NASA SP-7039(16)
Section 1
Abstracts

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY

Section 1 • Abstracts

JANUARY 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

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NASA SP-7039(16)
Section 1
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NASA

PATENT ABSTRACTS BIBLIOGRAPHY

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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 July 1979 and December 1980.

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

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 138 citations published in this issue of the Abstract Section cover the period July 1979 through December 1979. The Index Section contains references to the 3709 citations covering the period May 1969 through December 1979.

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

AVAILABLE ON MICROFICHE

NASA ACCESSION NUMBER

N79-12416*# National Aeronautics and Space Administration. Pasadena Office, Calif. **SOURCE**

TITLE

METHOD AND MEANS FOR HELIUM/HYDROGEN RATIO MEASUREMENT BY ALPHA SCATTERING Patent Application

INVENTOR

A. Bruce Whitehead (JPL) and Thomas A. Trombrello, inventors (to NASA) (JPL) Filed 7 Nov. 1978 18 p
(Contract NAS7-100)

US PATENT APPLICATIONS SERIAL NUMBER

(NASA-Case-NPO-14079-1; US-Patent-Appl-SN-958573) Avail: NTIS HC A02/MF A01 CSCL 14B

AVAILABILITY

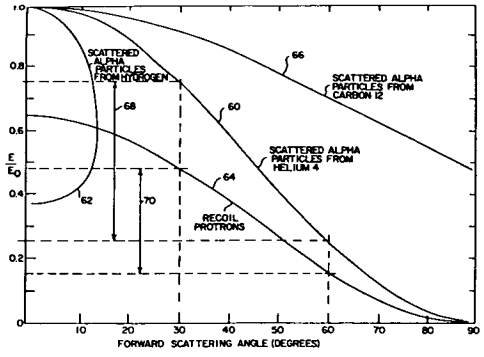
COSATI CODE

NASA CASE NUMBER

ABSTRACT

A cylindrically shaped enclosure has a source of alpha particles at one end and detectors mounted in tandem at the other end. Two downward-extending baffles and a blocking shield define a forward-scattering angular range in which scattering products from alpha particle/hydrogen and alpha particle/helium collisions can reach the detector's surface. The thickness of the detectors is sized so that alpha particles resulting from alpha particle helium collisions are absorbed in the first detector and recoil protons resulting from alpha particles/hydrogen collisions pass through the first detector and are absorbed by the second detector. Each scattering product is identified from to its ability to penetrate or not penetrate a detection material of predetermined thickness. The output pulses are processed by an electronic processing system. The apparatus could be carried by a planetary probe to one of the outer planets. 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 XAR-xxxxx	Ames Research Center Mail Code: 200-11A Moffett Field, California 94035 Telephone: (415)965-5104
ERC-xxxxx XER-xxxxx HQN-xxxxx XHQ-xxxxx	NASA Headquarters Mail Code: GP-4 Washington, D.C. 20546 Telephone: (202)755-3954
GSC-xxxxx XGS-xxxxx	Goddard Space Flight Center Mail Code: 204 Greenbelt, Maryland 20771 Telephone: (301)344-7351
KSC-xxxxx XKS-xxxxx	John F. Kennedy Space Center Mail Code: AA-PAT Kennedy Space Center, Florida 32899 Telephone: (305)867-2544
LAR-xxxxx XLA-xxxxx	Langley Research Center Mail Code: 456 Hampton, Virginia 23365 Telephone: (804)827-3725
LEW-xxxxx XLE-xxxxx	Lewis Research Center Mail Code: 500-311 21000 Brookpark Road Cleveland, Ohio 44135 Telephone: (216)433-6346
MSC-xxxxx XMS-xxxxx	Lyndon B. Johnson Space Center Mail Code: AM Houston, Texas 77058 Telephone: (713)483-4871
MFS-xxxxx XMF-xxxxx	George C. Marshall Space Flight Center Mail Code: CC01 Huntsville, Alabama 35812 Telephone: (205)453-0020
NPO-xxxxx XNP-xxxxx FRC-xxxxx XFR-xxxxx WOO-xxxxx	NASA Resident Legal Office Mail Code: 180-601 4800 Oak Grove Drive Pasadena, California 91103 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

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.*

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

Section 2 • Indexes

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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.*

N79-24958*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

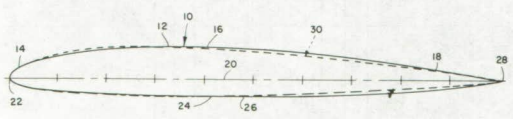
HELICOPTER ROTOR AIRFOIL Patent Application

Gene J. Bingham, inventor (to NASA) Filed 6 Mar. 1979 21 p

(NASA-Case-LAR-12396-1; US-Patent-Appl-SN-017889) Avail: NTIS HC A02/MF A01 CSCL 01A

An airfoil which has particular application to the blade or blades of rotor aircraft and aircraft propellers is presented. The airfoil thickness distribution, camber and leading edge radius are shaped to locate the airfoil crest at a more aft position along the chord, and to increase the freestream Mach number at which sonic flow is attained at the airfoil crest. The reduced slope of the airfoil causes a reduction in velocity at the airfoil crest at lift coefficients from zero to the maximum lift coefficient. The leading edge radius is adjusted so that the maximum local Mach number at 1.25 percent chord and at the designed maximum lift coefficient is limited to about 0.48 when the Mach number normal to the leading edge is approximately 0.20. The lower surface leading edge radius is shaped so that the maximum local Mach number at the leading edge is limited to about 0.29 when the Mach number normal to the leading edge is approximately 0.20. The drag divergence Mach number associated with the airfoil is moved to a higher Mach number over a range of lift coefficients resulting in superior aircraft performance.

NASA



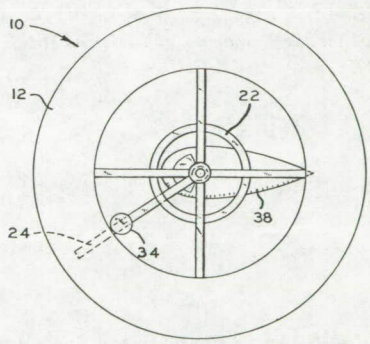
N79-24959*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

AN ANNULAR WING Patent Application

Harold J. Walker, inventor (to NASA) Filed 30 May 1979 25 p

(NASA-Case-FRC-11007-2; US-Patent-Appl-SN-043911) Avail: NTIS HC A02/MF A01 CSCL 01A

An annular wing suitable for supporting in flight an aircraft characterized by the absence of directional stabilizer surfaces is described. The wing comprises an annular body of a substantially uniformly symmetrical configuration characterized by an annular positive lifting surface and a chord line coincident with a segment of a line radiating along the surface of an inverted truncated cone whereby a decalage is established for the leading and trailing semicircular portions of the body, relative to instantaneous line of flight, and a dihedral is established for the laterally opposed semicircular portions of the body, relative to the line of flight. The direction of flight and the climb angle or glide slope are established by selectively positioning the center of mass of the wing ahead of the aerodynamic center along a radius coincident with an axis for a selected line of flight. NASA



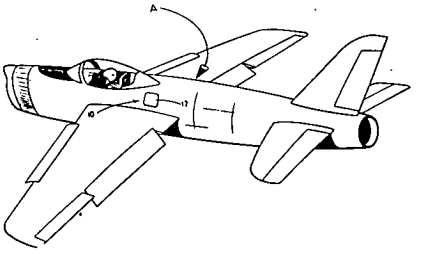
N79-31139*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

SKIN FRICTION MEASURING DEVICE FOR AIRCRAFT Patent Application

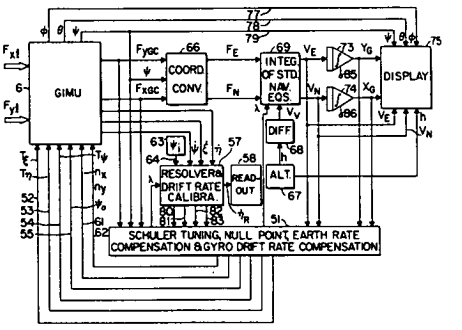
Lawrence C. Montoya and Donald R. Bellman, inventors (to NASA) Filed 7 Aug. 1979 17 p

(NASA-Case-FRC-11029-1; US-Patent-Appl-SN-064617) Avail: NTIS HC A02/MF A01 CSCL 01A

A skin friction measuring device for measuring the resistance of an aerodynamic surface to an airstream is disclosed. It is characterized by a friction plate adapted to be disposed in a flush relationship with the external surface of the aircraft and be displaced in response to skin friction drag as an airstream is caused to flow over the surface. A potentiometer is connected to the plate in order to provide an electrical output indicative of the magnitude of the drag. NASA



The system is composed of an unbalanced, pendulous, two axis gimbal system with a two degree of freedom leveling gyroscope and a heading gyroscope. A.W.H.



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.*

N79-33177*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

AUTONOMOUS NAVIGATION SYSTEM Patent Application

Shmuel J. Merhav, inventor (to NASA) (National Research Council, Haifa, Israel) Filed 24 Sep. 1979 19 p Sponsored by NASA (NASA-Case-ARC-11257-1; US-Patent-Appl-SN-078611) Avail: NTIS HC A02/MF A01 CSCL 17G

A low cost autonomous navigation system which disposes with accelerometers used in the conventional gimballed and strapdown inertial systems is described. The navigation system provides longitudinal and lateral vehicular specific force measurements in the locally level plane irrespective of the vehicle pitch, roll, and yaw motions. The navigation system provides longitudinal and lateral velocities in locally level geography coordinates along with vehicle position, altitude and attitude information. The system minimizes the number of sensors and system complexity, thus reducing errors, while providing a rapid method of north calibration.

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.*

N79-24976* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SELF STABILIZING SONIC INLET Patent

Brent A. Miller, inventor (to NASA) Issued 15 May 1979 5 p Filed 29 Mar. 1978

(NASA-Case-LEW-11890-1; US-Patent-4,154,256; US-Patent-Appl-SN-891244; US-Patent-Class-137-15.1; US-Patent-Class-244-53B) Avail: US Patent and Trademark Office CSCL 01C

An inlet suitable for a turbine engine in a STOL, VTOL or CTOL aircraft is described. A circumferentially extended slot is provided in the inner surface of the air inlet at the windward side and downstream of the throat region. The slot communicates with a circumferential plenum chamber formed in the front of the air inlet just behind the lip. Circumferentially extending rows of apertures are provided on the lip establishing two sets of apertures spaced circumferentially away from the slot in opposite directions. The slot removes the boundary layer from the critical portion of the diffuser to minimize or eliminate flow pressure loss or separations resulting from diffusion or tuning. The apertures are in a region of low static pressure on the lip of the inlet and serve as a source of suction to cause air flow into the slot.

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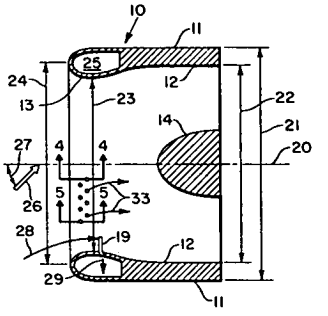


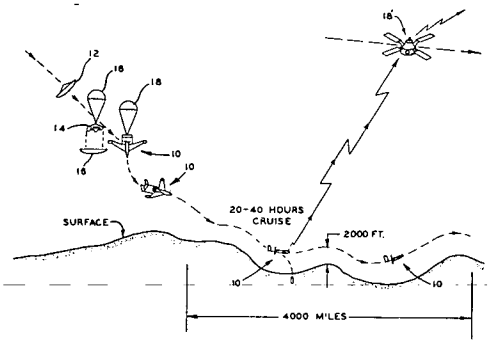
N79-24979*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

METHOD FOR OBSERVING THE FEATURES CHARACTERIZING THE SURFACE OF A LAND MASS Patent Application

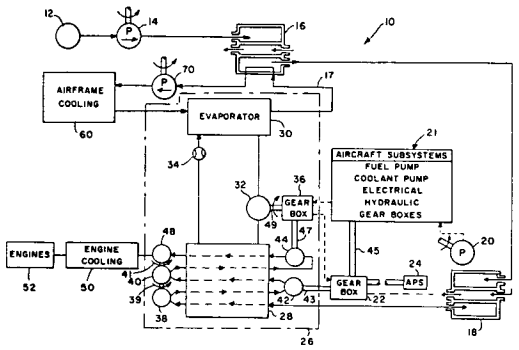
Robert D. Reed, inventor (to NASA) Filed 30 May 1979 15 p

(NASA-Case-FRC-11013-1; US-Patent-Appl-SN-043912) Avail: NTIS HC A02/MF A01 CSCL 01C

A propeller driven, hydrazine powered aircraft remotely piloted through rarefied atmosphere of a selected planet, including the planet Earth, and employed as a communication platform for a telemetry system provided for relaying information relating to features characterizing the surface of the surface of the planet is described. NASA



is circulated through a heat pump and a heat exchanger which together extract essentially all of the added heat from the coolant. The heat is transferred to the aircraft fuel system via the heat exchanger and the heat pump. The heat extracted from the coolant is utilized to power the heat pump. The heat pump is associated with a power turbine mechanism which is also driven by the extracted heat. The power turbines are utilized to drive various aircraft subsystems, the compressor of the heat pump, and provide engine cooling. This system is accomplished with a small increase in aircraft weight and a total result of a small increase in performance. 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.*

N79-24980*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

A COOLING SYSTEM FOR AN AIRCRAFT HAVING A CRUISE RANGE FROM MACH 2 TO MACH 8 Patent Application

Pierce L. Lawing and Laverne L. Pagel, inventors (to NASA) (McDonnell Aircraft Co.) Filed 31 Jan. 1979 21 p

(NASA-Case-LAR-12406-1; US-Patent-Appl-SN-008210) Avail: NTIS HC A02/MF A01 CSCL 01C

The necessity of shielding an aircraft airframe constructed of material such as aluminum is eliminated by using a system which provides total cooling for an airframe designed to fly in the speed range of Mach 2 to Mach 8. Cooling is accomplished by passing a coolant through the aircraft airframe, the coolant acting as a carrier to remove heat from the airframe. The coolant

N79-24988*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

A SYSTEM FOR PROVIDING AN INTEGRATED DISPLAY OF INSTANTANEOUS INFORMATION RELATIVE TO AIRCRAFT ATTITUDE, HEADING, ALTITUDE, AND HORIZONTAL SITUATION Patent Application

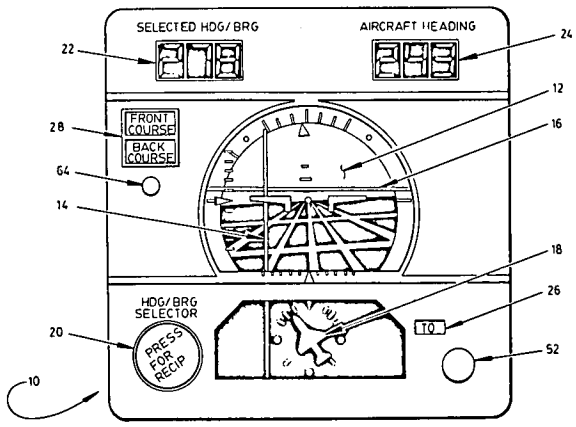
Robert James, inventor (to NASA) (James and Assoc., Lancaster, Calif.) Filed 30 May 1979 45 p

(Contract NAS4-2199)

(NASA-Case-FRC-11005-1; US-Patent-Appl-SN-043942) Avail: NTIS HC A03/MF A01 CSCL 01D

A display device is described which provides an aircraft pilot with combined inflight attitude, heading, altitude, and horizontal situation information. This invention combines a commonly used and commercially available flight director-type devices for a display in combination with a miniature aircraft supported for angular displacement from a vertical orientation to indicate heading error, or heading offset. An extended course deviation indicator bar is also provided which projects into

juxtaposition with the miniature aircraft for providing a true picture of the aircraft's horizontal situation relative to a selected VOR, ILS, or MLS course. NASA



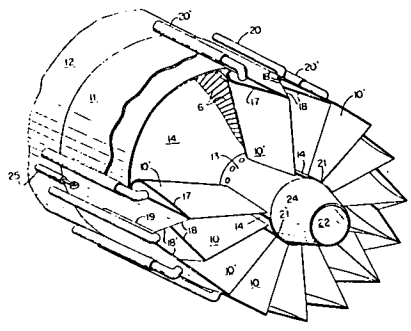
07 AIRCRAFT PROPULSION AND POWER

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.*

N79-23971*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AIRCRAFT ENGINE NOZZLE Patent Application
Norman E. Sorensen and Eldon A. Latham, inventors (to NASA) Filed 23 Mar. 1979 14 p
(NASA-Case-ARC-10977-1; US-Patent-Appl-SN-023436) Avail: NTIS HC A02/MF A01 CSCL 21E

A variable area exit nozzle arrangement for an aircraft engine having a substantially reduced length and weight is described. It comprises longitudinally movable radial vanes and fixed radial vanes. The movable radial vanes are alternately disposed with respect to the fixed radial vanes. Means for displacing the movable radial vanes along the longitudinal axis of the engine relative to the fixed radial vanes are determined. The fixed radial vanes radially extend across the main exhaust flow of the engine. NASA



08 AIRCRAFT STABILITY AND CONTROL

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

N79-23097* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FILTERING TECHNIQUE BASED ON HIGH-FREQUENCY PLANT MODELING FOR HIGH-GAIN CONTROL Patent
Frank R. Niessen and John F. Garren, Jr., inventors (to NASA) Issued 10 Apr. 1979 7 p Filed 8 Dec. 1977 Supersedes N78-17070 (16 - 08, p 0980)
(NASA-Case-LAR-12215-1; US-Patent-4,148,452; US-Patent-Appl-SN-858762; US-Patent-Class-244-195; US-Patent-Class-244-17.13; US-Patent-Class-244-83G; US-Patent-Class-318-585; US-Patent-Class-318-616; US-Patent-Class-364-434) Avail: US Patent and Trademark Office CSCL 01C

This invention was an improvement in aircraft control systems that utilized feedback motion sensors to generate a signal to control the aircraft. The improvement consisted essentially of a complementary filter comprising a simplified model of the aircraft, a high pass filter, a low pass filter and a summing amplifier. The control signal was applied to the simplified model of the aircraft which attempted to compute the vehicle response to the signal. This computed response was then fed into the high pass filter to eliminate long term errors in the calculated response, with the result that a good estimate of the high frequency content of the aircraft motion was obtained. In order to obtain a good estimate of the low frequency content of the motion, a rate gyro signal was fed through the low pass filter that eliminates all of the offending noise.

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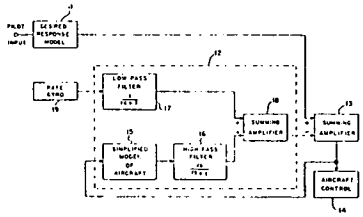


09 RESEARCH AND SUPPORT FACILITIES (AIR)

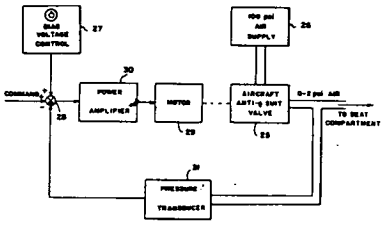
Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N79-31228* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SEAT CUSHION TO PROVIDE REALISTIC ACCELERATION CUES TO AIRCRAFT SIMULATOR PILOT Patent
Billy R. Ashworth, inventor (to NASA) Issued 14 Aug. 1979 10 p Filed 26 Jul. 1978 Supersedes N78-30821 (16 - 21 p 2857) Continuation-in-part of abandoned US Patent Appl. SN-829314, filed 31 Aug. 1977

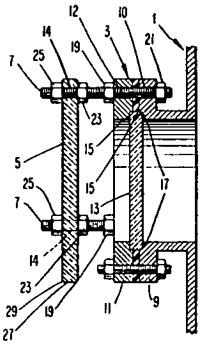
(NASA-Case-LAR-12149-2; US-Patent-4,164-079; US-Patent-Appl-SN-829314; US-Patent-Appl-SN-928131; US-Patent-Class-35-12E; US-Patent-Class-35-12H) Avail: US Patent and Trademark Office CSCL 14B

Seat cushions, each including an air cell with a non-compressible surface, are disclosed. The apparatus are provided for initially controlling the air pressure in the air cells to allow the two main support areas of the simulator pilot to touch the non-compressible surface and thus begin to compress the flesh near these areas. During a simulated flight the apparatus control the air pressure in the cells to simulate the events that occur in a seat cushion during actual flight. Author



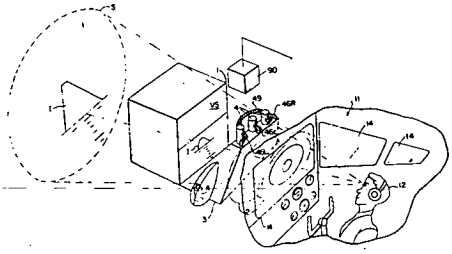
N79-32217*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SAFETY SHIELD FOR VACUUM/PRESSURE CHAMBER VIEWING PORT Patent Application
Richard A. Shimansky and Rodney S. Spencer, inventors (to NASA) Filed 29 Jun. 1979 12 p
(NASA-Case-GSC-12513-1; US-Patent-Appl-SN-053571) Avail: NTIS HC A02/MF A01 CSCL 14B

An optically clear safety shield, formed from a plate of Plexiglas, is mounted in a spaced-apart relationship from the viewing port on the outer surface of a vacuum or high pressure chamber. Because of the air gap between the viewing port and the safety shield, the shield is not subject to the cyclic stresses placed on the viewing window which tend to make it fail. Flying debris from a shattered viewing port window is deflected by the safety shield away from personnel and instruments in the vicinity of the chamber. NASA



N79-33220*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ENVIRONMENTAL FOG/RAIN VISUAL DISPLAY SYSTEM FOR AIRCRAFT SIMULATORS Patent Application
Wendell D. Chase, inventor (to NASA) Filed 29 Jun. 1979 62 p
(NASA-Case-ARC-11158-1; US-Patent-Appl-SN-053566) Avail: NTIS HC A07/MF A01 CSCL 14B

A combination of electronic and mechanical integrated elements which operate together are used to produce realistic environmental conditions that would actually be encountered by a pilot flying an aircraft. The electronic elements of the system include a real time digital computer, a calligraphic color display which simulates landing lights of selective intensity, and a color television camera for producing a moving color display of the airport runway as depicted on a model terrain board. The mechanical simulation elements of the system include an environmental chamber which can produce natural fog, nonhomogeneous fog, rain and fog combined, or rain only. A pilot looking through the aircraft windscreen will look through the fog and/or rain generated in the environmental chamber on to a viewing screen with the simulated color image of the airport runway, and observe a very real simulation of actual conditions of a runway as it would appear through actual fog and/or rain. NASA



12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N79-26075* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
GENERAL PURPOSE ROCKET FURNACE Patent
Billy R. Aldrich and William D. Whitt, inventors (to NASA) Issued 19 Jun. 1979 17 p Filed 30 Nov. 1976 Supersedes N77-12070 (15 - 03, p 0292)
(NASA-Case-MFS-23460-1; US-Patent-4,158,742; US-Patent-Appl-SN-746578; US-Patent-Class-13-20; US-Patent-Class-13-22; US-Patent-Class-13-24; US-Patent-Class-219-410) Avail: US Patent and Trademark Office CSCL 14B

A multipurpose furnace for space vehicles used for material processing experiments in an outer space environment is described. The furnace contains three separate cavities designed to process samples of the widest possible range of materials and thermal requirements. Each cavity contains three heating elements capable of independent function under the direction of an automatic and programmable control system. A heat removable mechanism is also provided for each cavity which operates in conjunction with the control system for establishing an isothermally heated cavity

or a wide range of thermal gradients and cool down rates. A monitoring system compatible with the rocket telemetry provides furnace performance and sample growth rate data throughout the processing cycle.

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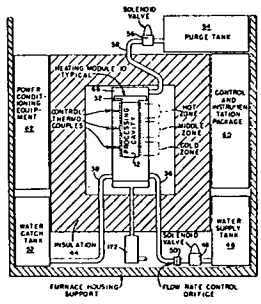

by a continuous process involving vacuum mixing, calendering, and curing under very strict conditions which depend to some extent upon the thickness of the sheet produced.

