



**NASA SP-7039(33)  
Section 1  
Abstracts**

# **NASA PATENT ABSTRACTS BIBLIOGRAPHY**

**A CONTINUING BIBLIOGRAPHY**

**Section 1 • Abstracts**

**JULY 1988**

(NASA-SP-7039(33)) NASA PATENT ABSTRACTS  
BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY.  
SECTION 1: ABSTRACTS (NASA) 25 p CSCI 05B

N88-25388

00/82 Unclas  
0148107

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

NASA SP-7039(33) NASA Patent Abstracts Bibliography (Section 1 Abstracts) JULY 1988

**NASA SP-7039(33)**  
**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 1988 and June 1988.**

1988-01-01 to 1988-06-30. This report contains the abstracts of the patents and patent applications of the NASA-owned inventions announced in *STAR* between January 1988 and June 1988.



Scientific and Technical Information Division 1988  
National Aeronautics and Space Administration  
Washington, DC

# 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 16 citations published in this issue of the Abstract Section cover the period January 1988 through June 1988. The Index Section references over 4500 citations covering the period May 1969 through June 1988.

## ABSTRACT SECTION (SECTION 1)

This *PAB* issue includes 10 major subject divisions separated into 76 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 scheme was devised in 1975 and revised in 1987 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, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in order of the ascending NASA Accession Number originally assigned for *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.

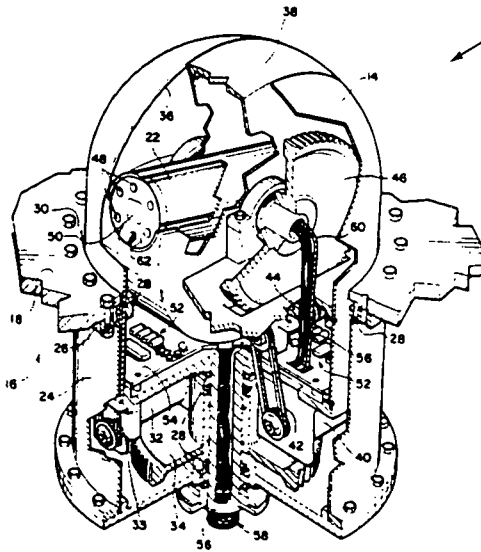
# TYPICAL CITATION AND ABSTRACT

NASA SPONSORED

**ACCESSION NUMBER** → **N88-14492\*** National Aeronautics and Space Administration.  
 Ames Research Center, Moffett Field, Calif. ← **CORPORATE SOURCE**  
**TITLE** → **AIRBORNE TRACKING SUNPHOTOMETER APPARATUS AND SYSTEM Patent**  
**INVENTORS** → YUTAKA MATSUMOTO, inventor (to NASA), CESAR MINA, inventor (to NASA), PHILIP B. RUSSELL, inventor (to NASA), and WILLIAM B. VANARK, inventor (to NASA) 1 Dec. 1987 10 p  
 Filed 29 Jan. 1986 Supersedes N86-21982 (24 - 12, p 1975)  
**NASA CASE NUMBER** → (NASA-CASE-ARC-11622-1; US-PATENT-4,710,618;  
**US PATENT APPLICATIONS SERIAL NUMBER** → US-PATENT-APPL-SN-823712; US-PATENT-CLASS-250-203R; US-PATENT-CLASS-126-425) Avail: US Patent and Trademark Office CSCL 10A ← **AVAILABILITY SOURCE**

**COSATI CODE** → An airborne tracking Sun photometer apparatus has a rotatable dome. An azimuth drive motor is connected to rotate the dome. The dome has an equatorial slot. A cylindrical 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 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 the 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 or by computer. ← **ABSTRACT**

KEY ILLUSTRATION



**18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE****N.A.**

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance*, *39 Structural Mechanics*, and *16 Space Transportation*.

