. The photometer has an end facing outward from the slot with an optical flat transparent window. An elevation drive motor is connected to pivot the cylindrical housing. The rotatable dome is mounted in bulkhead of an aircraft to extend from the interior of the aircraft. A Sun sensor causes the photometer to track the Sun automatically. Alternatively, the photometer may be oriented manually (by voltages or by computer). NASA



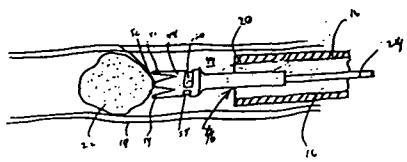
52

AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N86-19885*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CUTTING HEAD FOR ULTRASONIC LITHOTRIPSY Patent Application
E. D. ANGULUO and R. GOODFRIEND, inventors (to NASA) 30 Oct. 1985 10 p
(NASA-CASE-GSC-12944-1; NAS 1.71:GSC-12944-1; US-PATENT-APPL-SN-793006) Avail: NTIS HC A02/MF A01 CSCL 06E

A cutting head for attachment to the end of the wire probe of an ultrasonic kidney stone disintegration instrument is described. The cutting head has a plurality of circumferentially arranged teeth formed at one end thereof to provide a cup shaped receptacle for kidney stones encountered during the disintegration procedure. An integral reduced diameter collar diminishes stress points in the wire and reduce breakage thereof. NASA



54

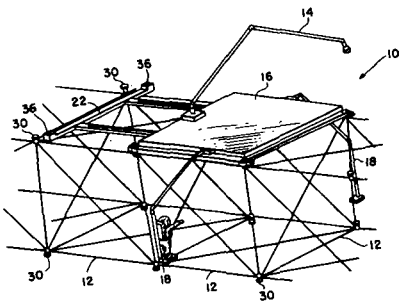
MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N86-21147*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MOBILE REMOTE MANIPULATOR VEHICLE SYSTEM Patent Application
H. G. BUSH, M. M. MIKULAS, JR., R. E. WALLSOM, and J. K. JENSEN, inventors (to NASA) 31 Jul. 1985 27 p
(NASA-CASE-LAR-13393-1; NAS 1.71:LAR-13393-1; US-PATENT-APPL-SN-760799) Avail: NTIS HC A03/MF A01 CSCL 05H

A mobile remote manipulator system is disclosed for assembly, repair and logistics transport on, around and about a space station square bay truss structure. The vehicle is supported by a square track arrangement supported by guide pins integral with the space station truss structure and located at each truss node. Propulsion is provided by a central push-pull drive mechanism that extends out from the vehicle one full structural bay over the truss and locks drive rods into the guide pins. The track switches allow the vehicle to travel in two (2) orthogonal directions over the truss structure which coupled with the bi-directional drive, allow

movement in four (4) directions on one plane. The top layer of this tri-layered vehicle is a logistics platform. This platform is capable of 360 degrees of rotation and will have two (2) astronaut foot restraint platforms 18 and a space crane integral. NASA



N86-22112* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DROP FOOT CORRECTIVE DEVICE Patent
B. C. DEIS, inventor (to NASA) 28 Jan. 1986 5 p Continuation of US-Patent-Appl-SN-876298, filed 9 Feb. 1978, abandoned
(NASA-CASE-LAR-12259-2; US-PATENT-4,566,447;
US-PATENT-APPL-SN-280152; US-PATENT-CLASS-128-80-E)
Avail: US Patent and Trademark Office CSCL 05H

A light weight, economical device to alleviate a plurality of difficulties encountered in walking by a victim suffering from a drop foot condition is discussed. A legband girdles the leg below the knee and above the calf providing an anchor point for the upper end of a ligament having its lower end attached to a toe of a shoe or a toe on the foot. The ligament is of such length that the foot is supported thereby and retained in a normal position during walking.

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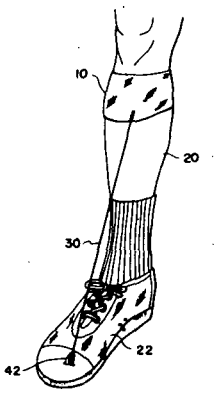
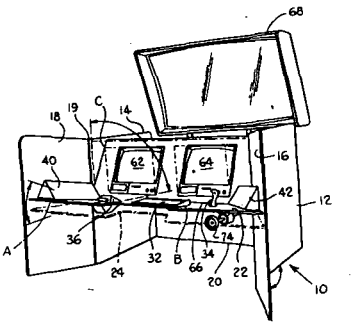


N86-22114*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
RECONFIGURABLE WORK STATION FOR A VIDEO DISPLAY UNIT AND KEYBOARD Patent Application
N. L. SHIELDS (Essex Corp.), M. F. FAGG (Essex Corp.), D. E. HENDERSON (Essex Corp.), and F. D. ROE, inventors (to NASA) 5 Dec. 1985 17 p
(NASA-CASE-MFS-26009-1SB; NAS 1.71:MFS-26009-1SB;
US-PATENT-APPL-SN-805011) Avail: NTIS HC A02/MF A01 CSCL 05H