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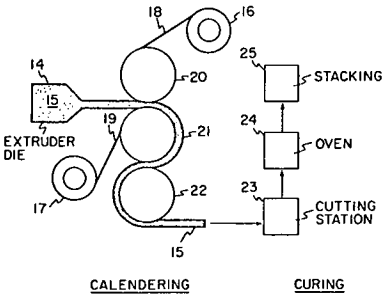


15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N79-26100* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

FIRE PROTECTION COVERING FOR SMALL DIAMETER MISSILES Patent

Salvatore R. Riccitiello and Paul M. Sawko, inventors (to NASA) Issued 29 May 1979 7 p Filed 25 Nov. 1977 Supersedes N78-13110 (16 - 03 p 0437)

(NASA-Case-ARC-11104-1; US-Patent-4,156,752; US-Patent-Appl-SN-854920; US-Patent-Class-428-220; US-Patent-Class-260-37EP; US-Patent-Class-260-830S; US-Patent-Class-264-102; US-Patent-Class-264-145; US-Patent-Class-264-151; US-Patent-Class-264-175; US-Patent-Class-264-236; US-Patent-Class-244-121; US-Patent-Class-428-413; US-Patent-Class-428-414; US-Patent-Class-428-418; US-Patent-Class-428-421; US-Patent-Class-428-920) Avail: US Patent and Trademark Office CSCL 16D

Flexible intumescent protection sheeting of unusually uniform thickness were prepared from epoxy-polysulfide compositions, containing microfibers and the ammonium salt of 1,4-nitroaniline-2-sulfonic acid, as disclosed in U.S. Pat. No. 3,663,464, except that an ammonium salt particle size in the order of 5 to 8 microns and a fiber size of about 1/128th inch in length and 3 to 5 microns in diameter were found critical to obtain the required density of 1.46 to 1.50 g/cc. The insulation sheeting was prepared

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N79-24061*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

POLYIMIDE PREPREG MATERIAL HAVING IMPROVED TACK RETENTION Patent Application

T. T. Serafini and P. Deluigs, inventors (to NASA) Filed 6 Apr. 1979 10 p

(NASA-Case-LEW-12933-1; US-Patent-Appl-SN-027557) Avail: NTIS HC A02/MF A01 CSCL 07C

A composition, of the type disclosed in U.S. Patent 3,745,149 and which includes a polyfunctional ester, a polyfunctional amine, and an end-capping agent, is impregnated into fibers or fabric and heated to form prepreg material. The tack retention characteristics of this prepreg material are improved by incorporating into the composition a liquid olefinic material compatible with the other ingredients of the composition. The prepreg material is heated at a higher temperature to effect formation of the polyimide resin and the monomeric additive is incorporated in the polyimide polymer structure. NASA

N79-31345*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

CURING AGENT FOR POLYEPOXIDES AND EPOXY RESINS AND COMPOSITES CURED THEREWITH Patent Application

T. T. Serafini and P. Delvigs, inventors (to NASA) Filed 30 Aug. 1979 14 p

(NASA-Case-LEW-12226-1; US-Patent-Appl-SN-070771) Avail: NTIS HC A02/MF A01 CSCL 07C

A curing agent for a polyepoxide is described which contains a divalent aryl radical such as phenylene and a tetravalent aryl radical such as a tetravalent benzene radical. An epoxide is cured by admixture with the curing agent. The cured epoxy product retains the usual properties of cured epoxides and, in addition, has a high char residue after burning, on the order of 45% by weight. The high char residue is of value in preventing release to the atmosphere of carbon fibers from carbon fiber-epoxy resin composites in the event of burning of the composite.

NASA

24 COMPOSITE MATERIALS

Includes laminates.

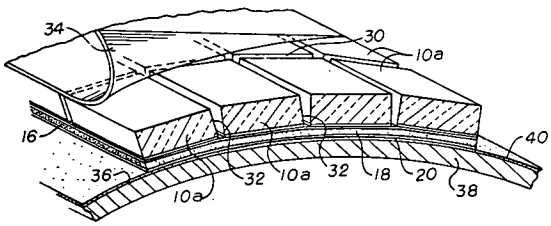
N79-23142*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

DICED TILE THERMAL PROTECTION FOR SPACECRAFT Patent Application

William C. Schneider, inventor (to NASA) Filed 27 Apr. 1979 24 p

(NASA-Case-MSC-16366-1; US-Patent-Appl-SN-034529) Avail: NTIS HC A02/MF A01 CSCL 11D

A method is presented for installing a segmental covering of solid material on a body surface, as well as an insulated spacecraft structure produced by such method. The method comprises securing an integral tile to one face of an integral flexible base member to form a composite covering unit. The tile is then diced to form a plurality of separate tile segments, while retaining the base member in integral form to serve as a carrier for the tile segments. The base member is then secured to the surface of the spacecraft body. NASA



N79-24062* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

FIBROUS REFRACTORY COMPOSITE INSULATION Patent

Daniel B. Leiser (Stanford Univ., Calif.), Howard E. Goldstein (Stanford Univ., Calif.), and Marnell Smith, inventors (to NASA) (Stanford Univ., Calif.) Issued 10 Apr. 1979 5 p Filed 8 Sep. 1978 Supersedes N78-32189 (16 - 23, p 3052) Sponsored by NASA

(NASA-Case-ARC-11169-1; US-Patent-4,148,962; US-Patent-Appl-SN-940688; US-Patent-Class-428-366) Avail: US Patent and Trademark Office CSCL 11D

A refractory composite insulating material was prepared from silica fibers and aluminosilicate fibers in a weight ratio ranging from 1:19 to 19:1, and about 0.5 to 30% boron oxide, based on the total fiber weight. The aluminosilicate fiber and boron oxide requirements may be satisfied by using aluminoborosilicate fibers and, in such instances, additional free boron oxide may be incorporated in the mix up to the 30% limit. Small quantities of refractory opacifiers, such as silicon carbide, may be also added. The composites just described are characterized by the absence of a nonfibrous matrix.

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

N79-25142* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

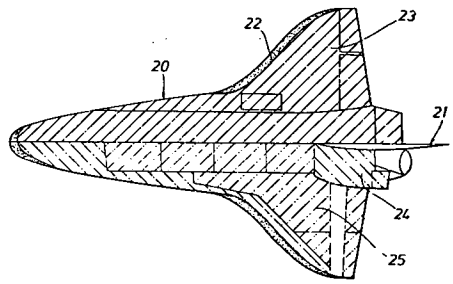
THERMAL INSULATION PROTECTION MEANS Patent

Robert L. Dotts, James A. Smith, and George Strouhal, inventors (to NASA) Issued 1 May 1979 7 p Filed 15 Apr. 1977 Supersedes N77-22423 (15 - 13, p 1721)

(NASA-Case-MSC-12737-1; US-Patent-4,151,800; US-Patent-Appl-SN-788045; US-Patent-Class-102-105; US-Patent-Class-244-121; US-Patent-Class-244-163; US-Patent-Class-427-350; US-Patent-Class-427-372A; US-Patent-Class-428-137; US-Patent-Class-428-282; US-Patent-Class-428-290; US-Patent-Class-428-332; US-Patent-Class-428-447; US-Patent-Class-428-920) Avail: US Patent and Trademark Office CSCL 11D

A system for providing thermal insulation for portions of a spacecraft which do not exceed 900 F during ascent or reentry relative to the earth's atmosphere is described. The thermal insulation is formed of relatively large flexible sheets of needled Nomex felt having a flexible waterproof coating. The thickness of the felt is sized to protect against projected temperatures and is attached to the structure by a resin adhesive. Vent holes in the sheets allow ventilation while maintaining waterproofing. The system is heat treated to provide thermal stability.

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



N79-25143* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

BONDING OF SAPPHIRE TO SAPPHIRE BY EUTECTIC MIXTURE OF ALUMINUM OXIDE AND ZIRCONIUM OXIDE Patent

John J. DeLuca, inventor (to NASA) Issued 22 May 1979 5 p Filed 30 Dec. 1975 Supersedes N76-19234 (14 - 10, p 1229) Continuation-in-part of abandoned US Patent Appl. SN-506803, filed 17 Sep. 1974, which is a division of US Patent Appl. SN-322997, filed 12 Jan. 1973, US-Patent-3,859,714

(NASA-Case-GSC-11577-3; US-Patent-4,155,475; US-Patent-Appl-SN-645502; US-Patent-Class-220-2.2; US-Patent-Class-65-43; US-Patent-Class-156-89; US-Patent-3,859,714; US-Patent-Appl-SN-506803; US-Patent-Appl-SN-322997) Avail: US Patent and Trademark Office CSCL 11D

An element comprising sapphire, ruby or blue sapphire can be bonded to another element of such material with a eutectic mixture of aluminum oxide and zirconium oxide. The bonding mixture may be applied in the form of a distilled water slurry or by electron beam vapor deposition. In one embodiment the eutectic is formed in situ by applying a lasdr of zirconium oxide and then heating the assembly to a temperature above the eutectic

temperature and below the melting point of the material from which the elements are formed. The formation of a sapphire rubidium maser cell utilizing eutectic bonding is shown.

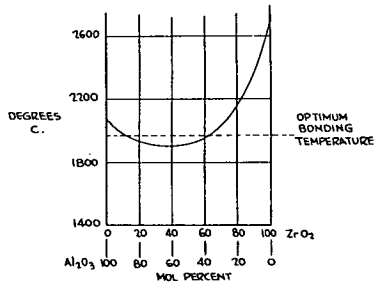
Official Gazette of the U.S. Patent and Trademark Office

N79-31347* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ALKALI-METAL SILICATE BINDERS AND METHODS OF MANUFACTURE Patent

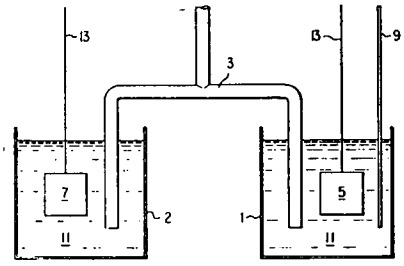
John B. Schutt, inventor (to NASA) Issued 24 Jul. 1979 5 p Filed 21 Dec. 1977 Supersedes N78-17217 (16 - 08 p 1001) (NASA-Case-GSC-12303-1; US-Patent-4,162,169; US-Patent-Appl-SN-862880; US-Patent-Class-106-74; US-Patent-Class-106-84) Avail: US Patent and Trademark Office CSCL 11D

A paint binder is described which uses a potassium or sodium silicate dispersion having a silicon dioxide to alkali-metal oxide mol ratio of from 4.8:1 to 6.0:1. The binder exhibits stability during both manufacture and storage. The process of making the binder is predictable and repeatable and the binder may be made with inexpensive components. The high mol ratio is achieved with the inclusion of a silicon dioxide hydrogel. The binder, which also employs a silicone, is in the final form of a hydrogel sol. Official Gazette of the U.S. Patent and Trademark Office



A method is described which permits the selective oxidation and potentiometric detection of phenol and related compounds in an electrochemical cell. An anode coated with a gel immobilized oxidative enzyme and a cathode are each placed in an electrolyte solution. The potential of the cell is measured by a potentiometer connected to the electrodes.

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

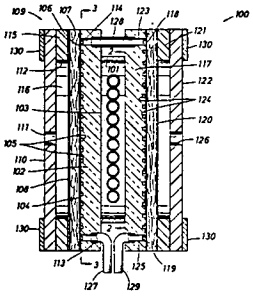


N79-23167*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

ELECTROPHOTOLYSIS OXIDATION SYSTEM FOR MEASUREMENT OF ORGANIC CONCENTRATION IN WATER Patent Application

H. Eugene Winkler, inventor (to NASA) Filed 21 May 1979 24 p (NASA-Case-MSC-16497-1; US-Patent-Appl-SN-041145) Avail: NTIS HC A02/MF A01 CSCL 07D

A method as well as the apparatus for determining carbon from organic compounds in aqueous solutions are described. Oxygen is generated from the solution by electrolysis while a simultaneous ultraviolet irradiation oxidizes carbon to carbon dioxide which is recovered and measured quantitatively for carbon. NASA



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.*

N79-22235* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

METHOD AND DEVICE FOR THE DETECTION OF PHENOL AND RELATED COMPOUNDS Patent

Julian G. Schiller (Pittsburgh Univ., Pa.) and Chung C. Liu, inventors (to NASA) (Pittsburgh Univ., Pa.) Issued 20 Mar. 1979 8 p Filed 25 Feb. 1977 Supersedes N77-18238 (15 - 09, p 1148) Sponsored by NASA (NASA-Case-LEW-12513-1; US-Patent-4,145,255; US-Patent-Appl-SN-772167; US-Patent-Class-195-103.5R; US-Patent-Class-195-127; US-Patent-Class-204-1T; US-Patent-Class-2041-195B) Avail: US Patent and Trademark Office CSCL 07D

N79-24073* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

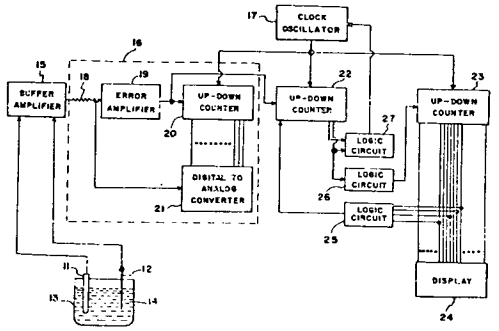
ELECTROCHEMICAL DETECTION DEVICE Patent

Richard N. Young and Judd R. Wilkins, inventors (to NASA) Issued 17 Apr. 1979 5 p Filed 30 Nov. 1977 Supersedes N78-17171 (16 - 08 p 0994)

(NASA-Case-LAR-11922-1; US-Patent-4,149,938; US-Patent-Appl-SN-856460; US-Patent-Class-195-127; US-Patent-Class-204-195B) Avail: US Patent and Trademark Office CSCL 07D

A standard pH reference electrode and a platinum cathodic electrode are positioned in a container with suitable nutrient medium for microbial growth plus the sample to be tested. The two electrodes are connected to electronic circuitry including an up/down counter which counts up for the first 80 minutes after a test has initiated. Then the potential between the two electrodes is tracked by the electronic circuitry and after there is a change of 10 mv a signal is sent to the up/down counter to cause it to reverse its count. When there is a additional 20 mv change in the potential between the two electrodes another signal is sent to the up/down counter, signalling it to stop. The resulting count on the counter is equal to the length of time for the inoculum to begin the production of measurable amounts of H2 after inoculation.

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



N79-28253* National Aeronautics and Space Administration. Pasadena Office, Calif.

CHEMICAL VAPOR DEPOSITION REACTOR Patent

Shy-Shiun Chern (JPL) and Joseph Maserjian, inventors (to NASA) (JPL) Issued 5 Jul. 1977 6 p Filed 12 Jul. 1976 Sponsored by NASA

(NASA-Case-NPO-13650-1; US-Patent-4,033,286; US-Patent-Appl-SN-704468; US-Patent-Class-118-49; US-Patent-Class-23-252R; US-Patent-Class-427-95; US-Patent-Class-248; US-Patent-Class-253; US-Patent-Class-423-33-5; US-Patent-Class-337; US-Patent-Class-349) Avail: US Patent and Trademark Office CSCL 07D

An improved chemical vapor deposition reactor is characterized by a vapor deposition chamber configured to substantially eliminate non-uniformities in films deposited on substrates by control of gas flow and removing gas phase reaction materials from the chamber. Uniformity in the thickness of films is produced by having reactive gases injected through multiple jets which are placed at uniformally distributed locations. Gas phase reaction materials are removed through an exhaust chimney which is positioned above the centrally located, heated pad or platform on which substrates are placed. A baffle is situated above the heated platform below the mouth of the chimney to prevent downdraft dispersion and scattering of gas phase reactant materials.

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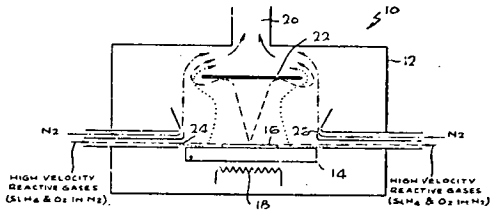


26 METALLIC MATERIALS

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

N79-22271* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

PROCESS FOR MAKING A HIGH TOUGHNESS-HIGH STRENGTH ION ALLOY Patent

Joseph R. Stephens and Walter R. Witzke, inventors (to NASA) Issued 27 Mar. 1979 4 p Filed 13 Dec. 1977 Supersedes N78-22205 (16 - 13, p 1681) Division of US Patent Appl. SN-803822, filed 6 Jun. 1977

(NASA-Case-LEW-12542-2; US-Patent-4,146,409; US-Patent-Appl-SN-860405; US-Patent-Class-148-2; US-Patent-Class-148-12F; US-Patent-Class-148-12.4; US-Patent-Appl-SN-803822) Avail: US Patent and Trademark Office

A steel alloy is produced by a process which includes using cold rolling at room temperature and subsequent heat treatment at temperatures ranging from 500 C to 650 C. The resulting alloys exhibits excellent strength and toughness characteristics at cryogenic temperatures. This alloy consists essentially of about 10 to 16 percent by weight nickel, to about 1.0 percent by weight aluminum, and 0 to about 3 percent by weight of at least one of the following additional elements: copper, lanthanum, niobium, tantalum, titanium, vanadium, yttrium, zirconium and the rare earth metals, with the balance being essentially iron. The improved alloy possesses a fracture toughness ranging from 200 to 230 ksi sq in. and yield strengths up to 230 ksi.

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

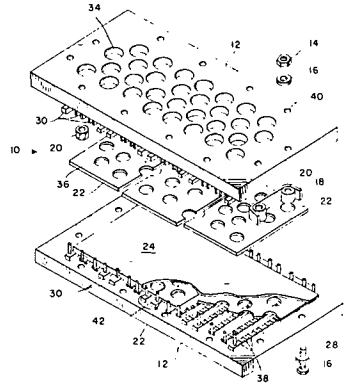
N79-25197*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

HEAT TREAT FIXTURE Patent Application

Charles S. Beuyukian (Rockwell International, Downey, Calif.) and Robert M. Heisman, inventors (to NASA) (Rockwell International, Downey, Calif.) Filed 23 Mar. 1979 11 p Sponsored by NASA

(NASA-Case-LAR-11821-1; US-Patent-Appl-SN-023501) Avail: NTIS HC A02/MF A01 CSCL 11F

A heat treating fixture is disclosed in which the shape of the metal specimen is maintained by cold rolled steel support plates. Glide sheets of stainless steel, coated with boron nitride, in contact with each face of the metal specimens, allow for lateral expansion of the metal specimens without binding. Grooved support bars separate the glide sheets from the upper and lower support plates and allow flow of quenching fluid to the metal specimen. NASA



27 NONMETALLIC MATERIALS

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

N79-22300* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

PREPARATION OF HETEROCYCLIC BLOCK COPOLYMER OMEGA-DIAMIDOXIMES Patent

Leonard O. Ross (Stanford Research Inst., Menlo Park, Calif.), Robert W. Rosser, and Mark Iannone, inventors (to NASA) (Stanford Research Inst., Menlo Park, Calif.) Issued 20 Mar. 1979 6 p Filed 17 Oct. 1977 Supersedes N78-10292 (16 - 01, p 0044)

(NASA-Case-ARC-11060-1; US-Patent-4,145,524; US-Patent-Appl-SN-843090; US-Patent-Class-528-401; US-Patent-Class-260-307G; US-Patent-Class-528-422) Avail: US Patent and Trademark Office CSCL 11C

Diamidoxime monomers are intermolecularly and thermally condensed to form a heat and chemical resistant polymer containing 1,2,4-oxadiazole linkages: with identical bivalent organic radicals or any combination of bivalent organic radicals selected from the group consisting of -(CX2)p-, where P ranges from 2 to 8 when X is fluorine and 2 to 18 when X is hydrogen, chlorine, nitro or aryl; arylene; and an oligometric or polymeric radical prepared by reacting a dicarboxylic acid halide with a fluorinated epoxide.

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

N79-22301*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

PROCESS FOR THE PREPARATION OF NEW ELASTOMERIC POLYTRIAZINES Patent Application

Robert W. Rosser and Roger A. Korus, inventors (to NASA) (San Jose State Univ., Calif.) Filed 9 Apr. 1979 15 p (NASA-Case-ARC-11248-1; US-Patent-Appl-SN-028300) Avail: NTIS HC A02/MF A01 CSCL 07D

New crosslinked elastomeric polytriazines were prepared by a 4 step procedure which consists of: (1) forming a poly (imidoylamidine) by the reaction under reflux conditions of anhydrous ammonia with certain perfluorinated alkyl or alkyletdinitriles; (2) forming a linear polytriazine by cyclizing the imidoylamidine linkages by reaction with certain perfluorinated alkyl or alkylether acid anhydrides or halides; (3) extending the linear polytriazine chain by further refluxing in anhydrous ammonia; and (4) heating to cyclize the new imidoylamidine linkages and thereby crosslink the polymer. NASA

N79-22302*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE 1,2;4-OXADIAZOLE ELASTOMERS Patent Application

Robert W. Rosser, Ibrahim M. Shalhoub (San Jose State Univ. Foundation, Calif.), and Hanoi Kwong, inventors (to NASA) (San Jose State Univ. Foundation, Calif.) Filed 9 Apr. 1979 17 p (NASA-Case-ARC-11253-1; US-Patent-Appl-SN-028301) Avail: NTIS HC A02/MF A01 CSCL 07D

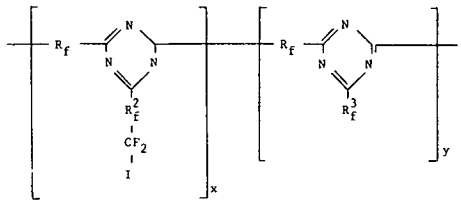
Crosslinked 1,2,4-oxadiazole elastomers were prepared by thermally condensing: (1) monomers having the formula H2N(HON) C-R-Q, where Q is a triazine ring-forming group such as nitrile or amidine or a mixture of such groups with amidoxime; or (2) a mixture of said monomer with R[C(NOH)NH2]2, with R in these formulas standing for a bivalent organic radical having the formula: -(CX2) suh p-, or -CFY(OCF2CFY) sub m O(CX2) sub p O(CFYCF2O) sub n CFY-, where X is fluorine or hydrogen, Y is fluorine or trifluoromethyl, p ranges from 1 to 18, and m + n ranges from 2 to 7. In the monomer charge, the overall proportions of amidoxime groups to triazine ring-forming groups varies depending on the extent of crosslinking desired in the final polymer. NASA

N79-24153*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

NEW PERFLUOROALKYL POLYTRIAZINES CONTAINING PENDENT IODODIFLUOROMETHYL GROUPS Patent Application

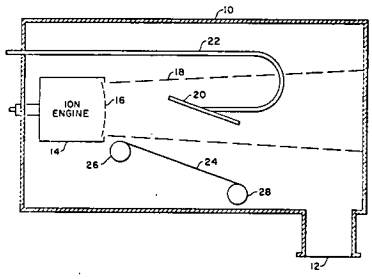
Robert W. Rosser and Theodore Psarras, inventors (to NASA) (PCR, Inc., Gainesville, Fla.) Filed 8 May 1979 11 p (NASA-Case-ARC-11241-1; US-Patent-Appl-SN-037066) Avail: NTIS HC A02/MF A01 CSCL 07C

The synthesis of a sealer for aircraft structures is described. Perfluoroalkyl polytriazines containing pendent iodo difluoro methyl groups are prepared by the reaction of perfluoro alkyl dinitriles with ammonia to form poly(imidoylamidines), followed by the cyclization of the imidoylamidine groups with, e.g. various mixtures of a perfluoroacyl fluoride with an omega-iodo perfluoro acyl fluoride. The polytriazines obtained are cured by heat which causes crosslinking at the iodo difluoro methyl groups by elimination of iodine and formation of carbon to carbon bonds. NASA



N79-24154*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ION BEAM SPUTTER DEPOSITION OF FLUOROPOLYMERS Patent Application
Bruce A. Banks and James S. Sovey, inventors (to NASA) Filed 21 May 1979 8 p
(NASA-Case-LEW-13122-1; US-Patent-Appl-SN-041146) Avail: NTIS HC A02/MF A01 CSCL 07C

Ions are impinged on a fluoropolymer target which is the sputter deposition source for a large area substrate to be coated. A clear hydrophobic coating is produced on a substrate of selected solid materials. NASA



N79-28307* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CATALYTIC TRIMERIZATION OF AROMATIC NITRILES AND TRIARYL-s-TRIAZINE RING CROSS-LINKED HIGH TEMPERATURE RESISTANT POLYMERS AND COPOLYMERS MADE THEREBY Patent
Li-Chen Hsu, inventor (to NASA) Issued 26 Jun. 1979 30 p Filed 12 May 1977 Supersedes N77-32244 (15 - 23, p 3049) Division of US Patent Appl. SN-513613, filed 10 Oct. 1974, US-Patent-4,061,856
(NASA-Case-LEW-12053-2; US-Patent-4,159,262; US-Patent-Appl-SN-796263; US-Patent-Class-528-126; US-Patent-Class-260-37N; US-Patent-Class-260-42; US-Patent-Class-260-53; US-Patent-Class-544-193; US-Patent-Class-528-221; US-Patent-Class-528-223; US-Patent-Class-528-229; US-Patent-Class-528-227; US-Patent-Class-528-225; US-Patent-Class-528-127; US-Patent-Class-528-128; US-Patent-Class-528-336; US-Patent-Class-528-337; US-Patent-Class-528-338; US-Patent-Class-528-342; US-Patent-Class-528-331) Avail: US Patent and Trademark Office CSCL 07C

Triazine compounds and cross-linked polymer compositions are made by heating aromatic nitriles to a temperature in the range of from about 100 C to about 700 C, and preferably in the range of from about 200 C to about 350 C, in the presence of a catalyst or mixture of catalysts selected from one or more of the following groups: (1) organic sulfonic and sulfinic acids, (2) organic phosphonic and phosphinic acids, and (3)metallic acetylacetonates, at a pressure in the range of from about atmospheric pressure to about 10,000 psi and preferably in the range of from about 200 psi to about 750 psi. Aromatic nitrile-modified (terminated and/or appended) imide, benzimidazole, imidazopyrrolone, quinoxaline, and other condensation type prepolymers or their precopolymers are made which are trimerized with or without a filler by the aforementioned catalytic trimerization process into triaryl-s-triazine ring containing or cross-linked polymeric or copolymeric products useful in applications requiring high thermal-oxidative stability and high performance structural properties at elevated temperatures.

