NASA SP-7039(17)
Section 1
Abstracts

NASA SP-7039(17) NASA Patent Abstracts Bibliography (Sect. 1 • Abstracts) JULY 1980

# NASA PATENT ABSTRACTS BIBLIOGRAPHY

## A CONTINUING BIBLIOGRAPHY

### Section 1 ◦ Abstracts

JULY 1980



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

## ACCESSION NUMBER RANGES

| *Bibliography Number* | *STAR Accession Numbers* |
|---|---|
| NASA SP-7039(04) | N69-20701–N73-33931 |
| NASA SP-7039(12) | N74-10001–N77-34042 |
| NASA SP-7039(13) | N78-10001–N78-22018 |
| NASA SP-7039(14) | N78-22019–N78-34034 |
| NASA SP-7039(15) | N79-10001–N79-21993 |
| NASA SP-7039(16) | N79-21994–N79-34158 |
| NASA SP-7039(17) | N80-10001–N80-22254 |

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# 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 1980 and June 1980.

*Scientific and Technical Information Branch* JULY 1980
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
*Washington, D.C.*

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# 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 May 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 151 citations published in this issue of the Abstract Section cover the period January 1980 through June 1980. The Index Section contains references to the 3860 citations covering the period May 1969 through June 1980.

## 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 in the citation of the abstract as depicted in the Typical Citation and Abstract reproduced below and are also used in the several indexes.

# TYPICAL CITATION AND ABSTRACT

NASA SPONSORED DOCUMENT

NASA ACCESSION NUMBER

TITLE

INVENTOR

NASA CASE NUMBER

ABSTRACT

AVAILABLE ON MICROFICHE

SOURCE

US PATENT APPLICATIONS SERIAL NUMBER

AVAILABILITY

COSATI CODE

**N80-20574*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

**METHOD AND APPARATUS FOR CONVECTION CONTROL OF METALLIC HALIDE VAPOR DENSITY IN A METALLIC HALIDE LASER Patent Application**

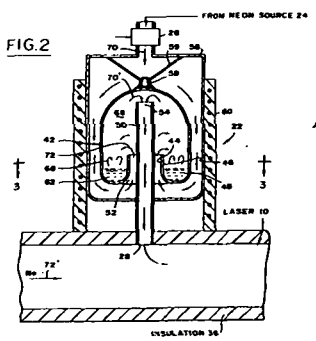
Thomas J. Pivirotto, inventor (to NASA) (JPL) Filed 14 Mar. 1980 14 p

(Contract NAS7-100)

(NASA-Case-NPO-15021-1; US-Patent-Appl-SN-130496) Avail: NTIS HC A02/MF A01 CSCL 20E

A method and apparatus for convection control of metallic halide vapor density in a metallic halide laser are described. A reservoir containing copper chloride is heated so that the copper chloride is maintained in a liquid form. The apparatus includes a means for flowing a buffer gas (neon) over the liquid copper chloride to provide a mixture of copper chloride vapor and neon above the liquid copper chloride. A conduit for providing fluid communication between the reservoir containing the copper chloride vapor/neon mixture and the laser is also included. The copper chloride vapor density in the laser is related to the liquid copper chloride temperature and the neon flow rate through the reservoir. Neon is also provided directly to the laser in order to provide a further means of controlling the copper chloride vapor density in the laser. NASA

KEY ILLUSTRATION



## INDEX SECTION (SECTION 2)

The Index Section is divided into five indexes which are cross-indexed and are useful in locating a single invention or groups of inventions.

Each of the five indexes utilizes basic data elements: (1) Subject Category Number, (2) NASA Accession Number, and (3) NASA Case Number, in addition to other specific index terms.

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

**Accession Number Index:** Lists all inventions in order of ascending NASA 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 when using 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 inventions(s), and (B) follow the instructions outlined in (2)(B), and (D) above.

## 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, for fifty cents a 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 ($5.00 domestic; $10.00 foreign). Microfiche are sold at price code A01 ($3.50 domestic; $5.25 foreign). 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 Assistant General Counsel for Patent Matters, Code GP-4, 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. Formal application of license must be submitted on the NASA Form, Application for NASA Patent License, which is available upon request from any NASA Patent Counsel.

| NASA Case Number Prefix Letters | Address of Cognizant NASA Patent Counsel |
|---|---|
| ARC-xxxxx<br>XAR-xxxxx | Ames Research Center<br>Mail Code: 200-11A<br>Moffett Field, California 94035<br>Telephone: (415)965-5104 |
| ERC-xxxxx<br>XER-xxxxx<br>HQN-xxxxx<br>XHQ-xxxxx | NASA Headquarters<br>Mail Code: GP-4<br>Washington, D.C. 20546<br>Telephone: (202)755-3954 |
| GSC-xxxxx<br>XGS-xxxxx | Goddard Space Flight Center<br>Mail Code: 204<br>Greenbelt, Maryland 20771<br>Telephone: (301)344-7351 |
| KSC-xxxxx<br>XKS-xxxxx | John F. Kennedy Space Center<br>Mail Code: AA-PAT<br>Kennedy Space Center, Florida 32899<br>Telephone: (305)867-2544 |
| LAR-xxxxx<br>XLA-xxxxx | Langley Research Center<br>Mail Code: 456<br>Hampton, Virginia 23365<br>Telephone: (804)827-3725 |
| LEW-xxxxx<br>XLE-xxxxx | Lewis Research Center<br>Mail Code: 500-311<br>21000 Brookpark Road<br>Cleveland, Ohio 44135<br>Telephone: (216)433-6346 |
| MSC-xxxxx<br>XMS-xxxxx | Lyndon B. Johnson Space Center<br>Mail Code: AM<br>Houston, Texas 77058<br>Telephone: (713)483-4871 |
| MFS-xxxxx<br>XMF-xxxxx | George C. Marshall Space Flight Center<br>Mail Code: CC01<br>Huntsville, Alabama 35812<br>Telephone: (205)453-0020 |
| NPO-xxxxx<br>XNP-xxxxx<br>FRC-xxxxx<br>XFR-xxxxx<br>WOO-xxxxx | NASA Resident Legal Office<br>Mail Code: 180-601<br>4800 Oak Grove Drive<br>Pasadena, California 91103<br>Telephone: (213)354-2700 |

# PATENT LICENSING REGULATIONS

## Title 14—AERONAUTICS AND SPACE

### Chapter V—National Aeronautics and Space Administration

### PART 1245—PATENTS

### Subpart 2—Patent Licensing Regulations

1. Subpart 2 is revised in its entirety as follows:

Sec.



AUTHORITY: The provisions of this Subpart 2 issued under 42 U.S.C. 2457, 2473(b)(3).

**§ 1245.200 Scope of subpart.**

This Subpart 2 prescribes the terms, conditions, and procedures for licensing inventions covered by U.S. patents and patent applications for which the Administrator of the National Aeronautics and Space Administration holds title on behalf of the United States.

**§ 1245.201 Definitions.**

For the purpose of this subpart, the following definitions apply:

(a) "Invention" means an invention covered by a U.S. patent or patent application for which the Administrator of NASA holds title on behalf of the United States and which is designated by the Administration as appropriate for the grant of license(s) in accordance with this subpart.

(b) "To practice an invention" means to make or have made, use or have used, sell or have sold, or otherwise dispose of according to law any machine, article of manufacture or composition of matter physically embodying the invention, or to use or have used the process or method comprising the invention.

(c) "Practical application" means the manufacture in the case of a composition of matter or product, the use in the case of a process, or the operation in the case of a machine, under such conditions as to establish that the invention is being utilized and that its benefits are reasonably accessible to the public.

(d) "Special invention" means any invention designated by the NASA Assistant General Counsel for Patent Matters to be subject to short-form licensing procedures. An invention may be designated as a special invention when a determination is made that:

(1) Practical application has occurred and is likely to continue for the life of the patent and for which an exclusive license is not in force, or

(2) The public interest would be served by the expeditious granting of a nonexclusive license for practice of the invention by the public.

(e) The "Administrator" means the Administrator of the National Aeronautics and Space Administration, or his designee.

(f) "Government" means the Government of the United States of America.

(g) The "Inventions and Contributions Board" means the NASA Inventions and Contributions Board established by the Administrator of NASA within the Administration in accordance with section 305 of the National Aeronautics and Space Act of 1958 as amended (42 U.S.C. 2457).

**§ 1245.202 Basic considerations.**

(a) Much of the new technology resulting from NASA sponsored research and development in aeronautical and space activities has application in other fields. NASA has special authority and responsibility under the National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2451), to provide for the widest practical dissemination and utilization of this new technology. In addition, NASA has been given unique requirements to protect the inventions resulting from NASA activities and to promulgate licensing regulations to encourage commercial use of these inventions.

(b) NASA-owned inventions will best serve the interests of the United States when they are brought to practical application in the shortest time possible. Although NASA encourages the nonexclusive licensing of its inventions to promote competition and achieve their widest possible utilization, the commercial development of certain inventions calls for a substantial capital investment which private manufacturers may be unwilling to risk under a nonexclusive license. It is the policy of NASA to seek exclusive licensees when such licenses will provide the necessary incentive to the licensee to achieve early practical application of the invention.

(c) The Administrator, in determining whether to grant an exclusive license, will evaluate all relevant information submitted by applicants and all other persons and will consider the necessity for further technical and market development of the invention, the capabilities of prospective licensees, their proposed plans to undertake the required investment and development, the impact on competitors, and the benefits of the license to the Government and to the public. Preference for exclusive license shall be given to U.S. citizens or companies who intend to manufacture or use, in the case of a process, the invention in the United States of America, its territories and possessions. Consideration may also be given to assisting small businesses and minority business enterprises, as well as economically depressed, low income and labor surplus areas.

(d) All licenses for inventions shall be by express written instruments. No license shall be granted either expressly or by implication, for a NASA invention except as provided for in §§ 1245.203 and 1245.204 and in any existing or future treaty or agreement between the United States and any foreign government.

(e) Licenses for inventions covered by NASA-owned foreign patents and patent applications shall be granted in accordance with the NASA Foreign Patent Licensing Regulations (§ 1245.4).

**§ 1245.203 Licenses for practical application of inventions.**

(a) *General.* As an incentive to encourage practical application of inventions, licenses will be granted to responsible applicants according to the circumstances and conditions set forth in this section.

(b) *Nonexclusive licenses.* (1) Each invention will be made available to responsible applicants for nonexclusive, revocable licensing in accordance with § 1245.206, consistent with the provisions of any existing exclusive license.

(2) The duration of the license shall be for a period as specified in the license.

(3) The license shall require the licensee to achieve the practical application of the invention and to then practice the invention for the duration of the license.

(4) The license may be granted for all or less than all fields of use of the invention and throughout the United States of America, its territories and possessions, Puerto Rico, and the District of Columbia, or in any lesser geographic portion thereof.

(5) The license shall extend to the subsidiaries and affiliates of the licensee and shall be nonassignable without approval of the Administrator, NASA, except to the successor of that part of the licensee's business to which the invention pertains.

(c) *Short-form nonexclusive licenses.* A nonexclusive, revocable license for a special invention, as defined in § 1245.201(d), shall be granted upon written request, to any applicant by the Patent Counsel of the NASA installation having cognizance of the invention.

(d) *Exclusive licenses.* (1) A limited exclusive license may be granted on an invention available for such licensing provided that:

(i) The Administrator has determined that: (*a*) The invention has not been brought to practical application by a nonexclusive licensee in the fields of use or in the geographical locations covered by the application for the exclusive license, (*b*) practical application of the invention in the fields of use or geographical locations covered by the application for the exclusive license is not likely to be achieved expeditiously by the further funding of the invention by the Government or under a nonexclusive license requested by any applicant pursuant to these regulations, and (*c*) the exclusive license will provide the necessary incentive to the licensee to achieve the practical application of the invention; and

(ii) Either a notice pursuant to

§ 1245.205 listing the invention as available for licensing has been published in the FEDERAL REGISTER for at least 9 months; or a patent covering the invention has been issued for at least 6 months. However, a limited exclusive license may be granted prior to the periods specified above if the Administrator determines that the public interest will best be served by the earlier grant of an exclusive license.

(2) The license may be granted for all or less than all fields of use of the invention, and throughout the United States of America, its territories and possessions, Puerto Rico, and the District of Columbia, or in any lesser geographic portion thereof.

(3) The exclusive period of the license shall be negotiated, but shall be for less than the terminal portion of the patent, and shall be related to the period necessary to provide a reasonable incentive to invest the necessary risk capital.

(4) The license shall require the licensee to practice the invention within a period specified in the license and then to achieve practical application of the invention.

(5) The license shall require the licensee to expend a specified minimum sum of money and/or to take other specified actions, within indicated period(s) after the effective date of the license, in an effort to achieve practical application of the invention.

(6) The license shall be subject to at least an irrevocable royalty-free right of the Government of the United States to practice and have practiced the invention throughout the world by or on behalf of the Government of the United States and on behalf of any foreign government pursuant to any existing or future treaty or agreement with the United States.

(7) The license may reserve to the Administrator, NASA, under the following circumstances, the right to require the granting of a sublicense to responsible applicant(s) on terms that are considered reasonable by the Administrator, taking into consideration the current royalty rates under similar patents and other pertinent facts: (i) To the extent that the invention is required for public use by Government regulation, or (ii) as may be necessary to fulfill health or safety needs, or (iii) for other purposes stipulated in the license.

(8) The license shall be nontransferable except to the successor of that part of the licensee's business to which the invention pertains.

(9) Subject to the approval of the Administrator, the licensee may grant sublicenses under the license. Each sublicense granted by an exclusive licensee shall make reference to and shall provide that the sublicense is subject to the terms of the exclusive license including the rights retained by the Government under the exclusive license. A copy of each sublicense shall be furnished to the Administrator.

(10) The license may be subject to such other reservations as may be in the public interest.

**§ 1245.204 Other licenses.**

(a) *License to contractor.* There is hereby granted to the contractor reporting an invention made in the performance of work under a contract of NASA in the manner specified in section 305(a)(1) or (2) of the National Aeronautics and Space Act of 1958 as amended (42 U.S.C. 2457(a)(1) or (2)), a revocable, nonexclusive, royalty-free license for the practice of such invention, together with the right to grant sublicenses of the same scope to the extent the contractor was legally obligated to do so at the time the contract was awarded. Such license and right is nontransferable except to the successor of that part of the contractor's business to which the invention pertains.

(b) *Miscellaneous licenses.* Subject to any outstanding licenses, nothing in this subpart 2 shall preclude the Administrator from granting other licenses for inventions, when he determines that do so would provide for an equitable distribution of rights. The following exemplify circumstances wherein such licenses may be granted:

(1) In consideration of the settlement of an interference;

(2) In consideration of a release of a claim of infringement; or

(3) In exchange for or as part of the consideration for a license under adversely held patent(s).

**§ 1245.205 Publication of NASA inventions available for license.**

(a) A notice will be perodically published in the FEDERAL REGISTER listing inventions available for licensing. Abstracts of the inventions will also be published in the NASA Scientific and Technical Aerospace Reports (STAR) and other NASA publications.

(b) Copies of pending patent applications for inventions abstracted in STAR may be purchased from the National Technical Information Service, Springfield, Va. 22151.

**§ 1245.206 Application for nonexclusive license.**

(a) *Submission of application.* An application for nonexclusive license under § 1245.203(b) or a short-form nonexclusive license for special inventions under § 1245.203(c) shall be addressed to the NASA Patent Counsel of the NASA installation having cognizance over the NASA invention for which a license is desired or to the NASA Assistant General Counsel for Patent Matters.

(b) *Contents of an application for nonexclusive license.* An application for nonexclusive license under § 1245.203(b) shall include:

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

(2) Name and address of the person, company or organization applying for license and whether the applicant is a U.S. citizen or a U.S. corporation;

(3) Name and address of representative of applicant to whom correspondence should be sent;

(4) Nature and type of applicant's business;

(5) Number of employees;

(6) Purpose for which license is desired;

(7) A statement that contains the applicant's best knowledge of the extent to which the invention is being practiced by private industry and the Government;

(8) A description of applicant's capability and plan to undertake the development and marketing required to achieve the practical application of the invention, including the geographical location where the applicant plans to manufacture or use, in the case of a process, the invention; and

(9) A statement indicating the minimum term of years the applicant desires to be licensed.

(c) *Contents of an application for a short-form nonexclusive license.* An application for a short-form nonexclusive license under § 1245.203(c) for a special invention shall include:

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

(2) Name and address of company or organization applying for license; and

(3) Name and address of representative of applicant to whom correspondence should be sent.

**§ 1245.207 Application for exclusive license.**

(a) *Submission of application.* An application for exclusive license under § 1245.203(d) may be submitted to NASA at any time. An application for exclusive license shall be addressed to the NASA Assistant General Counsel for Patent Matters.

(b) *Contents of an application for exclusive license.* In addition to the requirements set forth in § 1245.206(b), the application for an exclusive license shall include:

(1) Applicant's status, if any, in any one or more of the following categories:

(i) Small business firm;

(ii) Minority business enterprise;

(iii) Location in a surplus labor area;

(iv) Location in a low-income urban area; and

(v) Location in an area designed by the Government as economically depressed.

(2) A statement indicating the time, expenditure, and other acts which the applicant considers necessary to achieve practical application of the invention, and the applicant's offer to invest that sum and to perform such acts if the license is granted;

(3) A statement whether the applicant would be willing to accept a license for all or less than all fields of use of the invention throughout the United States of America, its territories and possessions, Puerto Rico, and the District of Columbia, or in any lesser geographic portion thereof.

(4) A statement indicating the amount of royalty fees or other consideration, if any, the applicant would be willing to pay the Government for the exclusive license; and

(5) Any other facts which the applicant believes to show it to be in the interests of the United States of America for the Administrator to grant an exclusive license rather than a nonexclusive li-

cense and that such an exclusive license should be granted to the applicant.

§ 1245.208 Processing applications for license.

(a) *Initial review.* Applications for nonexclusive and exclusive licenses under §§ 1245.206 and 1245.207 will be reviewed by the Patent Counsel of the NASA installation having cognizance for the invention and the NASA Assistant General Counsel for Patent Matters, to determine the conformity and appropriateness of the application for license and the availability of the specific invention for the license requested. The Assistant General Counsel for Patent Matters will forward all applications for license conforming to §§ 1245.206(b) and 1245.207(b) to the NASA Inventions and Contributions Board when the invention is available for consideration of the requested license. Prior to forwarding applications for exclusive licenses to the Inventions and Contributions Board, notice in writing will be given to each nonexclusive licensee for the specific invention advising of the receipt of the application for the exclusive license and providing each nonexclusive licensee with a 30-day period for submitting either evidence that practical application of the invention has occurred or is about to occur or, an application for an exclusive license for the invention.

(b) *Recommendations of Inventions and Contributions Board.* The Inventions and Contributions Board shall, in accordance with the basic considerations set forth in §§ 1245.202 and 1245.203, evaluate all applications for license forwarded by the Assistant General Counsel for Patent Matters. Based upon the facts presented to the Inventions and Contributions Board in the application and any other facts in its possession, the Inventions and Contributions Board shall recommend to the Administrator: (1) Whether a nonexclusive or exclusive license should be granted, (2) the identity of the licensee, and (3) any special terms or conditions of the license.

(c) *Determination of Administrator and grant of nonexclusive licenses.* The Administrator shall review the recommendations of the Inventions and Contributions Board and shall determine whether to grant the nonexclusive license as recommended by the Board. If the Administrator determines to grant the license, the license will be granted upon the negotiation of the appropriate terms and conditions of the Office of General Counsel.

(d) *Determination of Administrator and grant of exclusive licenses*—(1) *Notice.* If the Administrator determines that the best interest of the United States will be served by the granting of an exclusive license in accordance with the basic considerations set forth in §§ 1245.202 and 1245.203, a notice shall be published in the FEDERAL REGISTER announcing the intent to grant the exclusive license, the identification of the invention, special terms or conditions of the proposed license, and a statement that NASA will grant the exclusive license unless within 30 days of the publication of such notice the Inventions and Contributions Board receives in writing any of the following together with supporting documentation:

(i) A statement from any person setting forth reasons why it would not be in the best interest of the United States to grant the proposed exclusive license; or

(ii) An application for a nonexclusive license under such invention, in accordance with § 1245.206(b), in which applicant states that he has already brought or is likely to bring the invention to practical application within a reasonable period.

The Inventions and Contributions Board shall, upon receipt of a written request within the 30 days' notice period, grant an extension of 30 days for the submission of the documents designated above.

(2) *Recommendation of Inventions and Contributions Board.* Upon the expiration of the period required by subparagraph (1) of this paragraph, the Board shall review all written responses to the notice and shall then recommend to the Administrator whether to grant the exclusive license as the Board initially recommended or whether a different form of license, if any, should instead be granted.

(3) *Grant of exclusive licenses.* The Administrator shall review the Board's recommendation and shall determine if the interest of the United States would best be served by the grant of an exclusive license as recommended by the Board. If the Administrator determines to grant the exclusive license, the license will be granted upon the negotiation of the appropriate terms and conditions by the Office of General Counsel.

§ 1245.209 Royalties and fees.

(a) Normally, a nonexclusive license for the practical application of an invention granted to a U.S. citizen or company will not require the payment of royalties; however, NASA may require other consideration.

(b) An exclusive license for an invention may require the payment of royalties, fees or other consideration when the licensing circumstances and the basic considerations in § 1245.202, considered together, indicate that it is in the public interest to do so.

§ 1245.210 Reports.

A license shall require the licensee to submit periodic reports of his efforts to work the invention. The reports shall contain information within his knowledge, or which he may acquire under normal business practice, pertaining to the commercial use that is being made of the invention and such other information which the Administrator may determine pertinent to the licensing program and which is specified in the license.

§ 1245.211 Revocation of licenses.

(a) Any license granted pursuant to § 1245.203 may be revoked, either in part or in its entirety, by the Administrator if in his opinion the licensee at any time shall fail to use adequate efforts to bring to or achieve practical application of the invention in accordance with the terms of the license, or if the licensee at any time shall default in making any report required by the license, or shall make any false report, or shall commit any breach of any covenant or agreement therein contained, and shall fail to remedy any such default, false report, or breach within 30 days after written notice, or if the patent is deemed unenforceable either by the Attorney General or a final decision of a U.S. court.

(b) Any license granted pursuant to § 1245.204(a) may be revoked, either in part or in its entirety, by the Administrator if in his opinion such revocation is necessary to achieve the earliest practical application of the invention pursuant to an application for exclusive license submitted in accordance with § 1245.207, or the licensee at any time shall breach any covenant or agreement contained in the license, and shall fail to remedy any such breach within 30 days after written notice thereof.

(c) Before revoking any license granted pursuant to this Subpart 2 for any cause, there will be furnished to the licensee a written notice of intention to revoke the license, and the licensee will be allowed 30 days after such notice in which to appeal and request a hearing before the Inventions and Contributions Board on the question of revocation. After a hearing, the Inventions and Contributions Board shall transmit to the Administrator the record of proceedings, its findings of fact, and its recommendation whether the license should be revoked either in part or in its entirety. The Administrator shall review the recommendation of the Board and determine whether to revoke the license in part or in its entirety. Revocation of a license shall include revocation of all sublicenses which have been granted.

§ 1245.212 Appeals.

Any person desiring to file an appeal pursuant to § 1245.211(c) shall address the appeal to Chairman, Inventions and Contributions Board. Any person filing an appeal shall be afforded an opportunity to be heard before the Inventions and Contributions Board, and to offer evidence in support of his appeal. The procedures to be followed in any such matter shall be determined by the Administrator. The Board shall make findings of fact and recommendations with respect to disposition of the appeal. The decision on the appeal shall be made by the Administrator, and such decision shall be final and conclusive, except on questions of law, unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence.

§ 1245.213 Litigation.

An exclusive licensee shall be granted the right to sue at his own expense any party who infringes the rights set forth in his license and covered by the licensed patent. The licensee may join the Government, upon consent of the Attorney General, as a party complainant in such suit, but without expense to the Government and the licensee shall pay costs and any final judgment or decree that may be rendered against the Govern-

ment in such suit. The Government shall also have an absolute right to intervene in any such suit at its own expense. The licensee shall be obligated to promptly furnish to the Government, upon request, copies of all pleadings and other papers filed in any such suit and of evidence adduced in proceedings relating to the licensed patent including, but not limited to, negotiations for settlement and agreements settling claims by a licensee based on the licensed patent, and all other books, documents, papers, and records pertaining to such suit. If, as a result of any such litigation, the patent shall be declared invalid, the licensee shall have the right to surrender his license and be relieved from any further obligation thereunder.

§ 1245.214 Address of communications.

(a) Communications to the Assistant General Counsel for Patent Matters in accordance with §§ 1245.206 and 1245.207 and requests for information concerning licenses for NASA inventions should be addressed to the Assistant General Counsel for Patent Matters, Code GP, National Aeronautics and Space Administration, Washington, D.C. 20546.

(b) Communications to the Inventions and Contributions Board in accordance with §§ 1245.208, 1245.211, and 1245.212 should be addressed to Chairman, Inventions and Contributions Board, National Aeronautics and Space Administration, Washington, D.C. 20546.

*Effective date.* The regulations set forth in this subpart 2 are effective April 1, 1972.

JAMES C. FLETCHER,
*Administrator.*

## FOREIGN PATENT LICENSING REGULATIONS

Selected NASA inventions are also available for licensing in countries other than the United States in accordance with the NASA Foreign Patent Licensing Regulation (14 C.F.R. 1245.4), a copy of which is available from any NASA Patent Counsel. For abstracts of NASA-owned inventions available for licensing in countries other than the United States, see NASA SP-7038, "Significant NASA Inventions Available for Licensing in Countries Other Than the United States." A copy of this NASA publication is available from NASA Headquarters, Code GP-4, Washington, D.C., 20546.

# 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 life 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*.

**71 ACOUSTICS** **N.A.**
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution*.

**72 ATOMIC AND MOLECULAR PHYSICS** **42**
Includes atomic structure and molecular spectra.

**73 NUCLEAR AND HIGH-ENERGY PHYSICS** **42**
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation*.

**74 OPTICS** **42**
Includes light phenomena.

**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** **44**
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; 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 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** **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 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 1980 (Supplement 17)

# NASA Patent Abstracts Bibliography

*A Semiannual Publication of the National Aeronautics and Space Administration*

## 02 AERODYNAMICS

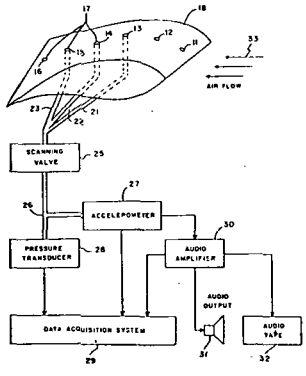
Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

**N80-20224*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**DETECTION OF THE TRANSITIONAL LAYER BETWEEN LAMINAR AND TURBULENT FLOW AREAS ON A WING SURFACE Patent**
William R. Hood Issued 19 Feb. 1980 4 p Filed 27 Nov. 1978 Supersedes N79-16805 (17 - 08, p 0932)
(NASA-Case-LAR-12261-1; US-Patent-4,188,823; US-Patent-Appl-SN-964009; US-Patent-Class-73-147; US-Patent-Class-73-205L) Avail: US Patent and Trademark Office CSCL 01A

A system is disclosed for detecting the laminar to turbulent boundary layer transition on a surface while simultaneously taking pressure measurements. The system uses an accelerometer for producing electrical signals proportional to the noise levels along the surface and a transducer for producing electrical signals proportional to pressure along the surface. The signals generated by the accelerometer and transducer are sent to a data reduction system for interpretation and storage.

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



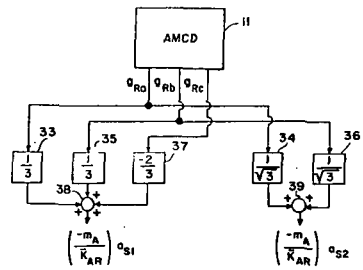

## 04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

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

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

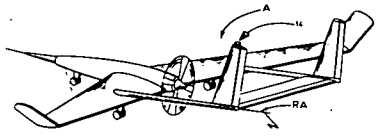
**N80-18019*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**RIM INERTIAL MEASURING SYSTEM Patent Application**
Nelson J. Groom, Willard W. Anderson, and William H. Phillips, inventors (to NASA) Filed 7 Dec. 1979 27 p
(NASA-Case-LAR-12052-1; US-Patent-Appl-SN-102002) Avail: NTIS HC A03/MF A01 CSCL 17G

A strapdown inertial measuring system for measuring angular rate and linear accelerations about a spacecraft is disclosed. The system uses an annular momentum control device (AMCD) as the basic sensor. Features of the device include reliability, zero friction, zero wear, low volume, high momentum to mass ratio, and zero breakout forces. The AMCD is comprised of a rim and several magnetic bearing stations to control the position of the rim in the axial and radial directions. Signals from axial position sensors are used to compute the angular rates about first and second mutually perpendicular axes in the plane or the rim and the linear acceleration along a third axis perpendicular to the first and second axes. Signals from radial position sensors are used to compute the linear accelerations along the first and second axes. J.M.S.