**19 SPACECRAFT INSTRUMENTATION****N.A.**

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

**20 SPACECRAFT PROPULSION AND POWER****N.A.**

Includes main propulsion systems and components, e.g. rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power*, *28 Propellants and Fuels*, *44 Energy Production and Conversion*, and *15 Launch Vehicles and Space Vehicles*.

**CHEMISTRY AND MATERIALS**

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

**23 CHEMISTRY AND MATERIALS (GENERAL)****N.A.****24 COMPOSITE MATERIALS****1**

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

For ceramic materials see *27 Nonmetallic Materials*.

**25 INORGANIC AND PHYSICAL CHEMISTRY****N.A.**

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

For related information see also *77 Thermodynamics and Statistical Physics*.

**26 METALLIC MATERIALS****2**

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

**27 NONMETALLIC MATERIALS****2**

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

For composite materials see *24 Composite Materials*.

**28 PROPELLANTS AND FUELS****N.A.**

Includes rocket propellants, igniters and oxidizers; their storage and handling procedures; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power*, *20 Spacecraft Propulsion and Power*, and *44 Energy Production and Conversion*.

**29 MATERIALS PROCESSING****N.A.**

Includes space-based development of products and processes for commercial application.

For biological materials see *55 Space Biology*.

**ENGINEERING**

Includes engineering (general); communications and radar; 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*.

**31 ENGINEERING (GENERAL)****3**

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

**32 COMMUNICATIONS AND RADAR****N.A.**

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

For related information see also *04 Aircraft Communications and Navigation* and *17 Space Communications, Spacecraft Communications, Command and Tracking*. For search and rescue see *03 Air Transportation and Safety*, and *16 Space Transportation*.

**33 ELECTRONICS AND ELECTRICAL ENGINEERING****3**

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

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

**34 FLUID MECHANICS AND HEAT TRANSFER****N.A.**

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

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

**35 INSTRUMENTATION AND PHOTOGRAPHY****N.A.**

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

For aerial photography see *43 Earth Resources and Remote Sensing*. For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation*.

**36 LASERS AND MASERS****4**

Includes parametric amplifiers.

For related information see also *76 Solid-State Physics*.

**37 MECHANICAL ENGINEERING****4**

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

**38 QUALITY ASSURANCE AND RELIABILITY****N.A.**

Includes product sampling procedures and techniques; and quality control.

**39 STRUCTURAL MECHANICS****N.A.**

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

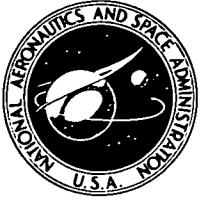
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

- 71 ACOUSTICS** N.A.  
Includes sound generation, transmission, and attenuation.  
For noise pollution see *45 Environment Pollution*.
- 72 ATOMIC AND MOLECULAR PHYSICS** N.A.  
Includes atomic structure, electron properties, and molecular spectra.
- 73 NUCLEAR AND HIGH-ENERGY PHYSICS** N.A.  
Includes elementary and nuclear particles; and reactor theory.  
For space radiation see *93 Space Radiation*.
- 74 OPTICS** N.A.  
Includes light phenomena and optical devices.  
For lasers see *36 Lasers and Masers*.
- 75 PLASMA PHYSICS** N.A.  
Includes magnetohydrodynamics and plasma fusion.  
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.
- 76 SOLID-STATE PHYSICS** 6  
Includes superconductivity.  
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.
- 77 THERMODYNAMICS AND STATISTICAL PHYSICS** N.A.  
Includes quantum mechanics; theoretical physics; and Bose and Fermi statistics.  
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.
- SOCIAL SCIENCES**  
Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law, political science, and space policy; 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 management; information storage and retrieval technology; technical writing; graphic arts; and micrography.  
For computer documentation see *61 Computer Programming and Software*.
- 83 ECONOMICS AND COST ANALYSIS** N.A.  
Includes cost effectiveness studies.
- 84 LAW, POLITICAL SCIENCE AND SPACE POLICY** N.A.  
Includes NASA appropriation hearings; aviation law; space law and policy; international law; international cooperation; and patent policy.
- 85 URBAN TECHNOLOGY AND TRANSPORTATION** N.A.  
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** N.A.  
Includes radio, gamma-ray, and infrared astronomy; and astrometry.
- 90 ASTROPHYSICS** N.A.  
Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust.  
For related information see also *75 Plasma Physics*.
- 91 LUNAR AND PLANETARY EXPLORATION** N.A.  
Includes planetology; and manned and unmanned flights.  
For spacecraft design or space stations see *18 Spacecraft Design, Testing and Performance*.
- 92 SOLAR PHYSICS** N.A.  
Includes solar activity, solar flares, solar radiation and sunspots.  
For related information see *93 Space Radiation*.
- 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**  
Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs.
- 99 GENERAL** N.A.