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

N79-30375*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN IMPROVED SYNTHESIS OF 2, 4, 8, 10-TEXTROXASPIRO (5.5)UNDECANE Patent Application
Algirdas C. Poshkus, inventor (to NASA) (NAS-NRC) Filed 3 Jul. 1979 12 p Sponsored by NASA
(NASA-Case-ARC-11243-1; US-Patent-Appl-SN-054502) Avail: NTIS HC A02/MF A01 CSCL 07D

Pentaery thritol is converted to its diformal, 2,4,8,10-tetrox aspiro (5.5) undecane, by heating it to a temperature within the range of about 110 to 150 C for a period of up to 10 minutes, in the presence of a slight excess of paraformaldehyde and of a catalytic quantity of an acid catalyst such as sulfuric acid. The reaction is carried out in two steps, by forming first the monoformal, then the diformal. The total reaction time is about 10 minutes and yield of diformal are greater than 90%. NASA

N79-30376*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
IMPROVED SYNTHESIS OF POLYFORMALS Patent Application
Algirdas C. Poshkus, inventor (to NASA) (NAS-NRC) Filed 3 Jul. 1979 9 p Sponsored by NASA
(NASA-Case-ARC-11244-1; US-Patent-Appl-SN-054501) Avail: NTIS HC A02/MF A01 CSCL 07C

Formals of CH2OH(CHOH)nCH2 polyols (n = 2 to 4) are prepared in less than 15 minutes by heating to about 125 C, a mixture of e.g. sorbitol and paraformaldehyde in slight excess (5 to 10%), in the presence of e.g. sulfuric acid in catalytic quantities. Elution with methanol and filtration yield the pure solid cyclic triformal. The process can be carried in stages, using most stoichiometric quantities of paraformaldehyde, but without any change in overall heating time. NASA

N79-33316* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MIXED DIAMINES FOR LOWER MELTING ADDITION POLYIMIDE PREPARATION AND UTILIZATION Patent
Terry L. StClaire, inventor (to NASA) Issued 28 Aug. 1979 5 p Filed 6 Oct. 1977 Supersedes N78-18218 (16 - 08 p 1002)
(NASA-Case-LAR-12054-1; US-Patent-4,166,170; US-Patent-Appl-SN-839963; US-Patent-Class-528-229; US-Patent-Class-428-474; US-Patent-Class-264-137) Avail: US Patent and Trademark Office CSCL 07D

A novel addition polyimide based on the use of liquid monomers is described. The essentially solventless prepreg produced retails good drape, tack, and other mechanical properties.

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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.*

N79-28342* National Aeronautics and Space Administration. Pasadena Office, Calif.
HIGH PERFORMANCE AMMONIUM NITRATE PROPELLANT Patent
Floyd A. Anderson, inventor (to NASA) (JPL) Issued 19 Jun. 1979 7 p Filed 16 Dec. 1977 Supersedes N78-17230 (16 - 08, p 1003) Sponsored by NASA
(NASA-Case-NPO-14260-1; US-Patent-4,158,583; US-Patent-Appl-SN-861390; US-Patent-Class-149-19.4;

US-Patent-Class-149-19.9; US-Patent-Class-149-20) Avail: US Patent and Trademark Office CSCL 20I

A high performance propellant having greatly reduced hydrogen chloride emission is presented. It is comprised of: (1) a minor amount of hydrocarbon binder (10-15%), (2) at least 85% solids including ammonium nitrate as the primary oxidizer (about 40% to 70%), (3) a significant amount (5-25%) powdered metal fuel, such as aluminum, (4) a small amount (5-25%) of ammonium perchlorate as a supplementary oxidizer, and (5) optionally a small amount (0-20%) of a nitramine.

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

31 ENGINEERING (GENERAL)

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

N79-24197*# National Aeronautics and Space Administration. Pasadena Office, Calif.

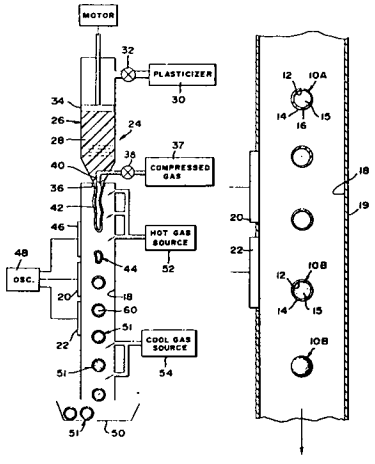
METHOD AND APPARATUS FOR PRODUCING CONCENTRIC HOLLOW SPHERES Patent Application

Taylor G. Wang (JPL) and Daniel D. Elleman, inventors (to NASA) (JPL) Filed 8 May 1979 15 p

(Contract NAS7-100)

(NASA-Case-NPO-14596-1; US-Patent-Appl-SN-037072) Avail: NTIS HC A02/MF A01 CSCL 13H

Hollow spheres with precisely concentric inner and outer spherical surfaces are formed by applying vibrations to a nonconcentric hollow sphere while it is at an elevated temperature at which it is fluid or plastic. The vibrations produce internal flows which cause the inner and outer surfaces to become precisely concentric. Concentric spheres can be mass produced by extruding a material such as glass or metal while injecting a stream of gas into the center of the extrusion to form a gas-filled tube. Vibrations are applied to the extruded tube to help break it up into individual hollow bodies of a desired uniform size. The bodies tending to form spherical inner and outer surfaces. NASA



N79-28370* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

THICKNESS MEASUREMENT SYSTEM Patent

Thomas A. Barr, inventor (to NASA) Issued 17 Jul. 1979 4 p Filed 31 Oct. 1977

(NASA-Case-MFS-23721-1; US-Patent-4,161,731; US-Patent-Appl-SN-847277; US-Patent-Class-343-14; US-Patent-Class-343-5NA) Avail: US Patent and Trademark Office CSCL 13I

An FM radar for the measurement of coal thickness wherein an FM transmitter is modulated by the combination of two signals; One, for example, could be a frequency of 100 Hz; and the other a frequency of 15 Hz. A horn-type antenna is used which is filled with a material having a dielectric constant approximating that of coal.

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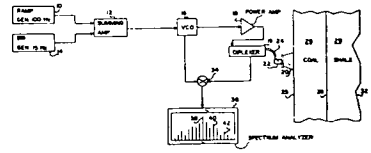

32 COMMUNICATIONS

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.*

N79-22347* National Aeronautics and Space Administration. Pasadena Office, Calif.

REDUNDANT RF SYSTEM FOR SPACE APPLICATION Patent

Charles W. Rook, inventor (to NASA) (Motorola, Inc., Scottsdale, Ariz.) Issued 3 Apr. 1979 7 p Filed 11 Jul. 1977 Supersedes N77-28358 (15 - 19, p 2520) Sponsored by NASA

(NASA-Case-NPO-13955-1; NASA-Case-NPO-13956-1; NASA-Case-NPO-13957-1; US-Patent-4,147,980; US-Patent-Appl-SN-814813; US-Patent-Class-325-24; US-Patent-Class-343-176; US-Patent-Class-343-180; US-Patent-Class-333-206; US-Patent-Class-325-366) Avail: US Patent and Trademark Office CSCL 17B

An S-band radio frequency subsystem is described including two transmitters, two receivers and two antennas. The subsystem is capable of connecting either transmitter or receiver to either antenna while permitting simultaneous operation of a transmitter and a receiver. Circulator switches provide selection of a specific transmitter and receiver for connection to either a high gain or low gain antenna. Transmitter output filters, receiver input filters, and diplexers are combined to prevent radiation or coupling or unwanted transmitter and receiver signals and to

provide isolation, permitting simultaneous operation of the transmitter and receiver. The filter elements are designed of constant diameter coaxial elements to meet demanding rejection, loss, power-handling and environmental characteristics.

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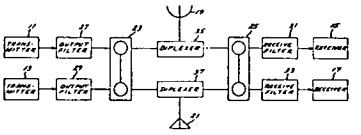

N79-23310* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

TELEPHONE MULTILINE SIGNALING USING COMMON SIGNAL PAIR Patent

Radford R. Goodloe (PRC, McLean, Va.), Pierce C. Toole (PRC, McLean, Va.), Jerry L. Belt (PRC, McLean, Va.), and Donald B. Leininger, inventors (to NASA) (PRC, McLean, Va.) Issued 8 May 1979 9 p Filed 23 Jun. 1978 Sponsored by NASA

(NASA-Case-KSC-11023-1; US-Patent-4,153,818; US-Patent-Appl-SN-918533; US-Patent-Class-179-27CA; US-Patent-Class-179-1MN; US-Patent-Class-179-84VF)

Avail: US Patent and Trademark Office CSCL 17B

An operator can rapidly and automatically produce coded electrical signals by manipulating mechanical thumb wheel switches so as to instruct a service center to connect any number of telephone lines to the console thus enabling the operator to listen and/or talk over several lines simultaneously. The system includes an on-site console having several mechanically operated thumb wheel switches to which the desired lines to be connected can be dialed in. Electrical coded signals are fed to a number of banks of line AND gates representing units, tens and hundreds, a group of channel gates, and a command gate. These signals are gated out in a controlled manner to an encoder which generates tones that are transmitted over a single line to a communication service center.

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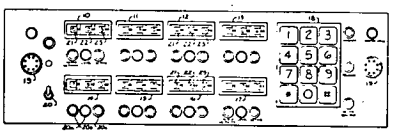

N79-24203* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

HIGH-TEMPERATURE MICROPHONE SYSTEM Patent

Allan J. Zuckerwar, inventor (to NASA) (Old Dominion Univ., Norfolk, Va.) Issued 17 Apr. 1979 10 p Filed 28 Apr. 1978 Supersedes N78-23275 (16 -14, p 1831) Sponsored by NASA

(NASA-Case-LAR-12375-1; US-Patent-4,149,423; US-Patent-Appl-SN-900842; US-Patent-Class-73-724; US-Patent-Class-73-647) Avail: US Patent and Trademark Office CSCL 17B

Pressure fluctuations in air or other gases in an area of elevated temperature are measured using a condenser microphone located in the area of elevated temperature and electronics for processing changes in the microphone capacitance located outside the area the area and connected to the microphone by means of high-temperature cable assembly. The microphone includes apparatus for decreasing the undesirable change in microphone sensitivity at high temperatures. The high temperature cable assembly operates as a half-wavelength transmission line in an AM carrier system and maintains a large temperature gradient between the two ends of the cable assembly. The processing electronics utilizes a voltage controlled oscillator for automatic tuning thereby increasing the sensitivity of the measuring apparatus.

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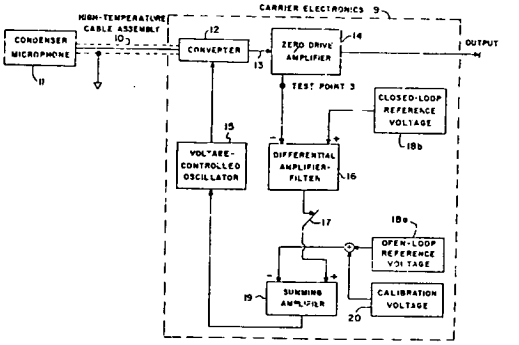

N79-24210* National Aeronautics and Space Administration. Pasadena Office, Calif.

PHASE CONJUGATION METHOD AND APPARATUS FOR AN ACTIVE RETRODIRECTIVE ANTENNA ARRAY Patent

Robert C. Tausworthe (JPL) and Ralph C. Chernoff, inventors (to NASA) (JPL) Issued 3 Apr. 1979 14 p Filed 16 Mar. 1977 Supersedes N77-24340 (15 - 15, p 1976) Sponsored by NASA

(NASA-Case-NPO-13641-1; US-Patent-4,148,031; US-Patent-Appl-SN-777983; US-Patent-Class-343-100TD)

Avail: US Patent and Trademark Office CSCL 09C

An active retrodirective antenna array wherein a reference array element is used to generate a phase reference which is replicated at succeeding elements of the array. Each element of the array is associated with a phase regeneration circuit and the phase conjugation circuitry of an adjacent element. In one implementation, the phase reference circuit operates on the input signal at the reference element, a voltage controlled oscillator (VCO) output signal and the input pilot signal at the next array element received from a transmission line. By proper filtering and mixing, a phase component may be produced to which the VCO may be locked to produce the phase conjugate of the pilot signal at the next array element plus a transmission line delay. In another implementation, particularly suited for large arrays in space, two different input pilot frequencies are employed.

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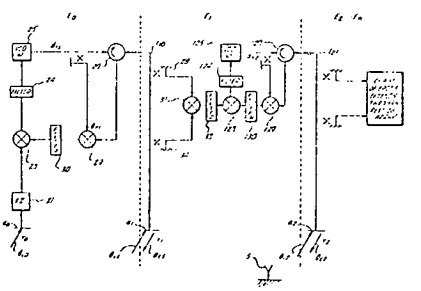


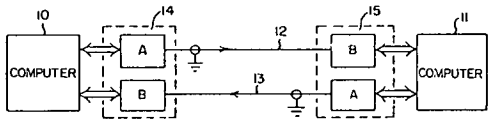
N79-24212*# National Aeronautics and Space Administration. Pasadena Office, Calif.

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

Michael W. Sievers, inventor (to NASA) (JPL) Filed 25 Apr. 1978 25 p Sponsored by NASA

(NASA-Case-NPO-14152-1; US-Patent-Appl-SN-899828) Avail: NTIS HC A02/MF A01 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 has a digital frequency modulation with a 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. NASA



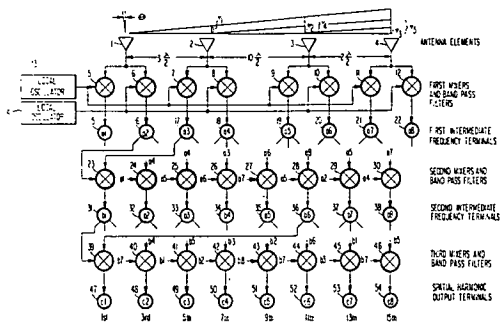
N79-26252*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A SCANNABLE BEAM-FORMING INTERFEROMETER ANTENNA ARRAY SYSTEM Patent Application

Julius A. Kaiser, Jr., inventor (to NASA) Filed 14 May 1979 18 p

(NASA-Case-GSC-12365-1; US-Patent-Appl-SN-039031) Avail: NTIS HC A02/MF A01 CSCL 20N

An antenna array comprising at least three interferometer pairs of antenna elements with selected spacings was made to form a single beam which was readily scannable. All spatial frequencies generated by a signal and intercepted by the array were derived from a signal processing technique applied to the array. The array sampled space in the spatial frequency domain while the signal processing technique utilized real time convolution of functions in the spectral frequency domain. Summation of the appropriate spatial frequencies was equivalent to a Fourier transform operation, yielding the location of the signal source in space. Resolution and freedom from interference of the interferometer system was equal to that of a fully filled array of the same aperture size containing element spacings of one-half wavelength. NASA



N79-26253*# National Aeronautics and Space Administration. Pasadena Office, Calif.

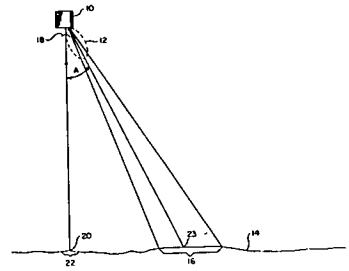
ECHO TRACKER/RANGE FINDER FOR RADARS AND SONARS Patent Application

Nick J. Constantinides, inventor (to NASA) (JPL) Filed 29 Jun. 1979 22 p

(Contract NAS7-100)

(NASA-Case-NPO-14361-1; US-Patent-Appl-SN-053572) Avail: NTIS HC A02/MF A01 CSCL 20N

An echo tracker/range finder or altimeter is described in which the pulse repetition frequency (PFR) of a predetermined number of transmitted pulses is adjusted so that echo pulses received from a reflecting object are positioned between transmitted pulses and divide their interpulse time interval into two time intervals having a predetermined ratio with respect to each other. The thus-adjusted PRF is related to the range of the reflecting object. In addition, the invention provides a means whereby the arrival time of a plurality of echo pulses is defined as the time at which a composite echo pulse formed of a sum of the individual echo pulses has the highest amplitude. An especially useful application is in determining altitude information for an aircraft or an orbiting spacecraft utilizing a synthetic aperture imaging radar system. However, it could be used with sonar systems, laser ranger finders, or any other kind of rangefinding application in which a number of pulses are received. NASA



N79-27348*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

MULTIPLE BAND CIRCULARLY POLARIZED ANTENNA Patent Application

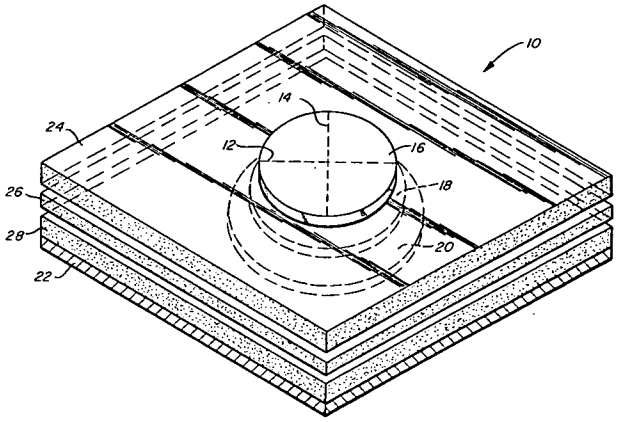
I-Ping Yu, inventor (to NASA) (Lockheed Electronics Co., Houston, Tex.) Filed 22 Jun. 1979 21 p

(Contract NAS9-15200)

(NASA-Case-MSC-18334-1; US-Patent-Appl-SN-051270) Avail: NTIS HC A02/MF A01 CSCL 09A

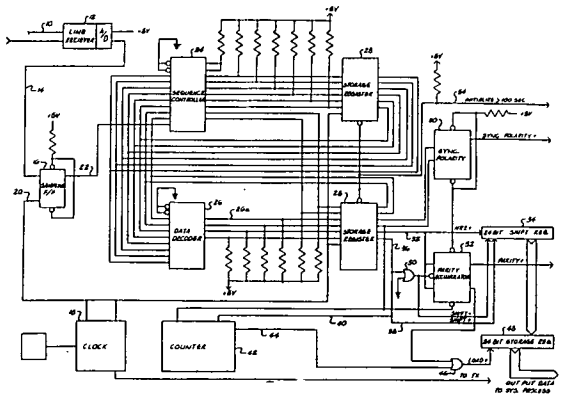
A multiple band antenna assembly for communicating electromagnetic raadiation is presented. An antenna element stack was constructed of a plurality of elliptical lamina antenna elements multually separated by layers of dielectric material, and separated from a ground plane by dielectric material. The antenna assembly was coupled through a feed line in contact with the top antenna element. A conductor was used to join the remaining antenna elements to the ground plane. Each individual antenna element was operable for communication reception and transmission within a frequency band determined by the size of the particular antenna element. The sizes of the antenna elements

can be selected to provide electromagnetic radiation communication over several distinct frequency bands, or to connect the individual bands into a broad band. NASA



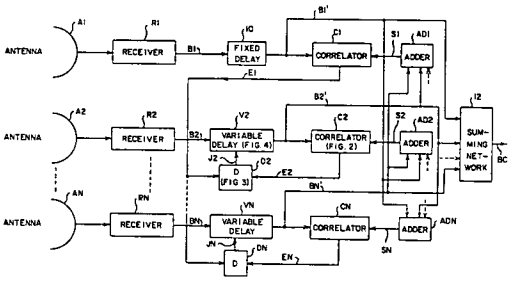
N79-28383*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
SERIAL DATA CORRELATOR/CODE TRANSLATOR Patent Application
Larry Edward Morgan, inventor (to NASA) Filed 27 Jul. 1979 18 p
(NASA-Case-KSC-11025-1; US-Patent-Appl-SN-061327) Avail: NTIS HC A02/MF A01 CSCL 17B

A system is presented for analyzing asynchronous signals containing bits of information for ensuring the validity of said signals by sampling each bit of information a plurality of times and feeding the sample bits of information into a sequence controller. The sequence controller has a plurality of maps or programs through which the sample bits are stepped so as to identify the particular bit of information and determine the validity and phase of the bit. The step in which the sampling controller is clocked is controlled by a storage register. A data decoder decodes the information fed out of the sequence controller and storage register and feeds such information to shift registers for storage. NASA



N79-32408*# National Aeronautics and Space Administration. Pasadena Office, Calif.
BASEBAND SIGNAL COMBINER FOR ANTENNA ARRAY Patent Application
Mahlon F. Easterling (JPL) and Robin A. Winkelstein, inventors (to NASA) (JPL) Filed 18 Sep. 1979 21 p
(Contract NAS7-100)
(NASA-Case-NPO-14641-1; US-Patent-Appl-SN-076643) Avail: NTIS HC A02/MF A01 CSCL 17B

A method and apparatus for combining baseband signals from a large aperture antenna array in which none of the individual baseband signals has a sufficiently high signal-to-noise ratio is disclosed. The invention provides a means whereby the baseband output signals of all but one of the receivers associated with each of the antennas are summed and used as a correlation reference for the baseband signal not contained in the summed signal. Thereby, a plurality of correlation or alignment loops is provided, each having an output signal related to the phase difference between its input baseband signal and the summed signal. The invention further provides a means for subtracting an output or error signal generated in one of the correlation loops whose baseband signal has a predetermined phase delay from all the other alignment loops, thus avoiding interaction and reflection effects in the signal combiner. 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*.

N79-22373* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
DIGITAL AUTOMATIC GAIN AMPLIFIER Patent
Larry D. Holley and James O. Ward, inventors (to NASA) (Federal Electric Corp., Paramus, N.J.) Issued 22 Aug. 1978 5 p Filed 24 Mar. 1977 Supersedes N77-21321 (15 - 12, p 1577)
(NASA-Case-KSC-11008-1; US-Patent-4,109,213; US-Patent-Appl-SN-780729; US-Patent-Class-330-2; US-Patent-Class-324-99D; US-Patent-Class-324-123C; US-Patent-Class-330-51; US-Patent-Class-330-86) Avail: US Patent and Trademark Office CSCL 09A

A circuit is described for adjusting the amplitude of a reference signal to a predetermined level so as to permit subsequent data signals to be interpreted correctly. The circuit includes an operational amplifier having a feedback circuit connected between an output terminal and an input terminal; a bank of relays operably connected to a plurality of resistors; and a

comparator comparing an output voltage of the amplifier with a reference voltage and generating a compared signal responsive thereto. Means is provided for selectively energizing the relays according to the compared signal from the comparator until the output signal from the amplifier equals to the reference signal. A second comparator is provided for comparing the output of the amplifier with a second voltage source so as to illuminate a lamp when the output signal from the amplifier exceeds the second voltage.