A reconfigurable workstation is illustrated having video, keyboard, and hand operated motion controller capabilities. The workstation includes main side panels between which a primary work panel is pivotally carried in a manner in which primary work panel may be adjusted and set in a negatively declined or positively inclined position for proper forearm support while operating hand controllers. A keyboard table supports a keyboard in such a manner that the keyboard is set in a positively inclined position with respect to the negatively declined work panel. Various adjustable devices are provided for adjusting the relative declinations and inclinations of the work panels, tables, and visual display panels. NASA



60

COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

N86-21154* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AUTO COVARIANCE COMPUTER Patent
T. E. HEPNER and J. F. MEYERS, inventors (to NASA) 1 Oct. 1985 6 p Filed 16 Aug. 1983
(NASA-CASE-LAR-12968-1; US-PATENT-4,545,025;
US-PATENT-APPL-SN-523560; US-PATENT-CLASS-364-728)
Avail: US Patent and Trademark Office CSCL 09B

A laser velocimeter covariance processor which calculates the auto covariance and cross covariance functions for a turbulent flow field based on Poisson sampled measurements in time from a laser velocimeter is described. The device will process a block of data that is up to 4096 data points in length and return a 512 point covariance function with 48-bit resolution along with a 512 point histogram of the interarrival times which is used to normalize the covariance function. The device is designed to interface and be controlled by a minicomputer from which the data is received and the results returned. A typical 4096 point computation takes approximately 1.5 seconds to receive the data, compute the covariance function, and return the results to the computer.

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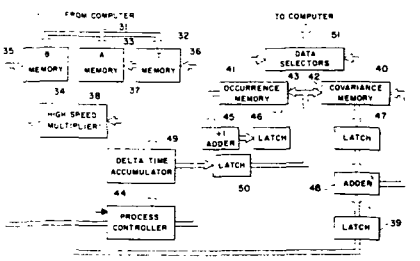


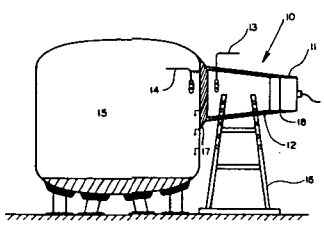
71

ACOUSTICS

Includes sound generation, transmission, and attenuation.

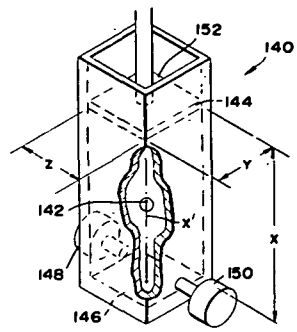
N86-20086*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ACOUSTIC GUIDE FOR NOISE TRANSMISSION TESTING OF AIRCRAFT Patent Application
R. VAICAITIS, inventor (to NASA) (Columbia Univ., N.Y., N.Y.) 3 Jul. 1985 13 p Sponsored by NASA
(NASA-CASE-LAR-13111-1-CU; NAS 1.71:LAR-13111-1-CU; US-PATENT-APPL-SN-751695) Avail: NTIS HC A02/MF A01 CSCL 20A

Selective testing of aircraft or other vehicular components without requiring disassembly of the vehicle or components was accomplished by using a portable guide apparatus. The device consists of a broadband noise source, a guide to direct the acoustic energy, soft sealing insulation to seal the guide to the noise source and to the vehicle component, and noise measurement microphones, both outside the vehicle at the acoustic guide output and inside the vehicle to receive attenuated sound. By directing acoustic energy only to selected components of a vehicle via the acoustic guide, it is possible to test a specific component, such as a door or window, without picking up extraneous noise which which may be transmitted to the vehicle interior through other components or structure. This effect is achieved because no acoustic energy strikes the vehicle exterior except at the selected component. Also, since the test component remains attached to the vehicle, component dynamics with vehicle frame are not altered. NASA



N86-20087*# National Aeronautics and Space Administration. Pasadena Office, Calif.
SINGLE MODE LEVITATION AND TRANSLATION Patent Application
M. B. BARMATZ (JPL, Pasadena, Calif.) and J. L. ALLEN, inventors (to NASA) 18 Oct. 1985 17 p
(Contract NAS7-918)
(NASA-CASE-NPO-16675-1-CU; NAS 1.71:NPO-16675-1-CU; US-PATENT-APPL-SN-789266) Avail: NTIS HC A02/MF A01 CSCL 20A

A single frequency resonant mode is applied by a transducer to acoustically levitate an object within a chamber. This process allows smooth movement of the object and suppression of unwanted levitation modes that would urge the object to a different levitation position. A plunger forms one end of the chamber, and the frequency changes as the plunger moves. Acoustic energy is applied to opposite sides of the chamber, with the acoustic energy on opposite sides being substantially 180 degrees out of phase. NASA



N86-21276* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ULTRASONIC ANGLE BEAM STANDARD REFLECTOR Patent
R. F. BERRY, JR., inventor (to NASA) 17 Dec. 1985 5 p Filed 19 Mar. 1984
(NASA-CASE-LAR-13153-1; US-PATENT-4,558,585; US-PATENT-APPL-SN-590921; US-PATENT-CLASS-73-1-DV; US-PATENT-CLASS-72-341; US-PATENT-CLASS-72-324) Avail: US Patent and Trademark Office CSCL 20A