**N80-20249*#** National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
**IMPROVED SUN-SENSING GUIDANCE SYSTEM FOR HIGH-ALTITUDE AIRCRAFT Patent Application**
Robert D. Reed, inventor (to NASA) Filed 12 Mar. 1980 17 p
(NASA-Case-FRC-11052-1; US-Patent-Appl-SN-129783) Avail: NTIS HC A02/MF A01 CSCL 17G

A Sun sensing guidance system for high altitude aircraft is described. The system is characterized by a disk shaped body mounted for rotation aboard the aircraft in exposed relation to solar radiation and has a plurality of mutually isolated chambers. The photosensors are arranged in facing relation with the chamber openings for receiving incident solar radiation and responsively providing a voltage output. The photosensors are connected in a paired relation through a bridge circuit for providing heading error signals in response to detected imbalances in intensities of solar radiation incident on the photosensors of either pair of photosensors until a nulled relationship is achieved for the disk to the source of radiation. NASA



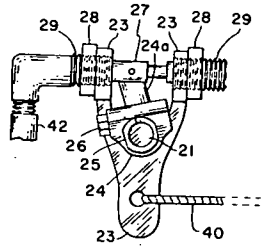

# 05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

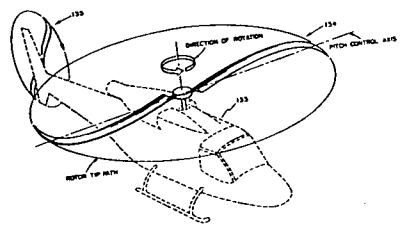
**N80-11065*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
**A HYDRAULIC ACTUATOR MECHANISM TO CONTROL AIRCRAFT SPOILER MOVEMENTS THROUGH DUAL INPUT COMMANDS Patent Application**
Stephen C. Irick, inventor (to NASA) Filed 17 Aug. 1979 11 p
(NASA-Case-LAR-12412-1; US-Patent-Appl-SN-067595) Avail: NTIS HC A02/MF A01 CSCL 10C

A conventional, primary spoiler control system retains its operational characteristics while accommodating a secondary input controlled by a conventional computer system to supplement the settings made by the primary input. This is achieved by interposing springs between the primary input and the spoiler control unit. The springs are selected to have a stiffness intermediate to the greater force applied by the primary control linkage and the lesser resistance offered by the spoiler control unit. Thus, operation of the primary input causes the control unit to yield before the springs, yet, operation of the secondary input, acting directly on the control unit, causes the springs to yield and absorb adjustments before they are transmitted into the primary control system. NASA




**N80-14107*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
**ACOUSTICALLY SWEPT ROTOR Patent**
Fredric H. Schmitz, Donald A. Boxwell, and Rande Vause, inventors (to NASA) Issued 25 Sep. 1979 23 p Filed 8 Sep. 1977 Supersedes N77-31130 (15 - 22, p 2893)
(NASA-Case-ARC-11106-1; US-Patent-4,168,939; US-Patent-Appl-SN-831633; US-Patent-Class-416-228; US-Patent-Class-416-238; US-Patent-Class-415-199) Avail: US Patent and Trademark Office CSCL 01C

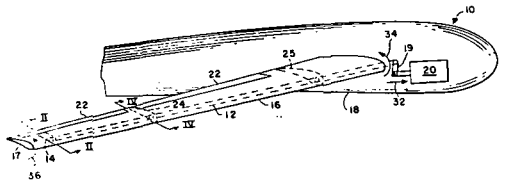
Impulsive noise reduction is provided in a rotor blade by acoustically sweeping the chord line from root to tip so that the acoustic radiation resulting from the summation of potential singularities used to model the flow about the blade tend to cancel for all times at an observation point in the acoustic far field. Official Gazette of the U.S. Patent and Trademark Office



**N80-16055*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**MEANS FOR CONTROLLING AERODYNAMICALLY INDUCED TWIST Patent Application**
Wolf Elber, inventor (to NASA) Filed 28 Sep. 1979 10 p
(NASA-Case-LAR-12175-1; US-Patent-Appl-SN-079913) Avail: NTIS HC A02/MF A01 CSCL 01C

A wing twist deformation control mechanism which provides active compensation for aerodynamically induced twist deformation of high aspect ratio wings is described. The twist deformation

control mechanism consists of a torque tube, internal to each wing and rigidly attached near the tip of each wing, and an actuator located in the aircraft fuselage. As changes in the aerodynamic loads on the wings occur, the torque tube is rotated to compensate for the induced wing twist. NASA



# 06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

**N80-18036*** National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

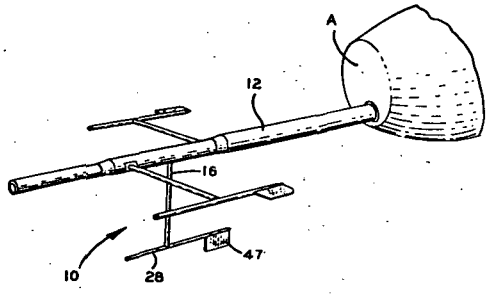
**AIR SPEED AND ATTITUDE PROBE Patent**

Gerald J. Baker and Merle A. Economu, inventors (to NASA) Issued 15 Jan. 1980 6 p Filed 30 May 1978 Supersedes N78-25088 (16 - 16, p 2077)

(NASA-Case-FRC-11009-1; US-Patent-4,184,149; US-Patent-Appl-SN-910708; US-Patent-Class-340-177VA; US-Patent-Class-73-188; US-Patent-Class-73-189; US-Patent-Class-73-212) Avail: US Patent and Trademark Office CSCL 01D

An air speed and attitude probe characterized by a pivot shaft normally projected from a data boom and supported thereby for rotation about an axis of rotation coincident with the longitudinal axis of the shaft is described. The probe is a tubular body supported for angular displacement about the axis of rotation and has a fin mounted on the body for maintaining one end of the body in facing relation with relative wind and has a pair of transducers mounted in the body for providing intelligence indicative of total pressure and static pressure for use in determining air speed. A stack of potentiometers coupled with the shaft to provide intelligence indicative of aircraft attitude, and circuitry connecting the transducers and potentiometers to suitable telemetry circuits are described.

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.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

**N80-18039*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

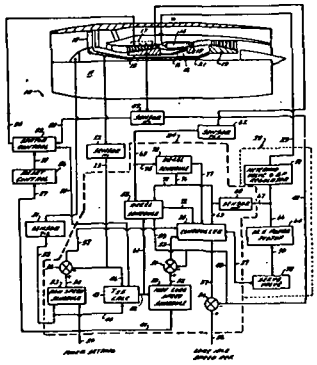
**METHOD AND APPARATUS FOR RAPID THRUST INCREASES IN A TURBOFAN ENGINE Patent**

Jack E. Cornett (GE, Cincinnati, Ohio), Ralph C. Corley (GE, Cincinnati, Ohio), Thomas O. Fraley (GE, Cincinnati, Ohio), and Andrew A. Saunders, Jr., inventors (to NASA) (GE, Cincinnati, Ohio) Issued 22 Jan. 1980 9 p Filed 9 Dec. 1977 Sponsored by NASA

(NASA-Case-LEW-12971-1; US-Patent-4,184,327 ; US-Patent-Appl-SN-858936; US-Patent-Class-60-240; US-Patent-Class-60-39.03; US-Patent-Class-60-39.27) Avail: US Patent and Trademark Office CSCL 21E

Upon a landing approach, the normal compressor stator schedule of a fan speed controlled turbofan engine is temporarily varied to substantially close the stators to thereby increase the fuel flow and compressor speed in order to maintain fan speed and thrust. This running of the compressor at an off-design speed substantially reduces the time required to subsequently advance the engine speed to the takeoff thrust level by advancing the throttle and opening the compressor stators.

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



**N80-21327*#** National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

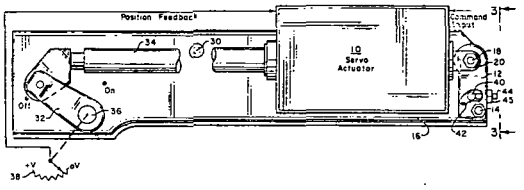
**ELECTRICAL SERVO ACTUATOR BRACKET Patent Application**

Ralph V. Sawyer, inventor (to NASA) Filed 20 Feb. 1980 10 p

(NASA-Case-FRC-11044-1; US-Patent-Appl-SN-135056) Avail: NTIS HC A02/MF A01 CSCL 21E

A bracket for an electrical servo actuator is disclosed which was developed particularly for jet engine fuel control values. Said servo actuator is mounted on a support arm which is allowed to pivot on a bolt through a fixed mounting bracket. The actuator is pivotally connected to the end of the support arm by a bolt which has an extension that passes through a slot in the fixed mounting bracket. An actuator rod extends from the servo actuator

to a crank arm which turns a control shaft. A short linear thrust of the rod pivots the crank arm through about 90 deg for full-on control with the rod contracted into the servo actuator, and full-off control when the rod is extended from the actuator.
NASA

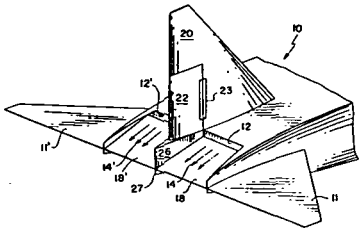



# 08 AIRCRAFT STABILITY AND CONTROL

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

**N80-18048*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**THRUST AUGMENTED SPIN RECOVERY DEVICE Patent Application**
Bobby L. Berrier, inventor (to NASA) Filed 27 Apr. 1979 15 p
(NASA-Case-LAR-11970-2; US-Patent-Appl-SN-034104) Avail: NTIS HC A02/MF A01 CSCL 01C

A lightweight and drag-free yaw control system developed for a jet propelled aircraft is described. Emphasis is placed on providing aircraft attitude control at low flight speeds, at high angles of attack, and during spin. The control system is comprised of a vertical tail with a thrust augmented rudder and a thrust rudder tab. The jet exhaust stream is deflected by the thrust vectoring rudder tab in a sideward direction to the aircraft, producing a thrust vectored yawing moment and creating supercirculation about the vertical tail and thrust augmented rudder. Supercirculation, a thrust-induced aerodynamic phenomenon, generates lift without increasing drag, enabling the rudder to provide additional yawing force for attitude control. J.M.S.



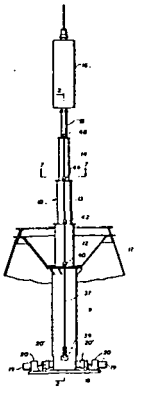
# 18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

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

**N80-14183*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
**ANTENNA DEPLOYMENT MECHANISM FOR USE WITH A SPACECRAFT Patent**
William A. Leavy and Charles R. Griffin, inventor (to NASA) Issued 27 Nov. 1979 9 p Filed 18 Sep. 1978 Supersedes N78-32436 (16 - 23, p 3086)
(NASA-Case-GSC-12331-1; US-Patent-4,176,360; US-Patent-Appl-SN-943088; US-Patent-Class-343-883; US-Patent-Class-343-880) Avail: US Patent and Trademark Office CSCL 22B

A mechanical system is disclosed to deploy an antenna on a support which may, for example, be a spacecraft. A series of telescoping tubes are nested one within the other when the antenna is in a retracted stowed position. The outermost tube is rigidly attached to the support and the inner tubes are latched in the stowed position by a caging mechanism. The antenna is driven toward a deployed position by a dual motor driven cable which is terminated in a driving tube at the lower end of the innermost tube, from whence the cable is trained about pulleys at the tops and bottoms of successively large tubes of the antenna. The cable is wound on a drum at the lower end of the antenna and coaxial therewith. During deployment of the antenna, the drum rotates, thereby reeling in the deployment cable. The initial movement of the cable causes cam releasing of the latches in the caging device. Thereafter, the antenna tubes are extended until the final deployed position of the antenna is reached. A ratchet attached to the drum prevents reverse rotation of the drum and locks the antenna in the deployed position until the ratchet is released.
Official Gazette of the U.S. Patent and Trademark Office



# 20 SPACECRAFT PROPULSION AND POWER

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

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

**N80-10278*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**PASSIVE PROPELLANT SYSTEM Patent**

Donald A. Hess (McDonnell-Douglas Corp., St. Louis), William W. Regnier (McDonnell-Douglas Corp., St. Louis), and Virgil L. Jacobs, inventors (to NASA) (McDonnell-Douglas Corp., St. Louis) Issued 25 Sep. 1979 6 p Filed 11 Jul. 1978 Sponsored by NASA

(NASA-Case-MFS-23642-1; US-Patent-4,168,718; US-Patent-Appl-SN-923758; US-Patent-Class-137-177; US-Patent-Class-137-590; US-Patent-Class-137-574; US-Patent-Class-137-576; US-Patent-Class-137-209; US-Patent-Class-244-135R) Avail: US Patent and Trademark Office CSCL 21H

A passive propellant acquisition and feed system is disclosed which acquires and feeds gas-free propellant in low or zero-g environments during orbital maneuvers and retains this propellant under high axially directed acceleration such as may be experienced during launch of a space vehicle and orbit-to-orbit transfer is described. The propellant system includes a dual compartment propellant tank with independent surface tension acquisition channels in each compartment to provide gas-free flow of pressurized liquid propellant from one compartment to the other in one direction only.

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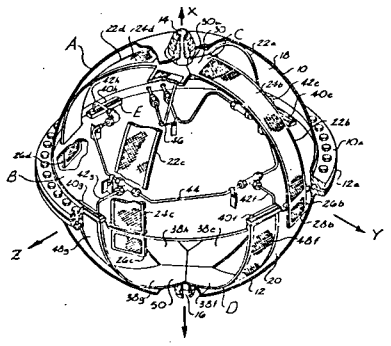


**N80-14188*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

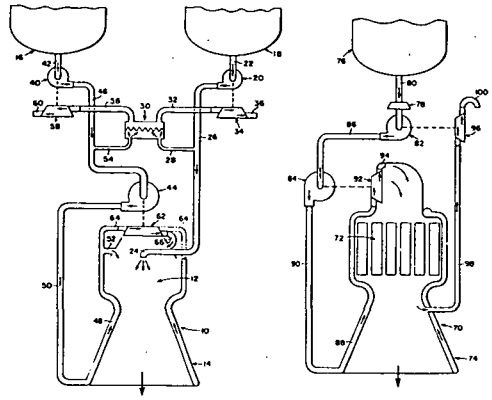
**SUPERCHARGED TOPPING ROCKET PROPELLANT FEED SYSTEM Patent**

Warner L. Stewart, Ambrose Ginsburg, and Melvin J. Hartmann, inventors (to NASA) Issued 23 Oct. 1979 6 p Filed 21 Apr. 1966

(NASA-Case-XLE-02062-1; US-Patent-4,171,615; US-Patent-Appl-SN-545793; US-Patent-Class-60-203; US-Patent-Class-60-259) Avail: US Patent and Trademark Office CSCL 21H

A rocket propellant feed system utilizing a bleed turbopump to supercharge a topping turbopump is presented. The bleed turbopump is of a low pressure type to meet the cavitation requirements imposed by the propellant storage tanks. The topping turbopump is of a high pressure type and develops 60 to 70 percent of the pressure rise in the propellant.

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



**N80-18097*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**PRESSURE LIMITING PROPELLANT ACTUATING SYSTEM Patent**

Paul B. Reese (Rockwell International Corp., Downey, Calif.) and David W. Murphy, inventors (to NASA) (Rockwell International Corp., Downey, Calif.) Issued 15 Jan. 1980 4 p Filed 4 Aug. 1978 Supersedes N78-31162 (16 - 22, p 2906)

(NASA-Case-MSC-18179-1; US-Patent-4,183,217; US-Patent-Appl-SN-931218; US-Patent-Class-60-632) Avail: US Patent and Trademark Office CSCL 21H

A pressure limiting propellant activating system for simultaneously limiting the output force while maintaining a constant output pressure from the combustion chamber is described. The propellant actuated system includes an outer barrel, outer housing and a combustion chamber. A main piston is movable in the barrel housing when gas pressure is developed in the combustion chamber. A relief piston is concentrically mounted and fixedly movable with the main piston when gas pressure is exerted from the combustion. A relief piston has a force-activated separation mechanism for limiting the output force while simultaneously maintaining constant output pressure on the main piston from the combustion chamber.

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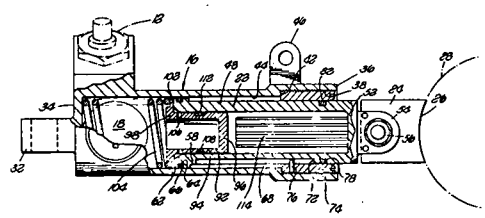

# 24 COMPOSITE MATERIALS

Includes laminates.

**N80-11142*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
**CORROSION RESISTANT THERMAL BARRIER COATING Patent Application**
S. R. Levine, R. A. Miller, and P. E. Hodge, inventors (to NASA) Filed 31 Oct. 1979 8 p
(NASA-Case-LEW-13088-1; US-Patent-Appl-SN-089779) Avail: NTIS HC A02/MF A01 CSCL 11D

A thermal barrier coating system was developed to protect the surfaces of metal components, gas turbines, and other heat engine parts that are exposed to fuels contaminated with metallic impurities which are normally corrosive to previously known metallic coatings. The coating system includes a metal alloy bond coating, the alloy containing nickel, cobalt, iron, or a combination of these metals. The system also includes a corrosion resistant thermal barrier oxide coating containing at least one alkaline earth silicate. The preferred oxides are calcium silicate, barium silicate, magnesium silicate, or a combination of these silicates. NASA

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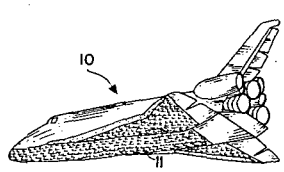
**N80-12117*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
**MULTIWALL THERMAL PROTECTION SYSTEM Patent Application**
L. Robert Jackson, inventor (to NASA) Filed 5 Sep. 1979 19 p
(NASA-Case-LAR-12620-1; US-Patent-Appl-SN-072857) Avail: NTIS HC A02/MF A01 CSCL 11D

Multiwall insulating sandwich panels are provided for thermal protection of hypervelocity vehicles and other enclosures. In one version of the invention, the multiwall panels are formed of alternate layers of dimpled and flat metal (titanium alloy) foil sheets and beaded scarfed edge seals to provide enclosure thermal protection up to 1000 F. Another version employs an intermediate fibrous insulation for the sandwich panel to provide thermal protection up to 2000 F, and a third version employs a silicide coated columbium waffle as the outer panel skin and fibrous layered intermediate protection for thermal environment protection up to 2500 F. The use of multiple panels on an enclosure facilitates repair of the thermal protection system. NASA

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# 25 INORGANIC AND PHYSICAL CHEMISTRY

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

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

**N80-16116*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
***CATALYSTS FOR POLYIMIDE FOAMS FROM AROMATIC ISOCYANATES AND AROMATIC DIANHYDRIDES* Patent**
Salvatore R. Riccitiello, Paul M. Sawko, and Carlos A. Estrella, inventors (to NASA) Issued 4 Dec. 1979 5 p Filed 24 Feb. 1978 Supersedes N78-221156 (16 - 13, p 1674)
(NASA-Case-ARC-11107-1; US-Patent-4,177,333; US-Patent-Appl-SN-883961; US-Patent-Class-521-124; US-Patent-Class-521-125; US-Patent-Class-521-127; US-Patent-Class-521-157; US-Patent-Class-528-73) Avail: US Patent and Trademark Office CSCL 07D

Polyimide foam products having greatly improved burn-through and flame-spread resistance are prepared by the reaction of aromatic polyisocyanates with aromatic dianhydrides in the presence of metallic salts of octoic acid. The salts, for example stannous octoate, ferric octoate and aluminum octoate, favor the formation of imide linkages at the expense of other possible reactions.

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

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**N80-20334*** National Aeronautics and Space Administration. Pasadena Office, Calif.
**METHOD AND MEANS FOR HELIUM/HYDROGEN RATIO MEASUREMENT BY ALPHA SCATTERING Patent**
A. Bruce Whitehead (JPL) and Thomas A. Tombrello, inventors (to NASA) (JPL) Issued 18 Mar. 1980 8 p Filed 7 Nov. 1978 Supersedes N79-12416 (17 - 03, p 0329) Sponsored by NASA
(NASA-Case-NPO-14079-1; US-Patent-4,194,115; US-Patent-Appl-SN-958573; US-Patent-Class-250-308; US-Patent-Class-250-307) Avail: US Patent and Trademark Office CSCL 07D

An apparatus for determining helium to hydrogen ratios in a gaseous sample is presented. The sample is bombarded with alpha particles created by a self contained radioactive source and scattering products falling within a predetermined forward scattering angular range impact a detector assembly. Two detectors are mounted in tandem, the first completely blocking the second with respect to incident scattering products. Alpha particle/hydrogen or alpha particle/helium collisions are identified by whether scattering product impacts occur simultaneously in both detectors or only in the first detector. Relative magnitudes of the two pulses can be used to further discriminate against other effects such as noise and cosmic ray events.

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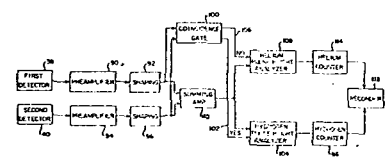
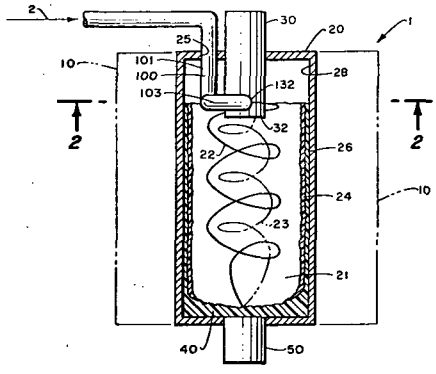


**N80-20338*#** National Aeronautics and Space Administration. Pasadena Office, Calif.
**THERMAL REACTOR AND PROCESS Patent Application**
Harry Levin, inventor (to NASA) (JPL) Filed 29 Feb. 1980 19 p
(Contract NAS7-100)
(NASA-Case-NPO-14369-1; US-Patent-Appl-SN-126063) Avail: NTIS HC A02/MF A01

A thermal reactor for pyrolytically decomposing silane gas into liquid silicon and hydrogen gas is presented. A water cooled injection probe introduces the silane tangentially into a reaction chamber heated well above the decomposition temperature of silane. An outer downwardly moving vortex containing the liquid silicon and an inner upwardly moving vortex containing hydrogen gas are formed. The liquid silicon deposits into the interior walls of the reaction chamber to form an equilibrium skull layer which flows to the bottom of the reaction chamber where it is removed. The hydrogen gas is removed from the top of the reaction chamber by a vortex finder. NASA




**N80-21464*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
**PROCESS FOR THE PREPARATION OF POLY-CARBORANYLPHOSPHAZENES Patent Application**
Larry L. Fewell, Harry Rex Allcock (Pennsylvania State Univ., University Park), John Philip OBrien (Pennsylvania State Univ., University Park), and Angelo George Scopelianos, inventors (to NASA) (Pennsylvania State Univ., University Park) Filed 12 Mar. 1980 9 p
(NASA-Case-ARC-11176-2; US-Patent-Appl-SN-129798) Avail: NTIS HC A02/MF A01 CSCL 07D

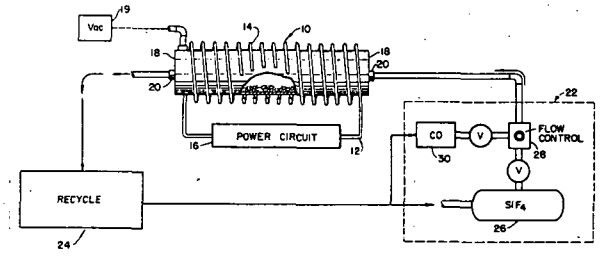
Polydihalophosphazenes are allowed to react at ambient temperatures for at least one hour with a lithium carborane in a suitable inert solvent. The remaining chlorine substituents of the carboranyl polyphosphazene are then replaced with aryloxy or alkoxy groups to enhance moisture resistance. The polymers give a high char yield when exposed to extreme heat and flame and can be used as insulation. NASA

# 26 METALLIC MATERIALS

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

**N80-14229*** National Aeronautics and Space Administration Pasadena Office, Calif.
**METHOD OF PURIFYING METALLURGICAL GRADE SILICON EMPLOYING REDUCED PRESSURE ATMOSPHERIC CONTROL Patent**
William M. Ingle (Motorola, Inc., Phoenix, Ariz.), Stephen W. Thompson (Motorola, Inc., Phoenix, Ariz.), and Robert E. Chaney, inventors (to NASA) (Motorola, Inc., Phoenix, Ariz.) Issued 30 Oct. 1979 4 p Filed 23 Jun. 1978 Supersedes N78-27255 (16 - 18, p 2373) Sponsored by NASA Prepared in cooperation with Motorola, Inc., Phoenix, Ariz.
(NASA-Case-NPO-14474-1; US-Patent-4,172,883; US-Patent-Appl-SN-918537; US-Patent-Class-423-348; US-Patent-Class-423-149; US-Patent-Class-423-293; US-Patent-Class-423-417; US-Patent-Class-423-625) Avail: US Patent and Trademark Office CSCL 11F

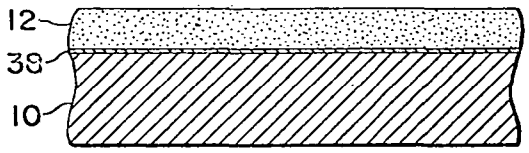
A method in which a quartz tube is charged with chunks of metallurgical grade silicon and/or a mixture of such chunks and high purity quartz sand, and impurities from a class including aluminum, boron, as well as certain transition metals including nickel, iron, and manganese is described. The tube is then evacuated and heated to a temperature within a range of 800 C to 1400 C. A stream of gas comprising a reactant, such as silicon tetrafluoride, is continuously delivered at low pressures through the charge for causing a metathetical reaction of impurities of the silicon and the reactant to occur for forming a volatile halide and leaving a residue of silicon of an improved purity. The reactant which included carbon monoxide gas and impurities such as iron and nickel react to form volatile carbonyls.
Official Gazette of the U.S. Patent and Trademark Office




**N80-14232*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
**IMPROVED REFRACTORY COATINGS AND METHOD OF PRODUCING THE SAME Patent Application**
W. A. Brainard and D. R. Wheeler, inventors (to NASA) Filed 12 Jul. 1979 7 p
(NASA-Case-LEW-13169-1; US-Patent-Appl-SN-102003) Avail: NTIS HC A02/MF A01 CSCL 11F

A thin sputtered film that exhibits improved adherence to a substrate and has improved friction and wear characteristics is described. These improvements are achieved by coating the substrate by rf sputtering with a film of titanium carbide using an argon sputtering plasma. A small nitrogen partial pressure from about 0.5% to 2.5% is added in the initial stages of the deposition during which the interface is formed. The improvements

in adhesion of the titanium carbide coating to the substrate results from the presence of both titanium nitride and a nitride of the substrate in the interfacial region. NASA

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**N80-19237*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**METHOD OF FORMING DYNAMIC MEMBRANE ON STAINLESS STEEL SUPPORT Patent Application**
J. L. Gaddis (Clemson Univ., S.C.) and Craig A. Brandon, inventors (to NASA) (Clemson Univ., S.C.) Filed 7 Feb. 1980 10 p Sponsored by NASA
(NASA-Case-MSC-18172-1; US-Patent-Appl-SN-119334) Avail: NTIS HC A02/MF A01 CSCL 11F

A method for forming a membrane on a porous stainless steel substrate is disclosed. The stainless steel substrate is prepared from sintered, powdered stainless steel and contacted with an aqueous nitrate solution of a suitable polyvalent metal such as iron, zirconium, tin, or thorium. Contact between the substrate and the aqueous nitrate solution is maintained until the flow rate diminishes indicating that the hydrous metal oxide membrane has formed. Variables affecting the process include the applied pressure, the pore size, and the concentration of the aqueous nitrate solution. The advantage of the method is that membranes are formed on stainless steel substrates without corroding the stainless steel. Membranes deposited on the surface of porous substrates are used in hyperfiltration to remove contaminating chemicals from aqueous solutions by reverse osmosis. Such reverse osmosis membranes are used in desalination and other water purification equipment, and may have application in textile industries for separating dyes from aqueous solvents. J.M.S.