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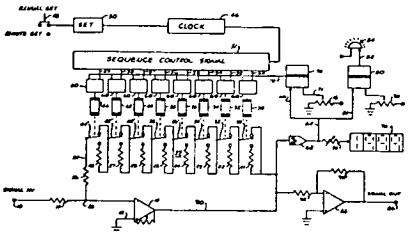

N79-23345* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.

VOLTAGE REGULATOR FOR BATTERY POWER SOURCE Patent

James M. Black, inventor (to NASA) Issued 24 Apr. 1979 5 p Filed 9 Mar. 1978
(NASA-Case-FRC-10116-1; US-Patent-4,151,456; US-Patent-Appl-SN-885049; US-Patent-Class-323-22T) Avail: US Patent and Trademark Office CSCL 09C

A bipolar transistor in series with the battery as the control element also in series with a zener diode and a resistor is used to maintain a predetermined voltage until the battery voltage decays to very nearly the predetermined voltage. A field effect transistor between the base of the bipolar transistor and a junction between the zener diode and resistor regulates base current of the bipolar transistor, thereby regulating the conductivity of the bipolar transistor for control of the output voltage.

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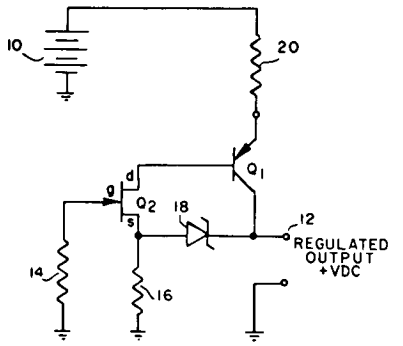


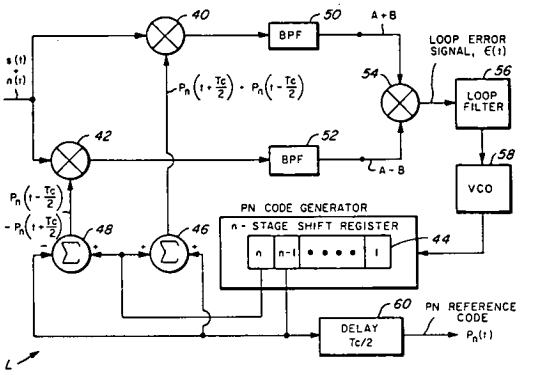
N79-23347*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

PSEUDONOISE CODE TRACKING LOOP Patent Application

David T. LaFlame, inventor (to NASA) (Hughes Aircraft Co., Los Angeles) Filed 21 May 1979 9 p Sponsored by NASA
(NASA-Case-MSC-18035-1; US-Patent-Appl-SN-041142) Avail: NTIS HC A02/MF A01 CSCL 09C

An improved delay-locked loop (DLL) for tracking pseudonoise (PN) codes is discussed. The loop is virtually insensitive to gain imbalances between its two arms. The result is an elimination of direct current timing errors encountered with previous designs.

NASA



N79-24254* National Aeronautics and Space Administration. Pasadena Office, Calif.

MODULE FAILURE ISOLATION CIRCUIT FOR PARALLELED INVERTERS Patent

Satoshi Nagano, inventor (to NASA) (JPL) Issued 17 Apr. 1979 6 p Filed 9 Feb. 1978 Supersedes N78-22299 (16 - 13, p 1694) Sponsored by NASA
(NASA-Case-NPO-14000-1; US-Patent-4,150,425; US-Patent-Appl-SN-876431; US-Patent-Class-363-56; US-Patent-Class-307-82; US-Patent-Class-363-71; US-Patent-Class-363-97) Avail: US Patent and Trademark Office CSCL 09C

A module failure isolation circuit is described which senses and averages the collector current of each paralled inverter power transistor and compares the collector current of each power transistor the average collector current of all power transistors to determine when the sensed collector current of a power transistor in any one inverter falls below a predetermined ratio of the average collector current. The module associated with any transistor that fails to maintain a current level above the predetermined radio of the average collector current is then shut

off. A separate circuit detects when there is no load, or a light load, to inhibit operation of the isolation circuit during no load or light load conditions.

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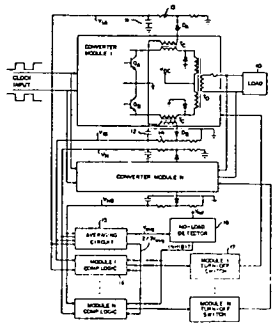

N79-24257* National Aeronautics and Space Administration. Pasadena Office, Calif.

CIRCUIT FOR AUTOMATIC LOAD SHARING IN PARALLEL CONVERTER MODULES Patent

Satoshi Nagano, inventor (to NASA) (JPL) Issued 10 Apr. 1979 5 p Filed 15 Sep. 1977 Supersedes N77-32402 (15 - 23, p 3071) Sponsored by NASA

(NASA-Case-NPO-14056-1; US-Patent-4,149,233; US-Patent-Appl-SN-833637; US-Patent-Class-363-71; US-Patent-Class-363-134; US-Patent-Class-363-95) Avail: US Patent and Trademark Office CSCL 09C

A nondissipative circuit for automatic load sharing in parallel converter modules having push-pull power transistors is presented. Each transistor has a separate current-sensing transformer and an impedance-adjusting transformer in series with its collector. The impedance-adjusting transformer functions as a current-controlled variable impedance that is responsive to the difference between the peak collector current of the transistor and the average peak current of all collector currents of power transistors in all modules, thereby to control the collector currents of all power transistors with reference to the average peak collector current.

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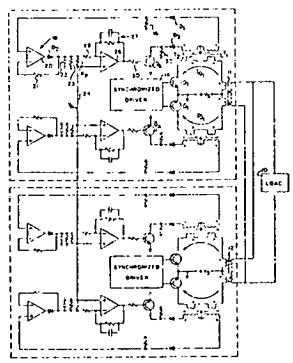


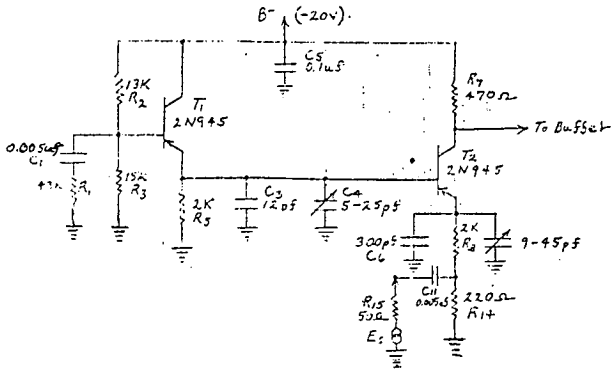
N79-24260*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

INDUCTORLESS NARROW-BAND FILTER/AMPLIFIER Patent Application

Leonard L. Kleinberg, inventor (to NASA) Filed 23 Apr. 1979 20 p

(NASA-Case-GSC-12410-1; US-Patent-Appl-SN-32306) Avail: NTIS HC A02/MF A01 CSCL 09A

An inductorless tuned circuit is described which employs a pair of directly coupled transistor stages which may be operated with a signal injected into the emitter of either transistor or may be operated as an oscillator. The transistors are selected so that they will be operating near and somewhat below their transitional frequency (f sub t) typically at a frequency of about F sub t/2. In one configuration, the circuit will appear as a positive reactance in series with a negative resistance. In another embodiment, the circuit will appear as a positive reactance in series with a negative resistance in parallel with a negative reactance in series with a resistance. NASA



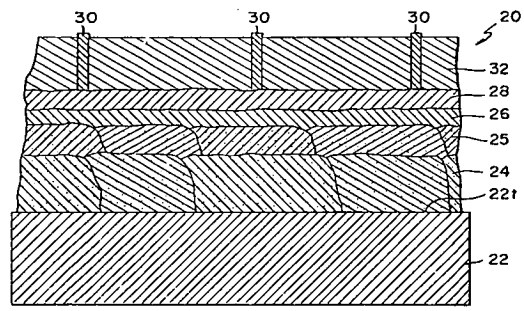
N79-25311*# National Aeronautics and Space Administration. Pasadena Office, Calif.

SCHOTTKY BARRIER CELL AND METHOD OF FABRICATING IT Patent Application

Richard J. Stirn (JPL) and Yea-Chuan M. Yeh, inventors (to NASA) (JPL) Filed 29 Sep. 1977 25 p Sponsored by NASA

(NASA-Case-NPO-13689A; US-Patent-Appl-SN-837513) Avail: NTIS HC A02/MF A01 CSCL 09A

A low cost Schottky barrier type solar cell is described. The prior active layer substrate is replaced with an inexpensive semiconductor polycrystalline substrate on which the active layer is grown, eliminating the need for a single crystal wafer. The methods of forming native and nonnative interfacial oxide layers is presented. M.M.M.

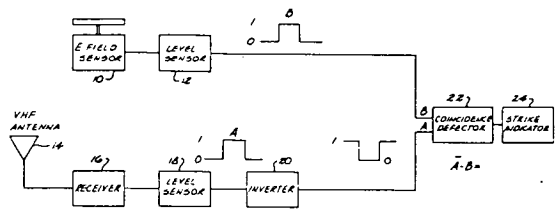


N79-25313*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

LIGHTNING DISCHARGE IDENTIFICATION SYSTEM Patent Application

Carl L. Lennon, inventor (to NASA) Filed 30 May 1979 7 p (NASA-Case-KSC-11099-1; US-Patent-Appl-SN-043945) Avail: NTIS HC A02/MF A01 CSCL 09A

A system for differentiating between cloud to cloud and cloud to ground lightning discharges was developed which includes an electric field antenna that senses the rate of change of an electric field produced by a lightning discharge. When the signal produced by the electric field exceeds a predetermined threshold, it is fed to a coincidence detector. A VHF antenna is also provided. When signals from the electric field antenna and the VHF antenna appear at the coincidence detector simultaneously, such indicates that there is a cloud to cloud lightning discharge; whereas, when there is not a signal produced on the VHF antenna simultaneously with a signal produced by the field sensor, then a strike indicator connected to the coincidence detector indicates a cloud to ground lightning discharge. NASA



N79-25314*# National Aeronautics and Space Administration. Pasadena Office, Calif.

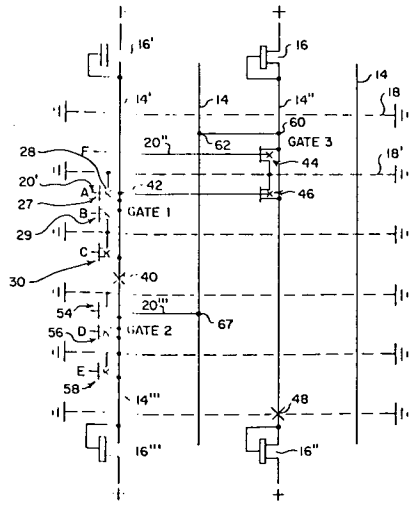
A GENERAL LOGIC STRUCTURE FOR CUSTOM LSI CIRCUITS Patent Application

Michael W. Sievers, inventor (to NASA) (JPL) Filed 1 Jun. 1979 27 p

(Contract NAS7-100)

(NASA-Case-NPO-14410-1; US-Patent-Appl-SN-044429) Avail: NTIS HC A03/MF A01 CSCL 09C

A general logic structure is described for custom large scale integration (LSI) circuit substrates. To form a NOR gate, a conduction column is connected to a pull-up resistor and a diffused conductor segment is positioned to cross an implicant row and connect a diffusion row to the conduction column. Conduction column and implicant row segments are formed by overlay masks which define cuts and contacts on a basic mask set defining the general logic structure. These overlay masks also define the diffused conductor segments. By interconnecting the various rows, columns, pull-up resistors, and diffused conductor segments within the structure, a plurality of NOR gates can be created to form a predetermined NOR gate logic array. Thus, overlay masks are utilized to program the basic general logic structure mask set to provide easily manufactured, high density, custom logic circuits. NASA

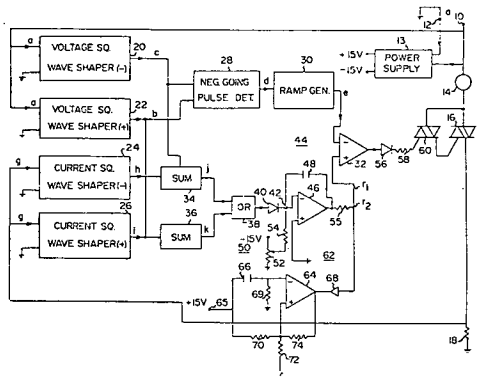


N79-25315*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

IMPROVED POWER FACTOR CONTROL SYSTEM FOR ac INDUCTION MOTORS Patent Application

Frank J. Nola, inventor (to NASA) Filed 1 Jun. 1979 21 p (NASA-Case-MFS-23988-1; US-Patent-Appl-SN-044431) Avail: NTIS HC A02/MF A01 CSCL 09C

A power control circuit for an induction motor was developed. A servo loop was used to control power input by controlling the power factor of motor operation. The power factor was then measured by summing the voltage and current derived square wave signals. NASA



N79-26311*# National Aeronautics and Space Administration. Pasadena Office, Calif.

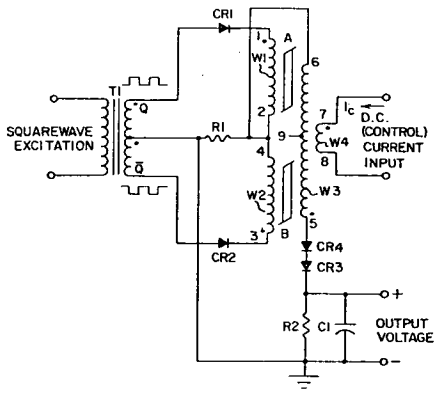
LOW CURRENT LINEARIZATION OF MAGNETIC AMPLIFIER FOR dc TRANSFORMER Patent Application

Satoshi Nagano, inventor (to NASA) (JPL) Filed 22 Jun. 1979 15 p

(Contract NAS7-100)

(NASA-Case-NPO-14617-1; US-Patent-Appl-SN-051269) Avail: NTIS HC A02/MF A01 CSCL 09C

A magnetic amplifier, having two saturable reactor cores with a separate excitation winding on each connected in series opposition, a common control winding, and a common output winding, was adapted for use as a low level signal transducer by exciting the separate excitation windings in push-pull mode through a center tapped transformer. Also, at least one diode in series with a load resistor connected to the output winding was included. A resistor in series with the output winding and load resistor was connected between the center tap of the transformer and the connection between the two excitation windings of the saturable core providing a return current path for the output winding. It also allows the excitation windings of the saturable cores to operate as primary windings of transformers. NASA



N79-26312*# National Aeronautics and Space Administration. Pasadena Office, Calif.

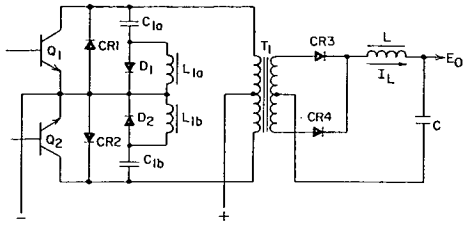
PUSH-PULL CONVERTER WITH ENERGY SAVING CIRCUIT FOR PROTECTING SWITCHING TRANSISTORS FROM PEAK POWER STRESS Patent Application

W. T. McLyman, inventor (to NASA) (JPL) Filed 22 Jun. 1979 15 p

(Contract NAS7-100)

(NASA-Case-NPO-14316-1; US-Patent-Appl-SN-051276) Avail: NTIS HC A02/MF A01 CSCL 09C

In a push-pull converter, switching transistors are protected from peak power stresses by a separate snubber circuit in parallel with each comprising a capacitor and an inductor in series, and a diode in parallel with the inductor. The diode is connected to conduct current of the same polarity as the base-emitter junction of the transistor so that energy stored in the capacitor while the transistor is switched off, to protect it against peak power stress, discharges through the inductor when the transistor is turned on, and after the capacitor is discharged the energy now stored in the inductor discharges through the diode. To return this energy to the power supply, or to utilize this energy in some external circuit, the inductor may be replaced by a transformer having its secondary winding connected to the power supply or to the external circuit. NASA



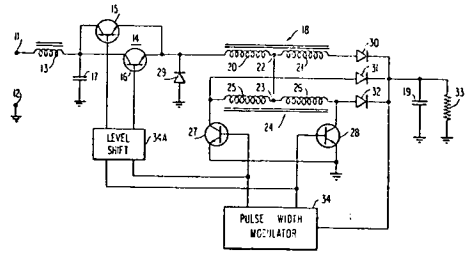
N79-27394*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

BUCK/BOOST REGULATOR Patent Application

John Paulkovich and G. Ernest Rodriguez, inventors (to NASA) Filed 21 May 1979 24 p

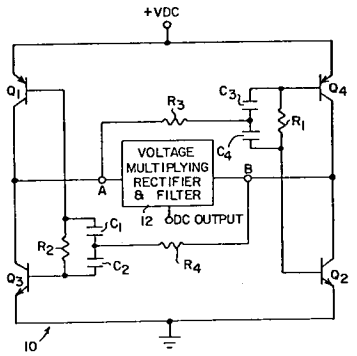
(NASA-Case-GSC-12360-1; US-Patent-Appl-SN-041164) Avail: NTIS HC A02/MF A01 CSCL 09C

A voltage regulated dc to dc converter is presented which is operable over a wide range of input voltage including voltages greater or less than the desired output voltage. The converter uses an inductor and a capacitor as storage elements with the inductor being composed of two windings having a common junction. A transformer having a center tap connected to the common junction of the two windings of the inductor is connected at either end of its winding to ground through controlled switches. One winding of the inductor and either end of the transformer winding are connected by respective power diodes to the capacitor which supplies the output voltage to a load. The other winding of the inductor is connected to a fourth power diode as a clamping diode. Input voltage is supplied to the inductor through a third controlled switch. NASA



N79-27395*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
POWER CONVERTER Patent Application
James M. Black, inventor (to NASA) Filed 29 Jun. 1979 16 p
(NASA-Case-FRC-11014-1; US-Patent-Appl-SN-053652) Avail: NTIS HC A02/MF A01 CSCL 09C

The dc to dc converter described employs four transistor switches in a bridge to chop dc power from a source, and a voltage multiplying diode rectifying ladder network to rectify and filter the chopped dc power for delivery to a load. The bridge switches are cross-coupled in order for diagonally opposite pairs to turn on and off together using RC networks for the cross-coupling to achieve the mode of operation of a free running multivibrator, and the diode rectifying ladder is configured to operate in a push-pull mode driven from opposite sides of the multivibrator outputs of the bridge switches. The four transistor switches provide a squarewave output voltage which has a peak-to-peak amplitude that is twice the input dc voltage, and is thus useful as a dc-to-ac inverter. NASA



A system is presented for automatically controlling transformer coupled alternating current electric lines. The secondary winding of each transformer is provided with a center tap. A switching circuit is connected to the center taps of a pair of secondary windings and includes a switch controller. An impedance is connected between the center taps of the opposite pair of secondary windings. The switching circuit has continuity when the AC lines are continuous and discontinuity with any disconnect of the AC lines. Normally open switching means are provided in at least one AC line. The switch controller automatically opens the switching means when the AC lines become separated.
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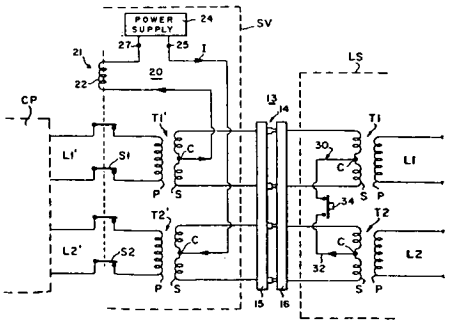

N79-28415* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SYSTEM FOR AUTOMATICALLY SWITCHING TRANSFORMER COUPLED LINES Patent
William S. Dwinell, inventor (to NASA) (Rockwell Intern., Downey, Calif.) Issued 17 Jul. 1979 5 p Filed 9 Mar. 1978 Supersedes N78-22298 (16 - 13, p 1694) Sponsored by NASA
(NASA-Case-MSC-16697-1; US-Patent-4,161,661; US-Patent-Appl-SN-885067; US-Patent-Class-307-119; US-Patent-Class-307-98; US-Patent-Class-361-170) Avail: US Patent and Trademark Office CSCL 09C

N79-28416* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MICROWAVE DICHROIC PLATE Patent
Thomas E. Wise, inventor (to NASA) (Bendix Field Eng. Corp., Columbia, Md.) Issued 3 Jul. 1979 8 p Filed 16 Feb. 1978 Supersedes N78-18313 (16 - 09, P 1149) Sponsored by NASA
(NASA-Case-GSC-12171-1; US-Patent-4,160,254; US-Patent-Appl-SN-878542; US-Patent-Class-343-909) Avail: US Patent and Trademark Office CSCL 20N

A dichroic plate for microwave energy includes an array of interlaced crossed slots or dipole elements. Each of the elements includes first and second crossed arms that are at approximately right angles to each other and aligned with X and Y axes. The elements are arranged so that the centers thereof are aligned parallel to the X and Y axes to form columns and rows, and the interlacing is such that a line between the centers of all adjacent elements has nonzero, differing components relative to the X and Y axes. In one embodiment, the spacing between adjacent arms of different, adjacent elements is the same along

the X and Y axes, while in a second embodiment, the spacing between similarly directed arms of adjacent elements differs from the spacing between oppositely directed arms of adjacent elements.

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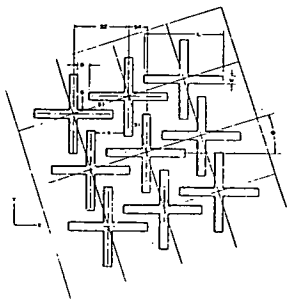


N79-31498*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

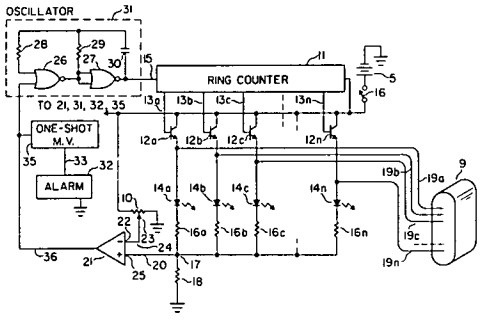
ELECTRICAL SHORT LOCATOR Patent Application

Gordon J. Deboo and David Joseph Devine, inventors (to NASA) Filed 24 Aug. 1979 12 p

(NASA-Case-ARC-11116-1; US-Patent-Appl-SN-069485) Avail: NTIS HC A02/MF A01 CSCL 09A

An electrical short finding instrument suited for locating shorts as they occur while an electrical system is being wired, sounds an alarm as soon as a short is produced and further identifies the conductors that are shorted together. A ring counter derives input pulses from a squarewave oscillator. The outputs of the counter are fed through transistors to an array of light emitting diodes. Each diode is connected to an electrical conductor, such as a bus bar, that is to be tested. Leads and connector permit such connections to be made to the bus bar assembly. In the absence of a short between two electrical conductors the diodes are sequentially illuminated. When a short occurs, a comparator/multivibrator circuit triggers an alarm and stops the oscillator and the sequential energization of the diodes. The two diodes that remain illuminated identify the bus bars that are shorted.

NASA



N79-32463*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

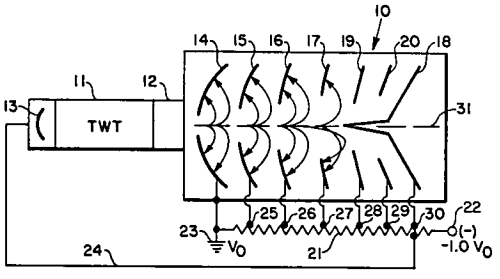
MULTISTAGE DEPRESSED COLLECTOR FOR DUAL NODE OPERATION Patent Application

H. G. Kosmahl, inventor (to NASA) Filed 7 Sep. 1979 14 p

(NASA-Case-LEW-13282-1; US-Patent-Appl-SN-073579) Avail: NTIS HC A02/MF A01 CSCL 09C

A depressed collector which captures the spent electrons of a microwave transmitting tube at high efficiency in both high and low power modes of operation is provided. The end electrode has a spike extending toward the entrance electrode. Intermediate electrodes and the entrance electrode have central apertures increasing in size in a downstream direction. These electrodes capture most high power mode spent electrons. A low power mode electrode is positioned between the last intermediate electrode and the end electrode to capture low power spent electrons. This electrode has a central aperture preferably smaller but no larger than that of the last intermediate electrode. An auxiliary low power mode electrode with a central aperture larger than that of the low power mode electrode may be axially positioned between the end electrode and the low power mode electrode. The electrodes are all at voltages provided by a voltage divider connected between a negative potential and a common ground return.