A method that provides an impression profile in a reference standard material utilized in inspecting critically stressed components with pulsed ultrasound is described. A die stamp having an I letter is used to impress the surface of a reference material. The die stamp is placed against the surface and struck with an inertia imparting member to impress the I in the reference standard material. Upset may appear on the surface as a result of the impression and is removed to form a smooth surface. The stamping and upset removal is repeated until the entire surface area of a depth control platform on the die stamp uniformly contacts the material surface. The I impression profile in the reference standard material is utilized for reflecting pulsed ultrasonic beams for inspection purposes.
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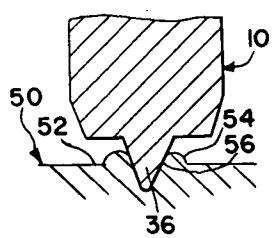
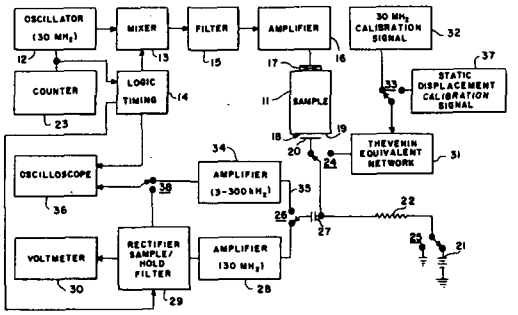


N86-22307*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ACOUSTIC RADIATION STRESS MEASUREMENT Patent Application
W. T. YOST and J. H. CANTRELL, JR., inventors (to NASA) 13 Sep. 1985 10 p
(NASA-CASE-LAR-13440-1; NAS 1.71:LAR-13440-1; US-PATENT-APPL-SN-775989) Avail: NTIS HC A02/MF A01 CSCL 20A

Ultrasonic radio frequency tone-bursts are launched into a sample of material tested. The amplitude of the tone-bursts and

the slope of the resulting static displacement pulses are measured. These measurements are used to calculate the nonlinearities of the materials. NASA



74

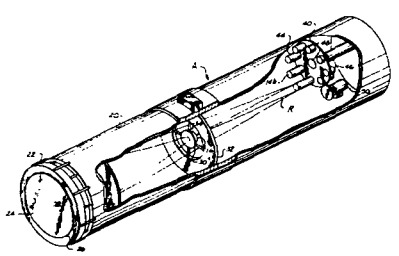
OPTICS

Includes light phenomena.

N86-20124* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPECTRAL SLICING X-RAY TELESCOPE WITH VARIABLE MAGNIFICATION Patent
R. B. HOOVER and E. HILDNER, inventors (to NASA) 31 Dec. 1985 9 p Filed 17 Jan. 1984
(NASA-CASE-MFS-25942-1; US-PATENT-4,562,583; US-PATENT-APPL-SN-571613; US-PATENT-CLASS-378-43; US-PATENT-CLASS-378-85) Avail: US Patent and Trademark Office

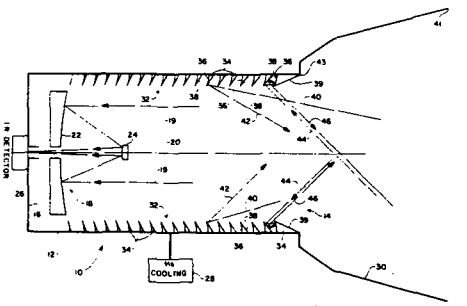
A telescope for viewing high frequency radiation (soft X-ray, extreme ultraviolet) is described. This telescope has a long focal length with a selection of magnifications despite a short housing. Light enters the telescope and is reflected by the telescope's primary optical system to one of several secondary mirrors at different locations on a movable frame. The secondary mirrors have varying degrees of magnification and select narrow spectral slices of the incident radiation. Thus, both the magnification and effective focal length field of view and wavelength can be altered by repositioning the moving frame. Configurations for spaceborne applications are discussed.

Official Gazette of the U.S. Patent and Trademark Office



N86-20125* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
OPTICAL SYSTEM WITH REFLECTIVE BAFFLES Patent
W. I. LINIOR, inventor (to NASA) 24 Sep. 1985 8 p Filed 28 Mar. 1984
(NASA-CASE-ARC-11502-1; US-PATENT-4,542,963; US-PATENT-APPL-SN-594134; US-PATENT-CLASS-350-537; US-PATENT-CLASS-350-276-R; US-PATENT-CLASS-350-319; US-PATENT-CLASS-350-448; US-PATENT-CLASS-350-580) Avail: US Patent and Trademark Office CSCL 20F

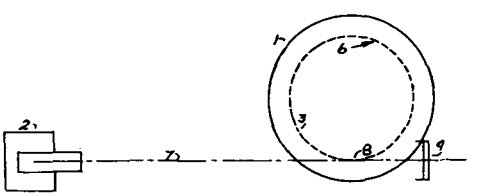
This invention relates to an optical system incorporating a plurality of reflective baffles which return incoming off-axis rays from the optical system. The baffles in an infrared telescope would extend circumferentially around the telescope tube. Each of the baffles has a concave, rearwardly facing curved surface and a frontwardly facing planar surface. Baffles extend from the interior wall of tube in an acute angle with the optical axis of the telescope, relative to front end of the tube. This acute angle becomes greater for the baffles toward rear end of the telescope. Incoming off axis rays are reflected by the planar surface of the baffles against the curved surface of a forward adjacent baffle and are reflected back and forth between adjacent surfaces a number of times before being reflected back as rays out of the front end of the telescope. Other off axis rays are directly reflected as rays by the planar surfaces of the baffles. M.G.