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# 27 NONMETALLIC MATERIALS

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

**N80-10358*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**COMPOUND OXIDIZED STYRYLPHOSPHINE Patent**
Kazimiera J. L. Paciorek, inventor (to NASA) (Ultrasystems, Inc., Irvine, Calif.) Issued 18 Sep. 1979 13 p Filed 19 May 1978 Supersedes N78-25216 (16 - 16, p 2093) Division of US-Patent-Appl-SN-706424, Filed 19 Jul. 1976, US-Patent-4,092,466; sponsored by NASA
(NASA-Case-MSC-14903-2; US-Patent-4,168,287; US-Patent-Appl-SN-907435; US-Patent-Class-260-926; US-Patent-Appl-SN-706424; US-Patent-4,092,466) Avail: US Patent and Trademark Office CSCL 07C

A process is described for preparing flame resistant, nontoxic vinyl polymers which contain phosphazene groups and which do not emit any toxic or corrosive products when they are oxidatively degraded. Homopolymers, copolymers, and terpolymers of a styrene based monomer are prepared by polymerizing at least one oxidized styrylphosphine monomer from a group of organic azides, or by polymerizing p-diphenylphosphinestyrene and then oxidizing that monomer with an organoazide from the group of (C6H5)2P(O)N3, (C6H5O)2P(O)N3, (C6H5)2C3N3(N3), and C6H5C3N3(N3)2. Copolymers can also be prepared by copolymerizing styrene with at least one oxidized styrylphosphine monomer. Official Gazette of the U.S. Patent and Trademark Office

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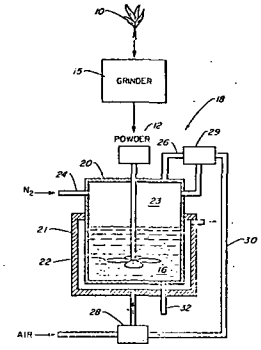
**N80-10361*#** National Aeronautics and Space Administration. Pasadena Office, Calif.
**MOLTEN SALT PYROLYSIS OF LATEX Patent Application**
Albert J. Bauman, inventor (to NASA) (JPL) Filed 27 Apr. 1978 11 p Sponsored by NASA.
(NASA-Case-NPO-14315-1; US-Patent-Appl-SN-900659) Avail: NTIS HC A02/MF A01 CSCL 07C

The production of synthetic hydrocarbon liquid fuel from latex rich plants is reported. The pyrolysis of high isoprene latex plants such as Guayule, or extracts thereof, in a molten inorganic salt at temperatures above 300 C is described. The pyrolysis process is examined using a number of inorganic salts and a reactor is described for the hydrogen fuel production. A.W.H.

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**N80-16158*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**CRYSTALLINE POLYIMIDES Patent**
Terry L. St.Clair and Anne K. St.Clair, inventors (to NASA) Issued 25 Dec. 1979 4 p Filed 15 May 1978 Supersedes N78-24360 (16 - 15, p 1975)
(NASA-Case-LAR-12099-1; US-Patent-4,180,648; US-Patent-Appl-SN-906299; US-Patent-Class-528-207; US-Patent-Class-528-208) Avail: US Patent and Trademark Office CSCL 07C

Aromatic crystalline polyimides are disclosed that are synthesized from polyamide-acid and when heated to 200 C to 300 C become cyclized to afford an opaque polymer. X-ray diffraction of the unoriented film exhibited 47 percent crystallinity. Differential scanning calorimetry reveals a melt at 425 C with no glass transition in these crystalline polyimides.
Official Gazette of the U.S. Patent and Trademark Office

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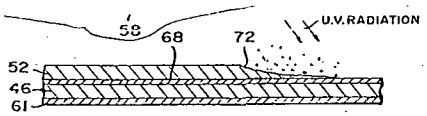
**N80-16163*#** National Aeronautics and Space Administration. Pasadena Office, Calif.
**STRONG THIN MEMBRANE STRUCTURE Patent Application**
Robert E. Frazer, inventor (to NASA) (JPL) Filed 21 Dec. 1979 24 p
(Contract NAS7-100)

(NASA-Case-NPO-14021-2; US-Patent-Appl-SN-106188) Avail: NTIS HC A02/MF A01 CSCL 11D

A continuous process is described for producing strong lightweight structures for use as solar sails for spacecraft propulsion by radiation pressure. A thin reflective coating, such as aluminum, is applied to a rotating cylinder. A nylon mesh, applied over the aluminum coating, is then coated with a polymerizing material such as a para-xylylene monomer gas to polymerize as a film bound to the mesh and the aluminum. An emissivity increasing material such as chromium or silicon monoxide is applied to the polymer film to disperse such material colloidally into the growing polymer film, or to the final polymer film. The resulting membrane structure is then removed from the cylinder. Alternately, the membrane structure can be formed by etching a substrate in the form of an organic film such as a polymide, or a metal foil, to remove material from the substrate and reduce its thickness. A thin reflective coating (aluminum) is applied on one side of the substrate, and an emissivity increasing coating is applied on the reverse side of the substrate. NASA




**N80-16164*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

**ALUMINUM ION-CONTAINING POLYIMIDE ADHESIVES Patent Application**

Anne K. St.Clair (Old Dominion Univ., Norfolk, Va.), Terry L. St.Clair (Old Dominion Univ., Norfolk, Va.), and Larry T. Taylor, inventors (to NASA) (Old Dominion Univ., Norfolk, Va.) Filed 7 Nov. 1979 14 p Sponsored by NASA

(NASA-Case-LAR-12640-1; US-Patent-Appl-SN-092142) Avail: NTIS HC A02/MF A01 CSCL 11I

A method is described for preparing an aluminum ion-filled polyimide adhesive. A meta-oriented aromatic diamine is reacted with an aromatic dianhydride and an aluminum compound in the presence of a water or lower alkanol miscible ether solvent to produce an intermediate polyamic acid. The polyamic acid is converted to the thermally stable, metal ion-filled polyimide by heating in the temperature range of 300 C to produce a flexible, high temperature adhesive. NASA

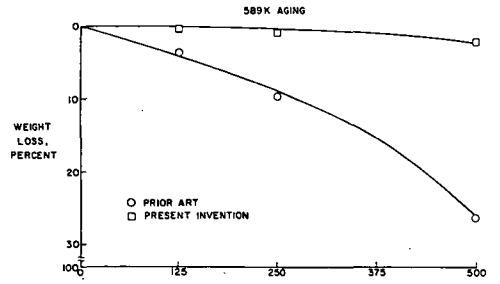
**N80-18179*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

**TACKIFIER FOR ADDITION POLYIMIDES Patent Application**

Terry L. StClair and John M. Butler, inventors (to NASA) (Virginia Polytechnic Inst. and State Univ., Blacksburg) Filed 7 Nov. 1979 18 p

(NASA-Case-LAR-12642-1; US-Patent-Appl-SN-092141) Avail: NTIS HC A02/MF A01 CSCL 11G

An improvement of addition polyimides wherein an essentially solventless, high viscosity laminating resin is synthesized from low-cost liquid monomers is presented. The improved process takes advantage of a reactive, liquid plasticizer such as monoethylphthalate which is used in lieu of an alcohol solvent, and helps solve a major problem of maintaining good prepreg tack and drape, or the ability of the prepreg to adhere to adjacent plies and conform to a desired shape during the layup process. This improvement results in both longer life of the polymer prepreg and the processing of low-void laminates and appears to be applicable to all addition polyimide systems. NASA




**N80-21533*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**CARBORANYLCYCLOTRIPHOSPHAZENES AND THEIR POLYMERS Patent Application**

Larry L. Fewell, Harry Rex Allcock (Pennsylvania State Univ., University Park), John Philip OBrien (Pennsylvania State Univ., Unversity Park), and Angelo George Sopelianos, inventors (to NASA) (Pennsylvania State Univ., University Park) Filed 12 Mar. 1980 10 p

(NASA-Case-ARC-11176-1; US-Patent-Appl-SN-129799) Avail: NTIS HC A02/MF A01 CSCL 07C

Carboranyl-substituted polyphosphazenes are prepared by heat polymerizing a carboranyl halocyclophosphazene at 250 C for about 120 hours in the absence of oxygen and moisture. The cyclophosphazene is obtained by allowing a lithium carborane, e.g., the reaction product of methyl-o-carborane with n-butyllithium in ethyl ether, to react with hexachlorocyclotriphosphazene at ambient temperatures and in anhydrous conditions. For greater stability in the presence of moisture, the chlorine substituents of the polymer are then replaced by aryloxy or alkoxy groups, such as CF3CH2O(-). The new substantially inorganic polymers are thermally stable materials which produce a high char yield when exposed to extreme temperatures, and can thus serve to insulate less heat and fire resistant substances. NASA

# 28 PROPELLANTS AND FUELS

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

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

**N80-10374*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**START UP SYSTEM FOR HYDROGEN GENERATOR USED WITH AN INTERNAL COMBUSTION ENGINE Patent**

John Houseman (JPL) and Donald J. Cerini, inventors (to NASA) (JPL) Issued 5 Jul. 1977 13 p Filed 22 Mar. 1976 Sponsored by NASA

(NASA-Case-NPO-13849-1; NASA-Case-NPO-13907-1; US-Patent-4,033,133; US-Patent-Appl-SN-668783; US-Patent-Class-60-606; US-Patent-Class-23-288R; US-Patent-Class-48-61; US-Patent-Class-48-102A; US-Patent-Class-48-10-3; US-Patent-Class-48-107; US-Patent-Class-48-117; US-Patent-Class-48-DIG.8;

US-Patent-Class-60-300; US-Patent-Class-123-3; US-Patent-Class-123-179R; US-Patent-Class-123-DIG.12; US-Patent-Class-423-650) Avail: US Patent and Trademark Office CSCL 21D

A hydrogen generator provides hydrogen rich product gases which are mixed with the fuel being supplied to an internal combustion engine for the purpose of enabling a very lean mixture of that fuel to be used, whereby nitrous oxides emitted by the engine are minimized. The hydrogen generator contains a catalyst which must be heated to a pre-determined temperature before it can react properly. To simplify the process of heating up the catalyst at start-up time, either some of the energy produced by the engine such as engine exhaust gas, or electrical energy produced by the engine, or the engine exhaust gas may be used to heat up air which is then used to heat the catalyst.

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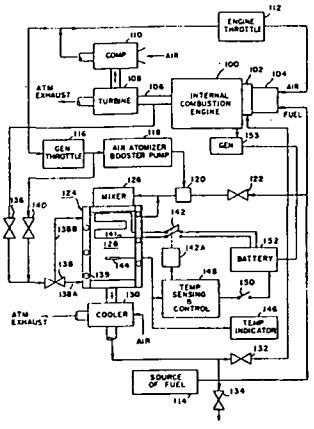


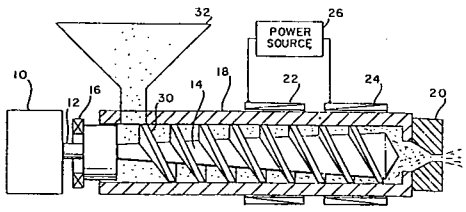

**N80-10377*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

**CONTINUOUS COAL PROCESSING METHOD AND MEANS Patent Application**

Porter R. Ryason, inventor (to NASA) (JPL) Filed 28 Sep. 1976 31 p Sponsored by NASA

(NASA-Case-NPO-13758-2; US-Patent-Appl-SN-727444) Avail: NTIS HC A03/MF A01 CSCL 21D

A coal pump is provided in which solid coal is heated in the barrel of an extruder under pressure to a temperature at which the coal assumes plastic properties. The coal is continuously extruded, without static zones, using, for example, screw extrusion preferably without venting through a reduced diameter die to form a dispersed spray. The dispersed coal may be continuously injected into vessels or combustors at any pressure up to the maximum pressure developed in the extrusion device. The coal may be premixed with other materials such as desulfurization aids or reducible metal ores so that reactions occur, during or after conversion to its plastic state. Alternatively, the coal may be processed and caused to react after extrusion, through the die, with liquid oxidizers, whereby a coal reactor is provided. Alternative utilization of the device may be to secure continuous pyrolysis of the coal or to feed the extruded coal into furnaces operating at pressures near ambient. NASA




**N80-20402*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

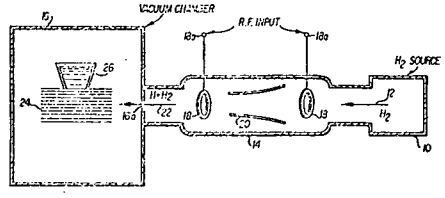
**ATOMIC HYDROGEN STORAGE Patent**

John A. Woollam, inventor (to NASA) Issued 18 Mar. 1980 3 p Filed 29 Sep. 1977 Supersedes N78-19907 (16 - 10, p 1365) Division of U.S. Patent Appl. SN-67432, filed 13 Apr. 1976, US Patent-4,077,788

(NASA-Case-LEW-12081-2; US-Patent-4,193,827; US-Patent-Appl-SN-837794; US-Patent-Class-149-1; US-Patent-Class-423-648R; US-Patent-Appl-SN-676432) Avail: US Patent and Trademark Office CSCL 21D

Atomic hydrogen, for use as a fuel or as an explosive, is stored in the presence of a strong magnetic field in exfoliated layered compounds such as molybdenum disulfide or an elemental layer material such as graphite. The compound is maintained at liquid temperatures and the atomic hydrogen is collected on the surfaces of the layered compound which are exposed during delamination (exfoliation). The strong magnetic field and the low temperature combine to prevent the atoms of hydrogen from recombining to form molecules.

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




# 31 ENGINEERING (GENERAL)

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

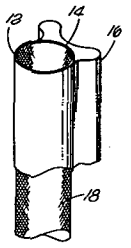
**N80-17292*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**PRECISION HEAT FORMING OF TETRAFLUOROETHYLENE TUBING Patent**

W. V. Ruiz (Rockwell International Corp., Downey, Calif.) and C. S. Thatcher, inventors (to NASA) (Rockwell International Corp., Downey, Calif.) Issued 18 Jan. 1980 11 p Sponsored by NASA

(NASA-Case-MSC-18430-1; US-Patent-Appl-SN-113015) Avail: NTIS HC A02/MF A01 CSCL 13H

A method is provided for altering the size of tetrafluoroethylene tubing which is only available in limited combination of wall thicknesses and diameter. The tetrafluoroethylene tubing is slid onto an aluminum mandrel to which the ends of the tubing are clamped. The tubing and mandrel are placed in a supporting coil which is then positioned in an insulated steel pipe. The steel pipe is normally covered with a fiber glass insulator to smooth out temperature distribution therein. The entire structure is then placed in an oven which heats the tetrafluoroethylene tubing and shrinks it to the outer dimension of the aluminum mandrel. After cooling, the aluminum mandrel is removed from the newly sized tetrafluoroethylene tubing by a conventional chemical milling process. NASA



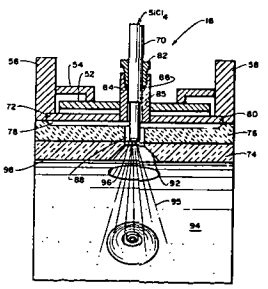

**N80-18231*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**METHOD OF PRODUCING SILICON Patent**

Charles B. Wolf (Westinghouse Electric Corp., Trafford, Pa.) and Thomas N. Meyer, inventors (to NASA) (Westinghouse Electric Corp., Trafford, Pa.) Issued 12 Feb. 1980 6 p Filed 29 Mar. 1978 Supersedes N78-22186 (16 - 13, p 1678) Sponsored by NASA

(NASA-Case-NPO-14382-1; US-Patent-4,188,368; US-Patent-Appl-SN-891373; US-Patent-Class-423-350; US-Patent-Class-261-118; US-Patent-Class-422-224) Avail: US Patent and Trademark Office CSCL 13H

A liquid reactant injector assembly suited for the injection of liquid reactant into a high temperature metal reductant vapor and carrier gas stream for the production of metal is presented. The assembly is especially adapted for the continuous production of high purity silicon by the reduction of $SiCl_4$ with sodium. The assembly includes a refractory-lined, hollow metal shell having ten equally-spaced, concentric, radially directed ports provided in the shell and wall. A hydraulic, atomizing type spray nozzle is mounted in each of the ports recessed from the inner wall surface. Official Gazette of the U.S. Patent Office




# 32 COMMUNICATIONS

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

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

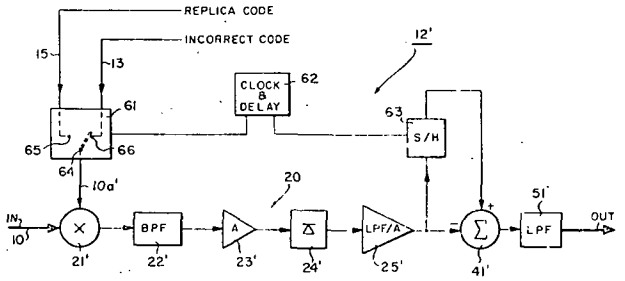
**N80-10413*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**SELF-CALIBRATING THRESHOLD DETECTOR Patent Application**

James Richard Barnes (TRW Systems Group, Redondo Beach, Calif.) and Marshall Yu Huang, inventors (to NASA) (TRW Systems Group, Redondo Beach, Calif.) Filed 27 Jul. 1979 16 p Sponsored by NASA

(NASA-Case-MSC-16370-1; US-Patent-Appl-SN-061556) Avail: NTIS HC A02/MF A01 CSCL 17B

A self calibrating threshold detector for use with receivers is described. The threshold detector is adapted to receive an incoming transmitted signal carrying a prescribed code. The detector comprises a single demodulating channel which includes a mixer having one input receiving the incoming signal and another input receiving a local replica code. The detector relates generally to signal detecting systems and more particularly to receivers employing an auxiliary detector for detecting the arrival of an expected transmitted signal by correlating the phase of a local phase coded signal, produced by a local replica generator, with the phase of the transmitted signal. A.W.H.




**N80-12256*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

**METHOD FOR SHAPING AND AIMING NARROW BEAMS Patent Application**

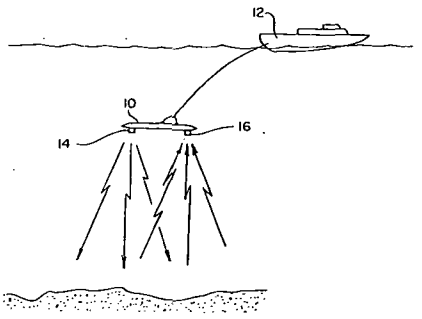
Richard C. Heyser, inventor (to NASA) (JPL) Filed 7 Nov. 1979 19 p

(Contract NAS7-100)

(NASA-Case-NPO-14632-1; US-Patent-Appl-SN-092143) Avail: NTIS HC A02/MF A01 CSCL 20N

A method and apparatus is disclosed for use of a linear frequency chirp in a transmitter/receiver having a correlator to synthesize a narrow beamwidth pattern from otherwise broad beam transducers when there is relative velocity between the transmitter/receiver and the target. The chirp is so produced in a generator in bandwidth, B, and time, T, as to produce a time-bandwidth product, TB, that is increased for a narrower angle. A replica of the chirp produced in a generator is time delayed and Doppler shifted for use as a reference in receiver for correlation of received chirps from targets. This reference is Doppler shifted to select targets preferentially, thereby to not

only synthesize a narrow beam but also aim the beam in azimuth and elevation. NASA




**N80-14281*** National Aeronautics and Space Administration. Pasadena Office, Calif.

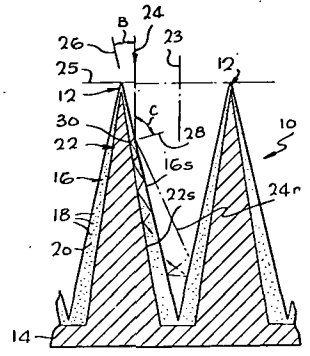
**ELECTROMAGNETIC POWER ABSORBER Patent**

Richard S. Iwasaki, inventor (to NASA) (JPL) Issued 14 Aug. 1979 6 p Filed 15 Sep. 1977 Continuation of abandoned US Patent Appl. SN-703905, Filed 9 Jul. 1976 Sponsored by NASA

(NASA-Case-NPO-13830-1; US-Patent-4,164,718; US-Patent-Appl-SN-834257; US-Patent-Class-333-81R; US-Patent-Class-343-18A; US-Patent-Class-343-909; US-Patent-Appl-SN-703905) Avail: US Patent and Trademark Office CSCL 20N

A structure is presented with a surface portion of dielectric material which passes electromagnetic radiation and with a portion below the surface which includes material that absorbs the radiation, the face of the structure being formed with numerous steep ridges. The steepness of the dielectric material results in a high proportion of the electromagnetic energy passing through the surface for absorption by the absorbing material under the surface. A backing of aluminum or other highly heat-conductive and reflective material lies under the face and has very steep protuberances supporting the absorbing and dielectric materials.

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




**N80-16261*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

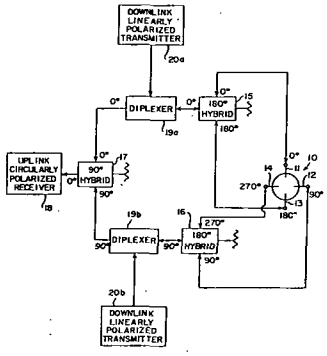
**ANTENNA FEED SYSTEM FOR RECEIVING CIRCULAR POLARIZATION AND TRANSMITTING LINEAR POLARIZATION Patent Application**

Boris L. Seidel (JPL) and Dan A. Bathker, inventors (to NASA) (JPL) Filed 30 Oct. 1979 13 p

(Contract NAS7-100)

(NASA-Case-NPO-14362-1; US-Patent-Appl-SN-106118) Avail: NTIS HC A02/MF A01 CSCL 20N

An invention is described which provides for receiving a circularly polarized signal from an antenna feed connected to orthogonally spaced antenna elements. It also provides for transmitting a linearly polarized signal through the same feed without switches, and without suffering a 3 dB polarization mismatch loss, using an arrangement of hybrid junctions. The arrangement is comprised of two dividing hybrid junctions, each connected to a different pair of antenna elements and a summing hybrid junction. In one version, a receiver is connected to the summing hybrid junction directly. A diplexer is used to connect a transmitter to only one pair of antenna elements. In another version, designated left and right circularly polarized (LCP and RCP) transmitters are connected to the summing hybrid junction by separate diplexers, and separate LCP and RCP sensitive receivers are connected to the diplexers in order to transmit linearly polarized signals using all four antenna elements while receiving circularly polarized signals as before. An orthomode junction and horn antenna may replace the two dividing hybrid junctions and antenna feed. NASA




**N80-18252*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**HIGH-SPEED DATA LINK FOR MODERATE DISTANCES AND NOISY ENVIRONMENTS Patent**

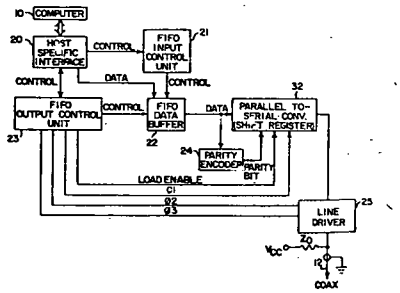
Michael W. Sievers, inventor (to NASA) (JPL) Issued 5 Feb. 1980 10 p Filed 25 Apr. 1978 Supersedes N79-24212 (17 - 15, p 1968) Sponsored by NASA

(NASA-Case-NPO-14152-1; US-Patent-4,187,394; US-Patent-Appl-SN-899828; US-Patent-Class-178-58R; US-Patent-Class-179-15BA) Avail: U.S. Patent and Trademark Office CSCL 17B

A full duplex, high speed data link is described which comprises identical modules at each site for communication over coaxial cables. Each module having a digital frequency modulation (DFM) transmitter with an first-in-first-out (FIFO) data buffer for data from a digital system to be transmitted over a cable and a receiver with an FIFO data buffer for data received for a digital system at the other end of the cable. Data words are preceded by a sync word which enables the receiver. Every word transmitted, including the sync word is stored in the FIFO data buffer. This arrangement using FIFO buffers allows for asynchronous

transmission of data with receipt of the data beginning with the very first bit of the sync word.

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




**N80-18253*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**RADIO FREQUENCY ARRAYING METHOD FOR RECEIVERS Patent**

Milton H. Brockman (JPL) and Mahlon F. Easterling, inventors (to NASA) (JPL) Issued 29 Jan. 1980 15 p Filed 31 Oct. 1978 Supersedes N79-14272 (17 - 05, p 0585) Sponsored by NASA

(NASA-Case-NPO-14328-1; NASA-Case-NPO-14579-1; NASA-Case-NPO-14590-1; US-Patent-4,186,347; US-Patent-Appl-SN-956160; US-Patent-Class-325-305; US-Patent-Class-325-307; US-Patent-Class-325-419) Avail: US Patent and Trademark Office CSCL 17B

A method and apparatus for increasing the signal to noise ratio of a receiving facility for coherent frequency reception by arraying receiving systems using separate antennas for each, or one antenna for all systems are presented. One system is operated with a carrier tracking loop to provide a first local oscillator frequency for the first and all other systems arrayed, with individual tracking loops in all other systems operated at IF for tracking out any phase differences due to separate group delays using an adjustable phase shifter for a second reference to compensate for different group delays in the antenna and low noise amplifier of each of the other systems. The second IF output of all systems is summed into the first system. This technique may also be used when two systems are arrayed to an antenna designed for circular or linear polarization diversity reception to effectively provide the same signal to noise ratio for both polarized signal transmission channels that would result from matched polarization. An arrangement adapted to high rate telemetry reception is disclosed. With additional components, the same arrangement is adapted to provide low rate telemetry reception as well.

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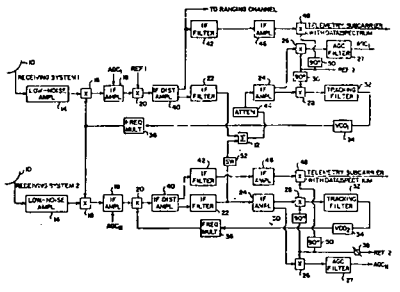


**N80-18261*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

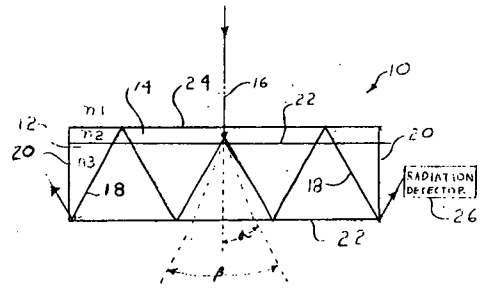
**A FLUORESCENT RADIATION CONVERTER Patent Application**

Walter Viehmann, inventor (to NASA) Filed 11 Jan. 1980 19 p

(NASA-Case-GSC-12528-1; US-Patent-Appl-SN-111439) Avail: NTIS HC A02/MF A01 CSCL 20N

A fluorescent radiation converter having a substantially undoped optically transparent substrate and a waveshifter coating deposited on at least one portion of substrate for absorption of radiation and conversion thereof to fluorescent radiation is described. The coating is formed of substantially 1000 g/liter of a solvent, 70 to 200 g/liter of an organic polymer, and .2 to 25 g/liter of at least one organic fluorescent dye. The incoming incident radiation impinges on the coating and enters therein. Radiation is absorbed by the fluorescent dye and is reemitted as a longer wavelength radiation. Advantages of the fluorescent radiation converter in the areas of liquid crystal displays, scintillation counters, and in photovoltaic conversion techniques are discussed.

NASA




**N80-20448*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**SATELLITE PERSONAL COMMUNICATIONS SYSTEM Patent**

Norman B. Reilly (JPL) and Joel G. Smith, inventors (to NASA) (JPL) Issued 19 Feb. 1980 9 p Filed 30 May 1978 Supersedes N78-25275 (6 - 16, p 2101) Sponsored by NASA

(NASA-Case-NPO-14480-1; US-Patent-4,189,675; US-Patent-Appl-SN-910707; US-Patent-Class-325-4; US-Patent-Class-325-8; US-Patent-Class-325-9; US-Patent-Class-325-14) Avail: US Patent and Trademark Office CSCL 17B

Voice channel communication between low power mobile stations dispersed over a large area is provided by a system which includes a geostationary satellite utilizing a large UHF antenna that can receive a transmission from a caller and retransmit it over any one beam of a matrix of narrow beams, so the chosen beam covers an area in which a designated called party is located. A single up-link control channel occupying a narrow frequency band, can be utilized to receive dial up signals from a caller, and another single down link control channel can be utilized to ring up the called party located anywhere within the continental United States. The satellite antenna includes a matrix of feed horns that not only direct the beams in a controlled matrix onto the area of the continental United States, but also permit detection of the region from which the caller's signal is transmitted and the region from which the called party's answer is received, to enable the interconnection of signals

received from these two regions. The system is particularly useful for rural areas.

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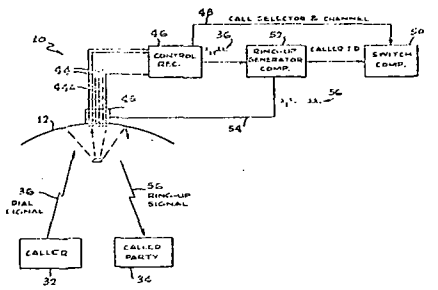


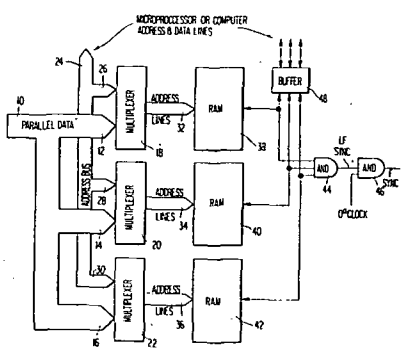

**N80-20453*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**MEMORY-BASED FRAME SYNCHRONIZER Patent Application**

James K. Niswander and Raymond J. Stattel, inventors (to NASA) Filed 12 Mar. 1980 23 p

(NASA-Case-GSC-12430-1; US-Patent-Appl-SN-129779) Avail: NTIS HC A02/MF A01 CSCL 17B

The memory frame synchronizer is comprised of a serial to parallel converter to convert a serial input data stream to a constantly changing parallel data output. This provides a data format which can be easily and dynamically changed. The process is accomplished using programmable memory arrays to perform the functions of the sync word recognizer and of the counter decoding logic. The parallel data output is supplied to programmable sync word recognizers each consisting of multiplexer and *random access memory (RAM). The multiplexer is connected to* both the parallel data output and an address bus. The RAM is used as an associative memory or decoder and is programmed with the pattern of binary 1's and 0's necessary to identify a specific sync word. NASA




# 33 ELECTRONICS AND ELECTRICAL ENGINEERING

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*.