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

## Section 2 • Indexes

SUBJECT INDEX  
INVENTOR INDEX  
SOURCE INDEX  
CONTRACT NUMBER INDEX  
NUMBER INDEX  
ACCESSION NUMBER INDEX



JULY 1988 (Supplement 33)

# NASA Patent Abstracts Bibliography

A Semiannual Publication of the National Aeronautics and Space Administration

02

## AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

**N88-14071\*** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

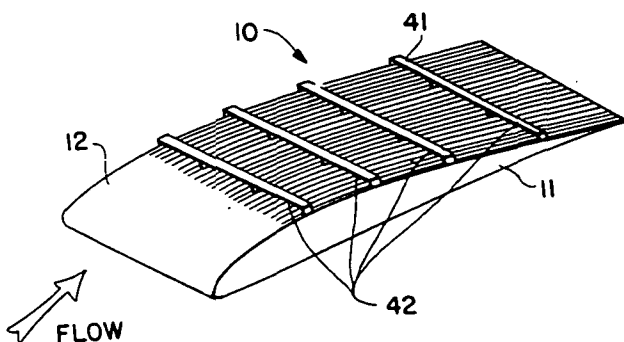
### COMBINED RIBLET AND LEBU DRAG REDUCTION SYSTEM Patent

MICHAEL J. WALSH, inventor (to NASA), JOHN B. ANDERS, inventor (to NASA), and JERRY N. HEFNER, inventor (to NASA) 17 Nov. 1987 10 p Filed 27 Dec. 1984 Supersedes N85-28922 (23 - 18, p 3058)

(NASA-CASE-LAR-13286-1; US-PATENT-4,706,910; US-PATENT-APPL-SN-686959; US-PATENT-CLASS-244-130; US-PATENT-CLASS-244-200; US-PATENT-CLASS-244-199; US-PATENT-CLASS-114-67R; US-PATENT-CLASS-296-1S; US-PATENT-CLASS-138-38) Avail: US Patent and Trademark Office CSCL 01A

The invention is a system of flow control devices which result in reduced skin friction on aerodynamic and hydrodynamic surfaces. The devices cause a breakup of large-scale disturbances in the boundary layer of the flow field. The riblet device acts to reduce disturbances near the boundary layer wall by the use of longitudinal striations forming V-shaped grooves. These grooves are dimensional on the order of the wall vortices and turbulent burst dimensions. The large eddy breakup device is a small strip or airfoil which is suspended in the upper region of the boundary layer. Various physical mechanisms cause a disruption of the large-scale vortices. The combination of the devices of this invention result in a substantial reduction in skin friction drag.

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



03

## AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

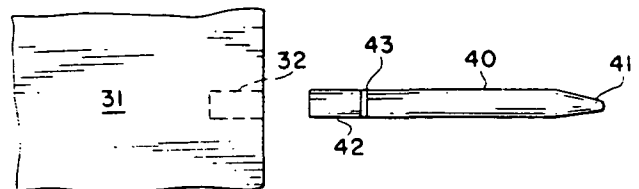
**N88-14083\*** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