N86-20126* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
X-RAY DETERMINATION OF PARTS ALIGNMENT Patent
C. W. NELSON (Beech Aircraft Corp., Boulder, Colo.) 17 Sep. 1985 4 p Sponsored by NASA
(NASA-CASE-MSC-20418-1; US-PATENT-4,542,520; US-PATENT-APPL-SN-438446; US-PATENT-CLASS-378-58; US-PATENT-CLASS-378-59) Avail: US Patent and Trademark Office

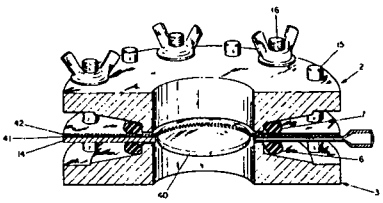
A method for determining the alignment of adjoining metal objects is provided. The method comprises producing an X-ray image of adjoining surfaces of the two metal objects. The X-ray beam is tangential to the point the surfaces are joined. The method is particularly applicable where the alignment of the two metal objects is not readily susceptible to visual inspection.

Official Gazette of the U.S. Patent and Trademark Office



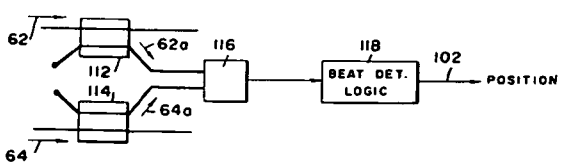
N86-20128*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A METHOD AND APPARATUS FOR MAKING AN OPTICAL ELEMENT HAVING A DIELECTRIC FILM Patent Application
G. C. AUGASON, inventor (to NASA) 15 Aug. 1985 16 p
(NASA-CASE-ARC-11611-1; NAS 1.71:ARC-11611-1;
US-PATENT-APPL-SN-765981) Avail: NTIS HC A02/MF A01
CSCL 20F

A film-application device (FAD) comprising a pair of exterior, tapered, O ring bearing plate members and a central plate member for simplifying the process of thermally bonding a thin dielectric film to a substrate comprising an optical element are discussed. In use, the film is sandwiched between the O rings and stretched across the optical element by squeezing the exterior plates together before bonding to the element. The film may be used for protecting the optical element or to reduce surface reflection of radiation. The FAD may also be used without the center plate to stretch a dielectric film prior to its attachment to or insertion in a holder to make pellicles or beam-splitters. NASA



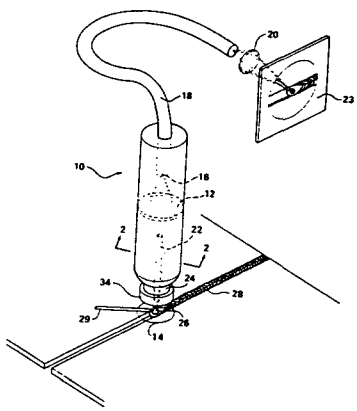
N86-20129*# National Aeronautics and Space Administration. Pasadena Office, Calif.
CLOSED LOOP FIBER OPTIC ROTATION SENSOR Patent Application
W. C. GOSS (JPL, Pasadena, Calif.), B. R. YOUMANS (JPL, Pasadena, Calif.), N. M. NERHEIM, inventors (to NASA) (JPL, Pasadena, Calif.), and R. K. BARTMAN 10 Sep. 1985 22 p
(Contract NAS7-918)
(NASA-CASE-NPO-16558-1-CU; NAS 1.71:NPO-16558-1-CU;
US-PATENT-APPL-SN-779744) Avail: NTIS HC A02/MF A01
CSCL 20F

An improved optical gyroscope is provided, of the type that passes two light components in opposite directions through an optic fiber coil, and which adds a small variable frequency to one of the light components to cancel the phase shift due to rotation of the coil. The amount of coil rotation from an initial orientation, is accurately determined by combining the two light components, one of which has a slightly increased frequency, to develop beats that each represent a predetermined angle of rotation. The direction of rotation is obtained by combining the two light components on a photodetector, intermittently phase shifting a single light component by 90 deg, and comparing the direction of change of photodetector output (+ or -) caused by the 90 deg shift, with the slope (+ or -) of the photodetector output at about the same time, when there is a 90 deg shift. NASA



N86-20130*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
WELDING TORCH ARC LIGHT REFLECTOR Patent Application
S. S. GORDON, inventor (to NASA) (Rockwell International Corp., Canoga Park, Calif.) 3 Oct. 1985 8 p
(NASA-CASE-MFS-29134-1; NAS 1.71:MFS-29134-1;
US-PATENT-APPL-SN-783890) Avail: NTIS HC A02/MF A01
CSCL 20F

A welding torch arc light reflector is disclosed for welding torches having optical viewing systems. A schematic of a welding torch having an internal coaxial viewing system consisting of a lens which focuses the field of view of the weld scene of the workpiece onto the end of the fiberoptic bundle is provided. The transmitted image of the fiberoptic bundle is provided to a camera lens which focuses it onto a TV sensor array for transmission. To improve the parity of the image of the monitoring system, an arc light reflector is shown fitted to the end of the torch housing or gas cup. The arc light reflector has an internal conical section portion which is polished to serve as a mirror which reflects the bright arc light back onto the darker areas of the weld area and thereby provide a more detailed image for the monitoring system. The novelty of the invention lies in the use of an arc light reflector on welding torches having optical viewing systems. NASA