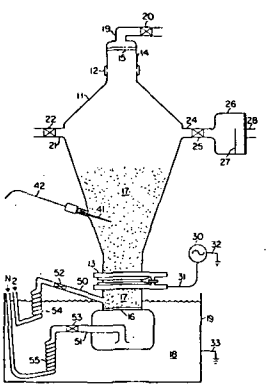
**N80-11326*#** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

**USE OF GLOW DISCHARGE IN FLUIDIZED BEDS Patent Application**

Theodore Wydeven, Peter C. Wood (San Jose State Univ. Foundation, Calif.), E. Vernon Ballou (San Jose State Univ. Foundation, Calif.), and Leroy A. Spitze, inventors (to NASA) (San Jose State Univ., Calif.) Filed 26 Oct. 1979 15 p

(NASA-Case-ARC-11245-1; US-Patent-Appl-SN-088663) Avail: NTIS HC A02/MF A01 CSCL 09C

Static charges and agglomeration of particles in a fluidized bed system are minimized by maintaining in at least part of the *bed a radio frequency glow discharge. This approach is eminently* suitable for processes in which the conventional charge removing agents, i.e., moisture or conductive particle coatings, cannot be used. The technique is applied here to the disproportionation of calcium peroxide diperoxyhydrate to yield calcium superoxide, an exceptionally water and heat sensitive reaction. NASA



**N80-12281*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

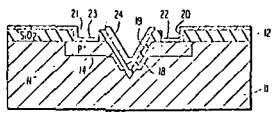
**METHOD OF MAKING V-MOS FIELD EFFECT TRANSISTORS Patent Application**

Murzban D. Jhabvala, inventor (to NASA) Filed 5 Sep. 1979 12 p

(NASA-Case-GSC-12515-1; US-Patent-Appl-SN-072727) Avail: NTIS HC A02/MF A01 CSCL 09A

A method of making V-MOS field effect transistors is disclosed. A masking layer is first formed over a surface of a crystalline substrate. An aperture is formed in the masking layer to expose the surface of the substrate. An *anisotropic etchant* is applied to the exposed surface so that a groove having a decreasing width with increasing depth is formed. The etch is *not allowed to go to completion, with the result that a partially* formed V-shaped groove is formed. Ions are accelerated through the aperture for implantation in the crystalline substrate in the *lower portion of the partially formed V-shaped groove. An*

anisotropic etchant is reapplied to the partially formed V-shaped groove, and the etch is allowed to go to completion. NASA



**N80-14330*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**MULTIPLE ANODE ARC LAMP SYSTEM Patent**

Charles G. Miller (JPL) and Ralph E. Bartera, inventors (to NASA) (JPL) Issued 18 Jan. 1972 7 p Filed 29 Dec. 1969 Sponsored by NASA

(NASA-Case-NPO-10857-1; US-Patent-3,635,537; US-Patent-Appl-SN-888362; US-Patent-Class-315-145; US-Patent-Class-315-260; US-Patent-Class-315-334) Avail: US Patent and Trademark Office CSCL 09A

A high-intensity xenon arc lamp having a plurality of separate anodes axially disposed in a symmetrical pattern which spaced a discharge gap from a common cathode is presented.

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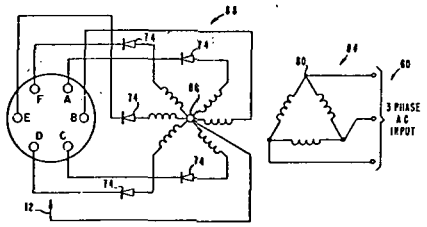


**N80-14332*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**METHOD FOR ANALYZING RADIATION SENSITIVITY OF INTEGRATED CIRCUITS Patent**

Michael K. Gauthier (JPL) and Alan G. Stanley, inventors (to NASA) (JPL) Issued 23 Oct. 1979 7 p Filed 30 Jun. 1978 Supersedes N78-27330 (16 - 18, p 2383) Sponsored by NASA

(NASA-Case-NPO-14350-1; US-Patent-4,172,228; US-Patent-Appl-SN-921627; US-Patent-Class-250-492A; US-Patent-Class-250-310; US-Patent-Class-324-158T) Avail: US Patent and Trademark Office CSCL 09C

A method for analyzing the radiation sensitivity of an integrated circuit is described to determine the components. The application of a narrow radiation beam to portions of the circuit is considered. The circuit is operated under normal bias conditions during the application of radiation in a dosage that is likely to cause malfunction of at least some transistors, while the circuit is monitored for failure of the irradiated transistor. When a radiation sensitive transistor is found, then the radiation beam is further narrowed and, using a fresh integrated circuit, a very narrow beam is applied to different parts of the transistor, such as its junctions, to locate the points of greatest sensitivity.

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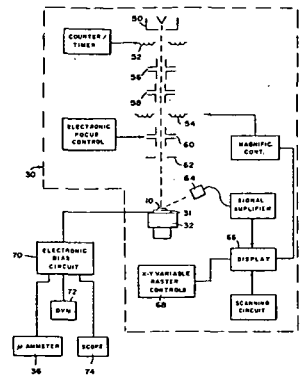


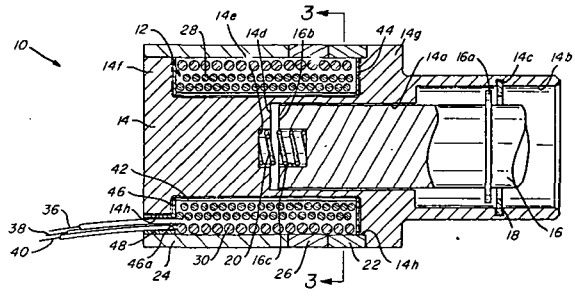
**N80-14338*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

**LOW TEMPERATURE LATCHING SOLENOID Patent Application**

William S. Wang, inventor (to NASA) (Consolidated Controls Corp., El Segundo, Calif.) Filed 29 Nov. 1979 27 p Sponsored by NASA

(NASA-Case-MSC-18106-1; US-Patent-Appl-SN-098568) Avail: NTIS HC A03/MF A01 CSCL 09A

A magnetically latching solenoid is disclosed which includes a pull-in coil and a delatching coil. Each of the coils is constructed with a combination of wire materials, including materials of low temperature coefficient of resistivity, to enable the solenoid to be operated at cryogenic temperatures while maintaining sufficient coil resistance. An armature is springbiased toward a first position that may extend beyond the field of force of a permanent magnet. When voltage is temporarily applied across the pull-in magnet, the induced electromagnetic forces overcome the spring force and pull the armature to a second position within the field of the permanent magnet, which latches the armature in the pulled-in position. Application of voltage across the delatching coil induces electromagnetic force which at least partially temporarily nullifies the field of the permanent magnet at the armature, thereby delatching the armature and allowing the spring to move the armature to the first position. NASA



**N80-17359*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

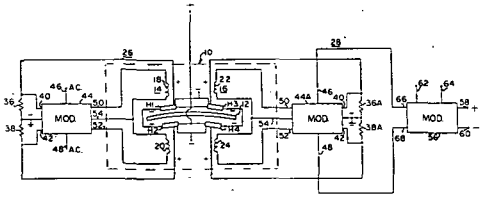
**MAGNETIC FIELD CONTROL Patent Application**

Walter Haeussermann, inventor (to NASA) Filed 11 Jan. 1980 12 p

(NASA-Case-MFS-23828-1; US-Patent-Appl-SN-111436) Avail: NTIS HC A02/MF A01 CSCL 09C

A torque control an electromechanical torquing device of a type where a variable clearance occurs between a rotor and field is presented. A Hall effect device senses the field present, which would vary as a function of spacing between field and rotor, and the output of the Hall effect device controls the power applied to the field so as to provide a well-defined field and thus a controlled torque to the rotor which is well defined.

NASA



**N80-18285*** National Aeronautics and Space Administration. Pasadena Office, Calif.

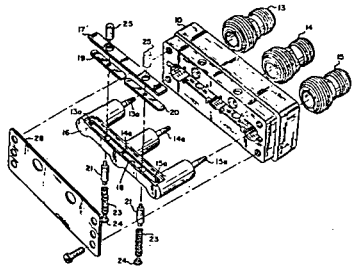
**HIGH POWER RF COAXIAL SWITCH Patent**

Edward R. Caro, inventor (to NASA) (JPL) Issued 5 Feb. 1980 6 p Filed 10 Oct. 1978 Continuation of abandoned U.S. Patent Appl. SN-835419, filed 21 Sep. 1977 Sponsored by NASA

(NASA-Case-NPO-14229-1; US-Patent-4,187,416; US-Patent-Appl-SN-949886; US-Patent-Class-200-153S; US-Patent-Class-200-304; US-Patent-Class-333-262; US-Patent-Appl-SN-835419) Avail: US Patent and Trademark Office CSCL 09A

A coaxial switch capable of operating in a vacuum with high RF power in the 1.2 GHz range without multipactor breakdown, and without relying on pressurization with an inert gas is described. The RF carrying conductors of the switch are surrounded with a high grade solid dielectric, thus eliminating any gaps in which electrons can accelerate.

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



**N80-18286*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

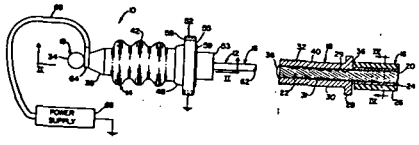
**VOLTAGE FEED THROUGH APPARATUS HAVING REDUCED PARTIAL DISCHARGE Patent**

Stephen R. Peck (GE, Philadelphia) and Jeffrey W. Benham, inventors (to NASA) (GE, Philadelphia) Issued 22 Jan. 1980 5 p Filed 10 Jan. 1978 Supersedes N78-17297 (16 - 8, p 1013) Sponsored by NASA

(NASA-Case-GSC-12347-1; US-Patent-4,185,164; US-Patent-Appl-SN-868249; US-Patent-Class-174-142; US-Patent-Class-174-73R) Avail: US Patent and Trademark Office CSCL 09A

A voltage feed-through apparatus, having reduced partial discharge, has an electrical conductor and an electrical terminal connected thereto. A semiconductor sleeve surrounds the conductor for reducing the electric field concentration at the metallic conductor surface and consequently reducing the partial discharge occurrences. An insulator sleeve encircles the semiconductor sleeve. A metallic sleeve surrounds a portion of the terminal. Another insulator is connected to the metallic sleeve and surrounds a portion of the insulator sleeve forming a space therebetween. Another metallic sleeve spaced from the first metallic sleeve surrounds a portion of the other insulator.

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



**N80-18287*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**MICROWAVE POWER TRANSMISSION BEAM SAFETY SYSTEM Patent**

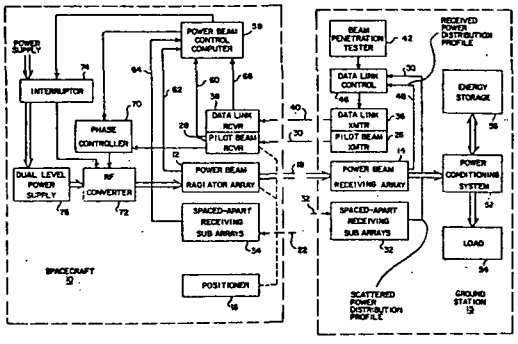
Richard M. Dickinson, inventor (to NASA) (JPL) Issued 5 Feb. 1980 8 p Filed 16 Oct. 1978 Supersedes N79-10271 (17 - 01, p 0036) Sponsored by NASA

(NASA-Case-NPO-14224-1; US-Patent-4,187,506; US-Patent-Appl-SN-951829; US-Patent-Class-343-100R; US-Patent-Class-310-306; US-Patent-Class-343-100ST) Avail: US Patent and Trademark Office CSCL 09C

A system in which the characteristics of a microwave power transmission beam are controlled in accordance with power distribution profiles altered due to the detected presence or entrance of an object into the beam which causes changes that are perceived in various received, reflected and scattered power distribution profiles resulting over various receiving elements of the system is presented. The system comprises a microwave power beam radiator array, a microwave power beam receiving antenna array, the radiator array in one embodiment being located on an orbiting spacecraft and the receiving array being located at a ground station. Another embodiment provides a ground

based transmitting array and a receiving array aboard an aircraft or airship.

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



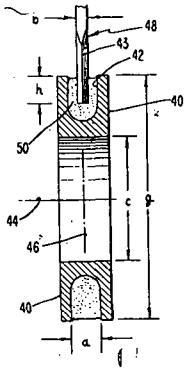

**N80-18300*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**LIQUID METAL SLIP RING Patent Application**

Frank D. Berkopec, Robert R. Lovell, and David H. Culp, inventors (to NASA) Filed 21 Dec. 1979 11 p

(NASA-Case-LEW-12277-3; US-Patent-Appl-SN-106190) Avail: NTIS HC A02/MF A01 CSCL 09A

The liquid metal slip ring described comprises a rotor in the form of a range about an axis and a stator, the rotor being rotatable relative to the stator. The rotor has a channel in which the liquid metal is retained during operation by surface tension. The stator comprises a brush or probe which is partially immersed in the metal in the channel and is bidirectionally symmmetrical so that whichever direction the rotor turns the probe presents the same physical resistance and affords the same electrical conductivity as a connection between the probe and the rotor. Author



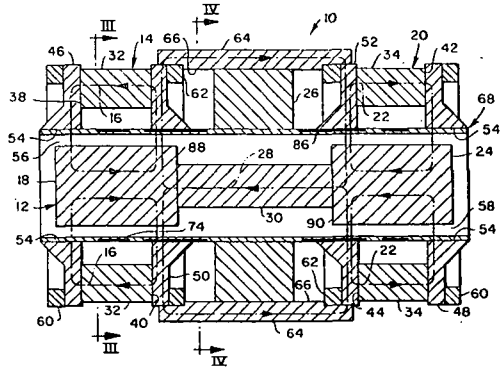

**N80-19424*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**A LINEAR MAGNETIC MOTOR/GENERATOR Patent Application**

Philip A. Studer, inventor (to NASA) Filed 7 Feb. 1980 27 p

(NASA-Case-GSC-12518-1; US-Patent-Appl-SN-119336) Avail: NTIS HC A03/MF A01 CSCL 09C

A linear magnetic motor/generator is described which uses magnetic flux to provide mechanical motion or electrical energy. The linear magnetic motor/generator includes an axially movable actuator mechanism. A permanent magnet mechanism defines a first magnetic flux path which passes through a first end portion of the actuator mechanism. Another permanent magnet mechanism defines a second magnetic flux path which passes through a second end portion of the actuator mechanism. A drive coil defines a third magnetic flux path passing through a third central portion of the actuator mechanism. The invention has potential applications on all types of spacecraft requiring the use of a motor or generator, or in environments requiring long life with minimum maintenance. Presently the invention is to be used in cryogenic refrigerators aboard future spacecraft. NASA



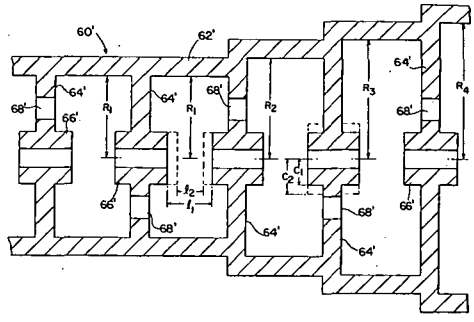

**N80-19425*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**COUPLED CAVITY TRAVELING WAVE TUBE WITH VELOCITY TAPERING Patent Application**

Denis J. Connolly, inventor (to NASA) Filed 20 Feb. 1980 16 p

(NASA-Case-LEW-12296-1; US-Patent-Appl-SN-122966) Avail: NTIS HC A02/MF A01 CSCL 09A

A coupled cavity traveling wave tube is described which has a velocity taper, i.e., gradual velocity reduction, which affords beam wave resynchronization and thereby enhances efficiency. The required wave velocity reduction is achieved by reducing the resonant frequencies of the individual resonant cavities as a function of the distance from the electron gun through changes in the internal cavity dimensions. The required changes in cavity dimensions are accomplished, for example, by gradually increasing the cavity radius or decreasing the gap length from cavity to cavity. NASA



**N80-20487*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

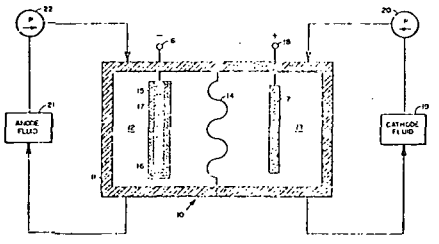
**CATALYST SURFACES FOR THE CHROMOUS/CHROMIC REDOX COUPLE Patent**

Jose D. Giner (Giner, Inc.) and Kathleen J. Cahill, inventor (to NASA) (Giner, Inc.) Issued 11 Mar. 1980 8 p Filed 29 Nov. 1978 Supersedes N79-14538 (17 - 05, p 0618) Sponsored by NASA

(NASA-Case-LEW-13148-1; US-Patent-4,192,910; US-Patent-Appl-SN-964754; US-Patent-Class-429-101; US-Patent-Class-429-105; US-Patent-Class-429-107; US-Patent-Class-429-109) Avail: US Patent and Trademark Office CSCL 09A

An electricity producing cell of the reduction-oxidation (REDOX) type is described. The cell is divided into two compartments by a membrane, each compartment containing a solid inert electrode. A ferrous/ferric couple in a chloride solution serves as a cathode fluid which is circulated through one of the compartments to produce a positive electric potential disposed therein. A chromic/chromous couple in a chloride solution serves as an anode fluid which is circulated through the second compartment to produce a negative potential on an electrode disposed therein. The electrode is an electrically conductive, inert material plated with copper, silver or gold. A thin layer of lead plates onto the copper, silver or gold layer when the cell is being charged, the lead ions being available from lead chloride which was added to the anode fluid. If the REDOX cell is then discharged, the current flows between the electrodes causing the lead to deplate from the negative electrode and the metal coating on the electrode will act as a catalyst to cause increased current density.

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



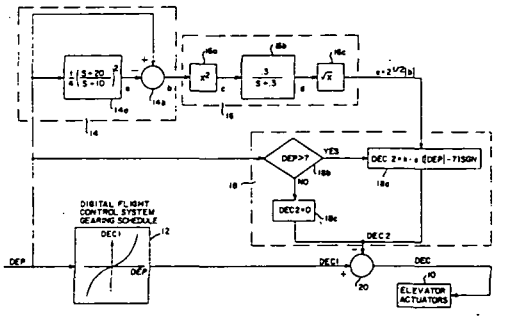
**N80-20488*#** National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

**APPARATUS FOR DAMPING OPERATOR INDUCED OSCILLATIONS OF A CONTROLLED SYSTEM Patent Application**

John W. Edwards and John W. Smith, inventors (to NASA) Filed 29 Feb. 1980 24 p

(NASA-Case-FRC-11041-1; US-Patent-Appl-SN-126064) Avail: NTIS HC A02/MF A01 CSCL 09C

The invention relates to an adaptive filter for suppressing operator induced oscillations of a control system such as a pilot controlled aircraft or spacecraft. The novelty of the invention is in the filter arrangements which effectively estimate frequency and amplitude to produce a signal that will provide damping without rate limiting. NASA



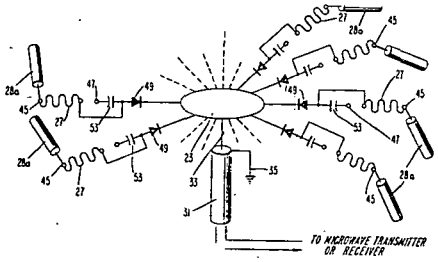

**N80-21670*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**MICROWAVE SWITCHING POWER DIVIDER Patent Application**

Ronald J. Stockton, inventor (to NASA) (Ball Aerospace Systems Div., Boulder, Colo.) Filed 12 Mar. 1980 24 p Sponsored by NASA

(NASA-Case-GSC-12420-1; US-Patent-Appl-SN-129793) Avail: NTIS HC A02/MF A01 CSCL 09A

A microwave switching power divider for selectively dividing and switching microwave energy among a plurality of outputs to antenna elements or other microwave devices such as filters, phase-shifters or other networks is disclosed. The power divider includes a pair of parallel, spaced-apart circular ground planes defining a microwave cavity with multi-port microwave power distributing switching circuitry formed on opposite sides of a thin circular dielectric substrate disposed between the ground planes. The power distributing circuitry includes a conductive disk located at the center of the substrate and connected to a source of microwave energy. Microwave energy propagates as standing waves within the cavity. A plurality of radial power dividing transmission lines for intercepting the standing waves are symmetrically disposed about and connected to the conductive disk. NASA



# 34 FLUID MECHANICS AND HEAT TRANSFER

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

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

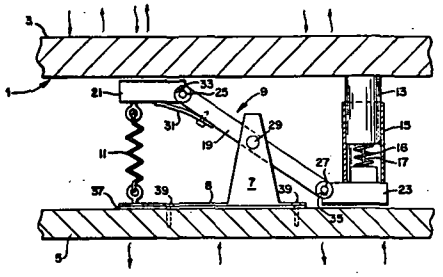
**N80-18338*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**AUTOMATIC THERMAL SWITCH Patent Application**

*Lawrence D. Wing and Joseph W. Cunningham, inventors* (to NASA) Filed 30 May 1979 23 p

(NASA-Case-GSC-12415-1; US-Patent-Appl-SN-043943) Avail: NTIS HC A02/MF A01 CSCL 20D

An automatic heat flow control switch consisting of a thermal transfer plate pivotally mounted between two thermally conductive plates is described. A phase change power unit which includes a plunger is in contact with one of the conductive plates. When the unit is actuated by an increase in heat transmission, the plunger extends and pivots the transfer plate to vary the thermal conduction. An element connected to the transfer plate biases the transfer plate in a predetermined position with respect to the conductive plates. The biasing element, transfer plate, and piston can be arranged to provide either a closed or open thermally conductive path. The switch is to be used to control the temperature of electronic instruments in the Space Shuttle equipment bays. NASA



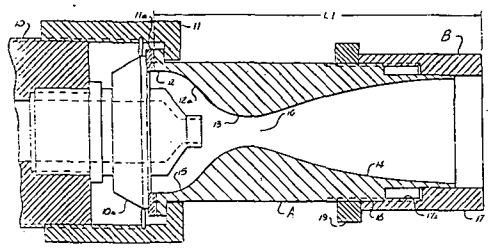
**N80-20528*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**CONTROLLED OVERSPRAY SPRAY NOZZLE Patent Application**

Willibald P. Prasthofer, inventor (to NASA) Filed 29 Feb. 1980 16 p

(NASA-Case-MFS-25139-1; US-Patent-Appl-SN-126138) Avail: NTIS HC A02/MF A01 CSCL 20D

A nozzle for suppressing overspray of multiingredient ablative materials is described. The nozzle includes a cylindrical inlet which converges to a restricted throat. A curved juncture between the cylindrical inlet and the convergent portion, with a predetermined radius of curvature, affords unrestricted and uninterrupted flow of the ablative material. A divergent bell shaped chamber and an adjustable nozzle exit are utilized which provide a highly effective spray pattern for suppressing overspray to an acceptable level and producing a homogeneous jet of material that adheres well to the substrate. NASA



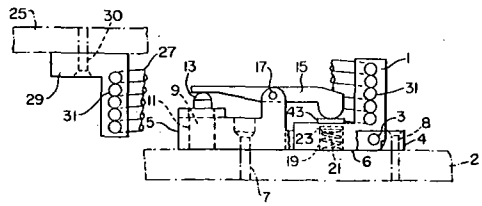
**N80-21671*#** National Aeronautics and Space Administration. *Goddard Space Flight Center, Greenbelt, Md.*

**AUTOMATIC THERMAL SWITCH Patent Application**

Joseph W. Cunningham and Lawrence D. Wing, inventors (to NASA) Filed 21 Dec. 1979 23 p

(NASA-Case-GSC-12553-1; US-Patent-Appl-SN-106192) Avail: NTIS HC A02/MF A01 CSCL 09A

An automatic thermal switch to control heat flow is described which includes a first thermally conductive plate, a second thermally conductive plate and a thermally conductive switch saddle pivotally mounted to the first plate. A flexible heat carrier is connected between the switch saddle and the second plate. A phase-change power unit, including a piston coupled to the switch saddle is in thermal contact with the first thermally conductive plate. A biasing element biases the switch saddle in a predetermined position with respect to the first plate. When the phase-change power unit is actuated by an increase in heat transmitted through the first plate, the piston extends and causes the switch saddle to pivot thereby varying the thermal conduction between the first and second plate and through the switch saddle and flexible heat carrier. The biasing element, switch saddle and piston can be arranged to provide either a normally closed or normally opened thermally conductive path between the first and second plates. NASA



# 35 INSTRUMENTATION AND PHOTOGRAPHY

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

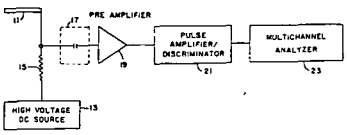
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

**N80-11400*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SMALL CONDUCTIVE PARTICLE SENSOR Patent Application**

Israel Taback, inventor (to NASA) (Bionetics Corp., Hampton, Va.) Filed 28 Aug. 1979 14 p Sponsored by NASA (NASA-Case-LAR-12552-1; US-Patent-Appl-SN-070366) Avail: NTIS HC A02/MF A01 CSCL 14B

This invention is an electrostatic conductive fiber detector for use in detecting, counting and measuring the length of fibers down to 0.1 mm and below with increased accuracy and reliability over prior art devices. It can be used for detection of fibers suspending in a flowing gas, in a nonflowing gas, or in a vacuum and its accumulated counts over a period of time is essentially unaffected by velocity of the fibers being detected. NASA

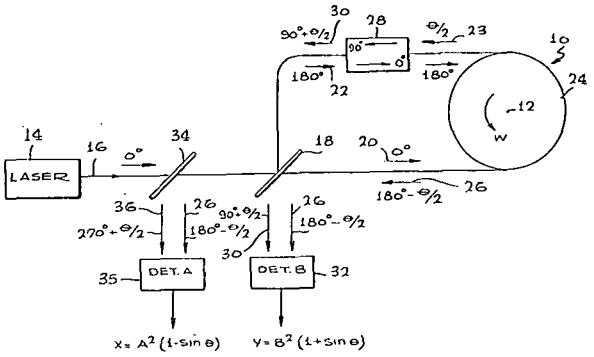



**N80-12383*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

**OPTICAL GYROSCOPE SYSTEM Patent Application**

Willis C. Goss (JPL) and Raymond Goldstein, inventors (to NASA) (JPL) Filed 22 Dec. 1978 35 p Sponsored by NASA (NASA-Case-NPO-14258-1; US-Patent-Appl-SN-972252) Avail: NTIS HC A03/MF A01 CSCL 20F

An optical gyroscope is disclosed which has high accuracy at both slow and fast rotation rates. The gyroscope operates alternately in two modes, one mode utilizing an added 90 deg phase shift and the other employing no added phase shift, to provide high sensitivity for a wide range of rotation rates. A novel beam splitter is used which first lets the beam pass through, and is later energized to cause the returned beam to be reflected. Linear polarization of the light beam is maintained by keeping all fiber portions in curvature. NASA

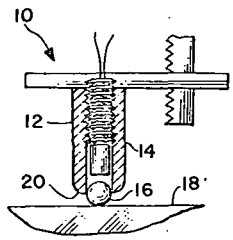



**N80-14371*** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**DISPLACEMENT PROBES WITH SELF-CONTAINED EXCITING MEDIUM Patent**

Robert Miserentino and Bruce Flagge, inventors (to NASA) Issued 23 Oct. 1979 5 p Filed 26 Jul. 1978 (16 - 22, p 2943) (NASA-Case-LAR-11690-1; US-Patent-4,171,645; US-Patent-Appl-SN-928129; US-Patent-Class-73-655; US-Patent-Class-73-661) Avail: US Patent and Trademark Office CSCL 14B

A transducer that combines a noncontacting displacement probe with a self-contained target is described. The target is held in position against a vibrating surface by a housing which also supports the noncontacting probe. The target vibrates with the surface and the probe senses the vibrations of the target. Official Gazette of the U.S. Patent and Trademark Office



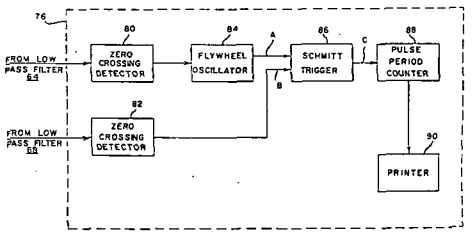

**N80-16313*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

**FARADAY ROTATION MEASUREMENT METHOD AND APPARATUS Patent Application**

Milton H. Brockman, inventor (to NASA) (JPL) Filed 21 Dec. 1979 19 p (Contract NAS7-100) (NASA-Case-NPO-14839-1; US-Patent-Appl-SN-106119) Avail: NTIS HC A02/MF A01 CSCL 14B