NASA



N79-33392* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

CALIBRATING PRESSURE SWITCH Patent

Norman J. Smith, inventor (to NASA) (Boeing Co., Seattle, Wash.) Issued 16 Apr. 1968 5 p Filed 4 May 1966 Sponsored by NASA

(NASA-Case-XMF-04494-1; US-Patent-3,378,657; US-Patent-Appl-SN-547643; US-Patent-Class-200-83) Avail: US Patent and Trademark Office CSCL 09A

A pressure switch assembly comprising a body portion and a switch mechanism having a contact element operable between opposite limit positions is described. A diaphragm chamber is provided in the body portion which mounts therein a system diaphragm and a calibration diaphragm which are of generally the same configuration and having outer faces conforming to the inner and outer walls of the diaphragm chamber. The space between the inner faces of the diaphragms defines a first chamber section and the space between the outer face of one of the diaphragms and the outer wall of the diaphragm chamber defines a second chamber section. The body portion includes a system pressure port communicating with one of the chamber sections and a calibration pressure port communicating with the other

chamber section. An actuator connected to one of the diaphragms and the contact element of the switch operates upon pressure change in the diaphragm sections to move said contact element between limit positions.

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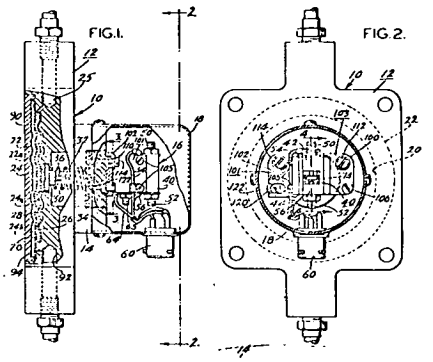

N79-33393* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

FUSED SWITCH Patent

George J. Weber, inventor (to NASA) (McDonnell Aircraft Corp., St. Louis) Issued 3 Mar. 1964 3 p Filed 6 Apr. 1960 Sponsored by NASA

(NASA-Case-XMS-01244-1; US-Patent-3,123,692; US-Patent-Appl-SN-20370; US-Patent-Class-200-114) Avail: US Patent and Trademark Office CSCL 09A

An electric switch device is described which can be used safely even in an explosive environment. The switch has an operating arm, and a moveable actuator which is engaged by the arm and moved between a number of positions in which the arm opens or closes the switch. A fuse is slidably positioned in a passage through the actuator. The fuse can be replaced in the passage by another fuse when the actuator is in one of its many positions. The device is lightweight and compact, is capable of withstanding severe shock, and is not adversely affected by extremes of temperature.

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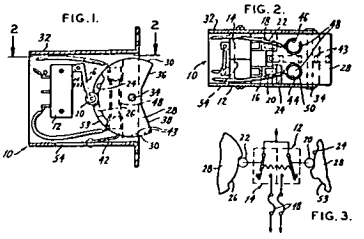


34 FLUID MECHANICS AND HEAT TRANSFER

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

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

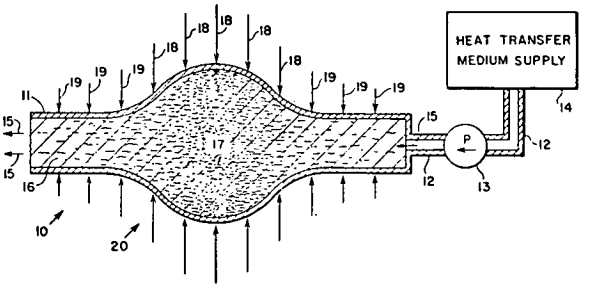
N79-23383*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

A HEAT EXCHANGER AND METHOD OF MAKING Patent Application

A. Fortini and John M. Kazaroff, inventors (to NASA) Filed 23 Apr. 1979 14 p

(NASA-Case-LEW-12441-3; US-Patent-Appl-SN-032307) Avail: NTIS HC A02/MF A01 CSCL 20D

A heat exchanger of increased effectiveness is disclosed. A porous metal matrix is disposed in a metal chamber or between walls through which a heat-transfer fluid is directed. The porous metal matrix has internal bonds and is bonded to the chamber in order to remove all thermal contact resistance within the composite structure. Utilization of the invention in a rocket chamber is disclosed as a specific use. Also disclosed is a method of constructing the heat exchanger. NASA



N79-24285* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

FLUID SAMPLE COLLECTION AND DISTRIBUTION SYSTEM Patent

Richard L. Brooks, inventor (to NASA) (Boeing Aerospace Co., Houston, Tex.) Issued 24 Apr. 1979 9 p Filed 4 Apr. 1978 Supersedes N78-22590 (16 - 13, p 1734) Sponsored by NASA

(NASA-Case-MSC-16841-1; US-Patent-4,151,086; US-Patent-Appl-SN-893382; US-Patent-Class-210-108; US-Patent-Class-210-142; US-Patent-Class-73-714) Avail: US Patent and Trademark Office CSCL 20D

A multipoint fluid sample collection and distribution system is provided wherein the sample inputs are made through one or more of a number of sampling valves to a progressive cavity pump which is not susceptible to damage by large unfiltered particles. The pump output is through a filter unit that can provide a filtered multipoint sample. An unfiltered multipoint sample is also provided. An effluent sample can be taken and applied to a second progressive cavity pump for pumping to a filter unit

that can provide one or more filtered effluent samples. The second pump can also provide an unfiltered effluent sample. Means are provided to periodically back flush each filter unit without shutting off the whole system.

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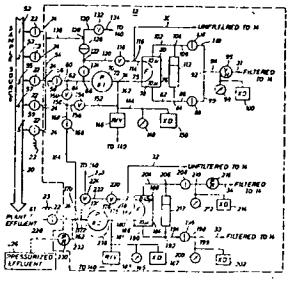

N79-31523* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

THERMAL CONTROL CANISTER Patent

Stanford Ollendorf, inventor (to NASA) Issued 31 Jul. 1979 11 p Filed 21 Nov. 1977 Supersedes N78-13380 (16 - 04 p 0474)

(NASA-Case-GSC-12253-1; US-Patent-4,162,701; US-Patent-Appl-SN-853677; US-Patent-Class-165-32; US-Patent-Class-165-105; US-Patent-Class-244-1R; US-Patent-Class-244-163) Avail: US Patent and Trademark Office CSCL 20D

An apparatus for maintaining a heat dissipating load at a substantially constant temperature, and more particularly, to such an apparatus where in variable conductance heat pipes control the radiating area of a radiator is described.

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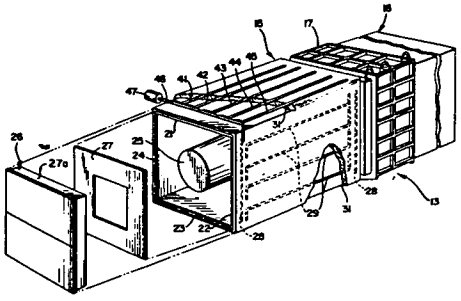

35 INSTRUMENTATION AND PHOTOGRAPHY

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.*

N79-26372* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

MAGNETIC SUSPENSION AND POINTING SYSTEM Patent

Willard W. Anderson and Nelson J. Groom, inventors (to NASA) Issued 29 May 1979 4 p Filed 27 Feb. 1976 Supersedes N76-18227 (14 - 09, p 1095)

(NASA-Case-LAR-11889-1; US-Patent-4,156,548; US-Patent-Appl-SN-662182; US-Patent-Class-308-10; US-Patent-Class-73-178R) Avail: US Patent and Trademark Office CSCL 14B

Apparatus for providing accurate pointing of instruments on a carrier vehicle and for providing isolation of the instruments from the vehicle's motion disturbances is presented. The apparatus includes two assemblies, with connecting interfaces, each assembly having a separate function. The first assembly is attached to the carrier vehicle and consists of an azimuth gimbal and an elevation gimbal which provide coarse pointing of the instruments by allowing two rotations of the instruments relative to the carrier vehicle. The second or vernier pointing assembly is made up of magnetic suspension and fine pointing actuators, roll motor segments, and an instrument mounting plate around which a continuous annular rim is attached which provides appropriate magnetic circuits for the actuators and the roll motor segments. The vernier pointing assembly provides six degree-of-freedom isolation from carrier motion disturbances.

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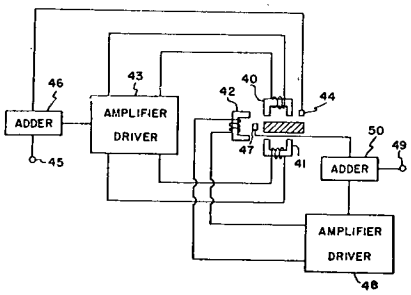


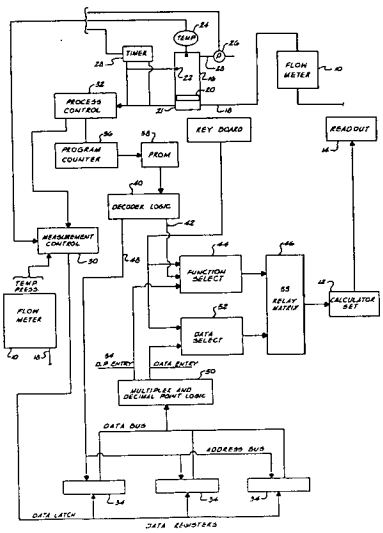
N79-27479*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

AUTOMATIC FLOWMETER CALIBRATION SYSTEM Patent Application

Raymond V. Lisle and Terry L. Wilson, inventors (to NASA) Filed 22 Jun. 1979 13 p

(NASA-Case-KSC-11076-1; US-Patent-Appl-SN-051274) Avail: NTIS HC A02/MF A01 CSCL 14B

A system for automatically calibrating the accuracy of a flowmeter includes a calculator capable of performing mathematical functions responsive to receiving data signals and function command signals. A prover cylinder which includes a piston is provided for measuring the temperature, pressure, and time required for accumulating a predetermined volume of fluid. Along with these signals, signals representing the temperature and pressure of the fluid going into the meter are fed to a number of data registers. Under control of a process controller, which includes a program counter, a programmable read only memory, and decoder logic system, the data registers are read out and the information is fed through a data select circuit to the calculator. Command signals are also produced by a function select circuit and are fed to the calculator set indicating the desired function to be performed. The calculator set performs the calculation and generates a readout indicating the flow rate of the fluid. This reading is, then compared with the reading produced by the flowmeter. NASA



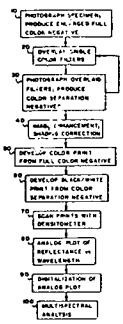
N79-28527* National Aeronautics and Space Administration. Pasadena Office, Calif.

BIOCONTAMINATION AND PARTICULATE DETECTION SYSTEM Patent

Jacqueline M. Jacobs, inventor (to NASA) (JPL) Issued 10 Jul. 1979 6 p Filed 24 Feb. 1978 Supersedes N78-22587 (16 - 13, p 1734) Sponsored by NASA
(NASA-Case-NPO-13953-1; US-Patent-4,160,601; US-Patent-Appl-SN-880727; US-Patent-Class-356-404; US-Patent-Class-356-237) Avail: US Patent and Trademark Office CSCL 14E

A method for determining the characteristics and amount of microscopic contaminants lodged on a photographed surface is disclosed. An image enhanced full color photographic negative and print are taken of the contaminated surface. Three black and white prints are developed subsequently from red, green and blue separation filter overlays of the color negative. Both the color and three monochromatic prints are then scanned to extract in digital form a profile of any contaminant possibly existing on the surface. The resulting profiles are electronically analyzed and compared with data already stored relating to known contaminants.

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

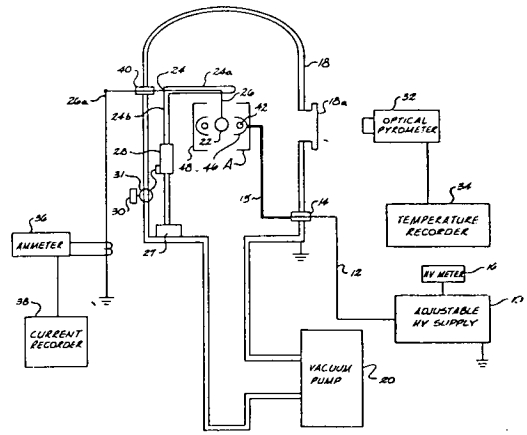


N79-29492*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

CONTAINERLESS HIGH TEMPERATURE CALORIMETER APPARATUS Patent Application

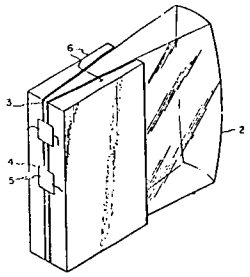
Lewis L. Lacy, Michael B. Robinson, and Daniel B. Nisen, inventors (to NASA) Filed 29 Jun. 1979 15 p
(NASA-Case-MFS-23923-1; US-Patent-Appl-SN-053569) Avail: NTIS HC A02/MF A01 CSCL 14B

An instrument is disclosed for measuring high temperature thermophysical properties of materials which includes a unique containerless heating apparatus wherein the specimen is suspended and heated by electron bombardment. NASA



N79-33449* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
WEDGE IMMERSED THERMISTOR BOLOMETERS Patent
Marc G. Dreyfus, inventor (to NASA) (Barnes Engineering Co., Stamford, Conn.) Issued 21 Jan. 1964 3 p Filed 29 Aug. 1961 Sponsored by NASA
(NASA-Case-XGS-01245-1; US-Patent-3,119,086; US-Patent-Appl-SN-134619; US-Patent-Class-338-18) Avail: US Patent and Trademark Office CSCL 14B

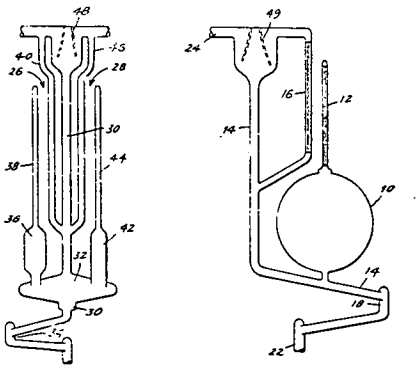
An immersed thermistor bolometer for the detection of ultraviolet, visible, and infrared radiation is described. Two types of immersed bolometers are discussed. The immersion of thermistor flakes in a lens, or half immersed by optical contact on a lens, is examined. Lens materials are evaluated for optimum immersion including fused aluminum oxide, beryllium oxide, and germanium. The application of the bolometer to instruments in which the entrance pupil of the immersion optics has a high aspect ratio is considered. A.W.H.



N79-33450* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
BAKEABLE MCLEOD GAUGE Patent
Wallace S. Kreisman, inventor (to NASA) (Geophysics Corp. of America, Bedford, Mass.) Issued 22 Jun. 1965 6 p Filed 7 Nov. 1961 Sponsored by NASA
(NASA-Case-XGS-01293-1; US-Patent-3,190,124; US-Patent-Appl-SN-150690; US-Patent-Class-73-400) Avail: US Patent and Trademark Office CSCL 14B

A low pressure gauge of the McLeod type demonstrating superior performance and measuring characteristics is described. A mercury reservoir which is kept in a vacuum at all times as well as bakeable glass components to reduce contamination are featured.

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

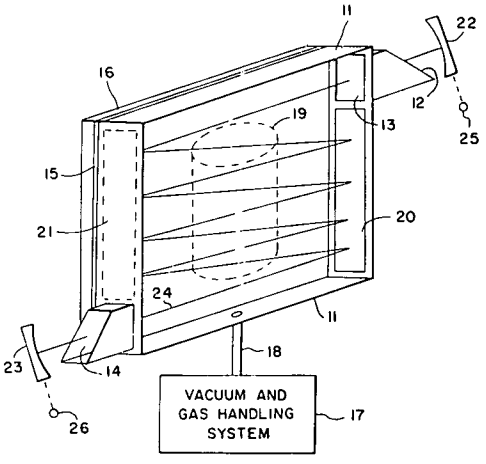


36 LASERS AND MASERS

Includes parametric amplifiers.

N79-26385*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LARGE VOLUME MULTIPLE PATH NUCLEAR PUMPED LASER Patent Application
Russell J. Deyoung (Miami Univ., Oxford, Ohio) and Frank Hohl, inventors (to NASA) Filed 21 May 1979 9 p
(NASA-Case-LAR-12592-1; US-Patent-Appl-SN-041141) Avail: NTIS HC A02/MF A01 CSCL 20E

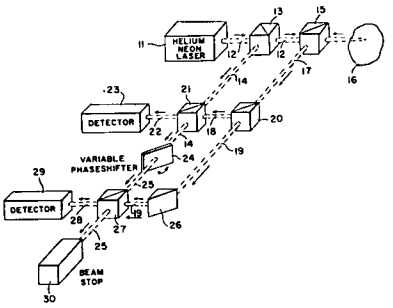
A large volume multiple-path nuclear pumper laser which improved characteristics over previous cylindrical nuclear pumped laser systems is presented. Large volumes of gas are excited by using internal high reflectance mirrors that are arranged so that the optical path crosses back and forth through the excited gaseous medium. By adjusting the external dielectric mirrors of the laser, the number of paths through the laser cavity can be varied. Output powers were obtained that are substantially higher than the output powers of previous nuclear laser systems. NASA



N79-28532*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DIRECTION SENSITIVE LASER VELOCIMETER Patent Application
John M. Franke, inventor (to NASA) Filed 6 Apr. 1979 11 p
(NASA-Case-LAR-12177-1; US-Patent-Appl-SN-027558) Avail: NTIS HC A02/MF A01 CSCL 20E

A laser velocimeter that determines the direction of movement of particles is described. A laser produces a transmitted beam which illuminates the volume under investigation. The backscattered light is divided into two equal intensity beams. A first

part of a sample of the transmitted beam is mixed with one of the two equal intensity beams and applied to a first photodetector. A second part of the sample is phase shifted by 90 deg, mixed with the other of the two equal intensity beams and applied to a second photodetector. The output of the first photodetector is phase shifted by -90 deg and then multiplied with the output of the second photodetector to produce a signal indicative of direction of movement. NASA



37 MECHANICAL ENGINEERING

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

N79-22474* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

RETRACTABLE ENVIRONMENTAL SEAL Patent

Joseph R. Dettling, inventor (to NASA) (United Technologies Corp., Sunnyvale, Calif.) Issued 27 Mar. 1979 6 p Filed 29 Mar. 1978 Supersedes N78-22150 (16 - 13, p 1673) Sponsored by NASA

(NASA-Case-MFS-23646-1; US-Patent-4,146,180; US-Patent-Appl-SN-891372; US-Patent-Class-239-288; US-Patent-Class-239-265.15; US-Patent-Class-220-266; US-Patent-Class-277-192; US-Patent-Class-138-96R) Avail: US Patent and Trademark Office CSCL 11A

A retractable environmental seal for use in sealing the opening of the exit cone for a rocket nozzle is described. A diaphragm-like cover having a central region adapted to be seated in sealing relation with the periphery of the opening is discussed. Radially extended failure zones for facilitating a pressure-induced rupture of the cover, and a plurality of angularly spaced tension springs connected with the peripheral portion of the cover are characterized.

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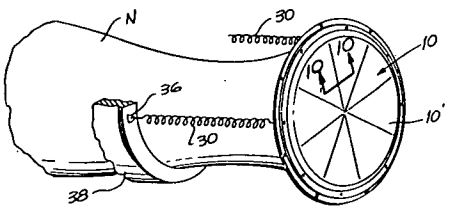

N79-22475* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SHAFT SEAL ASSEMBLY FOR HIGH SPEED AND HIGH PRESSURE APPLICATIONS Patent

William F. Hadt and Lawrence P. Ludwig, inventors (to NASA) Issued 20 Mar. 1979 7 p Filed 8 Jul. 1977 Supersedes N77-27404 (15 - 18, p 2390)

(NASA-Case-LEW-11873-1; US-Patent-4,145,058; US-Patent-Appl-SN-814006; US-Patent-Class-277-62; US-Patent-Class-277-96.1) Avail: US Patent and Trademark Office CSCL 11A

A seal assembly is provided for reducing the escape of fluids from between a housing and a shaft rotably mounted in the housing. The seal assembly comprises a pair of seal rings resiliently connected to each other and disposed in side-by-side relationship. In each seal ring, both the internal bore surface and the radial face which faces away from the other seal ring are provided with a plurality of equi-spaced recesses. The seal faces referred to are located adjacent a seating surface of the housing. Under normal operating conditions, the seal assembly is stationary with respect to the housing, and the recesses generate life, keep the assembly spaced from the rotating shaft and allow slip therebetween. The seal assembly can seize on the shaft, and slip will then occur between the radial faces and the housing.

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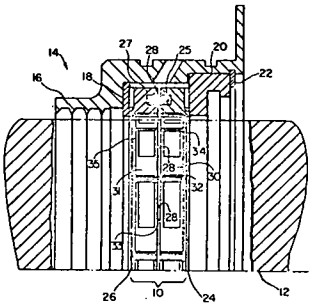


N79-23431*# National Aeronautics and Space Administration. Pasadena Office, Calif.

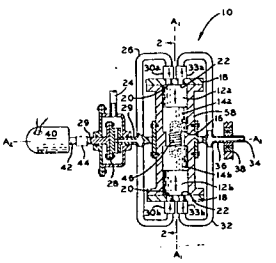
CENTRIFUGAL-RECIPROCATING COMPRESSOR Patent Application

Walter H. Higa, inventor (to NASA) (JPL) Filed 8 May 1979 24 p Sponsored by NASA

(Contract NAS7-100)

(NASA-Case-NPO-14597-1; US-Patent-Appl-SN-037194) Avail: NTIS HC A02/MF A01 CSCL 13I

A centrifugal compressor is presented which includes at least a pair of cylinders arranged in coaxial alignment and supported for angular displacement about a common axis of rotation normally bisecting a common longitudinal axis of symmetry for the cylinders. The cylinders are characterized by ported closures located at the mutually remote ends thereof though which the cylinders are charged and discharged, and a pair of piston heads seated within the cylinders and supported for floating displacement in compressive strokes in response to unidirectional angular displacement imparted to the cylinders. NASA



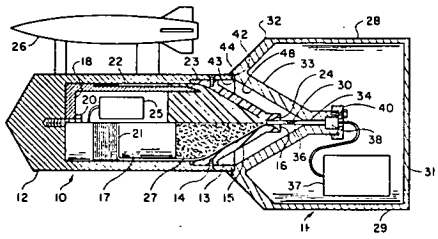
N79-23432*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

HIGH ACCELERATION CABLE DEPLOYMENT SYSTEM Patent Application

Thomas N. Canning, Christopher E. Barns, James P. Murphy, Bobby Gin, and Robert W. King, Inventors (to NASA) Filed 23 Apr. 1979 13 p

(NASA-Case-ARC-11256-1; US-Patent-Appl-SN-032305) Avail: NTIS HC A02/MF A01 CSCL 20K

A high acceleration umbilical cable deployment system was devised for enabling electrical communication between a ballistic projectile forebody and an afterbody. A cable coiled on a spool is housed within a ballistic casing having a drag funnel at the rear end. The cable is sandwiched between a foam plug and the drag funnel before it leaves the forebody and is secured in a strain relief at the apex of a funnel in the afterbody. On deployment, when the bodies are separated, energies that would tend to rupture the cable are expended by the funnels, plug and strain relief. NASA



N79-28549* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

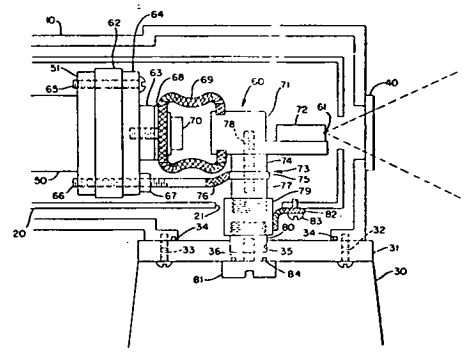
SHOCK ISOLATOR FOR OPERATING A DIODE LASER ON A CLOSED-CYCLE REFRIGERATOR Patent

Donald E. Jennings, inventor (to NASA) (NAS-NRC) Issued 17 Jul. 1979 6 p Filed 24 Feb. 1978 Supersedes N78-19515 (16 - 10, p 1312) Sponsored by NASA

(NASA-Case-GSC-12297-1; US-Patent-4,161,747; US-Patent-Appl-SN-880838; US-Patent-Class-357-82; US-Patent-Class-357-83; US-Patent-Class-357-74; US-Patent-Class-357-79; US-Patent-Class-357-81; US-Patent-Class-165-105) Avail: US Patent and Trademark Office CSCL 20E

A diode laser mounted within a helium refrigerator is mounted using a braided copper ground strap which provides good impact shock isolation from the refrigerator cold-tip while also providing a good thermal link to the cold-tip. The diode mount also contains a rigid stand-off assembly consisting of alternate sections of nylon and copper which serve as cold stations to improve thermal isolation from the vaccum housing mounting structure. Included in the mount is a Pb-In alloy wafer inserted between the cold-tip and the diode to damp temperature fluctuations occurring at the cold-tip.