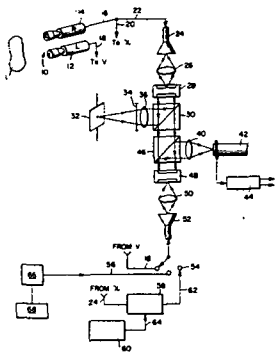


N86-21348* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
OPTICAL STEREO VIDEO SIGNAL PROCESSOR Patent
G. D. CRAIG, inventor (to NASA) 3 Dec. 1985 9 p Filed 9 Mar. 1983
(NASA-CASE-MFS-25752-1; US-PATENT-4,556,986;
US-PATENT-APPL-SN-473499; US-PATENT-CLASS-382-42;
US-PATENT-CLASS-350-335; US-PATENT-CLASS-356-4.5;
US-PATENT-CLASS-356-345; US-PATENT-CLASS-358-88;
US-PATENT-CLASS-358-105; US-PATENT-CLASS-358-125;
US-PATENT-CLASS-364-822) Avail: US Patent and Trademark Office CSCL 20F

An otpical video signal processor is described which produces a two-dimensional cross-correlation in real time of images received by a stereo camera system. The optical image of each camera is projected on respective liquid crystal light valves. The images on the liquid crystal valves modulate light produced by an extended light source. This modulated light output becomes the two-dimensional cross-correlation when focused onto a video detector and is a function of the range of a target with respect to the stereo camera. Alternate embodiments utilize the

two-dimensional cross-correlation to determine target movement and target identification.

Official Gazette of the U.S. Patent and Trademark Office



N86-21401*# National Aeronautics and Space Administration. Pasadena Office, Calif.

METHOD OF PRODUCING HIGH T SUPERCONDUCTING NBN FILMS Patent Application

S. THAKOOR (JPL, Pasadena, Calif.), J. L. LAMB (JPL, Pasadena, Calif.), A. P. THAKOOR (JPL, Pasadena, Calif.), and S. K. KHANNA, inventors (to NASA) (JPL, Pasadena, Calif.) 12 Aug. 1985 28 p

(Contract NAS7-918)

(NASA-CASE-NPO-16681-1-CU; NAS 1.71:NPO-16681-1-CU; US-PATENT-APPL-SN-764812) Avail: NTIS HC A03/MF A01 CSCL 20L

Thin films of niobium nitride with high superconducting temperature (T sub c) of 15.7 K are deposited on substrates held at room temperature (approx. 90 C) by heat sink throughout the sputtering process. Films deposited at P sub Ar 12.9 + or - 0.2 mTorr exhibit higher T sub c with increasing P sub N2, I' with the highest T sub c achieved at P sub n2, I = 3.7 + or - 0.2 mTorr and total sputtering pressure P sub tot = 16.6 + or - 0.4. Further increase of N2 injection starts decreasing T sub c. NASA

76

SOLID-STATE PHYSICS

Includes superconductivity.

N86-20150* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

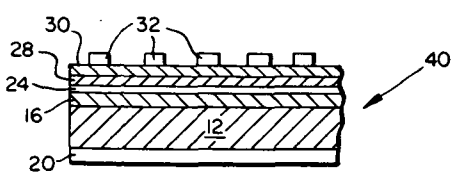
GAAS SCHOTTKY BARRIER PHOTO-RESPONSIVE DEVICE AND METHOD OF FABRICATION Patent

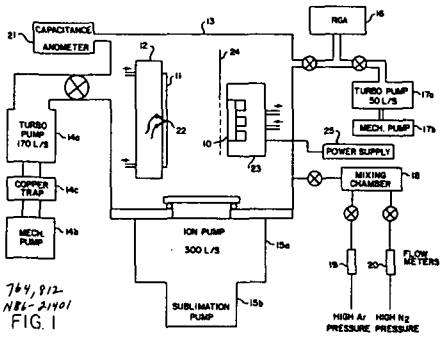
G. E. ALCORN (Howard Univ., Washington, D.C.), C. Z. LEINKRAM (Howard Univ., Washington, D.C.), and O. OKUNOLA, inventors (to NASA) (Howard Univ., Washington, D.C.) 24 Sep. 1985 6 p Filed 24 Jun. 1983 Sponsored by NASA

(NASA-CASE-GSC-12816-1; US-PATENT-4,543,442; US-PATENT-APPL-SN-507625; US-PATENT-CLASS-136-255; US-PATENT-CLASS-29-572; US-PATENT-CLASS-136-262; US-PATENT-CLASS-357-15; US-PATENT-CLASS-357-30) Avail: US Patent and Trademark Office CSCL 20L

A gallium arsenide photo-responsive device is provided with an intermediate, transparent layer of a refractory metal or alkaline earth metal forming a tenacious bond between a non-hydroscopic oxide layer and a noble metal Schottky barrier layer. The device has a gallium arsenide substrate with a predetermined type conductivity and a gallium arsenide epitaxial layer with the same type conductivity but a lower charge carrier concentration grown on the substrate. The oxide layer is formed to cover the epitaxial layer, and the transparent metal layer followed by the noble metal layer are deposited upon the oxide layer. An interdigitated ohmic contact is then formed upon the noble metal layer.