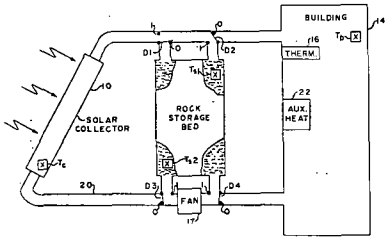
A Faraday measuring apparatus utilized in conjunction with the specific receiver array provides a means for comparing the phase of a reference signal in the receiver array to the phase of

a tracking loop signal related to the incoming signal, and comparing the phase of the reference signal to the phase of the tracking signal shifted in phase by 90 degrees. NASA



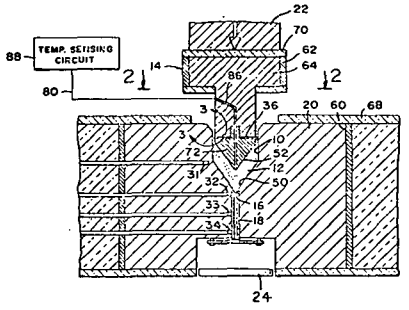

**N80-17421*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
**MULTI-CHANNEL TEMPERATURE MEASUREMENT AMPLIFICATION SYSTEM Patent Application**
James R. Currie, inventor (to NASA) Filed 29 Nov. 1979 19 p
(NASA-Case-MFS-23775-1; US-Patent-Appl-SN-098569) Avail: NTIS HC A02/MF A01 CSCL 14B

A multichannel temperature amplification system for solar energy applications is presented. Differential thermocouple outputs are sequentially amplified by a common amplifier and compared with a reference temperature signal in an offset correction amplifier. A poled output signal is provided when a differential output is of a discrete level. NASA



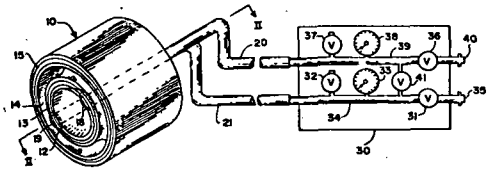

**N80-18357*** National Aeronautics and Space Administration. Pasadena Office, Calif.
**VISCOSITY MEASURING INSTRUMENT Patent**
Samuel P. Feinstein, inventor (to NASA) (JPL) Issued 29 Jan. 1980 6 p Filed 23 Jun. 1978 Supersedes N78-27385 (16 - 18, p 2390) Sponsored by NASA
(NASA-Case-NPO-14501-1; US-Patent-4,185,493; US-Patent-Appl-SN-918535; US-Patent-Class-73-56; US-Patent-Class-73-343R; US-Patent-Class-264-40.4) Avail: US Patent and Trademark Office CSCL 14B

A method and apparatus are provided for enabling the measurement of the viscosity of substances, especially those containing volatiles at elevated temperatures, with greater accuracy and at less cost than before. The apparatus includes a cylinder with a narrow exit opening at one end and a piston which closely slides within the cylinder to apply force against a sample in the cylinder to force the sample through the exit opening. In order to more rapidly heat a sample the ends of the cylinder and piston are tapered and the sample is correspondingly tapered, to provide a large surface to volume ratio. A corresponding coal sample is formed by compressing particles of coal under high pressure in a mold of appropriate shape.
Official Gazette of the U.S. Patent and Trademark Office




**N80-18358*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**STATIC PRESSURE ORIFICE SYSTEM TESTING METHOD AND APPARATUS Patent**
Randolph F. Culotta and Donald L. Posey, inventors (to NASA) Issued 8 Jan. 1980 7 p Filed 17 Aug. 1978 Supersedes N78-33123 (16 - 24, 3179)
(NASA-Case-LAR-12269-1; US-Patent-4,182,158; US-Patent-Appl-SN-934576; US-Patent-Class-73-40; US-Patent-Class-73-4R) Avail: U.S. Patent and Trademark Office CSCL 14B

A method and apparatus are presented for pressure testing the static pressure orifices and associated connections used in wind tunnels. A cylindrical module, having in one end an open hemispherical calibration pressure chamber separated from and surrounded by an annular vacuum chamber is placed over the orifice of the system to be tested. O-rings ensure seating and a vacuum seal between the chambered end of the module and the surface around the orifice: one O-ring separates the outer chamber from the outside environment. Ports lead from each of the chambers out the other end of the module to tubes connected to a control box consisting of calibration pressure and vacuum supply lines, bleeder valves, and gauges.
Official Gazette of the U.S. Patent and Trademark Office



**N80-18359*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
**DISTRIBUTED-SWITCH DICKE RADIOMETERS Patent**
Curt A. Levis, inventor (to NASA) (Ohio State Univ., Columbus) Issued 11 Dec. 1979 7 p Filed 29 Mar. 1978 Supersedes N78-22436 (16 - 13, p 1714) Sponsored by NASA
(NASA-Case-GSC-12219-1; US-Patent-4,178,100; US-Patent-Appl-SN-891356; US-Patent-Class-356-216; US-Patent-Class-325-363; US-Patent-Class-343-100ME; US-Patent-Class-73-355R) Avail: U.S. Patent and Trademark Office CSCL 14B

A radiometer on an orbiting spacecraft is described which derives high spatial resolution information from terrestrial and atmospheric regions. The N elements or subapertures on the spacecraft transduce electromagnetic energy into electric signals. Many or all of the elements are simultaneously illuminated by

electromagnetic energy radiated from the same region. Identical, parallel processing channels are responsive to the N elements. Each of the channels includes a variable gain amplifier responsive to the signal transduced by its corresponding array elements. The gain of each amplifier is controlled as a function of the output difference when the channel is connected periodically to each of a pair of Dicke noise sources, such as resistors maintained at predetermined temperatures.

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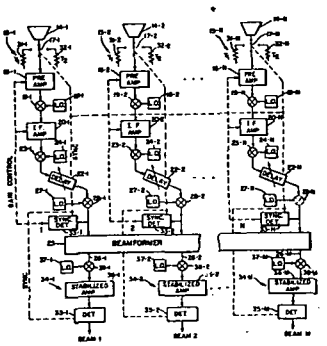


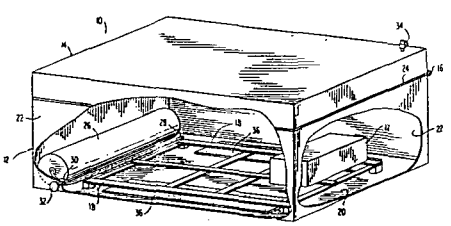
**N80-18362*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**METHOD OF AND MEANS FOR RETARDING DYE FADING DURING ARCHIVAL STORAGE OF DEVELOPED COLOR PHOTOGRAPHIC FILM Patent Application**

Richard B. Hoover and Charles M. Rhodes, inventors (to NASA) Filed 7 Feb. 1980 8 p

(NASA-Case-MFS-23250-1; US-Patent-Appl-SN-119340) Avail: NTIS HC A02/MF A01 CSCL 14E

A method for retarding dye fading of developed color photographic film is described. Fading is accomplished by placing the film in a sealed, opaque vault; introducing a dry, pressurized inert gas into the vault while the latter is vented; and sealing the vault after the air within the vault has been purged and replaced by the inert gas. Preferably, the gas is nitrogen; and the vault is stored at a temperature below room temperature to preserve the color photographic emulsions on the film contained within the vault. For short term storage, sodium thiocyanate pads charged with water are placed within the vault. For long term storage, the interior of the vault is kept at a low relative humidity. NASA



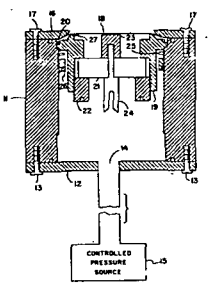
**N80-18363*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

**LIQUID-IMMERSIBLE ELECTROSTATIC ULTRASONIC TRANSDUCER Patent Application**

John H. Cantrell, Jr., Joseph S. Heyman, William T. Yost (Tennessee Univ.), Michael A. Torbett (Tennessee Univ.), and Mark A. Breazeale, inventors (to NASA) (Tennessee Univ.) Filed 21 Dec. 1979 12 p

(NASA-Case-LAR-12465-1; US-Patent-Appl-SN-106136) Avail: NTIS HC A02/MF A01 CSCL 14B

A broadband megahertz range electrostatic acoustic transducer for use in a liquid environment is described. A liquid-tight enclosure which includes a metallic conducting membrane as part of its outside surface has a means inside the liquid-tight enclosure for applying a tension to the membrane and for mounting an electrode with the flat end approximately parallel to the membrane. A structure for ensuring that the membrane and the flat end of the electrode are exactly parallel and a fixed predetermined distance from each other is included. NASA




**N80-18364*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

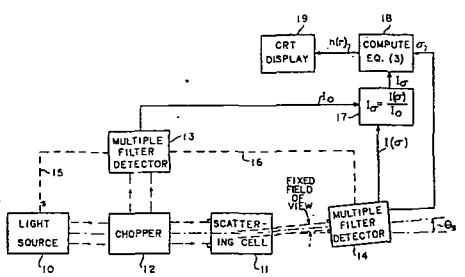
**FREQUENCY-SCANNING PARTICLE SIZE SPECTROMETER Patent Application**

Alain L. Fymat, inventor (to NASA) (JPL) Filed 10 Aug. 1979 21 p

(Contract NAS7-100)

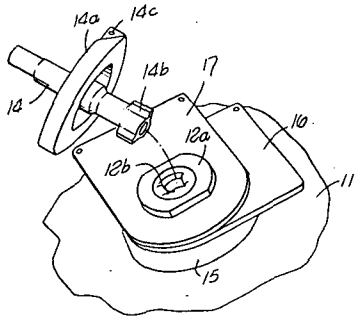
(NASA-Case-NPO-13606-2; US-Patent-Appl-SN-065676) Avail: NTIS HC A02/MF A01 CSCL 14B

A particle size spectrometer having a fixed field of view within the forward light scattering cone at an angle theta sub s between approximately 100 and 200 minutes of arc (preferably at 150 minutes), a spectral range extending approximately from 0.2 to 4.0 inverse micrometers, and a spectral resolution between about 0.1 and 0.2 inverse micrometers (preferably toward the lower end of this range of spectral resolution), is employed to determine the distribution of particle sizes, independently of the chemical composition of the particles, from measurements of incident light, at each frequency, sigma (= 1/lambda), and scattered light, I(sigma). NASA



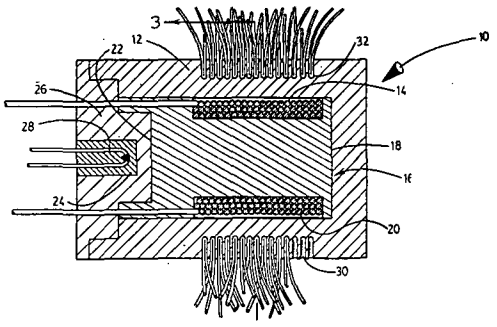
**N80-19468*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**HIGH TEMPERATURE PENETRATOR ASSEMBLY WITH BAYONET PLUG AND RAMP-ACTIVATED LOCK Patent Application**
Kenneth E. Wood, inventor (to NASA) (Rockwell International, Downey, Calif.) Filed 7 Feb. 1980 14 p Sponsored by NASA
(NASA-Case-MSC-18526-1; US-Patent-Appl-SN-119335) Avail: NTIS HC A02/MF A01 CSCL 14B

A penetrator assembly adaptable to the very high temperature environment encountered in space vehicle atmospheric reentry is disclosed. Features of the assembly include a bayonet plug and a ramp activated lock, eliminating threaded surfaces which are subject to oxidation and subsequent failure. Columbium base metal with a silicide coating is used and provision is made for safety wiring of the ramping washers against unintended rotation in place. Application of the penetrator assembly to a high temperature, pressure probe, orifice installation for a space vehicle is illustrated. J.M.S.



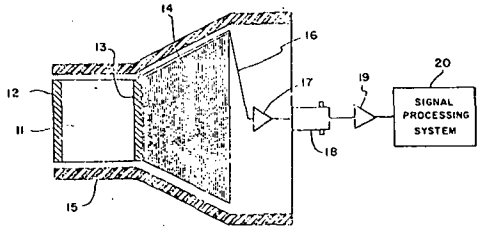

**N80-19469*#** National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
**THERMOCOUPLE, MULTIPLE JUNCTION REFERENCE OVEN Patent Application**
Louis P. LeBlanc, inventor (to NASA) Filed 22 Feb. 1980 11 p
(NASA-Case-FRC-10112-1; US-Patent-Appl-SN-122965) Avail: NTIS HC A02/MF A01 CSCL 14B

An improved oven for maintaining the junctions of a plurality of reference thermocouples at a common and constant temperature is described. The oven is characterized by a cylindrical body defining a heat sink having an axially extended cylindrical cavity, a singularized heating element, an annular array of radially extended bores, and a temperature sensing device seated in the axial bore for detecting temperature changes as they occur in the spool and circuit. A diagram of the oven and thermocouples is presented and the design and applications of the invention are discussed. NASA




**N80-20559*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**CDS SOLID STATE PHASE INSENSITIVE ULTRASONIC TRANSDUCER Patent**
Joseph S. Heyman, inventor (to NASA) Issued 25 Mar. 1980 8 p Filed 26 Jul. 1978 Supersedes N78-29871 (16 - 20, p 2725)
(NASA-Case-LAR-12304-1; US-Patent-4,195,244; US-Patent-Appl-SN-928130; US-Patent-Class-310-311; US-Patent-Class-29-25.35; US-Patent-Class-310-327; US-Patent-Class-310-334; US-Patent-Class-310-360) Avail: US Patent and Trademark Office CSCL 14B

A phase insensitive ultrasonic transducer which includes a CdS crystal that is annealed for a selected period of time and at a selected temperature to provide substantially maximum acoustic attenuation at the operating frequency of the transducer is described. Two electrodes are attached to the crystal with amplifier means and a signal processing system connected to one of the electrodes to provide an ultrasonic receiver.
Official Gazette of the U.S. Patent and Trademark Office




**N80-20560*** National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
**ATTACHING OF STRAIN GAGES TO SUBSTRATES Patent**
*Meyer M. Lemcoe (Battelle Columbus Labs., Ohio) and Harry E.* Pattee, inventors (to NASA) (Battelle Columbus Labs., Ohio) Issued 25 Mar. 1980 4 p Filed 16 Feb. 1978 Supersedes N78-18393 (16 - 09, p 1160) Sponsored by NASA
(NASA-Case-FRC-10093-1; US-Patent-4,195,279; US-Patent-Appl-SN-878539; US-Patent-Class-338-2; US-Patent-Class-219-85R; US-Patent-Class-219-85CA; US-Patent-Class-219-85CM) Avail: US Patent and Trademark Office CSCL 14B

A method and apparatus for attaching strain gages to substrates is described. A strain gage having a backing plate is attached to a substrate by using a foil of brazing material between the backing plate and substrate. A pair of electrodes that are connected to a current source, are applied to opposite sides of the backing plate, so that heating of the structure occurs primarily along the relatively highly conductive foil of brazing material. Field installations are facilitated by utilizing a backing plate with wings extending at an upward incline from either side of the backing plate, by attaching the electrodes to the wings to perform the brazing operation, and by breaking off the wings after the *brazing is completed.*
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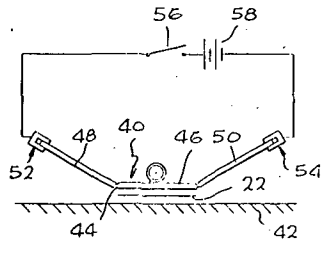

**N80-20563*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**VELOCITY SERVO FOR CONTINUOUS SCAN FOURIER INTERFERENCE SPECTROMETER Patent**

Rudolf A. Schindler, inventor (to NASA) (JPL) Issued 18 Mar. 1980 6 p Filed 24 Feb. 1978 Supersedes N78-22891 (16 - 13, p 1778) Sponsored by NASA
(NASA-Case-NPO-14093-1; US-Patent-4,193,693; US-Patent-Appl-SN-880729; US-Patent-Class-356-346) Avail: US Patent and Trademark Office CSCL 14B

A velocity servo for continuous scan Fourier interference spectrometer of the double pass retroreflector type having two cat's eye retroreflectors is described. The servo uses an open loop, lead screw drive system for one retroreflector with compensation for any variations in speed of drive of the lead screw provided by sensing any variation in the rate of reference laser fringes, and producing an error signal from such variation used to compensate by energizing a moving coil actuator for the other retroreflector optical path, and energizing (through a highpass filter) piezoelectric actuators for the secondary mirrors of the retroreflectors.

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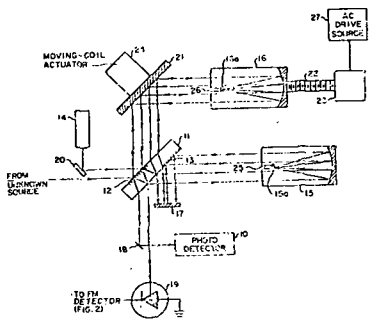
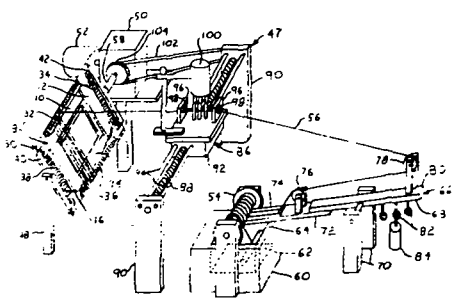



**N80-20565*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**INORGANIC SPARK CHAMBER FRAME AND METHOD OF MAKING THE SAME Patent Application**

Thomas M. Heslin, inventor (to NASA) Filed 7 Mar. 1980 22 p
(NASA-Case-GSC-12354-1; US-Patent-Appl-SN-128229) Avail: NTIS HC A02/MF A01 CSCL 14B

A spark chamber frame includes a number of beams formed from an inorganic materials such as cermic or glass which are connected together with an inorganic bonding material having substantially the same thermal expansion as the beam material. A number of wires also formed from an inorganic composition are positioned between opposed beams so that wires are uniformly spaced and form a grid. Four hold-down straps, also formed of ceramic or glass and having substantially the same chemical and thermal properites as the beam material, overlie the wires and are bonded to the beams. NASA



**N80-21719*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**ACTIVE NUTATION CONTROLLER Patent**

Henry C. Hoffman and James H. Donohue, inventors (to NASA) Issued 18 Mar. 1980 11 p Filed 19 Apr. 1978 Supersedes N78-23141 (16 - 14, p 1813)
(NASA-Case-GSC-12273-1; US-Patent-4,193,570; US-Patent-Appl-SN-897830; US-Patent-Class-244-165; US-Patent-Class-244-170) Avail: US Patent and Trademark Office CSCL 14B

An apparatus is described for controlling nutation motion in a spinning body, comprised of an angular accelerometer with its input axis perpendicular to the spin axis of the body, a flywheel with an axis of rotation perpendicular to the axis of the accelerometer and to the spin axis of the body, and a motor for driving the flywheel to attenuate or build nutation. The motor is controlled by circuitry that monitors the output of the angular accelerometer and drives the motor clockwise or counterclockwise during predetermined nutation angles synchronized to the zero crossover points of the accelerometer signal centered about the nutation peaks. The motor drive is phased to damp nutation motion to zero for stabilization. To increase the noise immunity of the system, when the output of the accelerometer falls below a threshold level, the circuitry operates in an open loop, beat mode where data representing the last accelerometer signal that exceeded that threshold level is stored, and the motor drive is controlled by the stored data. In a second version, the motor is controlled to supply a predetermined amount of nutation motion to a body undergoing testing on a spin table for energy dissipation evaluation. In each version, the use of an angular accelerometer rather than a linear accelerometer or gyro to monitor nutation enables placement of the nutation control apparatus at any location relative to the spin axis of the body requiring only crude orientation and no calibration.

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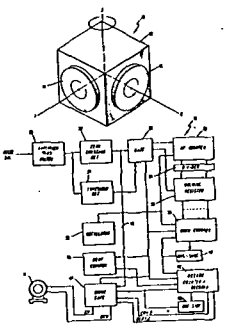


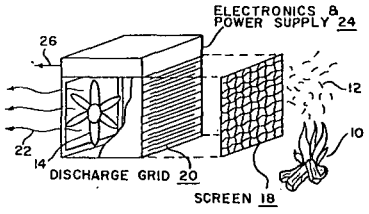
**N80-21723*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

**METHOD AND DEVICE FOR DESTRUCTIVE DETECTION OF A SUBSTANCE Patent Application**

Lien C. Yang, inventor (to NASA) (JPL) Filed 28 Mar. 1980 27 p
(Contract NAS7-100)
(NASA-Case-NPO-14940-1; US-Patent-Appl-SN-135038) Avail: NTIS HC A03/MF A01 CSCL 14B

A method and device for destructively detecting the presence of a substance having predetermined characteristics is disclosed. A discharge grid is provided having a sufficiently high voltage potential across its grid electrodes so that the substance having the predetermined characteristics will cause an electric spark discharge to occur between electrodes. The electric spark discharge alters the predetermined characteristics of the substance by oxidation and/or vaporization so that the substance is no longer detectable by an electric spark discharge. A means for counting the number of electric spark discharges is provided. (A count

provides an indication of the concentration of the substance having the predetermined characteristics.) NASA




# 36 LASERS AND MASERS

Includes parametric amplifiers.

**N80-14384*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
**LASER APPARATUS Patent**
Gerhard A. Koepf, inventor (to NASA) (NSF, Washington, D.C.) Issued 30 Oct. 1979 9 p Filed 29 Sep. 1977 Supersedes N78-10445 (16 - 01, p 0066) Sponsored by NASA (NASA-Case-GSC-12237-1; US-Patent-4,173,001; US-Patent-Appl-SN-837795; US-Patent-Class-331-94.5C; US-Patent-Class-331-94.5P) Avail: US Patent and Trademark Office CSCL 20E

A laser apparatus having a pump laser device for producing pump laser energy upon being excited is disclosed. The pump laser device has a resonating cavity for oscillating and amplifying the pump laser energy. A source laser device is used for producing source laser energy upon being excited by the pump laser energy. The source laser device has a resonating cavity for oscillating and amplifying the source laser energy. The source laser's resonating cavity is coupled withih a portion of the pump laser's resonating cavity.

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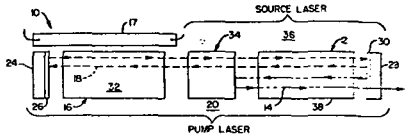


**N80-16321*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**LASER DOPPLER VELOCITY SIMULATOR Patent**
John M. Franke, inventor (to NASA) Issued 4 Dec. 1979 7 p Filed 28 Jul. 1978 Supersedes N78-29435 (16 - 20, p 2671) (NASA-Case-LAR-12176-1; US-Patent-4,176,950; US-Patent-Appl-SN-929083; US-Patent-Class-356-28; US-Patent-Class-332-751; US-Patent-Class-350-359; US-Patent-Class-356-243) Avail: US Patent and Trademark Office CSCL 20E

A method and apparatus for inducing a Doppler frequency shift in a reference beam laser velocimeter light beam to simulate target velocity are described. The light beam is passed through a rotating refractive transparent block positioned between two reference points along the beam which results in a continuous change in the light beam optical path length between the reference points according to a known function. The velocity indicated by the laser velocimeter is compared to the known simulated velocity function for velocimeter testing and calibration.

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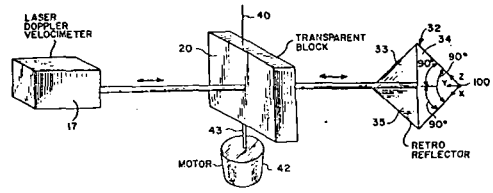


**N80-18372*** National Aeronautics and Space Administration. Pasadena Office, Calif.
**DIELECTRIC-LOADED WAVEGUIDE CIRCULATOR FOR CRYOGENICALLY COOLED AND CASCADED MASER WAVEGUIDE STRUCTURES Patent**
Robert C. Clauss (JPL) and Rex B. Quinn, inventors (to NASA) (JPL) Issued 5 Feb. 1980 6 p Filed 9 Feb. 1978 Supersedes N78-22359 (16 - 13, p 1703) Sponsored by NASA (NASA-Case-NPO-14254-1; US-Patent-4,187,470; US-Patent-Appl-SN-876432; US-Patent-Class-330-4; US-Patent-Class-331-94; US-Patent-Class-333-24R) Avail: US Patent and Trademark Office CSCL 20E

A dielectrically loaded four port waveguide circulator is used with a reflected wave maser connected to a second port between first and third ports to form one of a plurality of cascaded maser waveguide structures. The fourth port is connected to a waveguide loaded with microwave energy absorbing material. The third (output signal) port of one maser waveguide structure is connected by a waveguide loaded with dielectric material to the first (input) port of an adjacent maser waveguide structure, and the second port is connected to a reflected wave maser by a matching transformer which passes the signal to be amplified into and out of the reflected wavemaser and blocks pumping energy in the reflected wave maser from entering the circulator. A number of cascaded maser waveguide structures are thus housed in a relatively small volume of conductive material placed within a cryogenically cooled magnet assembly.

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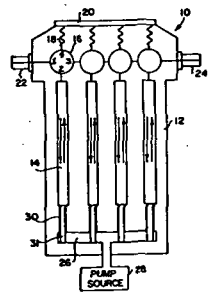
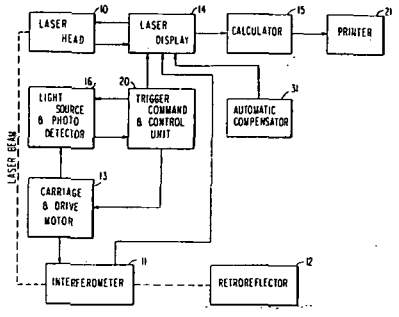



**N80-18380*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
**LASER MEASURING SYSTEM FOR INCREMENTAL ASSEMBLIES Patent Application**

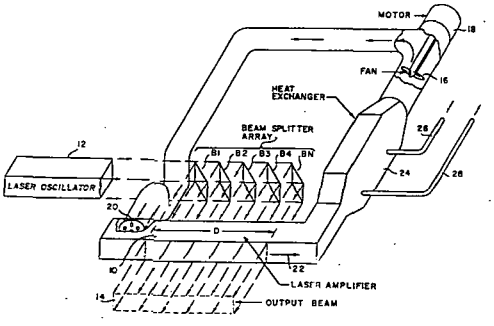
James A. Munford and John G. Etzel, inventors (to NASA) Filed 7 Dec. 1979 14 p
(NASA-Case-GSC-12321-1; US-Patent-Appl-SN-102001) Avail: NTIS HC A02/MF A01 CSCL 20E

Incremental assemblies such as wire-wrapped frame assemblies used in spark chambers and the like are precisely measured using a system which includes a laser, an interferometer, and a retroreflector. A light source and a photodetector are located adjacent to the incremental assembly and mounted on a movable carriage. The interferometer is also mounted on the movable carriage, while the laser and retroreflector are positioned at either end of the carriage track. The carriage is moved along one edge of the incremental assembly between the retroreflector and the laser, and as the carriage is moved, the light from the light source to the photodetector is interrupted. This produces a trigger command to a control unit which in turn causes a distance measurement to be made. A printout is provided for each sampling trigger command to list such items as ideal position, actual position and amount of error. NASA



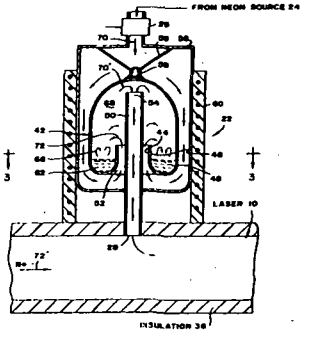

**N80-18381*#** National Aeronautics and Space Administration. Pasadena Office, Calif.
**HIGH POWER METALLIC HALIDE LASER Patent Application**
Thomas J. Pivirotto, inventor (to NASA) (JPL) Filed 7 Feb. 1980 19 p
(Contract NAS7-100)
(NASA-Case-NPO-14782-1; US-Patent-Appl-SN-119339) Avail: NTIS HC A02/MF A01 CSCL 20E

A high power metallic halide (CU3C13) laser capable of providing 300 watts of output power is disclosed. More specifically it is a laser amplification system and a heat exchanger in a closed loop system. In addition, a molecular dissociation apparatus is provided at the input to the laser amplifier for dissociating the copper chloride into copper atoms and ions and chlorine atoms and ions. The dissociation apparatus includes a hollow cathode tube and an annular ring spaced apart from the tube end. A voltage differential is applied between the annular ring and the hollow cathode tube so that as the copper chloride flows therethrough, it is dissociated into copper and chlorine ions and atoms. NASA




**N80-20574*#** National Aeronautics and Space Administration. Pasadena Office, Calif.
**METHOD AND APPARATUS FOR CONVECTION CONTROL OF METALLIC HALIDE VAPOR DENSITY IN A METALLIC HALIDE LASER Patent Application**
Thomas J. Pivirotto, inventor (to NASA) (JPL) Filed 14 Mar. 1980 14 p
(Contract NAS7-100)
(NASA-Case-NPO-15021-1; US-Patent-Appl-SN-130496) Avail: NTIS HC A02/MF A01 CSCL 20E