### LIGHTNING DISCHARGE PROTECTION ROD Patent

CHARLES F. BRYAN, JR., inventor (to NASA) 6 Oct. 1987 7 p Filed 24 Apr. 1986 Supersedes N86-26296 (24 - 17, p 2686) (NASA-CASE-LAR-13470-1; US-PATENT-4,698,723; US-PATENT-APPL-SN-855983; US-PATENT-CLASS-361-218; US-PATENT-CLASS-361-222) Avail: US Patent and Trademark Office CSCL 01C

A system for protecting an in-air vehicle from damage due to a lightning strike is disclosed. It is an extremely simple device consisting of a sacrificial graphite composite rod, approximately the diameter of a pencil with a length of about five inches. The sacrificial rod is constructed with the graphite fibers running axially within the rod in a manner that best provides a path of conduction axially from the trailing edge of an aircraft to the trailing end of the rod. The sacrificial rod is inserted into an attachment hole machined into trailing edges of aircraft flight surfaces, such as a vertical fin cap and attached with adhesive in a manner not prohibiting the conduction path between the rod and the aircraft. The trailing end of the rod may be tapered for aerodynamic and esthetic requirements. This rod is sacrificial but has the capability to sustain several lightning strikes and still provide protection.

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



24

## COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

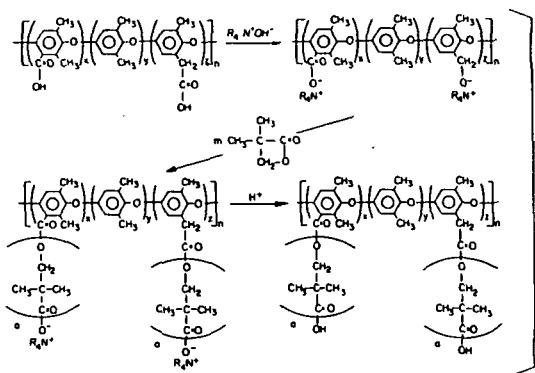
**N88-18628\*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

### CERAMIC-CERAMIC SHELL TILE THERMAL PROTECTION SYSTEM AND METHOD THEREOF Patent

SALVATORE R. RICCIETELLO, inventor (to NASA), MARNELL

commercially available polyether is a very high melting plastic. This makes it considerably more difficult to fabricate finished parts from this material. These problems are solved by providing an aromatic polyether graft copolymer with improved solvent resistance and crystalline thermally reversible crosslinks. The graft copolymer is formed by converting the carboxyl groups of a carboxylated polyphenylene oxide polymer to ionic carbonyl groups in a suitable solvent, reacting pivalolactone with the dissolved polymer, and adding acid to the solution to produce the graft copolymer.

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



31

ENGINEERING (GENERAL)

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

**N88-14223\*** Jet Propulsion Lab., California Inst. of Tech., Pasadena.

**OXYGEN CHEMISORPTION CRYOGENIC REFRIGERATOR Patent**

JACK A. JONES, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 6 Oct. 1987 6 p Filed 24 Apr. 1986 Supersedes N86-27467 (24 - 18, p 2879)

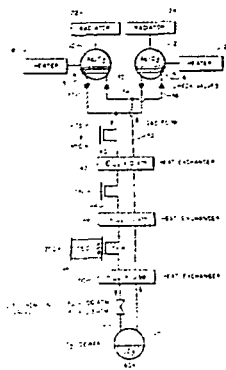
(NASA-CASE-NPO-16734-1-CU; US-PATENT-4,697,425; US-PATENT-APPL-SN-855982; US-PATENT-CLASS-62-48; US-PATENT-CLASS-62-467; US-PATENT-CLASS-62-514R)

Avail: US Patent and Trademark Office CSCL 13B

The present invention relates to a chemisorption compressor cryogenic refrigerator which employs oxygen to provide cooling at 60 to 100 K. The invention includes dual vessels containing an oxygen absorbent material, alternately heated and cooled to provide a continuous flow of high pressure oxygen, multiple heat exchangers for precooling the oxygen, a Joule-Thomson expansion valve system for expanding the oxygen to partially liquefy it and a liquid oxygen pressure vessel. The primary novelty is that, while it was believed that once oxygen combined with an element or compound the reaction could not reverse to release gaseous oxygen, in this case oxygen will indeed react in a reversible fashion

with certain materials and will do so at temperatures and pressures which make it practical for incorporation into a cryogenic refrigeration system.