Official Gazette of the U.S. Patent and Trademark Office





85

URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

N86-22452*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

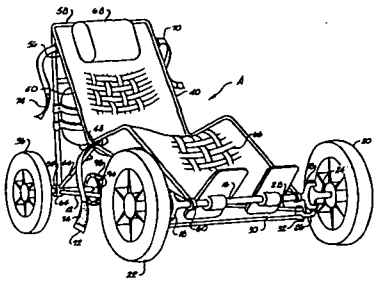
PERSONNEL EMERGENCY CARRIER VEHICLE Patent Application

O. H. FEDOR and L. J. OWENS, inventors (to NASA) 3 Jul. 1985 14 p

(NASA-CASE-KSC-11282-1; NAS 1.71:KSC-11282-1; US-PATENT-APPL-SN-751644) Avail: NTIS HC A02/MF A01 CSCL 13F

A personnel emergency carrier vehicle is disclosed which includes a vehicle frame supported on steerable front wheels and driven rear wheels. A supply of breathing air is connected to quick connect face mask coupling and umbilical cord couplings for supplying breathing air to an injured worker or attendant either with or without a self-contained atmospheric protection suit for protection against hazardous gases at an accident site. A non-sparking hydraulic motor is utilized to drive the vehicle and

suitable direction and throttling controls are provided for controlling the delivery of a hydraulic driving fluid from a pressurized hydraulic fluid accumulator. A steering axis is steerable through a handle to steer the front wheels through a linkage assembly. NASA



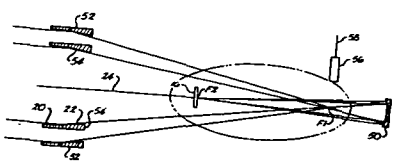
89

ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N86-22459*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
MULTISPECTRAL GLANCING INCIDENCE X-RAY TELESCOPE Patent Application
R. B. HOOVER, inventor (to NASA) 15 Aug. 1986 16 p
(NASA-CASE-MFS-28013-1; NAS 1.71:MFS-28013-1;
US-PATENT-APPL-SN-765979) Avail: NTIS HC A02/MF A01
CSCL 03A

A multispectural glancing incidence X-ray telescope is illustrated capable of broadband, high-resolution imaging of solar and stellar X-ray and extreme ultraviolet radiation sources which includes a primary optical system preferably of the Wolter I type having a primary mirror system. The primary optical system further includes an optical axis having a primary focus at which the incoming radiation is focused by the primary mirrors. A plurality of ellipsoidal mirrors are carried at an inclination to the optical axis behind the primary focus. A rotating carrier is provided on which the ellipsoidal mirrors are carried so that a desired one of the ellipsoidal mirrors may be selectively positioned in front of the incoming radiation beam. In the preferred embodiment, each of the ellipsoidal mirrors has an identical convave surface carrying a layered synthetic microstructure coating tailored to reflect a desired wavelength of 1.5A or longer. Each of the identifical ellipsoidal mirrors has a second focus at which a detector is carried. Thus the different wavelength image is focused upon the detector irregardless of which mirror is positioned in front of the radiation beam. NASA



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Copies of U.S. patents may be purchased directly from the U.S. Patent and Trademark Office, Washington, D.C. 20231 at $1.50 per copy. When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02. Microfiche are sold at price code A01. The US-Patent-Appl-SN-number should be used in ordering either paper copy or microfiche from NTIS.

LICENSES FOR COMMERCIAL USE: INQUIRIES AND APPLICATIONS FOR LICENSE

NASA inventions, abstracted in *NASA PAB,* are available for nonexclusive or exclusive licensing in accordance with the NASA Patent Licensing Regulations. It is significant that all licenses for NASA inventions shall be by express written instruments and that no license will be granted or implied in a NASA invention except as provided in the NASA Patent Licensing Regulations.

Inquiries concerning the NASA Patent Licensing Program or the availability of licenses for the commercial use of NASA-owned inventions covered by U.S. patents or pending applications for patent should be forwarded to the NASA Patent Counsel of the NASA installation having cognizance of the specific invention, or the Associate General Counsel for Intellectual Property, Code GP, National Aeronautics and Space Administration, Washington, D.C. 20546. Inquiries should refer to the NASA Case Number, the Title of the Invention, and the U.S. Patent Number or the U.S. Application Serial Number assigned to the invention as shown in *NASA PAB.*

The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table.

STANDING ORDER SUBSCRIPTIONS

NASA SP-7039, Section 1 and its supplements are available from the National Technical Information Service (NTIS) on standing order subscription as PB 86-911100 at the price of $11.50 domestic and $23.00 foreign. Standing order subscriptions do not terminate at the end of a year, as do regular subscriptions, but continue indefinitely unless specifically terminated by the subscriber.