A method and apparatus for convection control of metallic halide vapor density in a metallic halide laser are described. A reservoir containing copper chloride is heated so that the copper chloride is maintained in a liquid form. The apparatus includes a means for flowing a buffer gas (neon) over the liquid copper chloride to provide a mixture of copper chloride vapor and neon above the liquid copper chloride. A conduit for providing fluid communication between the reservoir containing the copper chloride vapor/neon mixture and the laser is also included. The copper chloride vapor density in the laser is related to the liquid copper chloride temperature and the neon flow rate through the reservoir. Neon is also provided directly to the laser in order to provide a further means of controlling the copper chloride vapor density in the laser. NASA




# 37 MECHANICAL ENGINEERING

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

**N80-10494*** National Aeronautics and Space Administration. Pasadena Office, Calif.
**SODIUM STORAGE AND INJECTION SYSTEM Patent**
Alvin R. Keeton, inventor (to NASA) (Westinghouse Electric Corp., Trafford, Pa.) Issued 25 Sep. 1979 7 p Filed 24 Feb. 1978 Supersedes N78-22187 (16 - 13, p 1679) Sponsored by NASA
(NASA-Case-NPO-14384-1; US-Patent-4,169,129; US-Patent-Appl-SN-880728; US-Patent-Class-422-242; US-Patent-Class-210-186; US-Patent-Class-210-340; US-Patent-Class-239-102; US-Patent-Class-239-302; US-Patent-Class-422-187; US-Patent-Class-422-199; US-Patent-Class-422-208; US-Patent-Class-422-235; US-Patent-Class-423-350) Avail: US Patent and Trademark Office CSCL 13I

A sodium storage and injection system for delivering atomized liquid sodium to a chemical reactor employed in the production of solar grade silicon is disclosed. The system is adapted to accommodate start-up, shut-down, normal and emergency operations, and is characterized by (1) a jacketed injection nozzle adapted to atomize liquefied sodium and (2) a supply circuit connected to the nozzle for delivering the liquefied sodium. The supply circuit is comprised of a plurality of replaceable sodium

containment vessels, a pump interposed between the vessels and the nozzle, and a pressurizing circuit including a source of inert gas connected with the vessels for maintaining the sodium under pressure.
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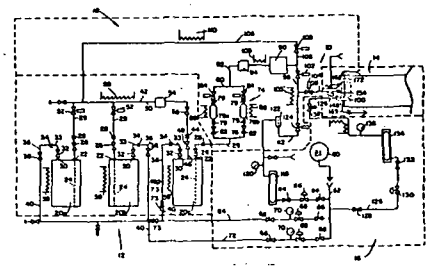
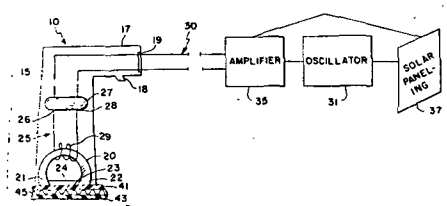


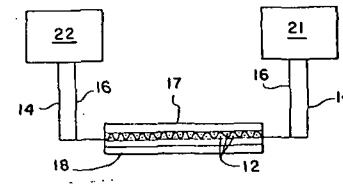
**N80-11468*#** *National Aeronautics and Space Administration.* Langley Research Center, Hampton, Va.
**INDUCTION HEATING GUN Patent Application**
John D. Buckley, Robert J. Swaim, and Robert L. Fox, inventors (to NASA) Filed 24 Aug. 1979 14 p
(NASA-Case-LAR-12540-1; US-Patent-Appl-SN-069429) Avail: NTIS HC A02/MF A01 CSCL 13I

A device was developed for inductively heating and fusing thermoplastics. The device includes an alternating current passing through a tank circuit and an inductor member of the tank circuit being wrapped around a curved pole piece of a ferromagnetic material. The magnetic flux arising within the inductor coil member flows to the ends of the pole piece and into a screen placed between the materials to be joined. The flux induces a current in the screen, and heat is generated to melt the thermoplastics together. Because only 30-150 watts of power are passed through the tank circuit, a wire which will remain cool under operational wattage may be selected, making air or fluid cooling unnecessary. NASA



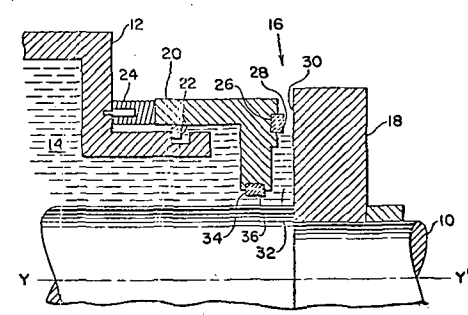

**N80-11469*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
**ONE STEP DUAL PURPOSE JOINING TECHNIQUE**
John D. Buckley, Robert J. Swaim, and Robert L. Fox, inventors (to NASA) 30 Aug. 1979 9 p
(NASA-Case-LAR-12595-1; US-Patent-Appl-SN-070774) Avail: NTIS HC A02/MF A01 CSCL 13I

A fastener to be used between two organic matrix composite objects for induction heating and joining purposes was developed. The fastener is comprised of a wire screen made of a high resistance, low reluctance material such as carbon steel. Selected wires of copper or similar conductive material, are integrated within the screen; these wires are insulated in a sheath 20 of enamel or similar oxidation-resistant, high temperature sustaining material. When placed between two sheets of thermoplastic, the screen may be used for induction heating and fusing of the thermoplastic. Upon application of inductive heating technique, the wires become hot and cause the thermoplastic to melt and fuse together around the screen. After cooling, the wires are capable of carrying electric current along the now-joined thermoplastics. The novel feature of the invention is the inclusion of conductive elements in an inductive heating fastener. NASA




**N80-12414*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
**MODIFIED FACE SEAL FOR POSITIVE FILM STIFFNESS Patent Application**
Izhak Etsion (Technion-Israel Inst. of Technol., Haifa) and Abraham Lipshitz, inventors (to NASA) (Technion-Israel Inst. of Technol., Haifa) Filed 7 Nov. 1979 7 p Sponsored by NASA
(NASA-Case-LEW-12989-1; US-Patent-Appl-SN-092145) Avail: NTIS HC A02/MF A01 CSCL 11A

An invention to improve the film stiffness of a face seal without increasing the sealing and dam area is described. The improved sealing apparatus has a primary seal ring in the form of a nose piece. A spring forces a sealing surface on the seal ring into sealing contact with a seat to form a face seal. A circumferential clearance seal is formed in series with this face by a lip on the nose piece. The width of the surface of the lip is substantially the same as the width of the sealing surface on the face seal. Also, the clearance between the surface on the lip and the shaft is substantially the same as the spacing between the face sealing surfaces on the face seal when the shaft is rotating. The circumferential clearance seal restricts the flow of fluid from a main cavity to an intermediate cavity with a resulting pressure drop. The hydrostatic opening is strongly dependent on the face seal clearance, and the desired axial stiffness is achieved. NASA




**N80-14395*** National Aeronautics and Space Administration. Pasadena Office, Calif.
***APPARATUS FOR ELECTROLYTICALLY TAPERED OR CONTOURED CAVITIES* Patent**
Lynn A. Williams, inventor (to NASA) (Anocut Engineering Co., Chicago) Issued 14 Nov. 1967. 6 p Filed 17 Jan. 1966 Division of US Patent Appl. SN-90438, Filed 20 Feb. 1961, US-Patent 3,257,300 Sponsored by NASA
(NASA-Case-XNP-08835-1; US-Patent-3,352,774; US-Patent-Appl-SN-534931; US-Patent-Class-204-224) Avail: US Patent and Trademark Office CSCL 13I

An electrolytic machining apparatus for forming tapered or contoured cavities in an electrically conductive and electrochemically erodible piece is presented. It supports the workpiece and an electrode for movement relatively toward each other and has means for pumping an electrolyte between the workpiece and the electrode.

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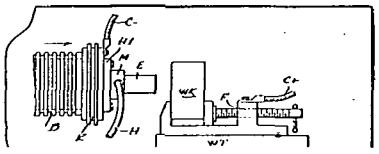

**N80-14397*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**ELECTROPHORETIC FRACTIONAL ELUTION APPARATUS EMPLOYING A ROTATIONAL SEAL FRACTION COLLECTOR Patent**

*Milan Bier, inventor* (to NASA) *Issued* 9 Aug. 1977 12 p Filed 21 Dec. 1976

(NASA-Case-MFS-23284-1; US-Patent-4,040,940; US-Patent-Appl-SN-753103; US-Patent-Class-204-299R; US-Patent-Class-204-180G) Avail: US Patent and Trademark Office CSCL 13I

Electrophoretic fractional elution apparatus which has a column with a rotating seal joint is described. A thin jet of eluting buffer is directed across the lumen of the electrophoretic column in a direction perpendicular to that of electrophoretic migration. Either the content of the column is rotated with respect to the stationary jet, or the jet is rotated with respect to the column. The system may employ electrophoresis either in free solution or in packed columns.

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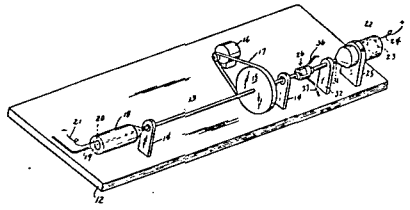

**N80-14398*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**COUPLING DEVICE FOR MOVING VEHICLES Patent**

Arthur A. Rudmann, inventor (to NASA) Issued 6 Nov. 1979 11 p Filed 19 May 1978 Supersedes N78-25429 (16 - 16, p 2122)

(NASA-Case-GSC-12322-1; US-Patent-4,173,324; US-Patent-Appl-SN-907436; US-Patent-Class-244-161; US-Patent-Class-269-156; US-Patent-Class-294-86R; US-Patent-Class-294-113; US-Patent-Class-414-1) Avail: US Patent and Trademark Office CSCL 13I

A mechanical system is disclosed to capture and/or deploy a device or vehicle having relative motion with respect to another vehicle. The mechanism includes an onboard controlled collapsible iris assembly located at the end of a controlled manipulator system carried by one moving vehicle. The iris assembly by means of the manipulator system encircles a probe located on the other moving vehicle whereupon the iris assembly is activated and one or more iris elements close around the probe, thus capturing, and axially aligning the other vehicle with the iris assembly. Additionally, a rotator assembly is included for spinning the iris assembly in a manner adapted to engage the probe of a spinning vehicle. Deployment of the other vehicle is accomplished by reversing the capture procedure.

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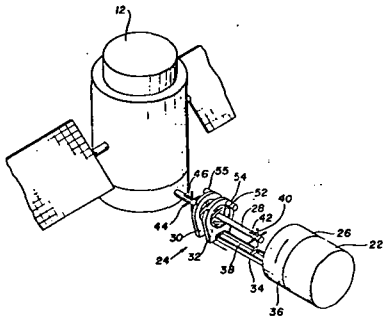


**N80-14400*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

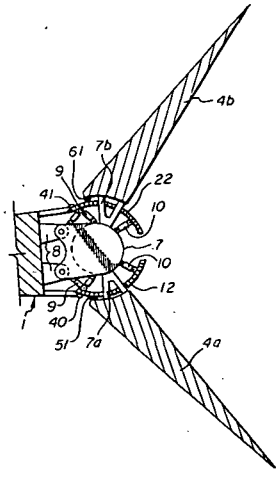
**SURFACE CONFORMING THERMAL/PRESSURE SEAL Patent Application**

Martin L. Stevens, inventor (to NASA) (Fairchild Republic Co.) Filed 12 Dec. 1979 21 p Sponsored by NASA

(NASA-Case-MSC-18422-1; US-Patent-Appl-SN-102593) Avail: NTIS HC A02/MF A01 CSCL 11A

A sealing apparatus is described which serves both pressure and thermal sealing functions between adjacent and relatively movable elements of relatively large surfaces. The sealing apparatus has the flexibility required for large movable surfaces, and can accommodate moderate variations in the gap between such surfaces which may be affected by thermal distortion. Sealing is accomplished with a nonabrasive, low frictional material, creating as little resistance as possible to movement of control members and minimal wear and damage to surface coatings.

NASA



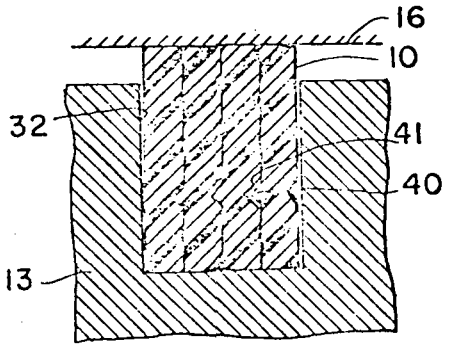
**N80-16339*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

**CONTINUOUS SELF-LOCKING SPIRAL WOUND SEAL Patent Application**

Stephen C. Irick, inventor (to NASA) Filed 20 Nov. 1979 13 p

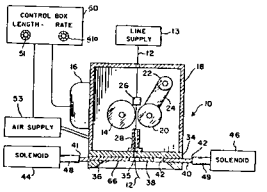
(NASA-Case-LAR-12315-1; US-Patent-Appl-SN-096257) Avail: NTIS HC A02/MF A01 CSCL 11A

A spiral wound seal for effecting a seal between two surfaces is described. The seal consists of a strip of gasket material wound into a groove machined into one of the surfaces. The gasket strip is wider than the groove is deep such that a portion of the gasket material protrudes from the groove. The seal is effected by clamping the second surface onto the first surface and thereby compressing the protruding gasket material. NASA




**N80-17468*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**PRECISION RECIPROCATING FILAMENT CHOPPER Patent Application**
Austin D. McHatton, Arthur L. Newcomb, Jr., and Gregory Schluge, inventors (to NASA) (Bionetics Corp., Hampton, Va.) Filed 29 Nov. 1979 11 p
(NASA-Case-LAR-12564-1; US-Patent-Appl-SN-098567) Avail: NTIS HC A02/MF A01 CSCL 13I

A chopper for cutting multifilament line is described in which the pull-pull motion of a double edged sliding blade driven by dual solenoids, provides a chop on each motion. The line is fed by a pair of rollers one of which is driven. The chopped line length and chop rate are independently controlled. A jet airstream is provided to dispense chopped lengths of line. NASA




**N80-18393*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
**CRYOGENIC CONTAINER COMPOUND SUSPENSION STRAP Patent**
John W. Vorreiter, inventor (to NASA) Issued 22 Jan. 1980 5 p Filed 22 Aug. 1978 Supersedes N79-18087 (17 - 09, p 1109)
(NASA-Case-ARC-11157-1; US-Patent-4,184,609; US-Patent-Appl-SN-935827; US-Patent-Class-220-445; US-Patent-Class-220-423; US-Patent-Class-220-901) Avail: US Patent and Trademark Office CSCL 13I

A support strap for use in a cryogenic storage vessel for supporting the inner shell from the outer shell with a minimum heat leak is presented. The compound suspension strap is made from a unidirectional fiberglass epoxy composite material with an ultimate tensile strength and fatigue strength which are approximately doubled when the material is cooled to a cryogenic temperature.

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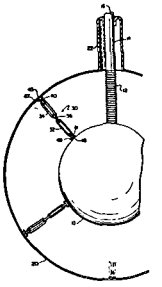
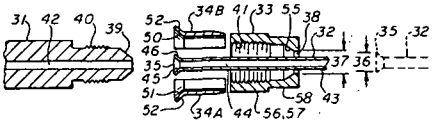


**N80-18396*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**FLARED TUBE ATTACH SYSTEM Patent Application**
Innis D. Alkire (Rockwell International Corp., Houston, Tex.) and Julian P. King, Jr., inventors (to NASA) (Rockwell International, Houston, Tex.) Filed 18 Jan. 1980 16 p Sponsored by NASA
(NASA-Case-MSC-18416-1; US-Patent-Appl-SN-113017) Avail: NTIS HC A02/MF A01 CSCL 13I

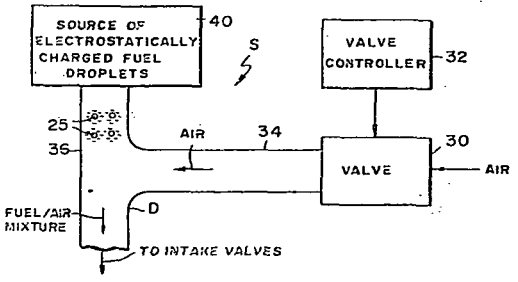
A flared tube connection is described. It can be disassembled and assembled in a nondestructive manner without wasting, discarding, or damaging any of its parts or any portion of the associated tubing and parts to which it is joined, and features a split ferrule which may be installed or removed in situ and used to couple fluid lines without the necessity of a permanently installed coupling nut. NASA




**N80-18397*#** National Aeronautics and Space Administration. Pasadena Office, Calif.
**INTERNAL COMBUSTION ENGINE WITH ELECTROSTATIC DISCHARGING FUELS Patent Application**
James B. Stephens (JPL) and Charles G. Miller, inventors (to NASA) (JPL) Filed 18 Sep. 1979 16 p Sponsored by NASA
(NASA-Case-NPO-13798-2; US-Patent-Appl-SN-076635) Avail: NTIS HC A02/MF A01 CSCL 21A

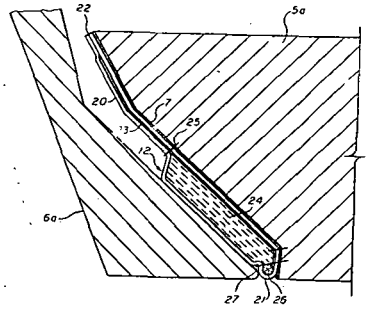
An internal combustion engine system is disclosed in which a mixture of air and fuel droplets which are electrostatically charged to a selected polarity, e.g., negative, is fed to the engine's chambers. The fuel droplets are of uniform size in the micron range, and tend to be uniformly distributed in each chamber. Each chamber includes an electrode which, at a particular point in the engine's cycle of operation, is electrically connected to a potential of a polarity opposite the polarity of the fuel droplets' charge to initiate electrostatic discharging of the droplets. The discharging produces sparks which initiate the combustion of the fuel droplets. Due to electrically insulating matter in the chambers' walls the charged droplets prior to combustion are

repelled away from the walls to minimize combustion quenching. NASA



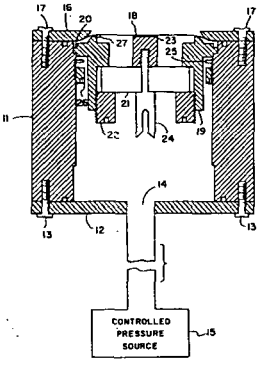

**N80-18398*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**THERMAL BARRIER SEAL Patent Application**
Milo Surbat (Rockwell International Corp., Downey, Calif.) and John O. Kane, inventors (to NASA) (Rockwell International Corp., Downey, Calif.) Filed 10 Mar. 1980 16 p Sponsored by NASA
(NASA-Case-MSC-18390-1; US-Patent-Appl-SN-092170) Avail: NTIS HC A02/MF A01 CSCL 11A

A thermal barrier for providing thermal sealing in an elongated space of varying width between adjacent surfaces of first and second members mounted for at least limited movement relative to each other is disclosed. The barrier may include an elongated envelope formed by an elongated sheet of fibrous material centrally and longitudinally folded to provide trailing and leading edges of the barrier. An elongated rigid support plate, the contour of which conforms to the contour of the adjacent surface of one of the members, may be enclosed in the envelope. An elongated core may be confined within the envelope near its leading edge between the rigid support plate and the inner surface of the other side of the envelope. The core is deformable to accommodate the varying width of the elongated space while still maintaining thermal sealing contact between the barrier and the adjacent surfaces of the first and second members. NASA



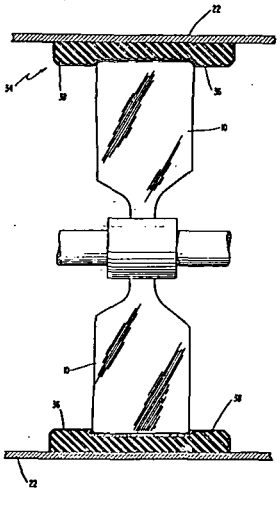

**N80-18399*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**MOVING BODY VELOCITY ARRESTING LINE Patent Application**
Reid A. Hull, inventor (to NASA) Filed 28 Dec. 1979 11 p
(NASA-Case-LAR-12372-1; US-Patent-Appl-SN-108107) Avail: NTIS HC A02/MF A01 CSCL 13H

A method for arresting a moving body using steel cables that elongate to absorb kinetic energy is presented. A sleeve surrounding the cables protects them from chafing and provides an energy absorbing system should the cables fail. NASA



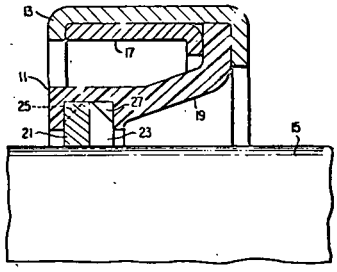

**N80-18400*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
**GAS PATH SEAL Patent Application**
Robert C. Bill and Robert D. Johnson, inventors (to NASA) Filed 20 Nov. 1979 8 p
(NASA-Case-NPO-12131-3; US-Patent-Appl-SN-096255) Avail: NTIS HC A02/MF A01 CSCL 20A

A gas path seal suitable for use with a turbine engine or compressor is described. A shroud wearable or abradable by the abrasion of the rotor blades of the turbine or compressor shrouds the rotor bades. A compliant backing surrounds the shroud. The backing is a yieldingly deformable porous material covered with a thin ductile layer. A mounting fixture surrounds the backing. NASA



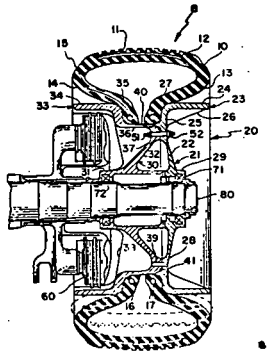
**N80-18401*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
**CIRCUMFERENTIAL SHAFT SEAL Patent Application**
L. P. Ludwig, inventor (to NASA) Filed 7 Dec. 1979 8 p
(NASA-Case-LEW-12119-2; US-Patent-Appl-SN-102004) Avail: NTIS HC A02/MF A01 CSCL 20A

A circumferential shaft seal in which the seal elements are capable of adequate response to shaft motion is described. The seal is comprised of two sealing rings held to a rotating shaft by means of a surrounding elastomeric band. The rings are segmented and have an inner diameter dimensioned so that the segments can slidably and sealably engage the shaft. Alternative embodiments of the seal concept are described and suggestions for component materials are given. M.G.



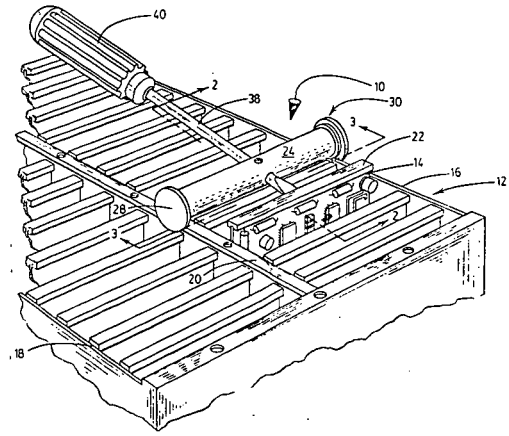

**N80-18402*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**IMPROVED TIRE/WHEEL CONCEPT Patent Application**
Philip M. Harper, Sr., inventor (to NASA) (Boeing Commercial Airplane Co., Seattle, Wash.) Filed 12 Dec. 1979 12 p Sponsored by NASA
(NASA-Case-LAR-11695-2; US-Patent-Appl-SN-103836) Avail: NTIS HC A02/MF A01 CSCL 01C

A tire and wheel assembly is described which consists of a low profile pneumatic tire with sidewalls that deflect inwardly under a load and a wheel having a narrow central channel and extended rim flanges. The extended rim flanges support the tire sidewalls under static and dynamic loading conditions to produce a combination particularly suited to aircraft applications. NASA




**N80-20589*#** National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
**COMPUTER CIRCUIT CARD PULLER Patent Application**
Ralph W. Sawyer and Bill Szwnalski, inventors (to NASA) Filed 12 Mar. 1980 11 p
(NASA-Case-FRC-11042-1; US-Patent-Appl-SN-129778) Avail: NTIS HC A02/MF A01 CSCL 13I

A handtool for facilitating the removal of printed circuit cards is described. The device is adapted to sit on spaced, parallel rail surfaces of a card rack having a plurality of printed circuit cards. The device includes a cylindrical bar adapted to sit on the rail surfaces of the rack, a blade projected radially from the bar adapted to be received beneath a card rail, and a handle affixed to the bar in diametric opposition to the blade for facilitating manipulation of the blade for unplugging and lifting the card at its rail. NASA




# 39 STRUCTURAL MECHANICS

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*.

**N80-10507*** National Aeronautics and Space Administration. Pasadena Office, Calif.
**SYSTEM FOR DETECTING SUBSTRUCTURE MICROFRACTURES AND METHOD THEREFORE Patent**
Shakkottai P. Parthasarathy (JPL) and Keshavaiyengar Y. Narasimhan, inventors (to NASA) (JPL) Issued 18 Sep. 1979 6 p Filed 6 Sep. 1977 Supersedes N79-20556 (17 - 11, p 1455) Sponsored by NASA
(NASA-Case-NPO-14192-1; US-Patent-4,168,483; US-Patent-Appl-SN-830562; US-Patent-Class-367-26; US-Patent-Class-181-102; US-Patent-Class-181-105; US-Patent-Class-467-2-8) Avail: US Patent and Trademark Office CSCL 20N

Bursts of signals at different frequencies are induced into substructure, adjacent to a borehole. The return signals from each burst of signals are normalized to compensate for the attenuation, experienced by more distant return signals. The peak amplitudes of return signals, above a selected level, are cut off,

and an average signal is produced from the normalized amplitude-limited return signals of each burst. The averaged signals of the return signals of all the signal bursts at the different frequencies are processed to provide a combined signal, whose amplitude is related to the microfracture density of the substructure adjacent to the borehole.

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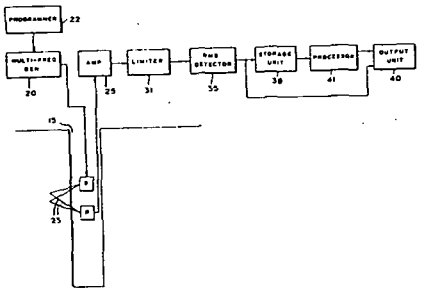

# 43 EARTH RESOURCES

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

For instrumentation see *35 Instrumentation and Photography*.

**N80-14423*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**COAL-SHALE INTERFACE DETECTION SYSTEM Patent**

Richard A. Campbell, Jerry L. Hudgins, Paul W. Morris, Harry Reid, Jr., and Joe E. Zimmerman, inventors (to NASA) Issued 12 Jun. 1979 9 p Filed 3 Nov. 1977

(NASA-Case-MFS-23720-2; US-Patent-4,157,655; US-Patent-Appl-SN-848421; US-Patent-Class-73-12; US-Patent-Class-73-82) Avail: US Patent and Trademark Office CSCL 08I

A coal-shale interface detection system for use with coal cutting equipment consists of a reciprocating hammer on which an accelerometer is mounted to measure the impact of the hammer as it penetrates the ceiling or floor surface of a mine. A pair of reflectometers simultaneously view the same surface. The outputs of the accelerometer and reflectometers are detected and jointly registered to determine when an interface between coal and shale is being cut through.

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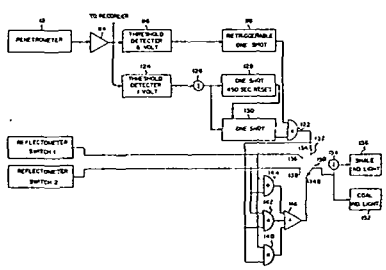


**N80-18498*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

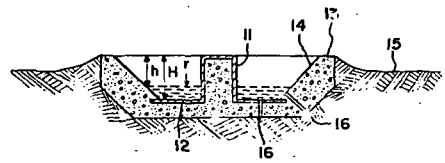
**RADAR TARGET FOR REMOTELY SENSING HYDROLOGICAL PHENOMENA Patent**

Wilford E. Sivertson, Jr., inventor (to NASA) Issued 15 Jan. 1980 6 p Filed 22 Sep. 1978 Supersedes N78-33511 (16 - 24, p 3231)

(NASA-Case-LAR-12344-1; US-Patent-4,184,155; US-Patent-Appl-SN-945041; US-Patent-Class-343-5CM; US-Patent-Class-343-5W; US-Patent-Class-343-18B; US-Patent-Class-343-18D) Avail: U.S. Patent and Trademark Office CSCL 08H

An apparatus for remotely measuring and accessing water status relative to snow and glacial melt, surface runoff, rainfall, evaporation, flow rate, and soil moisture is described. A radar target located at a selected location on the surface of the Earth is designed to collect water and render its cross sectional area variable as a function of the height of the water level within the target. The target is remotely monitored by an orbiting or airborne synthetic aperature radar. The target appears as a bright spot embedded within the radar image. The target brightness is indicative of the height of the water level within the ground located target.

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




# 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.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *85 Urban Technology and Transportation*.