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



33

ELECTRONICS AND ELECTRICAL ENGINEERING

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

**N88-14270\*** National Aeronautics and Space Administration. Pasadena Office, Calif.

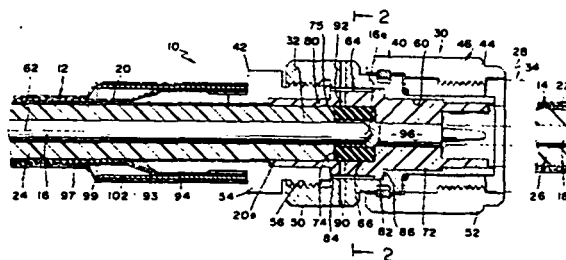
**COAXIAL CABLE CONNECTOR Patent**

EDWARD R. CARO, inventor (to NASA) and WALTER J. BONAZZA, inventor (to NASA) (California Inst. of Tech., Pasadena.) 6 Oct. 1987 6 p Filed 8 Sep. 1986 Supersedes N87-15414 (25 - 07, p 898)

(NASA-CASE-NPO-16764-1-CU; US-PATENT-4,698,028; US-PATENT-APPL-SN-904513; US-PATENT-CLASS-439-271; US-PATENT-CLASS-439-578) Avail: US Patent and Trademark Office CSCL 09A

A coaxial cable connector is provided, which resists radio frequency breakdown in coaxial cables used in the vacuum of outer space. The connector body surrounds an insulator which includes an easily compressible elastomeric portion. An insulated coaxial cable is prepared so that its insulation projects beyond the outer conductor and compresses the elastomeric portion of the connector insulator.

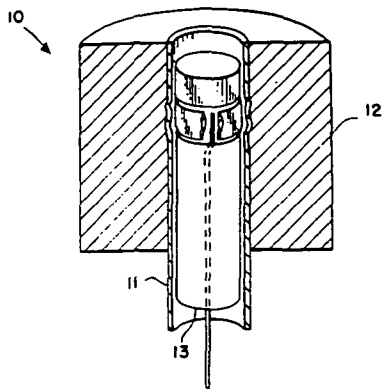
Official Gazette of the U.S. Patent and Trademark Office





and collision bonding wherein electron-sharing linkups are formed.

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

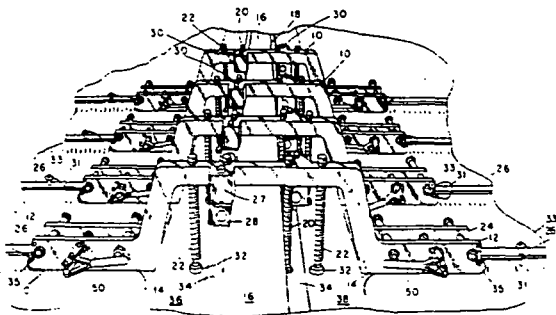


**N88-14360\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala. **ALIGNMENT AND ASSEMBLY TOOL FOR VERY LARGE DIAMETER CYLINDERS Patent**

JAMES H. EHL, inventor (to NASA) 24 Nov. 1987 9 p Filed 12 Mar. 1987 Continuation of US-Patent-Appl-SN-739788, filed 31 May 1985, abandoned (NASA-CASE-MFS-28001-2; US-PATENT-4,708,330; US-PATENT-APPL-SN-25039; US-PATENT-CLASS-269-43; US-PATENT-CLASS-269-71; US-PATENT-CLASS-269-73; US-PATENT-APPL-SN-739788) Avail: US Patent and Trademark Office CSCL 13H