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



N79-28550* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

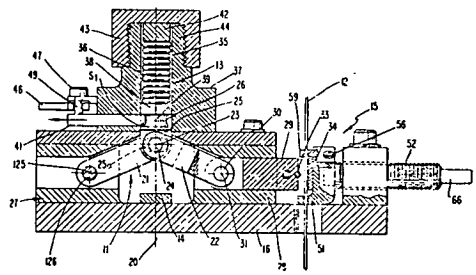
TOGGLE MECHANISM FOR PINCHING METAL TUBES Patent

Edwin O. Stengard, inventor (to NASA) Issued 3 Jul. 1979 6 p Filed 19 May 1978 Supersedes N78-25428 (16 - 16, p 2122)

(NASA-Case-GSC-12274-1; US-Patent-4,159,634; US-Patent-Appl-SN-909100; US-Patent-Class-72-436; US-Patent-Class-72-451; US-Patent-Class-72-470; US-Patent-Class-251-7) Avail: US Patent and Trademark Office CSCL 13I

A toggle mechanism pinches a metal tube and maintains the tube in a pinched condition, without fracturing. The toggle mechanism includes a plunger translatable along a longitudinal axis, as well as a pair of links pivoted about a common axis extending through an end of the plunger. One of the links also pivots about a fixed axis. A free end of the other link carries a push link which the other link translates at right angles to the plunger longitudinal axis. First and second sides of the tube bear against a first stop block and are engaged by the push link when a compression spring, attached to the plunger, is suddenly released to irreversibly drive the plunger along its longitudinal axis so the pivot point of the two links is driven to an over travel position.

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



N79-28551* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

CONTROLLER ARM FOR A REMOTELY RELATED SLAVE ARM Patent

John K. Salisbury, Jr., inventor (to NASA) (Stanford Univ., Calif.) Issued 10 Jul. 1979 11 p Filed 19 Aug. 1977 Supersedes N77-30751 (15 - 21, p 2841) Sponsored by NASA (NASA-Case-ARC-11052-1; US-Patent-4,160,508; US-Patent-Appl-SN-826202; US-Patent-Class-414-4) Avail: US Patent and Trademark Office CSCL 13I

A segmented controller arm configured and dimensioned to form a miniature kinematic replica of a remotely related slave arm is disclosed. The arm includes: (1) a plurality of joints for affording segments of the arm simultaneous angular displacement about a plurality of pairs of intersecting axes, (2) a plurality of position sensing devices for providing electrical signals indicative of angular displacement imparted to corresponding segments of the controller shaft about the axes, and (3) a control signal circuit for generating control signals to be transmitted to the slave arm. The arm is characterized by a plurality of yokes, each being supported for angular displacement about a pair of orthogonally related axes and counterbalanced against gravitation by a cantilevered mass.

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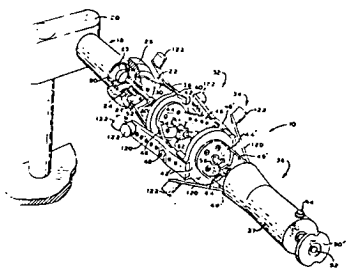
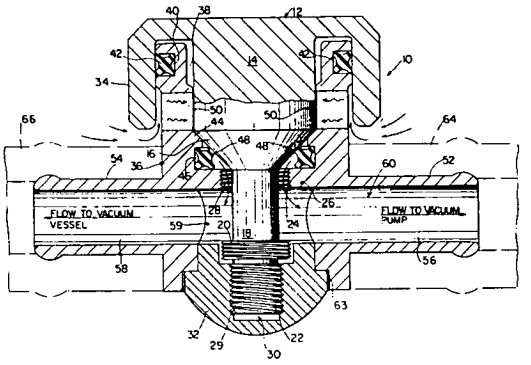


N79-30553*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

PRESSURE CONTROL VALVE Patent Application

Kenneth H. Lambson, inventor (to NASA) (Lambson, Kenneth H. and Assoc., San Jose, Calif.) Filed 13 Jul. 1979 12 p Sponsored by NASA (NASA-Case-ARC-11251-1; US-Patent-Appl-SN-057465) Avail: NTIS HC A02/MF A01 CSCL 13K

A control valve is described which is adapted to be connected between a pressure source, such as a vacuum pump, and a pressure vessel to control the pressure in the vessel. The valve comprises a housing having a longitudinal bore which is connected between the pump and vessel, and a transversely movable valve body which controls the air flow through an air inlet in the housing. The valve body includes cylindrical and conical portions which cooperate with reciprocally shaped portions of the housing to provide flow control. A filter disposed in the air inlet filters out foreign matter in the air. The bottom end of the valve body screws into the valve housing control knob which is formed integrally with the valve body and controls opening and closing of the valve. NASA

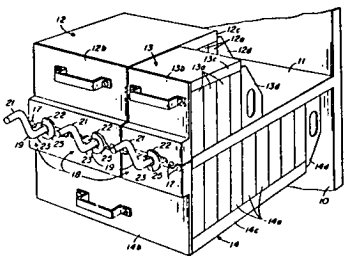


N79-33467* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

CHASSIS UNIT INSERT TIGHTENING-EXTRACT DEVICE Patent

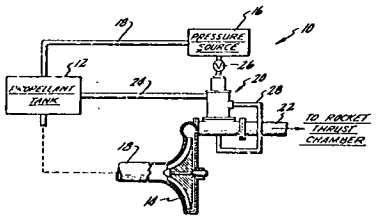
Lester W. Haerther (Collins Radio Co., Cedar Rapids, Iowa) and Paul A. Zimmerman, inventors (to NASA) (Collins Radio Co., Cedar Rapids, Iowa) Issued 3 Mar. 1964 5 p Filed 3 Oct. 1962 Sponsored by NASA (NASA-Case-XMS-01077-1; US-Patent-3,123,418; US-Patent-Appl-SN-228049; US-Patent-Class-312-319) Avail: US Patent and Trademark Office CSCL 13I

The invention relates to the insertion and extraction of rack mounted electronic units and in particular to a screw thread insert tightening and extract device, for chassis units having a collar which may be rotatably positioned manually for the insert tightening or extraction of various associated chassis units, as desired. Official Gazette of the U.S. Patent and Trademark Office



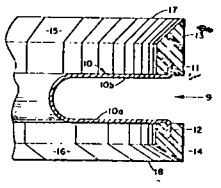
N79-33468* National Aeronautics and Space Administration, Washington, D. C.
FLOW DIVERTER VALUE AND FLOW DIVERSION METHOD Patent
Samuel B. Arline (United Aircraft Corp., East Hartford, Conn.) and Russell L. Carlson, inventors (to NASA) (United Aircraft Corp., East Hartford, Conn.) Issued 26 May 1964 5 p Filed 4 Aug. 1961 Sponsored by NASA
(NASA-Case-HQN-00573-1; US-Patent-3,134,389; US-Patent-Appl-SN-129379; US-Patent-Class-137-14) Avail: US Patent and Trademark Office CSCL 13I

A flow diverter valve applicable to any fluid flow system requiring rapid bleed or bypass is disclosed. Examples of application of the flow diverter valve to a liquid rocket and a turbojet aircraft engine are given. Features of the valve include: (1) an independent fluid source is used to activate the flow diverter valve toward its closed position during its initial stage of travel; (2) the flow diverter port area and size is unlimited and the valve travel is unlimited; and (3) the valve housing is fabricated such that the valve can be a one step valve, a two step valve, or include as many steps as are found desirable.
J.M.S.



N79-33469* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FLUID PRESSURE BALANCED SEAL Patent
Holdridge W. Marsh, inventor (To NASA) (North American Aviation, Inc., Woodland Hills, Calif.) Issued 8 Feb. 1966 7 p Filed 3 Oct. 1961 Sponsored by NASA
(NASA-Case-XGS-01286-1; US-Patent-3,233,862; US-Patent-Appl-SN-142583; US-Patent-Class-251-172) Avail: US Patent and Trademark Office CSCL 11A

A seal which increases in effectiveness with increasing pressure is presented. The seal's functional capability throughout both static and dynamic operation makes it particularly useful for sealing ball valve ports. Other features of the seal include the ability to seal two opposed surfaces simultaneously, tolerance of small misalignments, tolerance of wide temperature ranges, ability to maintain positive sealing contact under conditions of internal or external pressurization, and ability to conform to slight irregularities in seal or surface contours.
K.L.



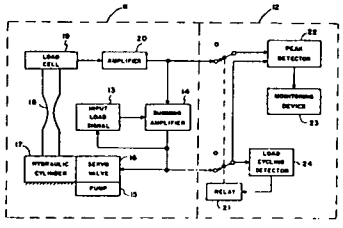
39 STRUCTURAL MECHANICS

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.*

N79-22537* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FATIGUE FAILURE LOAD INDICATOR Patent
Leland A. Imig, William T. Davis, and David C. Davis, inventors (to NASA) Issued 27 Mar. 1979 4 p Filed 24 Mar. 1978 Supersedes N78-22346 (16-13, p 1701)
(NASA-Case-LAR-12027-1; US-Patent-4,145,933; US-Patent-Appl-SN-889670; US-Patent-Class-73-770; US-Patent-Class-73-810) Avail: US Patent and Trademark Office CSCL 20K

An indicator for recording the load at which a fatigue specimen breaks during the last cycle of a fatigue test is described. A load cell is attached to the specimen which is alternately subjected to tension and compression loads. The output of the load cell which is proportional to the load on the specimen is applied to the input of a peak detector. Each time the specimen is subjected to a compression load, means are provided for applying a positive voltage to the rest of the peak detector to reset it. During the last cycle of the tension load the peak detector measures the maximum load on the specimen. Means are provided for disconnecting the load cell from the peak detector when there is a failure in the specimen.
Official Gazette of the U.S. Patent and Trademark Office

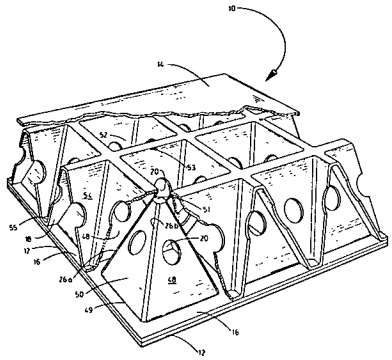


N79-25424*# National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
SUPERPLASTICALLY FORMED DIFFUSION BONDED METALLIC STRUCTURE Patent Application
William L. Ko, inventor (to NASA) Filed 30 May 1979 16 p
(NASA-Case-FRC-11026-1; US-Patent-Appl-SN-043944) Avail: NTIS HC A02/MF A01 CSCL 20K

A pair of core plates formed of a superplastic alloy are interposed between the base plate and the cover plate in a sandwich relationship. Each of the core plates are characterized

by a plurality of protrusions of square-based, truncated pyramids. These pyramids are uniformly aligned along orthogonally related axes which perpendicularly bisect the legs of the bases of the pyramids. The pyramids are also alternatively inverted along orthogonally related planes which diagonally bisect the pyramids. Thus, an orthogonally corrugated core is provided.

NASA



N79-25425*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

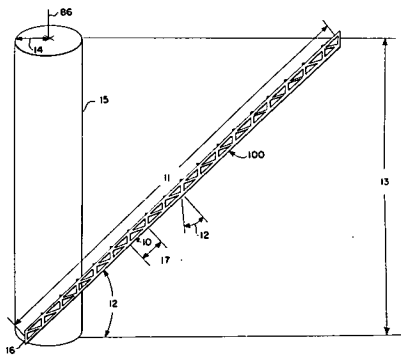
FOLDABLE BEAM Patent Application

John M. Hedgepeth (Astro Research Corp., Carpinteria, Calif.), John V. Coyner (Astro Research Corp., Carpinteria, Calif.), and Robert F. Crawford, inventors (to NASA) (Astro Research Corp., Carpinteria, Calif.) Filed 23 Feb. 1979 15 p Sponsored by NASA

(NASA-Case-LAR-12077-1; US-Patent-Appl-SN-014663) Avail: NTIS HC A02/MF A01 CSCL 20K

The invention is used in cases where a conventional solid beam is unsuitable, specifically where transportation to the use site requires a more lightweight or compact structure. Ease of deployment is another object. Construction of antennae or platforms in outer space is such a case. The novelty of the invention lies in the use of hinged segments in conjunction with cables, whereby a collapsed assembly of lightweight tublar struts may be readily deployed simply by applying tension to the cables, and just as easily stowed by loosening the cables.

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



43 EARTH RESOURCES

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

For instrumentation see *35 Instrumentation and Photography*.

N79-25443* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

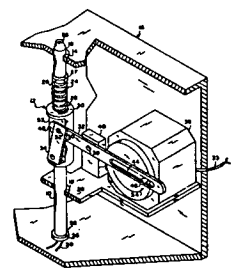
COAL-SHALE INTERFACE DETECTION Patent

Peter H. Broussard, John L. Burch, Edward J. Drost, and Richard J. Stein, inventors (to NASA) Issued 15 May 1979 8 p Filed 3 Nov. 1977

(NASA-Case-MFS-23720-3; US-Patent-4,154,084; US-Patent-Appl-SN-848420; US-Patent-Class-73-12; US-Patent-Class-73-82) Avail: US Patent and Trademark Office CSCL 08I

A penetrometer for coal-shale interface detection is presented. It is used with coal cutting equipment consisting of a reciprocating hammer, having an accelerometer mounted thereon to measure the impact of the hammer as it penetrates the ceiling or floor surface of a mine. Additionally, a pair of reflectometers simultaneously view the same surface, and the outputs from the accelerometer and reflectometers are detected and jointly registered to determine when an interface between coal and shale is being cut through.

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



N79-26439* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

CONTOUR MEASUREMENT SYSTEM Patent

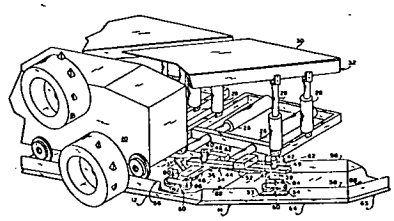
James R. Currie, Ralph R. Kissel, Emsley T. Deaton, Jr., and Richard A. Campbell, inventors (to NASA) Issued 5 Jun. 1979 8 p Filed 3 Nov. 1977

(NASA-Case-MFS-23726-1; US-Patent-4,156,971; US-Patent-Appl-SN-848418; US-Patent-Class-33-174L; US-Patent-Class-33-1Q; US-Patent-Class-33-1N; US-Patent-Class-105-161; US-Patent-Class-299-1; US-Patent-Class-364-560) Avail: US Patent and Trademark Office CSCL 08I

A measurement system for measuring the departures from a straight line of discrete track sections of a track along a coal face in a mine employing a vehicle having a pair of spaced wheel assemblies which align with the track is presented. A reference arm pivotally connects between the wheel assemblies, and there is indicating means for measuring the angle of pivot between the arm and each of the wheel assemblies. The length of the device is less than the length of a track section, and

thus when one of the wheel assemblies is on one track section and one is on an adjoining track section, the sum of the indicated angles will be indicative of the angle between track sections. Thus, from the length of a track section and angle, the departure of each track section from the line may be calculated.

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



N79-31706* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

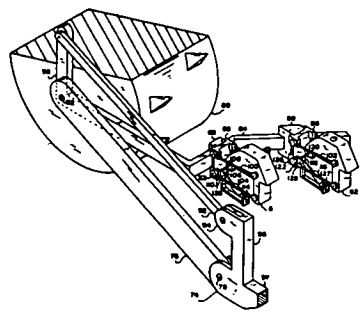
COAL-ROCK INTERFACE DETECTOR

Stephen D. Rose, Charles E. Crouch, and Elborn W. Jones, inventors (to NASA) (Mississippi State Univ., Mississippi State) 21 Aug. 1979 8 p Filed 4 Nov. 1977

(NASA-Case-MFS-23725-1; US-Patent-4,165,460; US-Patent-Appl-SN-848793; US-Patent-Class-250-253; US-Patent-Class-250-272) Avail: US Patent and Trademark Office CSCL 08I

A coal-rock interface detector is presented which employs a radioactive source and radiation sensor. The source and sensor are separately and independently suspended and positioned against a mine surface of hydraulic pistons, which are biased from an air cushioned source of pressurized hydraulic fluid.

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.*

N79-23481* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

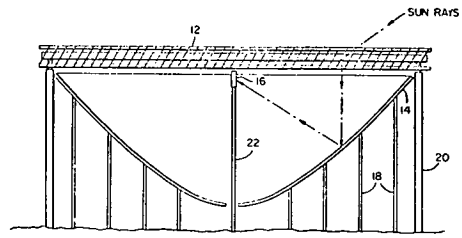
HORIZONTALLY MOUNTED SOLAR COLLECTOR Patent

Dolphus H. Black, inventor (to NASA) Issued 10 Apr. 1979 9 p Filed 9 Aug. 1977 Supersedes N77-30613 (15 - 21, p 2823)

(NASA-Case-MFS-23349-1; US-Patent-4,148,295; US-Patent-Appl-SN-823061; US-Patent-Class-126-270; US-Patent-Class-126-271) Avail: US Patent and Trademark Office CSCL 10A

Solar energy is collected by using a vertical deflector assembly, a stationary reflector and a horizontally mounted solar collector. The deflector assembly contains a plurality of vanes which change the direction of the solar energy to the vertical, while constantly keeping the same side of the deflector facing the sun. The vertical rays are then reflected off the stationary reflector and are then absorbed by the collector.

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



N79-24431* National Aeronautics and Space Administration. Pasadena Office, Calif.

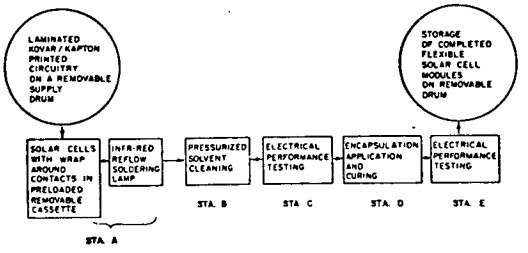
BONDING MACHINE FOR FORMING A SOLAR ARRAY STRIP Patent

Ernest N. Costogue (JPL), Roy G. Downing (JPL), Orwin Middleton (JPL), Robert L. Mueller (JPL), Robert K. Yasui (JPL), Fred J. Cairo (JPL), and Jerry K. Person, inventors (to NASA) (JPL) Issued 17 Apr. 1979 13 p Filed 4 Nov. 1977 Supersedes

N78-13441 (16 - 04, p 0482) Sponsored by NASA
(NASA-Case-NPO-13652-2; US-Patent-4,149,665;
US-Patent-Appl-SN-848794; US-Patent-Class-228-5.1;
US-Patent-Class-228-6; US-Patent-Class-29-572;
US-Patent-Class-29-57-4; US-Patent-Class-29-739;
US-Patent-Class-29-809) Avail: US Patent and Trademark Office CSCL 10A

A machine is described for attaching solar cells to a flexable substrate on which printed circuitry has been deposited. The strip is fed through: (1) a station in which solar cells are elevated into engagement with solder pads for the printed circuitry and thereafter heated by an infrared lamp; (2) a station at which flux and solder residue is removed; (3) a station at which electrical performance of the soldered cells is determined; (4) a station at which an encapsulating resin is deposited on the cells; (5) a station at which the encapsulated solar cells are examined for electrical performance; and (6) a final station at which the resulting array is wound on a takeup drum.

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



N79-24432* National Aeronautics and Space Administration. Pasadena Office, Calif.

PRIMARY REFLECTOR FOR SOLAR ENERGY COLLECTION SYSTEMS AND METHOD OF MAKING SAME Patent

Charles G. Miller (JPL) and James B. Stephens, inventors (to NASA) (JPL) Issued 17 Apr. 1979 9 p Filed 25 Jan. 1977 Supersedes N77-20566 (15 - 11, p 1473) Division of US Patent Appl-SN-598969, filed 24 Jul. 1975, US Patent-4,065,053 Sponsored by NASA
(NASA-Case-NPO-13579-3; US-Patent-4,149,817;
US-Patent-Appl-SN-762363; US-Patent-Class-405-229;
US-Patent-Class-126-270; US-Patent-Class-264-1;
US-Patent-Class-264-33; US-Patent-Class-264-34;
US-Patent-Class-264-35; US-Patent-Class-264-70;
US-Patent-Class-264-71; US-Patent-Class-264-510;
US-Patent-Class-264-516; US-Patent-Class-350-292;
US-Patent-Class-350-294; US-Patent-Class-350-296;
US-Patent-Class-405-263; US-Patent-4,065,053;
US-Patent-Appl-SN-598969) Avail: US Patent and Trademark Office CSCL 10A

Solar energy is reflected to a movably supported collector that is kept at the concentrated line focus of the reflector primary by a fixed, linear, ground-based primary reflector having an extended curved sawtooth contoured surface covered with a metalized polymeric reflecting material. The primary reflector was constructed by a process utilizing well-known freeway paving machinery.

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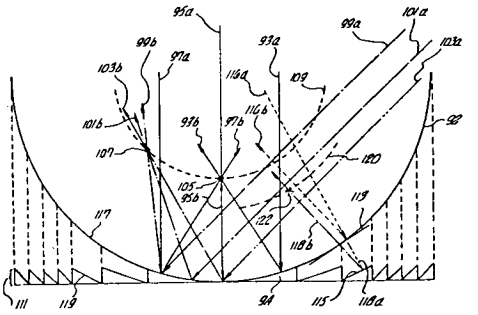

N79-24433* National Aeronautics and Space Administration. Pasadena Office, Calif.

SOLAR ENERGY COLLECTION SYSTEM Patent

Charles G. Miller (JPL) and James B. Stephens, inventors (to NASA) (JPL) Issued 17 Apr. 1979 27 p Filed 25 Jan. 1977 Supersedes N77-20565 (15 - 11, p 1473) Division of US Patent Appl. SN-598969, filed 24 Jul. 1975, US Patent-4,065,053 Sponsored by NASA
(NASA-Case-NPO-13579-2; US-Patent-4,149,521;
US-Patent-Appl-SN-762362; US-Patent-Class-126-271;
US-Patent-Class-237-1A; US-Patent-Class-350-288;
US-Patent-Class-350-299; US-Patent-Class-126-400;
US-Patent-4,065,053; US-Patent-Appl-SN-598969) Avail: US Patent and Trademark Office CSCL 10A

A fixed, linear, ground-based primary reflector having an extended curved sawtooth-contoured surface covered with a metalized polymeric reflecting material, reflects solar energy to a movably supported collector that is kept at the concentrated line focus reflector primary. The primary reflector may be constructed by a process utilizing well known freeway paving machinery. The solar energy absorber is preferably a fluid transporting pipe. Efficient utilization leading to high temperatures from the reflected solar energy is obtained by cylindrical shaped secondary reflectors that direct off-angle energy to the absorber pipe. A seriatim arrangement of cylindrical secondary reflector stages and spot-forming reflector stages produces a high temperature solar energy collection system of greater efficiency.