NASA Case Number Prefix Letters	Address of Cognizant NASA Patent Counsel
ARC-xxxxx XAR-xxxxx	Ames Research Center Mail Code: 200-11A Moffett Field, California 94035 Telephone: (415) 965-5104
ERC-xxxxx XER-xxxxx HQN-xxxxx XHQ-xxxxx	NASA Headquarters Mail Code: GP Washington, D.C. 20546 Telephone: (202) 755-3954
GSC-xxxxx XGS-xxxxx	Goddard Space Flight Center Mail Code: 204 Greenbelt, Maryland 20771 Telephone: (301) 344-7351
KSC-xxxxx XKS-xxxxx	John F. Kennedy Space Center Mail Code: PT-PAT Kennedy Space Center, Florida 32899 Telephone: (305) 867-2544
LAR-xxxxx XLA-xxxxx	Langley Research Center Mail Code: 279 Hampton, Virginia 23365 Telephone: (804) 827-8725
LEW-xxxxx XLE-xxxxx	Lewis Research Center Mail Code: 500-318 21000 Brookpark Road Cleveland, Ohio 44135 Telephone: (216) 433-6346
MSC-xxxxx XMS-xxxxx	Lyndon B. Johnson Space Center Mail Code: AL3 Houston, Texas 77058 Telephone: (713) 483-4871
MFS-xxxxx XMF-xxxxx	George C. Marshall Space Flight Center Mail Code: CC01 Huntsville, Alabama 35812 Telephone: (205) 453-0020
NPO-xxxxx XNP-xxxxx FRC-xxxxx XFR-xxxxx WOO-xxxxx	NASA Resident Legal Office Mail Code: 180-801 4800 Oak Grove Drive Pasadena, California 91103 Telephone: (213)354-2700

PATENT LICENSING REGULATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

14 CFR Part 1245

Licensing of NASA Inventions

AGENCY: National Aeronautics and Space Administration.

ACTION: Interim regulation with comments requested.

SUMMARY: The National Aeronautics and Space Administration (NASA) is revising its patent licensing regulations to conform with Pub. L. 96-517. This interim regulation provides policies and procedures applicable to the licensing of federally owned inventions in the custody of the National Aeronautics and Space Administration, and implements Pub. L. 96-517. The object of this subpart is to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

EFFECTIVE DATE: July 1, 1981. Comments must be received in writing by December 2, 1981. Unless a notice is published in the **Federal Register** after the comment period indicating changes to be made, this interim regulation shall become a final regulation.

ADDRESS: Mr. John G. Mannix, Director of Patent Licensing, GP-4, NASA, Washington, D.C. 20546.

FOR FURTHER INFORMATION CONTACT:
Mr. John G. Mannix, (202) 755-3954.

SUPPLEMENTARY INFORMATION:

PART 1245—PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

Subpart 2 of Part 1245 is revised to read as follows

• • • • •

Subpart 2—Licensing of NASA Inventions

Sec.

Authority: 35 U.S.C. Section 207 and 208, 94 Stat. 3023 and 3024.

• • • • •

Subpart 2—Licensing of NASA Inventions

§ 1245.200 Scope of subpart.

This subpart prescribes the terms, conditions, and procedures upon which a NASA invention may be licensed. It does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government's acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

§ 1245.201 Policy and objective.

It is the policy and objective of this subpart to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

§ 1245.202 Definitions.

(a) "Federally owned invention" means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.

(b) "Federal agency" means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a Federally owned invention.

(c) "NASA Invention" means a Federally owned invention with respect to which NASA maintains custody and administration, in whole or in part, of the right, title, or interest in such invention on behalf of the United States Government.

(d) "Small business firm" means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of these regulations, the size standard for small business concerns involved in Government procurement, contained in 13 C.F.R. 121.3-8, and in subcontracting, contained in 13 CFR 121.3-12, will be used.

(e) Practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

(f) "United States" means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

§ 1245.203 Authority to grant licenses.

NASA inventions shall be made available for licensing as deemed appropriate in the public interest. NASA may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this subpart on inventions in its custody.

Restrictions and Conditions

§ 1245.204 All licenses granted under this subpart.

(a) *Restrictions.* (1) A license may be granted only if the applicant has supplied NASA with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

(2) A license granting rights to use or sell under a NASA invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.

(b) *Conditions.* Licenses shall contain such terms and conditions as NASA determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this subpart. The following terms and conditions apply to any license:

(1) The duration of the license shall be for a period specified in the license agreement, unless sooner terminated in accordance with this subpart.

(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of NASA, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The license may provide the licensee the right to grant sublicenses under the license, subject to the approval of NASA. Each sublicense shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to NASA.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) All licenses shall normally require royalties or other consideration.

(8) Where an agreement is obtained pursuant to § 1245.204(a)(2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall recite such agreement.

(9) The license shall provide for the right of NASA to terminate the license, in whole or in part, if:

(i) NASA determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of NASA that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) NASA determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this subpart, upon mutual agreement of NASA and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this subpart shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

Types of Licenses

§ 1245.205 Nonexclusive licenses.

(a) *Availability of licenses.* Nonexclusive licenses may be granted under NASA inventions without publication of availability or notice of a prospective license.

(b) *Conditions.* In addition to the provisions of § 1245.204, the nonexclusive license may also provide that, after termination of a period specified in the license agreement, NASA may restrict the license to the fields of use or geographic areas, or both, in which the licensee has brought the invention to practical application and continues to make the benefits of the invention reasonably accessible to the public. However, such restriction shall be made only in order to grant an exclusive or partially exclusive license in accordance with this subpart.

§ 1245.206 Exclusive and partially exclusive licenses.