An alignment and assembly tool is disclosed for aligning the ends of two very large cylinders so that the ends may be welded with a cylindrical strengthening section inserted between the cylinders and aligned and welded into the joint. The tool has a U-shaped main body with a horizontal top section and two legs, which are attached to the ends of the top section and extend outward and downward. Horizontal bottom sections extend outward from the bottoms of two of the legs. The tool has one inner jackscrew and one outer jackscrew on each side of its center, extending downward from the top section. Each of the two bottom sections has an attached side clamp for clamping the alignment tool to two opposing skin stringers of two of the cylinders. The jackscrews are adjusted to bring the edges of a tee ring into precise alignment with the ends of the two large cylinders so that both joints may be welded around their circumference.

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



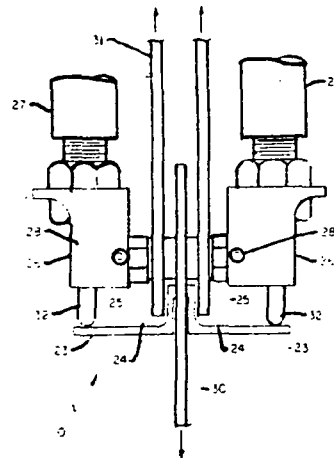
**N88-14361\*** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DEVICE FOR MEASURING HOLE ELONGATION IN A BOLTED JOINT Patent**

GREGORY R. WICHOREK, inventor (to NASA) 17 Nov. 1987 6 p Filed 5 Feb. 1987 Supersedes N87-25577 (25 - 19, p 2615) (NASA-CASE-LAR-13453-1; US-PATENT-4,706,387; US-PATENT-APPL-SN-10950; US-PATENT-CLASS-33-147D; US-PATENT-CLASS-73-834) Avail: US Patent and Trademark Office CSCL 13H

A device to determine the operable failure mode of mechanically fastened lightweight composite joints by measuring the hole elongation of a bolted joint is disclosed. The double-lap joint test apparatus comprises a stud, a test specimen having a hole, two load transfer plates, and linear displacement measuring instruments. The test specimen is sandwiched between the two load transfer plates and clamped together with the stud. Spacer washers are placed between the test specimen and each load transfer plate to provide a known, controllable area for the determination of clamping forces around the hole of the specimen attributable to bolt torque. The spacer washers also provide a gap for the mounting of reference angles on each side of the test specimen. Under tensile loading, elongation of the hole of the test specimen causes the stud to move away from the reference angles. This displacement is measured by the voltage output of two linear displacement measuring instruments that are attached to the stud and remain in contact with the reference angles throughout the tensile loading. The present invention obviates previous problems in obtaining specimen deformation measurements by monitoring the reference angles to the test specimen and the linear displacement measuring instruments to the stud.

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



**N88-14362\*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**WELDING MONITORING SYSTEM Patent**

STEPHEN G. BABCOCK, inventor (to NASA), GERALD E. DYER, inventor (to NASA), and STEPHEN S. GORDON, inventor (to NASA) (Rockwell International Corp., Canoga Park, Calif.) 6 Oct. 1987 8 p Filed 5 Feb. 1987 Supersedes N87-25575 (25 - 19, p 2615) (NASA-CASE-MFS-29177-1; US-PATENT-4,698,484; US-PATENT-APPL-SN-10942; US-PATENT-CLASS-219-130.01; US-PATENT-CLASS-219-124.34; US-PATENT-CLASS-219-136) Avail: US Patent and Trademark Office CSCL 13I

This invention relates to systems for remotely monitoring automatic welding operations, and more particularly to a system wherein the welder is readily positionable, while components of the optical system remain fixed. A welder having an electrode is mounted in an enclosure containing a pair of mirrors. The electrode