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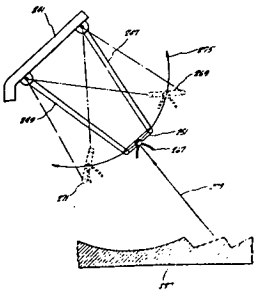


N79-25481* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

IN SITU SELF CROSS-LINKING OF POLYVINYL ALCOHOL BATTERY SEPARATORS Patent

Warren H. Philipp, Li-Chen Hsu, and Dean W. Sheibley, inventors (to NASA) Issued 15 May 1979 5 p Filed 19 Apr. 1978 Supersedes N78-22157 (16 - 13, p 1674)
(NASA-Case-LEW-12972-1; US-Patent-4,154,912; US-Patent-Appl-SN-897829; US-Patent-Class-526-7; US-Patent-Class-429-253; US-Patent-Class-526-9) Avail: US Patent and Trademark Office CSCL 10C

A battery separator was produced from a polyvinyl alcohol sheet structure which was subjected to an in situ, self crosslinking process by selective oxidation of the 1,2 diol units present in the polyvinyl alcohol sheet structure. The 1,2 diol units were cleaved to form aldehyde end groups which subsequently crosslink through acetalization of the 1,3 diol units of the polyvinyl alcohol. Selective oxidation was achieved using a solution of a suitable oxidizing agent such as periodic acid or lead tetraacetate.

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

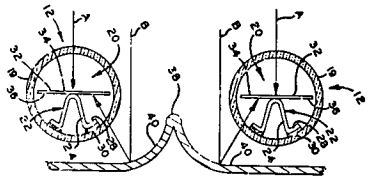
N79-25482* National Aeronautics and Space Administration. Pasadena Office, Calif.

DOUBLE-SIDED SOLAR CELL PACKAGE Patent

Benjamin Shelpuk, inventor (to NASA) (JPL) Issued 8 May 1979 8 p Filed 29 Mar. 1978 Supersedes N78-22470 (16 - 13, p 1719) Sponsored by NASA
(NASA-Case-NPO-14199-1; NASA-Case-NPO-14200-1; US-Patent-4,153,476; US-Patent-Appl-SN-891243; US-Patent-Class-136-89PC; US-Patent-Class-136-89SJ; US-Patent-Class-136-89CC; US-Patent-Class-136-89CA) Avail: US Patent and Trademark Office CSCL 10A

In a solar cell array of terrestrial use, an improved double-sided solar cell package, consisting of a photovoltaic cell having a metallized P-contact strip and an N-contact grid, provided on opposite faces of the cell, a transparent tubular body forming an enclosure for the cell. A pedestal supporting the cell from within the enclosure comprising an electrical conductor connected with the P-contact strip provided for each face of the cell, and a reflector having an elongated reflective surface disposed in substantially opposed relation with one face of the cell for redirecting light were also included.

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



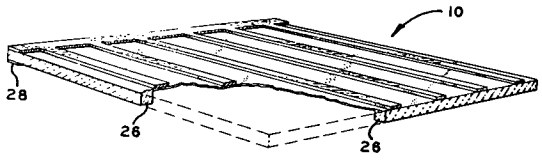
N79-25511*# National Aeronautics and Space Administration. Pasadena Office, Calif.

METHOD FOR ANISOTROPICALLY ETCHING A SILICON WAFER HAVING A REINFORCED PERIPHERAL PORTION Patent Application

John A. Scott-Monck (Spectrolab Inc., Sylmar, Calif.) and Charles F. Gay, inventors (to NASA) (Spectrolab Inc., Sylmar, Calif.) Filed 1 Jun. 1979 10 p
(Contract JPL-954600)
(NASA-Case-NPO-14482-1; US-Patent-Appl-SN-044428) Avail: NTIS HC A02/MF A01 CSCL 10A

A method for producing silicon wafers having reinforced peripheral portions for use in the production of silicon solar cells is presented. The method is characterized by the steps of applying to the surface of the central portion of one surface of the silicon wafer to be etched, a mask leaving an exposed peripheral portion of the surface, depositing a layer of metallization on the exposed peripheral portion of the surface, removing the mask from a central portion of the surface and treating the thus exposed surface with an etching fluid for etching the central portion of the wafer to a desired thickness, and thereafter removing the layer of metallization from the surface of the peripheral portion of the cell.

NASA



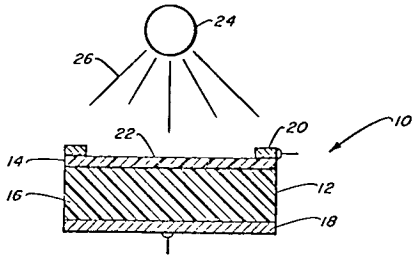
N79-25512*# National Aeronautics and Space Administration. Pasadena Office, Calif.

COPPER DOPED POLYCRYSTALLINE SILICON Patent Application

K. M. Koliwad (JPL) and T. Daud, inventors (to NASA) (JPL) Filed 30 May 1979 12 p
(Contract NAS7-100)
(NASA-Case-NPO-14670-1; US-Patent-Appl-SN-043941) Avail: NTIS HC A02/MF A01 CSCL 10A

It was discovered in accordance with the invention that the presence of copper in polycrystalline silicon solar cells strongly enhances the performance of the cells. It was further discovered that the effect of copper in polycrystalline, silicon solar cells is contrary to that observed in single crystal silicon solar cells, that the effect is greater with smaller grain size and that copper diffused into coarse grained silicon degrades cell performance.

NASA



N79-26474* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

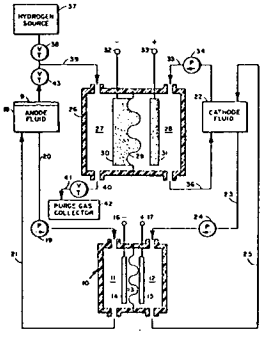
ELECTROCHEMICAL CELL FOR REBALANCING REDOX FLOW SYSTEM Patent

Lawrence H. Thaller, inventor (to NASA) Issued 26 Jun. 1979 5 p Filed 9 Jun. 1978 Supersedes N78-25554 (16 - 16 p 2137)

(NASA-Case-LEW-13150-1; US-Patent-4,159,366; US-Patent-Appl-SN-914260; US-Patent-Class-429-15; US-Patent-Class-429-101) Avail: US Patent and Trademark Office CSCL 10C

An electrically rechargeable REDOX cell or battery system including one of more rebalancing cells is described. Each rebalancing cell is divided into two chambers by an ion permeable membrane. The first chamber is fed with gaseous hydrogen and a cathode fluid which is circulated through the cathode chamber of the REDOX cell is also passed through the second chamber of the rebalancing cell. Electrochemical reactions take place on the surface of insert electrodes in the first and second chambers to rebalance the electrochemical capacity of the anode and cathode fluids of the REDOX system.

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



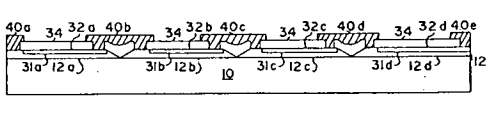
N79-26475* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

METHOD OF CONSTRUCTION OF A MULTI-CELL SOLAR ARRAY Patent

Donald E. Routh, Ben R. Hollis, and William R. Feltner, inventors (to NASA) Issued 29 May 1979 4 p Filed 23 Dec. 1977 Supersedes N78-17468 (16 - 08 p 1036)

(NASA-Case-MFS-23540-1; US-Patent-4,156,309; US-Patent-Appl-SN-863773; US-Patent-Class-29-572; US-Patent-Class-29-577; US-Patent-Class-29-578; US-Patent-Class-29-580; US-Patent-Class-357-45) Avail: US Patent and Trademark Office CSCL 10A

The method of constructing a high voltage, low power, multicell solar array is described. A solar cell base region is formed in a substrate such as but not limited to silicon or sapphire. A protective coating is applied on the base and a patterned etching of the coating and base forms discrete base regions. A semiconductive junction and upper active region are formed in each base region, and defined by photolithography. Thus, discrete cells which are interconnected by metallic electrodes are formed. Official Gazette of the U.S. Patent and Trademark Office



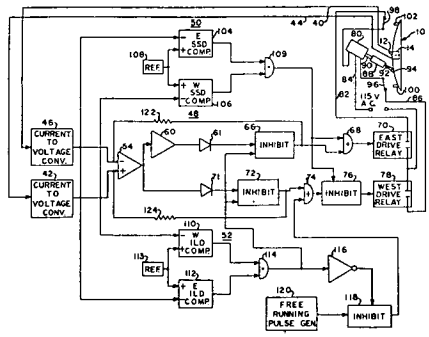
N79-28667*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

SOLAR TRACKING SYSTEM Patent Application

Paul R. White and Donald R. Scott, inventors (to NASA) Filed 25 Feb. 1979 16 p

(NASA-Case-MFS-23999-1; US-Patent-Appl-SN-060435) Avail: NTIS HC A02/MF A01 CSCL 10A

A solar collector is angularly oriented by motor wherein the output of two side-by-side photodetectors are discriminated as to three ranges, corresponding to a low light or darkness condition by east control circuit to light intensity lying in an intermediate range by pointing control circuit; and to light above an intermediate range, direct sunlight, by differential tracking circuit. The first output drives the motor to a selected maximum easterly angular position to await sunrise; the second enables the motor to be driven westerly at the earth rotational rate when clouds are present which prevent accurate tracking; and the third output, actually the separate outputs of the two photodetectors, differentially controls the direction of rotation of motor through east drive relay and west drive relay to effect tracking of the sun. NASA



N79-29608*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

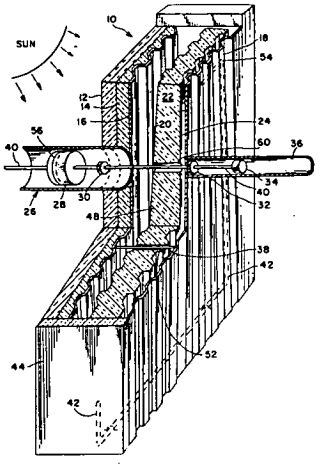
SOLAR ENGINE Patent Application

Ronald N. Jensen, inventor (to NASA) Filed 22 Jun. 1979 12 p

(NASA-Case-LAR-12148-1; US-Patent-Appl-SN-051275) Avail: NTIS HC A02/MF A01 CSCL 10B

A solar engine is disclosed in which a fluid, which is first heated and then cooled, forces a piston outward as the fluid is heated, and then draws inward as the fluid is cooled. The piston is connected to a shaft and produces work as it moves outward and inward. A displacer plate moves between an absorber plate and a cooling plate to form an air space between the displacer and one or the other of these two plates for heating and cooling the fluid. The displacer plate is for heating and cooling the fluid. The displacer plate is moved from one plate to the other by the displacer push ring as the piston nears the

midpoint of its travel on the outward stroke and again on the inward stroke.
NASA

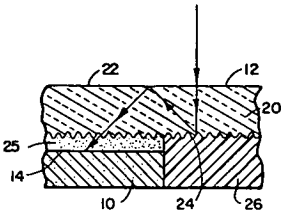


N79-31752* National Aeronautics and Space Administration. Pasadena Office, Calif.
SOLAR CELL WITH IMPROVED N-REGION CONTACT AND METHOD OF FORMING THE SAME Patent
Kenneth R. Bube, inventor (to NASA) (RCA Labs.) Issued 7 Aug. 1979 3 p Filed 30 Jun. 1978 Supersedes N78-27541 (16 - 18 p 2410 Sponsored by NASA
(NASA-Case-NPO-14205-1; US-Patent-4,163,678;
US-Patent-Appl-SN-920879; US-Patent-Class-136-89CC;
US-Patent-Class-29-572; US-Patent-Class-29-589;
US-Patent-Class-357-30; US-Patent-Class-357-65;
US-Patent-Class-357-67; US-Patent-Class-252-514;
US-Patent-Class-106-1; US-Patent-Class-106-1.2;
US-Patent-Class-427-88) Avail: US Patent and Trademark Office CSCL 10A

An improved solar cell, and method of forming the same are disclosed. It is characterized by a semiconductor silicon wafer of P-type material having diffused therein a shallow N-type region. A sintered silver contact is affixed to the surface of the N-type region at the outer surface. The improved solar cell is formulated from silver powder blended with silver metaphosphate for establishing a zone of increased carrier concentration. An aluminum or silver-aluminum alloy contact is affixed to the P-type wafer at the outer surface opposite the N-type region.
Official Gazette of the U.S. Patent and Trademark Office

N79-31753* National Aeronautics and Space Administration. Pasadena Office, Calif.
SOLAR CELL MODULE Patent
Neal F. Shepard, Jr., inventor (to NASA) (GE Co., Philadelphia) Issued 31 Jul. 1979 4 p Filed 29 Sep. 1978 Supersedes N79-10529 (17 - 01 p 0070) Sponsored by NASA
(NASA-Case-NPO-14467-1; US-Patent-4,162,928;
US-Patent-Appl-SN-946994; US-Patent-Class-136-89PC) Avail: US Patent and Trademark Office CSCL 10A

An improved solar cell module for use in terrestrial environments is disclosed. It is characterized by: (1) an internally reflective plate having a planar surface of incidence and an opposed textured surface (2) a plurality of uniformly spaced silicon solar cells having the active surfaces thereof bonded to portions of the textured surface, and (3) a layer of diffusely reflective matter applied to the textured surface in surrounding relation with the solar cells for reflecting solar energy. The solar energy then strikes the surface of incidence at such angles as to be internally re-reflected and caused to progress toward the active surfaces of the solar cells, whereby concentration of incident flux on the solar cell is achieved without increased module depth.
Official Gazette of the U.S. Patent and Trademark Office



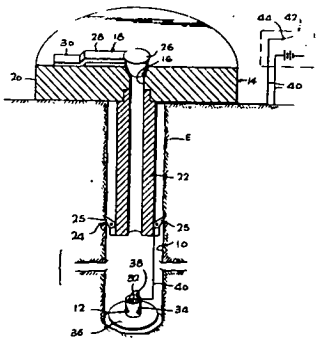
46 GEOPHYSICS

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

For space radiation see *93 Space Radiation*.

N79-22679* National Aeronautics and Space Administration. Pasadena Office, Calif.
SEISMIC VIBRATION SOURCE Patent
Warren L. Dowler (JPL), Giulio Varsi (JPL), and Lien C. Yang, inventors (to NASA) (JPL) Issued 10 Apr. 1979 4 p Filed 22 Aug. 1977 Sponsored by NASA
(NASA-Case-NPO-14112-1; US-Patent-4,148,375;
US-Patent-Appl-SN-826326; US-Patent-Class-181-117;
US-Patent-Class-181-106; US-Patent-Class-102-21.6;
US-Patent-Class-175-1; US-Patent-Class-166-63) Avail: US Patent and Trademark Office CSCL 08K

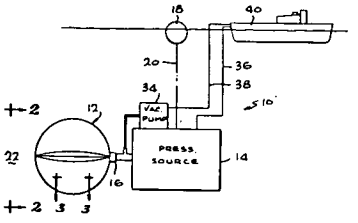
A system for vibrating the earth in a location where seismic mapping is to take place is described. A relatively shallow hole formed in the earth, such as a hole 10 feet deep, placing a solid propellant in the hole, sealing a portion of the hole above the solid propellant with a device that can rapidly open and close to allow a repeatedly interrupted escape of gas. The propellant is ignited so that high pressure gas is created which escapes in pulses to vibrate the earth.
Official Gazette of the U.S. Patent and Trademark Office



N79-23555* National Aeronautics and Space Administration. Pasadena Office, Calif.
UNDERWATER SEISMIC SOURCE Patent
Lien C. Yang, inventor (to NASA) (JPL) Issued 8 May 1979 4 p Filed 6 Sep. 1977 Sponsored by NASA
(NASA-Case-NPO-14255-1; US-Patent-4,153,134; US-Patent-Appl-SN-830458; US-Patent-Class-181-120; US-Patent-Class-340-12R; US-Patent-Class-181-115) Avail: US Patent and Trademark Office CSCL 08G

Apparatus for generating a substantially oscillation-free seismic signal for use in underwater petroleum exploration, including a bag with walls that are flexible but substantially inelastic, and a pressured gas supply for rapidly expanding the bag to its fully expanded condition is described. The inelasticity of the bag permits the application of high pressure gas to rapidly expand it to full size, without requiring a venting mechanism to decrease the pressure as the bag approaches a predetermined size to avoid breaking of the bag.

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

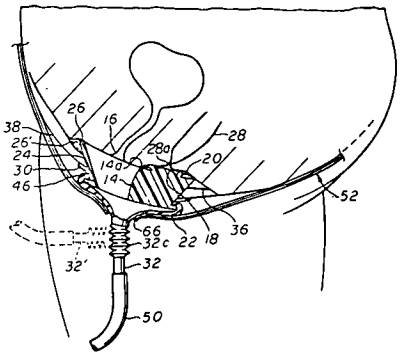


52 AEROSPACE MEDICINE

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

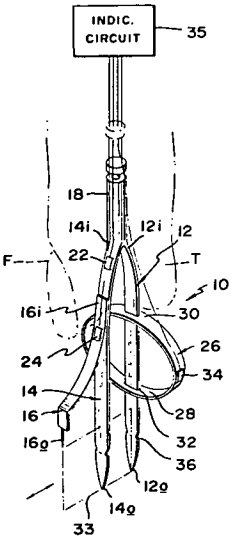
N79-23657*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
URINE COLLECTION APPARATUS Patent Application
Roger B. Michaud, inventor (to NASA) (Martin Marietta Corp., Denver, Colo.) Filed 27 Apr. 1979 21 p Sponsored by NASA
(NASA-Case-MSC-18381; US-Patent-Appl-SN-034531) Avail: NTIS HC A02/MF A01 CSCL 06P

A urine collection device for females comprising an interface body with a surface for engagement with the user's body is described. The interface body is composed of a forward portion defining a urine-receiving bore with an inlet in the interface surface adapted to the urethal opening of the user, and a rear portion integrally adjoining the forward portion with a noninvasive vaginal seal on the interface surface. A removable absorbent pad is supported on the interface body and is extended laterally. A garment is provided for supporting the urine collection device. NASA



N79-25737*# National Aeronautics and Space Administration. Pasadena Office, Calif.
MULTIFUNCTIONAL TRANSDUCER Patent Application
Cyril Feldstein (JPL), Gilbert W. Lewis (JPL), Virgil H. Culler (JPL), and Samuel Meerbaum, inventors (to NASA) (JPL) Filed 1 Jun. 1979 13 p
(Contract NAS7-100)
(NASA-Case-NPO-14329-1; US-Patent-Appl-SN-044432) Avail: NTIS HC A02/MF A01 CSCL 06B

A transducer is described for simultaneously measuring several parameters of a small region of a muscle tissue or other object, with minimal traumatizing or damage of the object. A trifunctional transducer which can measure the force applied by a muscle fiber, the displacement of the fiber, and the change in thickness of the fiber, includes a device having three legs with the inner ends joined together and outer ends formed to pierce the tissue and lie therein. Two legs are relatively stiff, to measure force applied by the tissue, and a third leg is relatively flexible to measure displacement of the tissue relative to one or both stiff legs, and with the three legs lying in a common plane so that the force and displacement measurements all relate to the same direction of muscle movement. NASA



N79-26771* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

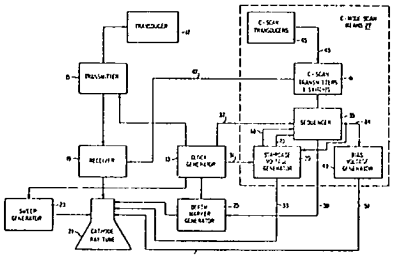
BIOMEDICAL ULTRASONOSCOPE Patent

Robert D. Lee, inventor (to NASA) Issued 29 May 1979 12 p Filed 30 Sep. 1976 Supersedes N77-15619 (15 - 06, p 0786)

(NASA-Case-ARC-10994-2; US-Patent-4,154,230; US-Patent-Appl-SN-759965; US-Patent-Class-128-660; US-Patent-Class-73-626) Avail: US Patent and Trademark Office CSCL 06A

The combination of a C mode scan electronics in a portable, battery powered biomedical ultrasonoscope having A and M mode scan electronics. The C mode scan electronics comprises a plurality of transducer elements arranged in a row and adapted to be positioned on the skin of the patient's body for: (1) converting a pulsed electrical signal to a pulsed ultrasonic signal, (2)radiating the ultrasonic signal into the patient's body,(3) picking up the echoes reflected from interfaces in the patient's body, and (4) converting the echoes to electrical signals. Each transmitter is coupled to a respective tranducer for transmitting a pulsed electrical signal and for transmitting the convected electrical echo signals directly to the receiver.

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



N79-26772* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

PROSTHESIS COUPLING Patent

James B. Reswick (Rancho Los Amigos Hospital Rehabilitation Center, Downey, Calif.), Vert Mooney (Rancho Los Amigos Hospital Rehabilitation Center, Downey, Calif.), Charles W. Bright, and Lester J. Owens, inventors (to NASA) Issued 26 Jun. 1979 4 p Filed 9 Feb. 1978 Supersedes N78-22721 (16 - 13, p 1754)

(NASA-Case-KSC-11069-1; US-Patent-4,158,895; US-Patent-Appl-SN-876438; US-Patent-Class-3-2; US-Patent-Class-3-1.9; US-Patent-Class-3-12) Avail: US Patent and Trademark Office CSCL 06B

A coupling for use in an apparatus for connecting a prosthesis to the bone of a stump of an amputated limb is described which permits a bio-compatible carbon sleeve forming a part of the prosthesis connector to float so as to prevent disturbing the skin seal around the carbon sleeve. The coupling includes a flexible member interposed between a socket that is inserted within an intermedullary cavity of the bone and the sleeve. A lock pin is carried by the prosthesis and has a stem portion which is adapted to be coaxially disposed and slideably within the tubular female socket for securing the prosthesis to the stump. The skin around the percutaneous arbon sleeve is able to move as a result of the flexing coupling so as to reduce stresses caused by changes in the stump shape and/or movement between the bone and the flesh portion of the stump.

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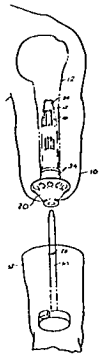

N79-27836* National Aeronautics and Space Administration. Pasadena Office, Calif.

APPARATUS AND METHOD OF INSERTING A MICROELECTRODE IN BODY TISSUE OR THE LIKE USING VIBRATION MEANS Patent

Cyril Feldstein (JPL), Donald W. Crawford (JPL), and Evangelyn W. Kanabus, inventors (to NASA) (JPL) Issued 15 May 1979 8 p Filed 6 Aug. 1976 Supersedes N79-24646 (17 - 15, p 2027) Sponsored by NASA

(NASA-Case-NPO-13910-1; US-Patent-4,154,228; US-Patent-Appl-SN-712270; US-Patent-Class-128-329R; US-Patent-Class-128-639) Avail: US Patent and Trademark Office CSCL 06B

An arrangement for and method of inserting a glass microelectrode having a tip in the micron range into body tissue is presented. The arrangement includes a microelectrode. The top of the microelectrode is attached to the diaphragm center of a first speaker. The microelectrode tip is brought into contact with the tissue by controlling a micromanipulator. Thereafter, an audio signal is applied to the speaker to cause the microelectrode to vibrate and thereby pierce the tissue surface without breaking the microelectrode tip. Thereafter, the tip is inserted into the tissue to the desired depth by operating the micromanipulator with the microelectrode in a vibratory or non-vibratory state.