**N80-12549*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

**SCHOTTKY BARRIER SOLAR CELL AND METHOD OF FABRICATION Patent Application**

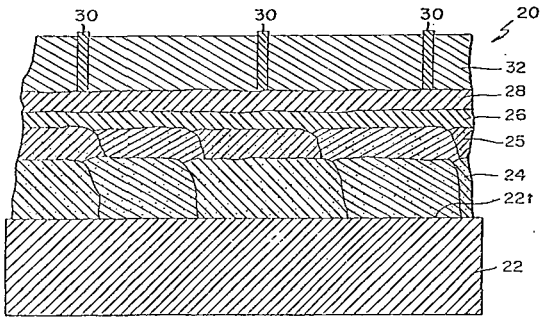
Richard J. Stirn (JPL) and Yea-chuan M. Yeh, inventors (to NASA) (JPL) Filed 13 Nov. 1979 33 p

(Contract NAS7-100)

(NASA-Case-NPO-13689-2; US-Patent-Appl-SN-093714) Avail: NTIS HC A03/MF A01 CSCL 10A

A Schottky barrier solar cell is described which consists of a thin substrate of low cost material with at least the top surface of the substrate being electrically conductive. A thin layer of heavily doped n-type polycrystalline germanium, with crystalline sizes in the submicron range, is deposited on the substrate after a passivation layer is deposited on the substrate to prevent migration of impurities into the polycrystalline germanium on a substrate of low-cost conductive material. Then, the polycrystalline

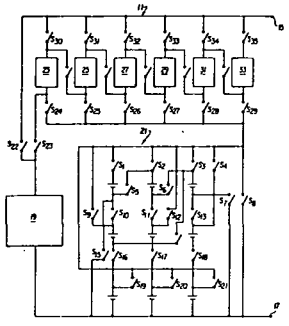
germanium is recrystallized to increase the crystal sizes in the germanium layer to not less than 5 microns, and preferably considerably more. It serves as a base layer on which a thin layer of gallium arsenide is vapor-epitaxially grown to a selected thickness. Then, a thermally-grown oxide layer of a thickness of several tens of angstroms is formed on the gallium arsenide layer. NASA




**N80-14472*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
**SELF-RECONFIGURING SOLAR CELL SYSTEM Patent**
Robert P. Gruber, inventor (to NASA) Issued 20 Nov. 1979 10 p filed 19 Jun. 1978 Supersedes N78-27520 (16 - 18, p 2408)
(NASA-Case-LEW-12586-1; US-Patent-4,175,249; US-Patent-Appl-SN-916655; US-Patent-Class-323-15; US-Patent-Class-307-63; US-Patent-Class-307-66; US-Patent-Class-323-19) Avail: US Patent and Trademark Office CSCL 10A

A self-reconfiguring solar cell array is disclosed wherein some of the cells are switched so that they can be either in series or in shunt within the array. This feature of series or parallel switching of cells allows the array to match the load to achieve maximum power transfer. Automatic control is used to determine the conditions for maximum power operation and to switch the array into the appropriate configuration necessary to transfer maximum power to the load.

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



**N80-14473*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
**SOLAR CONCENTRATOR Patent**
John G. Simpson, inventor (to NASA) Issued 6 Nov. 1979 6 p Filed 30 Nov. 1977 Supersedes N78-13556 (16 - 04, p 0499)
(NASA-Case-MFS-23727-1; US-Patent-4,173,397; US-Patent-Appl-SN-856465; US-Patent-Class-350-295; US-Patent-Class-126-438; US-Patent-Class-350-296; US-Patent-Class-126-442) Avail: US Patent and Trademark Office CSCL 10A

An improved solar concentrator is characterized by a number of elongated supporting members arranged in substantial horizontal parallelism with the axis and intersecting a common curve. A tensioned sheet of flexible reflective material is disposed in engaging relation with the supporting members in order to impart to the tensioned sheet a catenary configuration.

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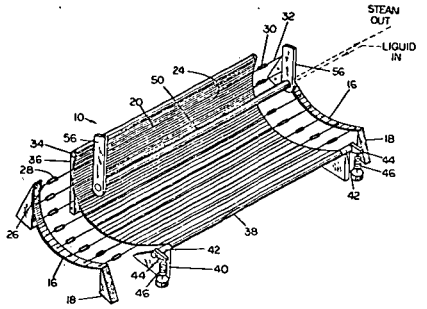
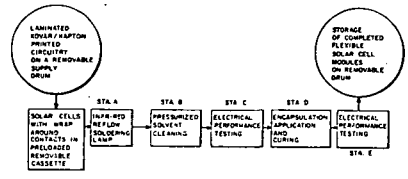



**N80-14474*** National Aeronautics and Space Administration. Pasadena Office, Calif.
**METHOD FOR FORMING A SOLAR ARRAY STRIP Patent**
Robert I. Mueller (JPL) and Robert K. Yasui, inventors (to NASA) (JPL) Issued 13 Nov. 1979 7 p Filed 29 Mar. 1978 Supersedes N78-25560 (16 - 16, p 2138) Division of US Patent Appl. SN-809890, filed 24 Jun. 1977, US Patent-4,133,697 sponsored by NASA
(NASA-Case-NPO-13652-3; US-Patent-4,173,820; US-Patent-Appl-SN-891358; US-Patent-Class-29-572; US-Patent-Class-29-588; US-Patent-Class-29-627; US-Patent-Class-136-89P; US-Patent-Appl-SN-809890; US-Patent-4,133,697) Avail: US Patent and Trademark Office CSCL 10A

A flexible solar array strip is formed by a method which lends itself to automatic production techniques. Solder pads are deposited on printed circuitry deposited on a flexible structure. The resultant substrate is stored on a drum from which it is withdrawn and incrementally advanced along a linear path. Solderless solar cells are serially transported into engagement with the pads which are then heated in order to attach the cells to the circuitry. Excess flux is cleaned from the cells which are encapsulated in a protective coating. The resultant array is then spirally wound on a drum.

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



**N80-16452*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

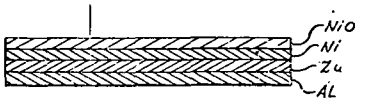
**ALUMINIUM OR COPPER SUBSTRATE PANEL FOR SELECTIVE ABSORPTION OF SOLAR ENERGY Patent**

Marion L. Roberts, Max H. Sharpe, and Albert C. Krupnick, inventors (to NASA) Issued 4 Dec. 1979 6 p Filed 30 May 1978 Supersedes N78-25557 (16 - 16, p 2137) Division of US Patent Appl. SN-829390, Filed 31 Aug. 1977, US Patent 4,104,134

(NASA-Case-MFS-23518-3; US-Patent-4,177,325; US-Patent-Appl-SN-910793; US-Patent-Class-428-629; US-Patent-Class-428-650; US-Patent-Class-428-658; US-Patent-Class-428-675; US-Patent-Class-428-680; US-Patent-Class-126-417; US-Patent-Class-126-901; US-Patent-Appl-SN-829390; US-Patent-4,104,134) Avail: US Patent and Trademark Office CSCL 10A

A method for making panels which selectively absorb solar energy is disclosed. The panels are comprised of an aluminum substrate, a layer of zinc thereon, a layer of nickel over the zinc layer and an outer layer of solar energy absorbing nickel oxide or a copper substrate with a layer of nickel thereon and a layer of solar energy absorbing nickel oxide distal from the copper substrate.

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



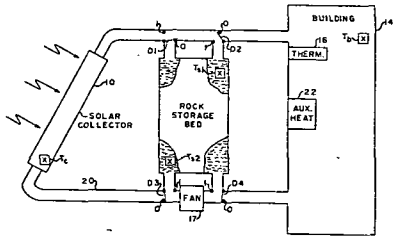

**N80-17544*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**SOLAR ENERGY CONTROL SYSTEM Patent Application**

James R. Currie, inventor (to NASA) Filed 29 Nov. 1979 18 p

(NASA-Case-MFS-25287-1; US-Patent-Appl-SN-098570) Avail: NTIS HC A02/MF A01 CSCL 10A

A solar energy control system for a hot air type solar energy heating system wherein thermocouples are arranged to sense the temperature of a solar collector, a space to be heated, and a top and bottom of a heat storage unit is described. Pertinent thermocouples are differentially connected togther, and these are employed to effect the operation of dampers, a fan, and an auxiliary heat source. In accomplishing this, the differential outputs from the thermocouples are amplified by a single amplifier by multiplexing techniques. Additionally, the amplifier is corrected as to offset by including as one multiplex channel a common reference signal. NASA




**N80-18550*** National Aeronautics and Space Administration. Pasadena Office, Calif.

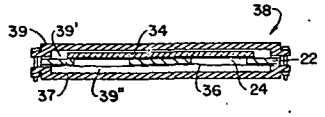
**METHOD OF FABRICATING A PHOTOVOLTAIC MODULE OF A SUBSTANTIALLY TRANSPARENT CONSTRUCTION Patent**

Paul A. Dillard (Lockheed Missile and Space Co., Sunnyvale, Calif.), Walter M. Fritz (Lockheed Missile and Space Co., Sunnyvale, Calif.), and Dan R. Lott, inventors (to NASA) (Lockheed Missile and Space Co., Sunnyvale, Calif.) Issued 22 Jan. 1980 7 p Filed 26 Jul. 1978 Supersedes N78-28626 (16 - 19, p 2558) Sponsored by NASA

(NASA-Case-NPO-14303-1; NASA-Case-NPO-14305-1; US-Patent-4,184,903; US-Patent-Appl-SN-928133; US-Patent-Class-156-104; US-Patent-Class-156-278; US-Patent-Class-156-285; US-Patent-Class-156-303; US-Patent-Class-156-312) Avail: U.S. Patent and Trademark Office CSCL 10A

A method characterized by the steps of positioning a plurality of uniformly dimensioned photovoltaic cells in registered relation with a plurality of openings formed in a planar tool is disclosed. The method allows acess to the P contact surface of each of the cells. The steps of the method are: (1) connecting the N contact surface of alternate cells to the P contact surface of the cells interposed therebetween, (2) removing therefrom residue of solder flux, (3) applying to the N contact surfaces of the cells a transparent adhesive, (4) placing a common transparent cover plate in engaged relation with the adhesive, (5) placing a film over the circular openings for hermetically sealing the openings, and (6) establishing a vacuum between the film and the cover plate.

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




**N80-18551*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**DRIVER FOR SOLAR CELL I-V CHARACTERISTIC PLOTS Patent**

Gary B. Turner, inventor (to NASA) (JPL) Issued 15 Jan. 1980 6 p Filed 26 Jul. 1978 Supersedes N78-28625 (16 - 19, p 2557) Sponsored by NASA

(NASA-Case-NPO-14096-1; US-Patent-4,184,111; US-Patent-Appl-SN-928128; US-Patent-Class-324-404; US-Patent-Class-324-158D) Avail: U.S. Patent and Trademark Office CSCL 10A

A bipolar voltage ramp generator which applies a linear voltage through a resistor to a solar cell for plotting its current versus voltage (I-V) characteristic between short circuit and open circuit conditions is disclosed. The generator has automatic stops at the end points. The resistor serves the multiple purpose of providing a current sensing resistor, setting the full-scale current value, and providing a load line with a slope approximately equal to one, such that it will pass through the origin and the approximate

center of the I-V curve with about equal distance from that center to each of the end points.

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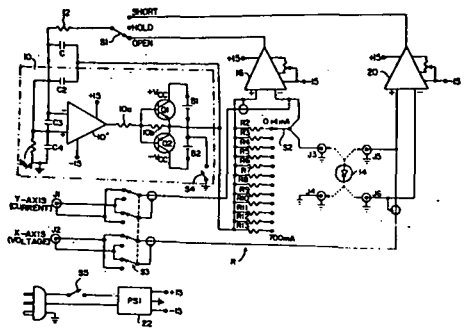


**N80-18552*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

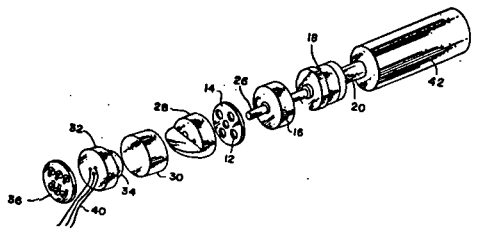
**SOLAR CELL ANGULAR POSITION TRANSDUCER Patent**

Maynard C. Sandford and David L. Gray, inventors (to NASA) Issued 15 Jan. 1980 8 p Filed 9 Feb. 1978 Supersedes N78-18394 (16 - 09, p 1160)

(NASA-Case-LAR-11999-1; US-Patent-4,184,072; US-Patent-Appl-SN-876299; US-Patent-Class-250-231SE; US-Patent-Class-250-211K) Avail: U.S. Patent and Trademark Office CSCL 10A

An angular position transducer utilizing photocells and a light source is disclosed. The device uses a fully rotatable baffle which is connected via an actuator shaft to the body whose rotational displacement is to be measured. The baffle blocks the light path between the light source and the photocells so that a constant semicircular beam of light reaches the photocells. The current produced by the photocells is fed through a resistor, a differential amplifier measures the voltage drop across the resistor which indicates the angular position of the actuator shaft and hence of the object.

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



**N80-18555*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FLEXIBLE FORMULATED PLASTIC SEPARATORS FOR ALKALINE BATTERIES Patent Application**

D. W. Scheibley, J. M. Bozek, and D. G. Soltis, inventors (to NASA) Filed 28 Sep. 1979 10 p

(NASA-Case-LEW-12363-4; US-Patent-Appl-SN-079914) Avail: NTIS HC A02/MF A01 CSCL 10C

A flexible separator for alkaline batteries is disclosed. The separator is comprised of a coating which is applied to a nonwoven porous substrate such as sheets or mats of asbestos or other materials which are inert with respect to the alkaline electrolyte of the battery. The coating material comprises a polyphenylene oxide polymer, an organic additive and inorganic and organic fillers which comprise 55% by volume or less of the coating material. Preferably, at least one inorganic filler material which is reactive with the electrolyte is included to produce desirable pores in the coating. The organic additive is a polymeric polyester material which is hydrolyzed by the alkaline electrolyte to improve conductivity of the coating. NASA

**N80-18556*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**FLEXIBLE FORMULATED PLASTIC SEPARATORS FOR ALKALINE BATTERIES Patent Application**

D. W. Scheibley, J. M. Bozek, and D. G. Soltis, inventors (to NASA) Filed 19 Jul. 1979 10 p

(NASA-Case-LEW-12363-3; US-Patent-Appl-SN-058658) Avail: NTIS HC A02/MF A01 CSCL 10C

A flexible separator for alkaline batteries is disclosed. The separator is comprised of a coating which is applied to a nonwoven porous substrate such as sheets or mats of asbestos or other materials which are inert with respect to the alkaline electrolyte of the battery. The coating material is comprised of a polyphenylene oxide polymer, an organic additive and inorganic, and organic fillers which comprise 55% by volume or less of the coating material. Preferably, at least one inorganic filler material which is reactive with the electrolyte is included to produce desirable pores in the coating. The organic additive is a polymeric polyester material which is hydrolyzed by the alkaline electrolyte to improve conductivity of the coating. NASA

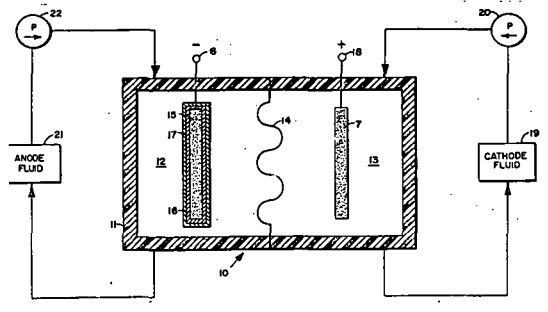
**N80-18557*#** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**CATALYST SURFACES FOR THE CHROMOUS/CHROMIC REDOX COUPLE Patent Application**

Jose D. Giner (Giner, Inc.) and Kathleen J. Cahill, inventors (to NASA) (Giner, Inc.) Filed 27 Jul. 1979 15 p Sponsored by NASA

(NASA-Case-Lew-13148-2; US-Patent-Appl-SN-061555) Avail: NTIS HC A02/MF A01 CSCL 10A

An electricity producing cell of the reduction-oxidation type is disclosed. The cell is divided into two compartments by a membrane and each compartment contains a solid inert electrode. A ferrous/ferric couple in a chloride solution serves as a cathode fluid which is circulated through one of the compartments to produce a positive electric potential disposed therein. A chromic/chromous couple in a chloride solution serves as an anode fluid which is circulated through the second compartment to produce a negative potential on an electrode disposed therein. The electrode is an electrically conductive, inert material plated with copper, silver or gold. A thin layer of lead plates onto the copper, silver or gold layer when the cell is being charged, the lead ions being available from lead chloride which has been added to the anode fluid. If the REDOX cell is then discharged, the current flows between the electrodes causing the lead to deplate from the negative electrode and the metal coating on the electrode will act as a catalyst to cause increased current density. NASA



**N80-20808*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**PORTABLE HEATABLE CONTAINER Patent**

Lien C. Yang, inventor (to NASA) (JPL) Issued 18 Mar. 1980 5 p Filed 19 Apr. 1978 Supersedes N78-24554 (16 - 15, p 2002) Sponsored by NASA

(NASA-Case-NPO-14237-1; US-Patent-4,193,388; US-Patent-Appl-SN-897831; US-Patent-Class-126-263; US-Patent-Class-149-15; US-Patent-Class-149-37; US-Patent-Class-220-429) Avail: US Patent and Trademark Office CSCL 10B

A container is provided which can be designed to heat its outer surface to sterilize it, or to heat its inner surface and any contents therewithin. In a container that self sterilizes its outer surface, the container includes a combustible layer of thermite-type pyrotechnic material which can be ignited to generate considerable heat, and a thin casing around the combustible layer which is of highly thermally conductive materials such as aluminum which can be heated to a high temperature by the ignited combustible layer. A buffer layer which may be of metal, lies within the combustible layer, and a layer of insulation such as Teflon lies within the buffer layer to insulate the contents of the container from the heat.

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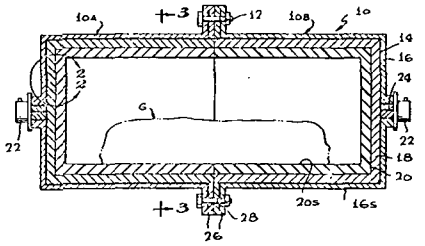


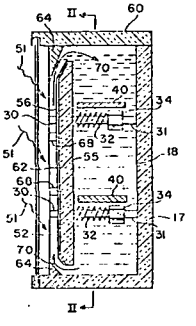
**N80-20810*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

**COMBINED SOLAR COLLECTOR AND ENERGY STORAGE SYSTEM Patent**

Ronald N. Jensen, inventor (to NASA) Issued 11 Mar. 1980 6 p Filed 28 Apr. 1978 Supersedes N78-23567 (16 - 14, p 1868)

(NASA-Case-LAR-12205-1; US-Patent-4,192,290; US-Patent-Appl-SN-900843; US-Patent-Class-126-437; US-Patent-Class-126-434; US-Patent-Class-165-32; US-Patent-Class-126-419) Avail: US Patent and Trademark Office CSCL 10A

A combined solar energy collector, fluid chiller and energy storage system is disclosed. A movable interior insulated panel in a storage tank is positionable flush against the storage tank wall to insulate the tank for energy storage. The movable interior insulated panel is alternately positionable to form a solar collector or fluid chiller through which the fluid flows by natural circulation. Official Gazette of the U.S. Patent and Trademark Office



**N80-21828*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**WIND WHEEL ELECTRIC POWER GENERATOR Patent**

John W. Kaufman, inventor (to NASA) Issued 4 Mar. 1980 8 p Filed 24 Feb. 1978 Supersedes N78-22469 (16 - 13, p 2137)

(NASA-Case-MFS-23515-1; US-Patent-4,191,505; US-Patent-Appl-SN-880726; US-Patent-Class-415-2; US-Patent-Class-415-101) Avail: U S Patent and Trademark Office CSCL 10B

Wind wheel electric power generator apparatus includes a housing rotatably mounted upon a vertical support column. Primary and auxiliary funnel-type, venturi ducts are fixed onto the housing for capturing wind currents and conducting to a bladed wheel adapted to be operatively connected with the generator apparatus. Additional air flows are also conducted onto the bladed wheel; all of the air flows positively effecting rotation of the wheel in a cumulative manner. The auxiliary ducts are disposed at an acute angle with respect to the longitudinal axis of the housing, and this feature, together with the rotatability of the housing and the ducts, permits capture of wind currents within a variable directional range.

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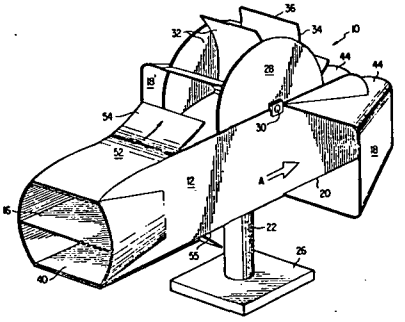


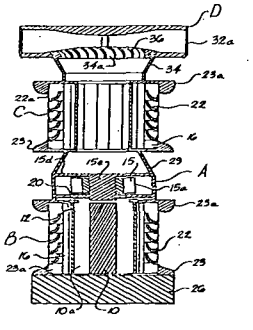
**N80-21831*#** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**AMPLIFIED WIND TURBINE APPARATUS Patent Application**

William N. Myers, inventors (to NASA) and Leopold A. Hein Filed 12 Mar. 1980 16 p

(NASA-Case-MFS-23830-1; US-Patent-Appl-SN-129780) Avail: NTIS HC A02/MF A01 CSCL 10A

An amplified wind turbine apparatus is disclosed wherein ambient inlet air is prerotated in an air rotation chamber having a high pressure profile. A second rotation chamber adjacent and downstream of the turbine has a low pressure core profile whereby flow across the turbine is accelerated and thereafter exits the turbine apparatus through a draft anti-interference device. The draft device eliminates interference with ambient winds at the outlet of the turbine apparatus. Pivotable vanes controlled in response to prevailing wind direction admit air to the chambers and aid in imparting rotation. NASA



# 45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

**N80-14579*** *National Aeronautics and Space Administration.* Pasadena Office, Calif.
**OZONATION OF COOLING TOWER WATERS Patent**
Marshall F. Humphrey (JPL), Kenneth R. French (JPL), and Ronald D. Howe, inventors (to NASA) (JPL) Issued 30 Oct. 1979 5 p Filed 29 Sep. 1978 Supersedes N79-10167 (17 - 01, p 0023) Sponsored by NASA
(NASA-Case-NPO-14340-1; US-Patent-4,172,786; US-Patent-Appl-SN-946992; US-Patent-Class-210-57; US-Patent-Class-210-63Z; US-Patent-Class-422-9) Avail: US Patent and Trademark Office CSCL 13B

Continuous ozone injection into water circulating between a cooling tower and heat exchanger with heavy scale deposits inhibits formation of further deposits, promotes flaking of existing deposits, inhibits chemical corrosion and controls algae and bacteria.

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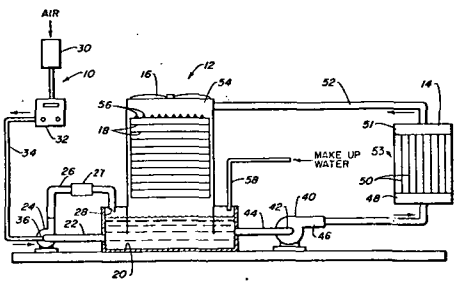
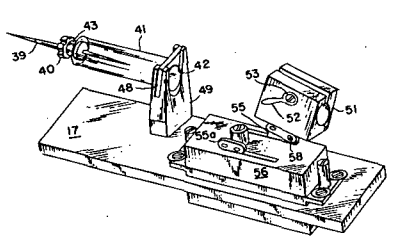



**N80-19664*#** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
**AUTOMATED SYRINGE SAMPLER Patent Application**
Gerald C. Purgold, inventor (to NASA) Filed 11 Jan. 1980 16 p
(NASA-Case-LAR-12308-1; US-Patent-Appl-SN-111438) Avail: NTIS HC A02/MF A01 CSCL 13B

The invention is housed within a housing and positionable within a test fluid medium where a pump causes continuous test fluid flow therethrough via inlet filters and a conduit. A plurality of sampling devices are disposed on a rack slidably received in the housing and are responsive to a remote signal received through an antenna to a receiver to activate circuitry elements. When activated the circuitry provides power individually, collectively or selectively to servomechanisms thereby moving the actuator arm and its attached jawed bracket supporting an evacuated tube toward stationary needle. The septum is punctured by the open end of the needle contained within the protective sleeve and a sample of the fluid test medium in the conduit flows through the needle and is transferred to the tube.
NASA



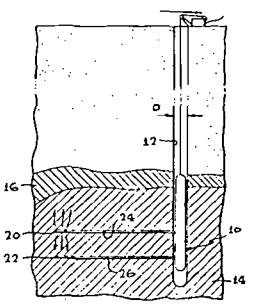
# 46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

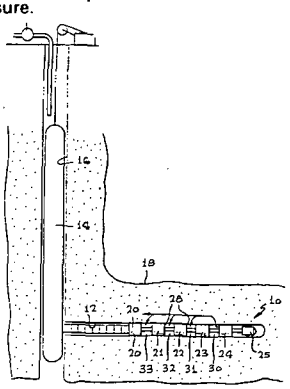
**N80-10709*** National Aeronautics and Space Administration. Pasadena Office, Calif.
**BOREHOLE GEOLOGICAL ASSESSMENT Patent**
William H. Spuck, III, inventor (to NASA) (JPL) Issued 11 Sep. 1979 10 p Filed 4 May 1978 Supersedes N79-19521 (17 - 10, p 1306) Sponsored by NASA
(NASA-Case-NPO-14231-1; US-Patent-4,167,111; US-Patent-Appl-SN-903019; US-Patent-Class-73-155; US-Patent-Class-175-78) Avail: US Patent and Trademark Office CSCL 08G

A method and apparatus are discussed for performing geological assessments of a formation located along a borehole, and a boring tool that bores a pair of holes into the walls of the borehole and into the surrounding strata along with a pair of probes which are installed in the holes. One of the probes applies an input such as a current or pressured fluid, and the other probe senses a corresponding input which it receives from the strata. Official Gazette of the U.S. Patent and Trademark Office



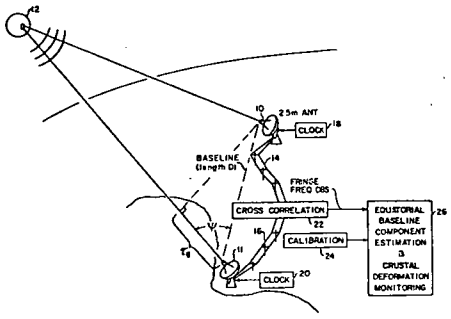
**N80-12642*#** National Aeronautics and Space Administration. Pasadena Office, Calif.
**GEOLOGICAL ASSESSMENT PROBE Patent Application**
Earl R. Collins, inventor (to NASA) (JPL) Filed 25 Sep. 1978 16 p Sponsored by NASA
(NASA-Case-NPO-14558-1; US-Patent-Appl-SN-945436) Avail: NTIS HC A02/MF A01 CSCL 08G

A probe is described which can be installed in a side hole that extends from a bore hole in the earth, to assess the permeability of the strata surrounding the borehole. The probe is elongated and has seals spaced the walls of the side hole to form chambers sealed from one another. A tracer fluid injector on the probe can inject a tracer fluid into one of the chambers, while a tracer fluid detector located in another chamber can detect the tracer fluid, to thereby sense the permeability of the strata surrounding the side hole. The probe can include a train of modules, with each module having an inflatable packer which is inflated by the difference between the borehole pressure and the strata pressure.
NASA



**N80-14603*** National Aeronautics and Space Administration. Pasadena Office, Calif.
**SYSTEM FOR REAL-TIME CRUSTAL DEFORMATION MONITORING Patent**
Peter F. MacDoran, inventor (to NASA) (JPL) Issued 9 Oct. 1979 7 p Filed 21 Dec. 1977 Supersedes N78-17529 (16 - 08, p 1043) Sponsored by NASA
(NASA-Case-NPO-14124-1; US-Patent-4,170,776; US-Patent-Appl-SN-863024; US-Patent-Class-343-112D; US-Patent-Class-343-100ME) CSCL 08G

A system is described for use in detecting earth crustal deformation using an RF interferometer technique for such purposes as earthquake predictive research and eventual operational predictions. A lunar based RF transmission or transmissions from earth orbiting satellites are received at two locations on Earth, and a precise time dependent phase measurement is made of the RF signal as received at the two locations to determine two or three spatial parameters of the antenna relative positions. The received data are precisely time-tagged and land-line routed to a central station for real-time phase comparison and analysis. By monitoring the antenna relative positions over an extended period of months or years, crustal deformation of the Earth can be detected.
Official Gazette of the U.S. Patent and Trademark Office

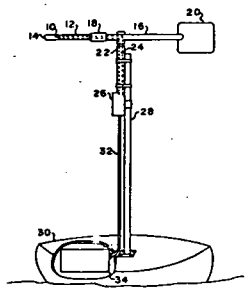



# 48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

**N80-18667*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
**OCEANIC WAVE MEASUREMENT SYSTEM Patent**
John F. Holmes (Computer Sciences Corp., Falls Church, Va.) and Ronald T. Miles, inventors (to NASA) (Computer Sciences Corp., Falls Church, Va.) Issued 22 Jan. 1980 6 p Filed 16 Oct. 1978 Supersedes N79-10689 (17 - 01, p 0091) Sponsored by NASA
(NASA-Case-MFS-23862-1; US-Patent-4,184,368; US-Patent-Appl-SN-951423; US-Patent-Class-73-170A) Avail: US Patent and Trademark Office CSCL 08C

An oceanic wave measured system is disclosed wherein wave height is sensed by a barometer mounted on a buoy. The distance between the trough and crest of a wave is monitored by sequentially detecting positive and negative peaks of the output of the barometer and by combining (adding) each set of two successive half cycle peaks. The timing of this measurement is achieved by detecting the period of a half cycle of wave motion. Official Gazette of the U.S. Patent and Trademark Office

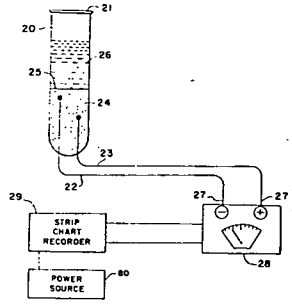


# 51 LIFE SCIENCES (GENERAL)

Includes genetics.