(a) Domestic licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on NASA inventions: (i) 3 months after notice of the invention's availability has been announced in the **Federal Register**; or (ii) without such notice where NASA determines that expeditious granting of such a license will best serve the interests of the Federal Government and the public; and (iii) in either situation, specified in (a)(1)(i) or (ii) of this section only if:

(A) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the **Federal Register**, providing opportunity for filing written objections within a 60-day period;

(B) After expiration of the period in § 1245.206(a) (1)(iii)(A) and consideration of nay written objections received during the period, NASA has determined that:

(*1*) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilization by the public;

(*2*) The desired practial application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(*3*) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(*4*) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(C) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(D) NASA has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to domestic exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to NASA the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) Foreign licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on a NASA invention covered by a foreign patent, patent application, or other form of protection, provided that:

(i) Notice of a prospective license,

identifying the invention and prospective licensee, has been published in the Federal Register, providing opportunity for filing written objections within a 60-day period and following consideration of such objections;

(ii) NASA has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii) The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) *Record of determinations.* NASA shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

Procedures

§ 1245.207 Application for a license.

An application for a license should be addressed to the Patent Counsel at the NASA installation having responsibility for the invention and shall normally include:

(a) Identification of the invention for which the license is desired, including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(d) Name, address, and telephone number of representative of applicant to whom correspondence should be sent;

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether applicant is a small business firm as defined in § 1245.202(c);

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under Federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

§ 1245.208 Processing applications.

(a) Applications for licenses will be initially reviewed by the Patent Counsel of the NASA installation having responsibility for the invention. The Patent Counsel shall make a preliminary recommendation to the Director of Licensing, NASA Headquarters, whether to: (1) grant the license as requested, (2) grant the license with modification after negotiation with the licensee, or (3) deny the license. The Director of Licensing shall review the preliminary recommendation of the Patent Counsel and make a final recommendation to the NASA Assistant General Counsel for Patent Matters. Such review and final recommendation may include, and be based on, any additional information obtained from applicant and other sources that the Patent Counsel and the Director of Licensing deem relevant to the license requested. The determination to grant or deny the license shall be made by the Assistant General Counsel for Patent Matters based on the final recommendation of the Director of Licensing.

(b) When notice of a prospective exclusive or partially exclusive license is published in the Federal Register in accordance with § 1245.206(a)(1)(iii)(A) or § 1245.206(b)(1)(i), any written objections received in response thereto will be considered by the Director of Licensing in making the final recommendation to the Assistant General Counsel for Patent Matters.

(c) If the requested license, including any negotiated modifications, is denied by the Assistant General Counsel for Patent Matters, the applicant may request reconsideration by filing a written request for reconsideration within 30 days after receiving notice of denial. This 30-day period may be extended for good cause.

(d) In addition to, or in lieu of requesting reconsideration, the applicant may also appeal the denial of the license in accordance with § 1245.211.

§ 1245.209 Notice to Attorney General.

A copy of the notice provided for in §§ 1245.206(a)(1)(iii)(A), and 1245.206(b)(1)(i) will be sent to the Attorney General.

§ 1245.210 Modification and termination of licenses.

Before modifying or terminating a license, other than by mutual agreement, NASA shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license should not be modified or terminated.

§ 1245.211 Appeals.

(a) The following parties may appeal to the NASA Administrator or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(1) A person whose application for a license has been denied;

(2) A licensee whose license has been modified or terminated, in whole or in part; or

(3) A person who timely filed a written objection in response to the notice required by §§ 1245.206(a)(1)(iii)(A) or

1245.206(b)(1)(i) and who can demonstrate to the satisfaction of NASA that such person may be damaged by the Agency action.

(b) Written notice of appeal must be filed within 30 days (or such other time as may be authorized for good cause shown) after receiving notice of the adverse decision or determination; including, an adverse decision following the request for reconsideration under § 1245.208(c). The notice of appeal, along with all supporting documentation should be addressed to the Administrator, National Aeronautics and Space Administration, Washington, DC 20546. Should the appeal raise a genuine dispute over material facts, fact-finding will be conducted by the NASA Inventions and Contributions Board. The person filing the appeal shall be afforded an opportunity to be heard and to offer evidence in support of the appeal. The Chairperson of the Inventions and Contributions Board shall prepare written findings of fact and transmit them to the Administrator or designee. The decision on the appeal shall be made by the NASA Administrator or designee. There is no further right of administrative appeal from the decision of the Administrator or designee.

§ 1245.212 Protection and administration of inventions.

NASA may take any suitable and necessary steps to protect and administer rights to NASA inventions, either directly or through contract.

§ 1245.213 Transfer of custody.

NASA having custody of certain Federally owned inventions may transfer custody and administration in whole or in part, to another Federal agency, of the right, title, or interest in any such invention.

§ 1245.214 Confidentiality of information.

Title 35, United States Code, section 209, provides that any plan submitted pursuant to § 1245.207(h) and any report required by § 1245.204(b)(6) may be treated by NASA as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under section 552 of Title 5 of the United States Code.

James M. Beggs,

Administrator.

October 15, 1981.

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Section 1: Abstracts

16. Abstract

Abstracts are provided for 115 patents and patent applications entered into the NASA scientific and technical information system during the period January 1986 through June 1986. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent application.

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