**N88-14836\*** National Aeronautics and Space Administration.  
Pasadena Office, Calif.

**TAILORABLE INFRARED SENSING DEVICE WITH STRAIN  
LAYER SUPERLATTICE STRUCTURE Patent**

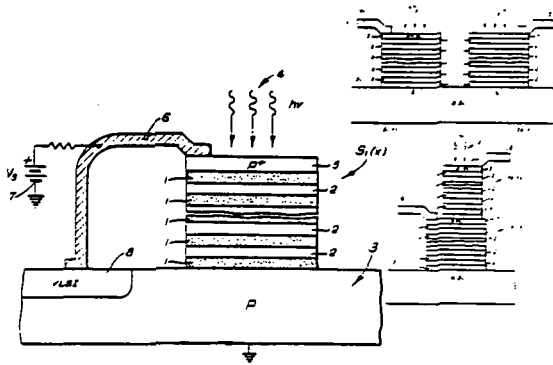
LI-JEN CHENG, inventor (to NASA) (California Inst. of Tech.,  
Pasadena.) 8 Dec. 1987 10 p Filed 28 Aug. 1986 Supersedes  
N87-15883 (25 - 07, p 975)

(NASA-CASE-NPO-16607-1-CU; US-PATENT-4,711,857;  
US-PATENT-APPL-SN-901114; US-PATENT-CLASS-437-3;  
US-PATENT-CLASS-437-7; US-PATENT-CLASS-437-8;  
US-PATENT-CLASS-437-128; US-PATENT-CLASS-437-131;  
US-PATENT-CLASS-437-969; US-PATENT-CLASS-357-30)

Avail: US Patent and Trademark Office CSCL 20L

An infrared photodetector is formed of a heavily doped p-type  
Ge sub x Si sub 1-x/Si superlattice in which x is pre-established  
during manufacture in the range 0 to 100 percent. A custom-tailored  
photodetector that can differentiate among close wavelengths in  
the range of 2.7 to 50 microns is fabricated by appropriate selection  
of the alloy constituency value, x, to establish a specific wavelength  
at which photodetection cutoff will occur.

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



# **PUBLIC AVAILABILITY OF COPIES OF PATENTS AND PATENT APPLICATIONS**

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 88-911100 at the price of \$12.50 domestic and \$25.00 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.

# 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.

- 1245.200 Scope of subpart.
- 1245.201 Policy and objective.
- 1245.202 Definitions.
- 1245.203 Authority to grant licenses.

#### Restrictions and Conditions

- 1245.204 All licenses granted under this subpart.

#### Types of Licenses

- 1245.205 Nonexclusive licenses.
- 1245.206 Exclusive and partially exclusive licenses.

#### Procedures

- 1245.207 Application for a license.
- 1245.208 Processing applications.
- 1245.209 Notice to Attorney General.

1245.210 Modification and termination of licenses.

1245.211 Appeals.

1245.212 Protection and administration of inventions.

1245.213 Transfer of custody.

1245.214 Confidentiality of information.

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 CFR 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.

## PATENT LICENSING REGULATIONS

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

1. Report No. NASA SP-7039 (33)	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle NASA Patent Abstracts Bibliography A Continuing Bibliography Section 1: Abstracts (Supplement 33)		5. Report Date July, 1988	
		6. Performing Organization Code	
7. Author(s)		8. Performing Organization Report No.	
		10. Work Unit No.	
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, DC 20546		11. Contract or Grant No.	
		13. Type of Report and Period Covered	
12. Sponsoring Agency Name and Address		14. Sponsoring Agency Code	
15. Supplementary Notes Section 1: Abstracts			
16. Abstract  Abstracts are provided for 16 patents and patent applications entered into the NASA scientific and technical information system during the period January 1988 through June 1988. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application.			
17. Key Words (Suggested by Authors(s)) Bibliographies Patent Policy NASA Programs		18. Distribution Statement Unclassified - Unlimited	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 26	22. Price * A03/HC

**National Aeronautics and  
Space Administration  
Code NTT-4**

**Washington, D.C.  
20546-0001**

Official Business  
Penalty for Private Use, \$300

**BULK RATE  
POSTAGE & FEES PAID  
NASA  
Permit No. G-27**

**NASA**

**POSTMASTER: If Undeliverable (Section 158  
Postal Manual) Do Not Return**

---