**N80-11756*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
**INDIRECT MICROBIAL DETECTION Patent Application**
Judd R. Wilkins, inventor (to NASA) Filed 17 Aug. 1979 18 p
(NASA-Case-LAR-12520-1; US-Patent-Appl-SN-067596) Avail: NTIS HC A02/MF A01 CSCL 06C

The 'invention' disclosed is an indirect microbial detection method. The growth of microorganisms in a sample is detected and monitored by culturing microorganisms in a growth medium and detecting a change in potential between two electrodes separated from the microbial growth by a barrier which is permeable to charged particles but microorganism impermeable.
NASA

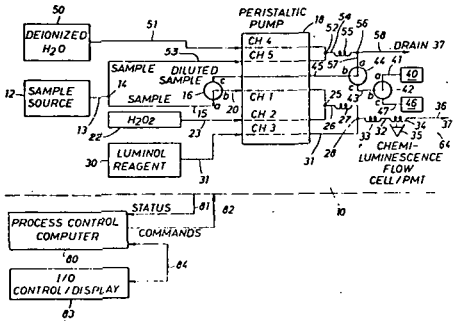



**N80-16714*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**METHOD AND APPARATUS FOR ELIMINATING LUMINOL INTERFERENCE MATERIAL Patent**
Eldon L. Jeffers (Boeing Aerospace Co., Houston, Tex.) and Richard R. Thomas, inventors (to NASA) (Boeing Aerospace Co., Houston, Tex.) Issued 27 Nov. 1979 10 p Filed 9 Feb. 1978 Supersedes N78-18674 (16 - 09, p 1197) Sponsored by NASA
(NASA-Case-MSC-16260-1; US-Patent-4,176,007; US-Patent-Appl-SN-876440; US-Patent-Class-435-34; US-Patent-Class-422-52; US-Patent-Class-23-927) Avail: US Patent and Trademark Office CSCL 06A

A method and apparatus for removing porphyrins from a fluid sample which are unrelated to the number of bacteria present

in the sample and prior to combining the sample with luminol reagent to produce a light reaction is disclosed. The method involves a pre-incubation of the sample with a dilute concentration of hydrogen peroxide which inactivates the interfering soluble porphyrins. Further, by delaying taking a light measurement for a predetermined time period after combining the hydrogen peroxide-treated water sample with a luminol reagent, the luminescence produced by the reaction of the luminol reagent with ions present in the solution, being short lived, will have died out so that only porphyrins within the bacteria which have been released by rupturing the cells with the sodium hydroxide in the luminol reagent, will be measured. The measurement thus obtained can then be related to the concentration of live and dead bacteria in the fluid sample.

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



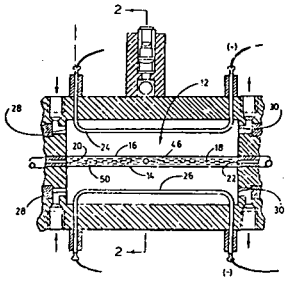

**N80-16715*** National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

**METHOD FOR SEPARATING BIOLOGICAL CELLS Patent**

Donald E. Brooks, inventor (to NASA) (Oregon Univ., Portland) Issued 1 Jan. 1980 5 p Filed 6 Mar. 1979 Supersedes N79-21743 (17 - 12 p 1616) Sponsored by NASA (NASA-Case-MFS-23883-1; US-Patent-4,181,589; US-Patent-Appl-SN-017888; US-Patent-Class-204-180R; US-Patent-Class-204-299R; US-Patent-Class-424-12) Avail: US Patent and Trademark Office CSCL 06A

A method for separating biological cells by suspending a mixed cell population in a two-phase polymer system is described. The polymer system consists of droplet phases with different surface potentials for which the cell populations exhibit different affinities. The system is subjected to an electrostatic field of sufficient intensity to cause migration of the droplets with an attendant separation of cells.

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



# 52 AEROSPACE MEDICINE

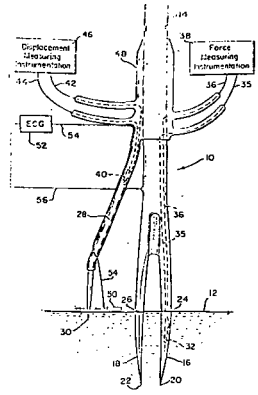
Includes physiological factors, biological effects of radiation; and weightlessness.

**N80-12730*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

**SIMULTANEOUS MUSCLE FORCE AND DISPLACEMENT TRANSDUCER Patent Application**

Cyril Feldstein (JPL), Gilbert W. Lewis (JPL), and Virgil H. Culler, inventors (to NASA) (JPL) Filed 30 Sep. 1977 12 p Sponsored by NASA (NASA-Case-NPO-14212-1; US-Patent-Appl-SN-838308) Avail: NTIS HC A02/MF A01 CSCL 06B

A myocardial transducer for simultaneously measuring force and displacement within a very small area of myocardium is presented. Each branch of the forked transducer constitutes a low compliance tine for penetrating the heart. When the heart is penetrated, the surface membrane closes around indentations in the tines. A small piezoresistive element that converts a force into an electrical signal is bonded to one of the low compliance tines. A third high compliance tine is of a length that just pierces the surface membrane. Displacement of the myocardium in a direction in line with the two low compliance tines causes a deformation in curvature of the high compliance tine that is converted into an electrical signal by a second piezoresistive element. An electrode placed on the epicardium and referenced to the transducer provides an ECG with force and displacement measurements. NASA




**N80-14684*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INTRA-OCULAR PRESSURE NORMALIZATION TECHNIQUE AND EQUIPMENT Patent**

Edward F. Baehr, inventor (to NASA) Issued 12 Jun. 1979 5 p Filed 31 Aug. 1977 Supersedes N77-30736 (15 - 21, p 2839) (NASA-Case-LEW-12955-1; US-Patent-4,157,718; US-Patent-Appl-SN-829318; US-Patent-Class-128-276) Avail: US Patent and Trademark Office CSCL 06B

A method and apparatus is described for safely reducing abnormally high intraocular pressure in an eye during a predetermined time interval. This allows maintenance of normal intraocular pressure during glaucoma surgery. A pressure regulator of the spring-biassed diaphragm type is provided with additional bias by a column of liquid. The hypodermic needle can be safely inserted into the anterior chamber of the eye. Liquid is then bled out of the column to reduce the bias on the diaphragm of

the pressure regulator and, consequently, the output pressure of the regulator. This lowering pressure of the regulator also occurs in the eye by means of a small second bleed path provided between the pressure regulator and the hypodermic needle.

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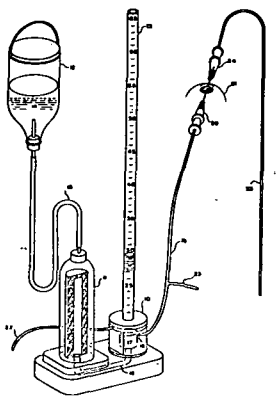

**N80-14687*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**DIALYSIS SYSTEM Patent**

William A. Mueller, inventor (to NASA) (JPL) Issued 13 Jun. 1978 6 p Filed 28 Feb. 1977 Sponsored by NASA (NASA-Case-NPO-14101-1; US-Patent-4,094,775; US-Patent-Appl-SN-772434; US-Patent-Class-210-22; US-Patent-Class-210-321B) Avail: US Patent and Trademark Office

The improved hemodialysis system utilizes a second polymeric membrane having dialyzate in contact with one surface and a urea decomposition solution in contact with the other surface. The membrane selectively passes urea from the dialyzate into the decomposition solution, while preventing passage of positively charged metal ions from the dialyzate into the solution and ammonium ions from the solution into the dialyzate.

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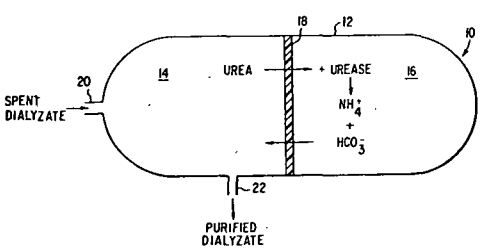


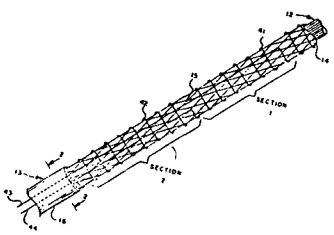

**N80-16725*** National Aeronautics and Space Administration. Pasadena Office, Calif.

**APPARATUS FOR ENDOSCOPIC EXAMINATION Patent**

Robert E. Frazer, inventor (to NASA) Issued 4 Dec. 1979 10 p Filed 17 Jun. 1977 Supersedes N79-19678 (17 - 10, p 1328) (NASA-Case-NPO-14092-1; US-Patent-4,176,662; US-Patent-Appl-SN-807597; US-Patent-Class-128-6; US-Patent-Class-128-348; US-Patent-Class-128-DIG9; US-Patent-Class-138-33; US-Patent-Class-138-103; US-Patent-Class-138-133; US-Patent-Class-219-201; US-Patent-Class-219-522) Avail: US Patent and Trademark Office CSCL 06B

An endoscope is having a propulsion mechanism and at least one transmitter at the distal end transmitting bursts of energy waves (radio frequency or ultrasonic) for tracking the position of the distal end through the use of two or more transducers on the anterior or lateral surfaces of a patient is described. The propulsion mechanism which consists of two radially expandable bladders separated by an axially expandable bellows with only the forward bladder attached to the distal end is discussed. Alternate mechanisms are reported. A sheath on the endoscope which includes material having a sharp melting point slightly above body temperature so that the sheath is made flexible at selected sections by applying current to separate heating wires in the sections of the sheath is described.

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



**N80-18690*** National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

**INTRA-OCULAR PRESSURE NORMALIZATION TECHNIQUE AND EQUIPMENT Patent**

William J. McGannon, inventor (to NASA) Issued 22 Jan. 1980 5 p Filed 31 Aug. 1977 Supersedes N77-30727 (15 - 21, p 2839) (NASA-Case-LEW-12723-1; US-Patent-4,184,491; US-Patent-Appl-SN-829317; US-Patent-Class-128-276; US-Patent-Class-128-760) Avail: US Patent and Trademark Office CSCL 06B

A method and apparatus for safely reducing abnormally high intraocular pressure in an eye during a predetermined time interval is presented. This allows maintenance of normal intraocular pressure during glaucoma surgery. According to the invention, a pressure regulator of the spring biased diaphragm type is provided with additional bias by a column of liquid. The height of the column of liquid is selected such that the pressure at a hypodermic needle connected to the output of the pressure regulator is equal to the measured pressure of the eye. The hypodermic needle can then be safely inserted into the anterior chamber of the eye. Liquid is then bled out of the column to reduce the bias on the diaphragm of the pressure regulator and, consequently, the output pressure of the regulator. This lowering pressure of the regulator also occurs in the eye by means of a small second bleed path provided between the pressure regulator and the hypodermic needle. Alternately, a second hypodermic needle may be inserted into the eye to provide a controlled leak off path for excessive pressure and clouded fluid from the anterior chamber.

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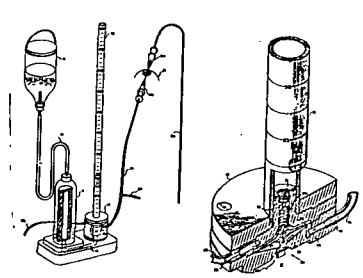

**N80-18691*** National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
**INDUCTION POWERED BIOLOGICAL RADIOSONDE Patent**
Thomas B. Fryer, inventor (to NASA) Issued 5 Feb. 1980 12 p Filed 12 May 1977 Supersedes N77-23743 (16 - 14, p 1894)
(NASA-Case-ARC-11120-1; US-Patent-4,186,749; US-Patent-Appl-SN-796256; US-Patent-Class-128-748; US-Patent-Class-128-903; US-Patent-Class-73-724) Avail: US Patent and Trademark Office CSCL 06B

An induction powered implanted monitor for epidurally measuring intracranial pressure and telemetering the pressure information to a remote readout is disclosed. The monitor utilizes an inductance-capacitance (L-C) oscillator in which the C comprises a variable capacitance transducer, one electrode of which is a small stiff pressure responsive diaphragm. The oscillator is isolated from a transmitting tank circuit by a buffer circuit and all electric components in the implanted unit except an input and an output coil are shielded by a metal housing.

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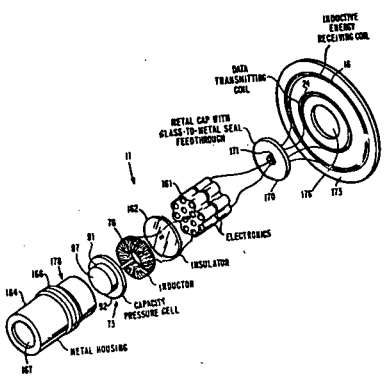


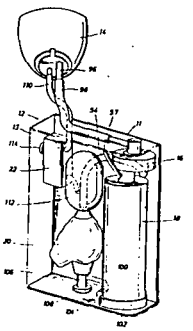

# 54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

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

**N80-10799*** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
**PORTABLE BREATHING SYSTEM Patent**
John S. Lovell, inventor (to NASA) (United Technologies Corp., East Hartford, Conn.) Issued 25 Sep. 1979 8 p Filed 24 Mar. 1977 Supersedes N77-21847 (15 - 12, p 1643) Sponsored by NASA
(NASA-Case-MSC-16182-1; US-Patent-4,168,706; US-Patent-Appl-SN-780938; US-Patent-Class-128-142R; US-Patent-Class-128-191R; US-Patent-Class-128-212) Avail: US Patent and Trademark Office CSCL 06K

A semiclosed-loop rebreathing system is discussed for use in a hostile environment. A packed bed regenerative heat exchanger providing two distinct temperature humidity zones of breathing gas with one zone providing cool, relatively dry air and the second zone providing hot, moist air is described.

A.W.H.



# 60 COMPUTER OPERATIONS AND HARDWARE

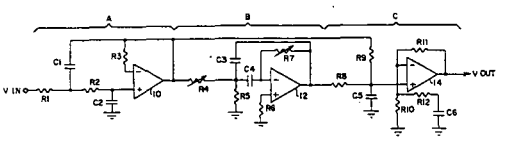
Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering*.

**N80-17723*#** National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
**SMOOTHING FILTER FOR DIGITAL TO ANALOG CONVERSION Patent**
Charles A. Wagner, inventor (to NASA) Issued 25 Jan. 1980 16 p
(NASA-Case-FRC-11025-1; US-Patent-Appl-SN-115536) Avail: NTIS HC A02/MF A01 CSCL 09B

An electronic filter comprised of three active filter sections (A, B, C) is provided to smooth the stepped signal from a digital to analog converter. The first section has a noninverting low pass filter transfer function, and the second has an inverting transfer function designed to pass a narrow frequency band centered at the step frequency of the stepped output signal with sharp cutoff on either side of that narrow band. The third section adds the noninverted output of the first section to the inverted output of the second section. This third section has a lead lag transfer function designed to reduce the phase angle between the signal at its output terminal and the stepped signal at the input of the first section.

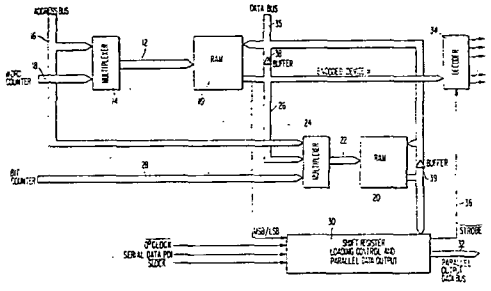
NASA




**N80-21987*#** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
**MEMORY-BASED PARALLEL DATA OUTPUT CONTROLLER Patent Application**
Raymond J. Stattel and James K. Niswander, inventors (to NASA) Filed 8 Mar. 1980 20 p
(NASA-Case-GSC-12447-1; US-Patent-Appl-SN-128230) Avail: NTIS HC A02/MF A01 CSCL 09B

A memory-based parallel data output controller which employs associative memories and memory mapping to decommutate multiple channels of telemetry data is described. The output controller contains a random access memory (RAM) addressed by a word counter which outputs an encoded peripheral device number and a most/least significant bit (MSB/LSB)-first flag.

*The device number and a bit counter address a second* RAM which contains START and STOP flags to pick out the required bits. The MSB/LSB, START and STOP flags, and the serial input data go to a control block which selectively fills a shift register used to drive the parallel data output bus. A strobe pulse enables a decoder to select the appropriate peripheral device. A microcomputer connected to an address bus can be used to set the contents of the RAMs via multiplexers using the technique of memory mapping. NASA

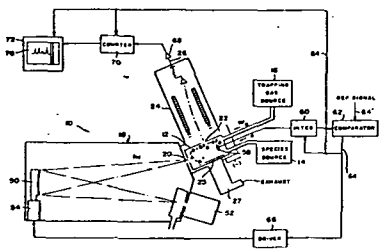


# 72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

**N80-14877*** National Aeronautics and Space Administration. Pasadena Office, Calif.
**HIGH RESOLUTION THRESHOLD PHOTOELECTRON SPECTROSCOPY BY ELECTRON ATTACHMENT Patent**
Ara Chutjian (JPL) and Joseph M. Ajello, inventors (to NASA) (JPL) Issued 19 Jun. 1979 6 p Filed 30 Nov. 1977 Supersedes N78-13917 (16 - 04, p 0546)
(NASA-Case-NPO-14078-1; US-Patent-4,158,775; US-Patent-Appl-SN-856466; US-Patent-Class-250-423P; US-Patent-Class-250-281; US-Patent-Class-250-282) Avail: US Patent and Trademark Office CSCL 20H

A system is provided for determining the stable energy levels of a species ion, of an atomic, molecular, or radical type, by application of ionizing energy of a predetermined level, such as through photoionization. The system adds a trapping gas to the gaseous species to provide a technique for detection of the energy levels. The electrons emitted from ionized species are captured by the trapping gas, only if the electrons have substantially zero kinetic energy. If the electrons have nearly zero energy, they are absorbed by the trapping gas to produce negative ions of the trapping gas that can be detected by a mass spectrometer. The applied energies (i.e. light frequencies) at which large quantities of trapping gas ions are detected, are the stable energy levels of the positive ion of the species. SF6 and CFCl3 have the narrowest acceptance bands, so that when they are used as the trapping gas, they bind electrons only when the electrons have very close to zero kinetic energy.
Official Gazette of the U.S. Patent and Trademark Office



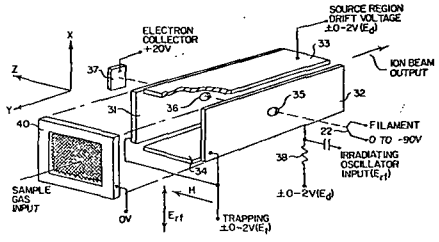
# 73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

**N80-12851*#** National Aeronautics and Space Administration. Pasadena Office, Calif.
**MINIATURE CYCLOTRON RESONANCE ION SOURCE USING SMALL PERMANENT MAGNET Patent Application**
Vincent G. Anicich and Wesley T. Huntress, inventors (to NASA) Filed 11 Sep. 1978 13 p
(NASA-Case-NPO-14324-1; US-Patent-Appl-SN-940970) Avail: NTIS HC A02/MF A01 CSCL 20H

An ion source using the cyclotron resonance principle is presented. A miniaturized ion source device in an air gap of a small permanent magnet with a substantially uniform field in the air gap of about 0.5 inches is described. The device and permanent magnet are placed in an enclosure which is maintained at a high vacuum into which a sample gas is introduced. A discussion of how the invention avoids the problem of getting the ion beam coupled into the utilization system is presented.
NASA



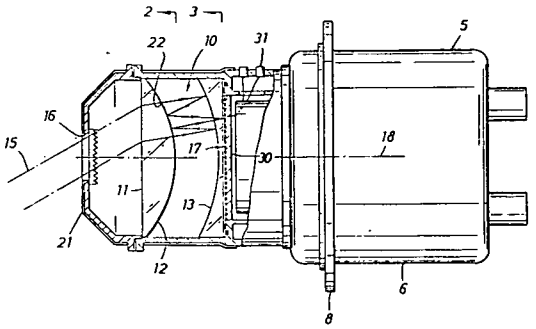

# 74 OPTICS

Includes light phenomena.

**N80-11892*#** National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
***WIDE ANGLE OPTICAL SYSTEMS* Patent Application**
Fred Vicik, inventor (to NASA) (Barnes Engineering Co., Stamford, Conn.) Filed 19 Oct. 1979 12 p Sponsored by NASA
(NASA-Case-MSC-18373-1; US-Patent-Appl-SN-86508) Avail: NTIS HC A02/MF A01 CSCL 20F

A wide angle optical field flattening system for a multispectral scanner is described which provides a large field angles and high resolution at low f-numbers. The system utilizes a basic optical element in the form of a first flat surface of a reflecting element which directs a ray bundle to a second sperical reflection surface. The second spherical reflection surface reflects the bundle to a field flattener coating on a third spherical surface located intermediate of the first flat surface and the second spherical surface. The third spherical surface forms an exit ray bundle on a flattened image plane with a lower f-number than that reflected from the field flattener coating. The exit ray bundle is passed

through a coating to the image plane and to a sensing or scanning surface. NASA



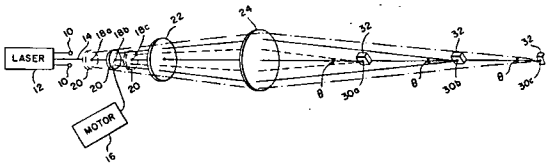

**N80-12866*#** National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

**SCANNING AFOCAL LASER VELOCIMETER PROJECTION LENS SYSTEM Patent Application**

David B. Rhodes, inventor (to NASA) Filed 7 Sep. 1979 10 p

(NASA-Case-LAR-12328-1; US-Patent-Appl-SN-073477) Avail: NTIS HC A02/MF A01 CSCL 20F

A method and apparatus for projecting and focusing parallel laser light beams from a laser Doppler velocimeter on a target area is presented. The system which includes three lenses is described. Two lenses work together as a fixed afocal lens combination. The third lens is a movable scanning lens. Parallel laser beams travel from the velocimeter through the scanning lens and through the afocal lens combination and converge. The constant focal volume and crossbeam angle which are maintained during the scan are discussed. NASA




**N80-21138*** National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

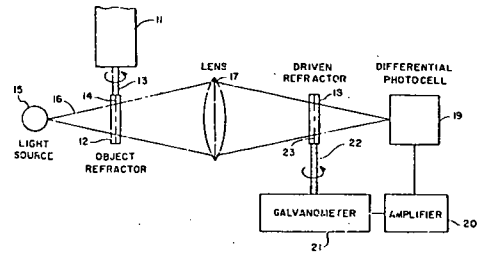
**NONCONTACTING METHOD FOR MEASURING ANGULAR DEFLECTION Patent**

Emmett L. Bryant, inventor (to NASA) Issued 19 Feb. 1980 4 p Filed 23 Oct. 1978 Supersedes N79-11866 (17 - 02, p 0252)

(NASA-Case-LAR-12178-1; US-Patent-4,189,234; US-Patent-Appl-SN-953390; US-Patent-Class-356-152; US-Patent-Class-350-25; US-Patent-Class-350-285; US-Patent-Class-356-150) Avail: US Patent and Trademark Office CSCL 20F

An apparatus is described for indicating the instantaneous angular deflection of an object about a selected axis without mechanical contact with the object. Light from a light source is transmitted through a flat refractor to a converging lens which focuses the light through another flat refractor onto a differential photocell. The first flat refractor is attached to the object such that when the object is deflected about the selected axis the refractor is also deflected about that axis. The two flat refractors are identical and they are placed an equal distance from the converging lens as are the light source and the photocell. The output of the photocell which is a function of image displacement is fed to a high gain amplifier that drives a galvanometer which rotates the second flat refractor. The second refractor is rotated so that the image displacement is very nearly zero making the galvanometer current a measure of the deflection of the object about the selected axis.

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




**N80-21140*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**DIFFRACTOID GRATING CONFIGURATION FOR X-RAY AND ULTRAVIOLET FOCUSING Patent**

Sidney O. Kastner, inventor (to NASA) Issued 11 Mar. 1980 7 p Filed 18 Sep. 1978 Supersedes N78-32857 (16 - 23, p 3142)

(NASA-Case-GSC-12357-1; US-Patent-4,192,994; US-Patent-Appl-SN-943089; US-Patent-Class-250-280; US-Patent-Class-250-277CH; US-Patent-Class-350-162R; US-Patent-Class-356-334) Avail: US Patent and Trademark Office CSCL 20F

An aspheric grating is described which is operable to image local or distant point sources sharply in a designated wavelength, i.e., produce a perfectly stigmatic image in the given wavelength at grazing angles of incidence. The grating surface comprises a surface of revolution defined by a curve which does not have a constant radius of curvature but is defined by a nonlinear differential equation.

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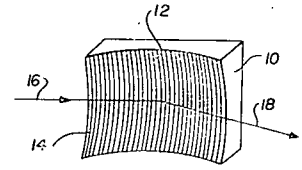



**N80-21141*#** National Aeronautics and Space Administration. Pasadena Office, Calif.

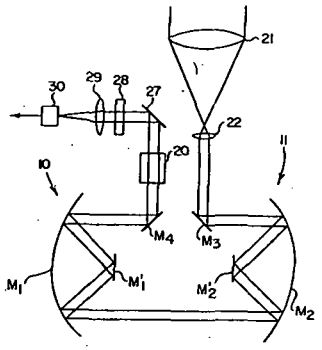
**METHOD AND APPARATUS FOR DOPPLER FREQUENCY MODULATION OF RADIATION Patent Application**

Jack S. Margolis (JPL), Daniel J. McCleese (JPL), Michael S. Shumate (JPL), and Clay H. Seamen (JPL) Filed 3 Nov. 1978 13 p Sponsored by NASA

(NASA-Case-NPO-14524-1; NASA-Case-NPO-14527-1; US-Patent-Appl-SN-957452) Avail: NTIS HC A02/MF A01 CSCL 20F

A method and apparatus is disclosed for frequency modulating radiation, such as from a laser, for optoacoustic detectors, interferometers, heterodyne spectrometers, and similar devices using two oppositely reciprocating cat's-eye retro-reflectors to Doppler modulate the radiation. By reciprocally moving both retroreflectors, the center of mass is maintained constant to permit smooth operation at many Hertz. By slightly offsetting the axis of one retroreflector relative to the other, multiple passes a light beam may be achieved for greater Doppler shifts with

the same reciprocating motion of the retroreflectors. A Doppler shift of 2(v/c) V sub 0 occurs for each pass. NASA

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Includes superconductivity.

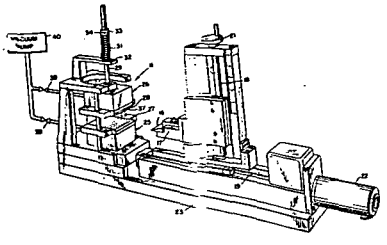
*For related information, see also 33 Electronics and Electrical Engineering and 36 Lasers and Masers.*

**N80-18951*** National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

**METHOD AND APPARATUS FOR SLICING CRYSTALS**
**Patent**

John S. J. Benedicto, Bruce E. Woodgate, and Frederick C. Hallberg, inventors (to NASA) Issued 22 Jan. 1980 5 p Filed 15 May 1978 Supersedes N78-24386 (16 - 15, p 1978)
(NASA-Case-GSC-12291-1; US-Patent-4,184,472; US-Patent-Appl-SN-906298; US-Patent-Class-125-23R; US-Patent-Class-51-235; US-Patent-Class-83-152; US-Patent-Class-83-870; US-Patent-Class-269-21) Avail: US Patent and Trademark Office CSCL 20B

The crystal slicing method is described as follows. A crystal is sliced in a plane parallel to flat, opposed parallel end faces of the crystal. The end faces of the crystal are gripped by a pair of opposed, perforated platens of a pair of vacuum chambers, one of which is translatable relative to the other. A blade cuts the crystal through the desired plane. A spring biases one of the vacuum chambers away from the other vacuum chamber while both of the faces are gripped by the vacuum chambers and the blade is cleaving the crystal. A sliced portion of the crystal gripped by one of the vacuum chambers is pulled away from the remainder of the crystal gripped by the second vacuum chamber when the crystal was cleaved by the blade through the plane. Official Gazette of the U.S. Patent and Trademark Office



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Section 1: Abstracts

16. Abstract

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