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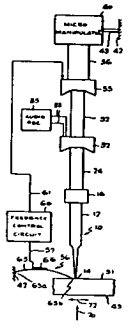


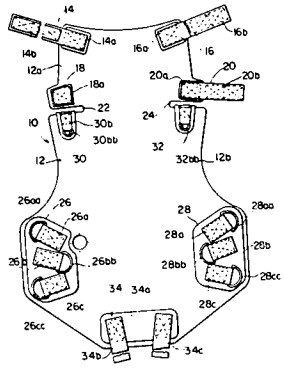
N79-30921*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

SPINE IMMOBILIZATION METHOD AND APPARATUS Patent Application

Kenneth H. Lambson (Lambson, Kenneth and Assoc., San Diego, Calif.) and Hubert C. Vykukal, inventors (to NASA) Filed 13 Jul. 1979 16 p

(NASA-Case-ARC-11167-1; US-Patent-Appl-SN-057526) Avail: NTIS HC A02/MF A01 CSCL 06B

A spine immobilization apparatus which uses a normally flat, flexible bladder filled with beads or microballoons is described. The beads form a rigid mass when the pressure within the bladder is decreased below ambient through the use of a suction pump. The bladder can be conformed to the victim's torso to provide the desired restraint. It is strapped to the victim prior to being rigidified by an arrangement of straps which avoid the stomach area. The bladder is adapted to be secured to a rigid support, i.e., a rescue chair, so as to enable removal of a victim after the bladder has been made rigid. A double sealing connector is used to connect the bladder to the suction pump and a control valve is employed to vary the pressure within the bladder so as to soften and harden the bladder as desired. NASA



54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

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

N79-24651* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

SPACESUIT MOBILITY KNEE JOINTS Patent

Hubert C. Vykukal, inventor (to NASA) Issued 1 May 1979 19 p Filed 3 Mar. 1978 Supersedes N78-18763 (16 - 09, p 1209) Division of US Patent Appl. SN-753965, filed 23 Dec. 1976, US Patent-4,091,464

(NASA-Case-ARC-11058-2; US-Patent-4,151,612; US-Patent-Appl-SN-883094; US-Patent-Class-2-2.1A; US-Patent-Class-285-235; US-Patent-4,091,464; US-Patent-Appl-SN-753965) Avail: US Patent and Trademark Office CSCL 05H

Pressure suit mobility joints are for use in interconnecting adjacent segments of an hermetically sealed spacesuit in which low torques, low leakage and a high degree of reliability are required. Each of the joints is a special purpose joint characterized by substantially constant volume and low torque characteristics and includes linkages which restrain the joint from longitudinal distension and includes a flexible, substantially impermeable diaphragm of tubular configuration spanning the distance between pivotally supported annuli. The diaphragms of selected joints include rolling convolutions for balancing the joints, while various joints include wedge-shaped sections which enhance the range of motion for the joints.

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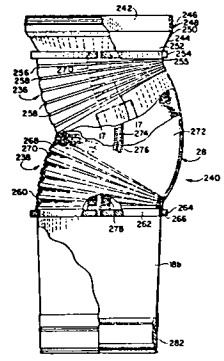

N79-24652* National Aeronautics and Space Administration. Pasadena Office, Calif.

COMPACT ARTIFICIAL HAND Patent

Gordon A. Wiker (JPL) and Wolfgang A. Mann, inventors (to NASA) (JPL) Issued 17 Apr. 1979 7 p Filed 27 Sep. 1977 Supersedes N77-32723 Sponsored by NASA

(NASA-Case-NPO-13906-1; US-Patent-4,149,278; US-Patent-Appl-SN-837259; US-Patent-Class-3-12.5; US-Patent-Class-3-1.1; US-Patent-Class-414-6) Avail: US Patent and Trademark Office CSCL 06B

A relatively simple, compact artificial hand, is described which includes hooks pivotally mounted on first frame to move together and apart. The first frame is rotatably mounted on a second frame to enable 'turning at the wrist' movement without limitation. The second frame is pivotally mounted on a third frame to permit 'flexing at the wrist' movement. A hook-driving motor is fixed to the second frame but has a shaft that drives a speed reducer on the first frame which, in turn, drives the hooks. A second motor mounted on the second frame, turns a gear on the first frame to rotate the first frame and the hooks thereon. A third motor mounted on the third frame, turns a gear on a second frame to pivot it.

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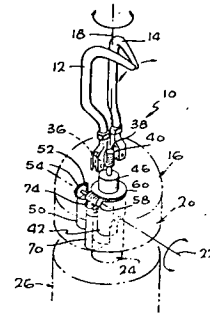
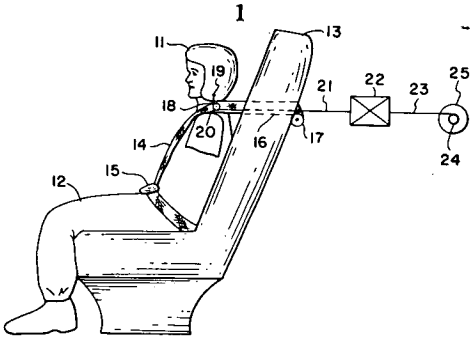


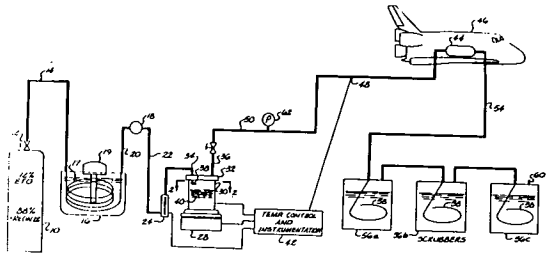
N79-25761*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HELMET WEIGHT SIMULATOR Patent Application
Billy R. Ashworth, Alton C. Hall, and Clyde E. Clark, inventors (to NASA) Filed 30 May 1979 9 p
(NASA-Case-LAR-12320-1; US-Patent-Appl-SN-043913) Avail: NTIS HC A02/MF A01 CSCL 01D

A device for providing acceleration cues to the helmet of a simulator pilot is presented. Pulleys are attached to both shoulders of the pilot. A cable is attached to both sides of the helmet and extends through the pulleys to a takeup reel that is controlled by a torque motor. Control signals are applied to a servo system including the torque motor, the takeup reel and a force transducer which supplies the feedback signal. In one embodiment of the invention the force transducer is in the cable and in another it is in the takeup reel. NASA



N79-33848*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
A SYSTEM FOR STERILIZING OBJECTS Patent Application
Coleman J. Bryan, Edward E. Wright, and Clyde V. Moyers, inventors (to NASA) Filed 8 Jun. 1979 12 p
(NASA-Case-KSC-11085-1; US-Patent-Appl-SN-046739) Avail: NTIS HC A02/MF A01 CSCL 06K

A system for producing a stream of humidified sterilizing gas for sterilizing objects such as the water systems in space vehicles is described. The system includes a source of sterilant gas which is fed to a mixing chamber having inlet and outlet ports. Water is carried in the mixing chamber, with the level of the water only partially filling the mixing chamber, to provide an empty space adjacent the top of the chamber. A heater is provided for heating the water in the chamber producing a humidified atmosphere. The sterilant gas is fed through an arcuate shaped tubular member connected to the inlet port of the mixing chamber to produce a vortex type of flow in the sterilant gas being humidified. A tubular member extends from the mixing chamber to supply the humidified sterilant gas to the object to be sterilized. Scrubbers are provided for removing the sterilant gas after use. NASA

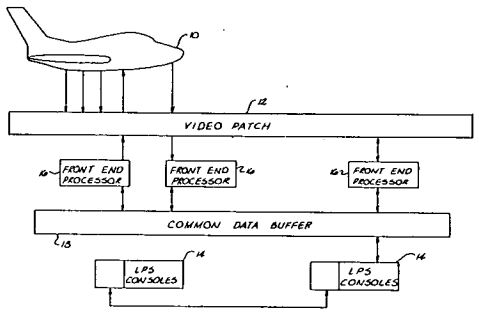


60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N79-23674*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
COMMON DATA BUFFER SYSTEM Patent Application
Frank Byrne, inventor (to NASA) Filed 23 Mar. 1979 22 p
(NASA-Case-KSC-11048-1; US-Patent-Appl-SN-023437) Avail: NTIS HC A02/MF A01 CSCL 09B

A high speed common data buffer system is described for providing an interface and communications medium between a plurality of computers utilized in a distributed computer complex forming part of a checkout, command and control system for space vehicles and associated ground support equipment. The system includes the capability for temporarily storing data to be transferred between computers, for transferring a plurality of interrupts between computers, for monitoring and recording these transfers and for correcting errors incurred in these transfers. Validity checks are made on each transfer and appropriate error notification is given to the computer associated with that transfer. NASA

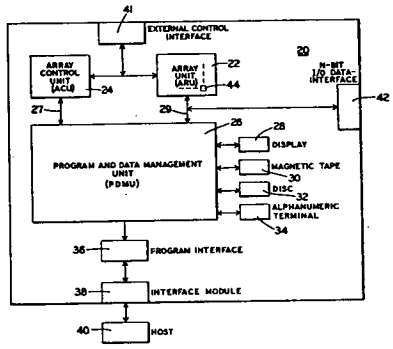


N79-27864*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MASSIVELY PARALLEL PROCESSOR COMPUTER Patent Application

Lai-wo Fung, inventor (to NASA) (NAS-NRC, Washington, D. C.) Filed 21 May 1979 36 p Sponsored by NASA (NASA-Case-GSC-12223-1; US-Patent-Appl-SN-041143) Avail: NTIS HC A03/MF A01 CSCL 09B

An apparatus for processing multidimensional data with strong spatial characteristics, such as raw image data, characterized by a large number of parallel data streams in an ordered array, comprises a large number (e.g., 16,384 in a 128 X 128 array) of parallel processing elements operating simultaneously and independently on single bit slices of a corresponding array of incoming data streams under control of a single set of instructions. Each of the processing elements comprises a bidirectional data bus in communication with a register for storing single bit slices memory unit and associated circuitry, including a binary counter/shift register device, for performing logical and arithmetical computations on the bit slices, and an I/O unit for interfacing the bidirectional data bus with the data stream source. The massively parallel processor architecture enables very high speed processing of large amounts of ordered, parallel data, including spatial translation by shifting or 'sliding' of bits vertically or horizontally to neighboring processing elements. NASA



N79-27865*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

DECOMMUTATOR PATCHBOARD VERIFIER Patent Application

John W. Brunson, inventor (to NASA) Filed 22 Jun. 1979 18 p (NASA-Case-KSC-11065-1; US-Patent-Appl-SN-051271) Avail: NTIS HC A02/MF A01 CSCL 09B

A system for automatically verifying the connections between terminals of a patchboard includes a back plane having a number of plugs corresponding to the pins of the patchboard so that the patchboard can be plugged in. A number of decoders are connected to the plugs of the back plane so that a signal can be sequentially applied to each plug of the back plane under control of a stepping register and a control circuit. A number of data selectors are also connected to the plugs of the back plane and under control of a second external register and control circuit, sequentially make connections between an output circuit and the plugs of the back plane so as to patch the signal applied to a respective plug through a patch connection to the output circuit. By making the above connections in a controlled manner, the precise locations of the patches on the patchboard can be identified and compared with previously stored information in a memory unit.

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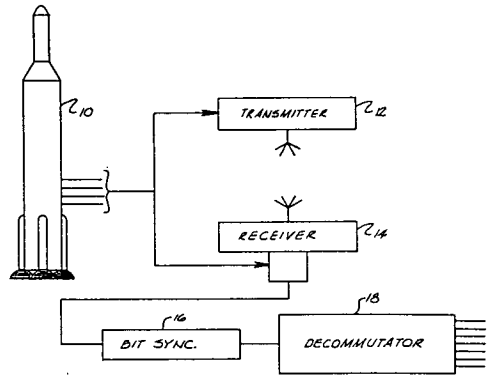
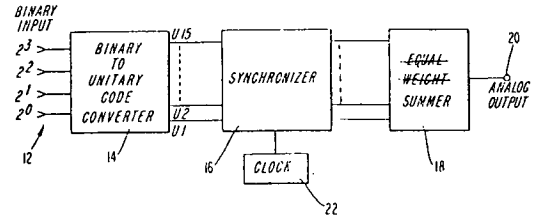


N79-32852*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

HIGH SPEED, GLITCH-FREE DIGITAL TO ANALOG CONVERTER Patent Application

Paul J. Grunberger, inventor (to NASA) (APL) Filed 3 Jul. 1979 14 p Sponsored by NASA (NASA-Case-GSC-12319-1; US-Patent-Appl-SN-054538) Avail: NTIS HC A02/MF A01 CSCL 09B

A digital to analog converter that eliminates glitches in the analog output waveform by using binary to unitary code conversion prior to summing is presented. The unsaturated emitter coupled logic that forms the converter allows a very high data conversion rate as well as improved synchronization among circuit elements. NASA



71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N79-23763* National Aeronautics and Space Administration. Pasadena Office, Calif.

RESOLUTION ENHANCED SOUND DETECTING APPARATUS Patent

James M. Kendall, inventor (to NASA) (JPL) Issued 10 Apr. 1979 5 p Filed 16 Dec. 1977 Supersedes N78-19898 (16 - 10, p 1364) Sponsored by NASA

(NASA-Case-NPO-14134-1; US-Patent-4,149,034; US-Patent-Appl-SN-861392; US-Patent-Class-179-1mf; US-Patent-Class-179-1DM; US-Patent-Class-181-148; US-Patent-Class-340-8LF) Avail: US Patent and Trademark Office CSCL 20A

An apparatus is described for enhancing the resolution of a sound detector of the type which includes an acoustic mirror for focusing sound from an object onto a microphone to enable the determination of the location from which the sound arises. The enhancement apparatus includes an enclosure which surrounds the space between the mirror and microphone, and contains a gas heavier than air, such as Freon, through which sound moves slower and therefore with a shorter wavelength than in air, so that a mirror of given size has greater resolving power. An acoustically transparent front wall of the enclosure which lies forward of the mirror, can include a pair of thin sheets with pressured air between them, to form an end of the region of heavy gas into a concave shape.

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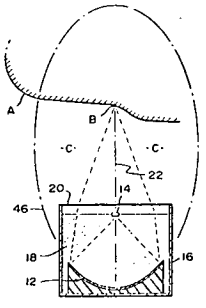


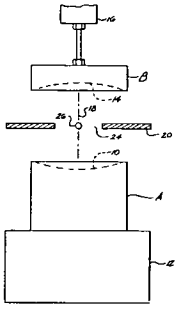
N79-29956*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

METHOD AND APPARATUS FOR SHAPING AND ENHANCING ACOUSTICAL LEVITATION FORCES Patent Application

William A. Oran, LeRoy H. Berge, Donald A. Reiss, and Jerry L. Johnson, inventors (to NASA) Filed 13 Jul. 1979 12 p

(NASA-Case-MFS-25050-1; US-Patent-Appl-SN-057466) Avail: NTIS HC A02/MF A01 CSCL 20A

A method and apparatus for enhancing and shaping acoustical levitation forces in a single-axis acoustic resonance system is described. Specially shaped drivers and reflectors are utilized to enhance the levitation force and better contain fluid substances by means of field shaping. NASA



74 OPTICS

Includes light phenomena.

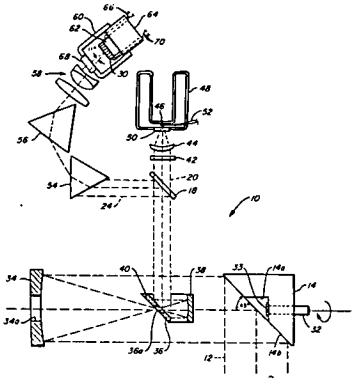
N79-22880*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

MULTISPECTRAL SCANNER OPTICAL SYSTEM Patent Application

Roy C. Stokes and N. Guy Koch, inventors (to NASA) (Lockheed Electronics Co., Inc.) Filed 29 Mar. 1979 21 p

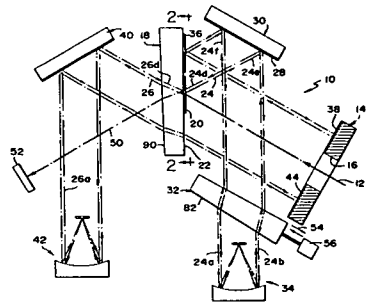
(NASA-Case-MSC-18255-1; US-Patent-Appl-SN-025163) Avail: NTIS HC A02/MF A01 CSCL 20F

An optical system is described for use in a multispectral scanner of the type used in video imaging devices. Electromagnetic radiation reflected by a rotating scan mirror is focused by a concave primary telescope mirror and collimated by a second concave mirror. The collimated beam is split by a dichroic filter which transmits radiant energy in the infrared spectrum and reflects visible and near infrared energy. The long wavelength beam is filtered and focused on an infrared detector positioned in a cryogenic environment. The short wavelength beam is dispersed by a pair of prisms, then projected on an array of detectors also mounted in a cryogenic environment and oriented at an angle relative to the optical path of the dispersed short wavelength beam. NASA



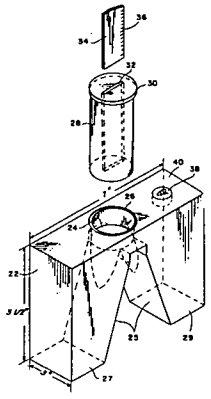
N79-23777*# National Aeronautics and Space Administration. Pasadena Office, Calif.
INTERFEROMETER Patent Application
James B. Breckinridge (JPL), Robert H. Norton (JPL), and Rudolf A. Schindler, inventors (to NASA) (JPL) Filed 9 May 1979 20 p
(Contract NAS7-100)
(NASA-Case-NPO-14448-1; US-Patent-Appl-SN-037560) Avail: NTIS HC A02/MF A01 CSCL 20F

A high resolution interferometer is provided which is insensitive to slight misalignment of its elements, avoids channeling in the spectrum, generates a maximum equal path fringe contrast, produces an even two-sided interferogram without critical matching of the wedge angles of the beamsplitter and compensator wedges, and is optically phase tunable. The interferometer includes a mirror along the path of each beam component produced by the beamsplitter, for reflecting the beam component from the beamsplitter to a correspondih - retroreflector and for reflecting the beam returned by the retroreflector back to the beamsplitter. The fact that the mirror 'covers' the retroreflector, so that the mirror reflects the beam component before and after it reaches the retroreflector, results in the system being insensitive to slight tilting of the mirror. NASA



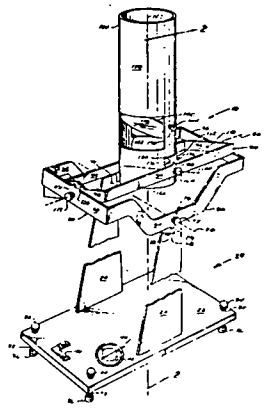
N79-25876*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ROTARY TARGET V-BLOCK Patent Application
Charlton W. Mann, inventor (to NASA) Filed 17 Apr. 1979 12 p
(NASA-Case-LAR-12007-2; US-Patent-Appl-SN-030964) Avail: NTIS HC A02/MF A01 CSCL 20F

A device is disclosed for measuring the distance from a reference plane to a flat or cylindrical surface. The device contains a rotatable measuring scale which is sited with an optical instrument to make the measurement. Readings are taken at various points along the surface to establish an elevation curve which is used to align the surface with the reference plane. NASA



N79-29037* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
RADIATION SHADOW INDICATOR Patent
Richard A. Campbell, inventor (to NASA) Issued 3 Jul. 1979 8 p Filed 31 Oct. 1978 Continuation of abandoned US Patent Appl. SN-778311, filed 16 Mar. 1977
(NASA-Case-MFS-23546-2; US-Patent-4,159,576; US-Patent-Appl-SN-956167; US-Patent-Class-33-281; US-Patent-Class-33-1H; US-Patent-Class-350-83) Avail: US Patent and Trademark Office CSCL 20F

A radiation shadow indicator having a slight tube for sighting shadow-casting objects along a sighting axis is described. The indicator includes a system of gimbals mounting the tube for angular movement so that the sighting axis thereof may be caused to follow the apparent diurnal movement of celestial objects at various seasons of the year. Position indicators are provided for instantaneous readout of angular positions of the gimbal device which, in turn, correspond to positions of the sighting axis at given seansons and/or times of day in relation to the location of the indicator on the surface of the earth.
Official Gazette of the U.S. Patent and Trademark Office



N79-34011* National Aeronautics and Space Administration. Pasadena Office, Calif.
MULTI-CHANNEL ROTATING OPTICAL INTERFACE FOR DATA TRANSMISSION Patent
Charles V. Ivie, inventor (to NASA) (JPL) Issued 4 Sep. 1979 6 p Filed 25 Aug. 1977 Supersedes N79-20496 (17 - 11 p 1447)
(NASA-Case-NPO-14066-1; US-Patent-4,166,959; US-Patent-Appl-SN-827464; US-Patent-Class-250-551; US-Patent-Class-250-216) Avail: US Patent and Trademark Office CSCL 20F

Apparatus for transmitting multiple channels of data across a rotating interface, such as between an antenna that rotates with respect to a platform, is described. Features of the apparatus include: (1) light emitter elements and light detector elements located on the two bodies that rotate relative to each other; (2) a lens for focusing light from each emitter element onto a corresponding detector element; and (3) an image rotating means which is turned as one of the objects rotates, to derotate the

images of the emitter elements that are to be focused on the detector elements.

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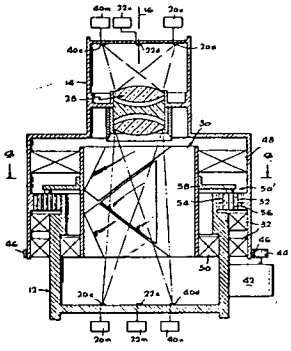


N79-34013*# National Aeronautics and Space Administration. Pasadena Office, Calif.

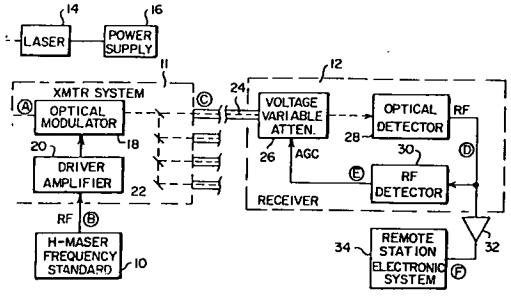
PRECISE RF TIMING SIGNAL DISTRIBUTION TO REMOTE STATIONS Patent Application

George F. Lutes, Jr., inventor (to NASA) (JPL) Filed 24 Aug. 1979 8 p

(Contract NAS7-100)

(NASA-Case-NPO-14749-1; US-Patent-Appl-SN-078521) Avail: NTIS HC A02/MF A01 CSCL 20F

An improved and simplified distribution system is provided for a precise RF reference signal, such as a signal from an H-maser using a light beam from a laser as a frequency carrier, modulating the light beam with the RF timing signal in a modulator, and after distribution to remote stations through optical fibers, demodulating the carrier with an optical detector to detect the RF timing signal. The detected RF reference signal is then processed through an RF detector to provide an automatic gain control (AGC) signal that has an average value proportional to the amplitude of the RF reference signal. This AGC signal is applied to a voltage variable attenuator positioned in front of the RF detector. Since the light frequency is very high, as compared to the RF reference signal, deviation of the reference signal phase is a very small fraction of the RF frequency. In that manner, the timing signal amplitude is maintained constant at each station with substantially zero phase stability degradation. NASA



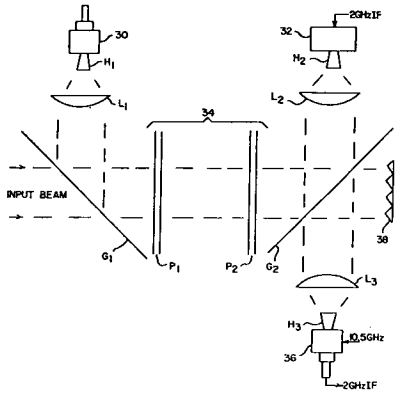
N79-34014*# National Aeronautics and Space Administration. Pasadena Office, Calif.

MICROWAVE LIMB SOUNDER Patent Application

Jacob J. Gustincic, inventor (to NASA) (Gustincic (J. J.) Consulting Engineer, Marina Del Rey, Calif.) Filed 24 Sep. 1979 21 p (Contract JPL-954492)

(NASA-Case-NPO-14544-1; NASA-Case-NPO-14545-1; NASA-Case-NPO-14546-1; NASA-Case-NPO-14547-1; US-Patent-Appl-SN-078612) Avail: NTIS HC A02/MF A01 CSCL 20F

A microwave limb sounder (MLS) to measure trace gases in the upper atmosphere by comparing spectral noise content of limb soundings with the spectral noise content of cold space is disclosed. In sounder utilizes an offset Cassegrain antenna system and a tiltable input mirror to alternately look out at the limb and up at cold space at an elevation angle of about 22 deg. Reflection from the mirror is directed into a radiometer which functions as a diplexer to combine the input radiation and a local oscillator (klystron) beam. The radiometer head is comprised of a Fabry-Perot resonator consisting of two Fabry-Perot cavities spaced a number of half wavelengths apart. Incoming radiation received on one side is reflected and rotated 90 deg in polarization by the resonator so that it will be reflected by an input grid into a mixer, while the klystron beam received on the other side is also reflected and rotated 90 deg. NASA



76 SOLID-STATE PHYSICS

Includes superconductivity.

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

N79-23798* National Aeronautics and Space Administration. Pasadena Office, Calif.

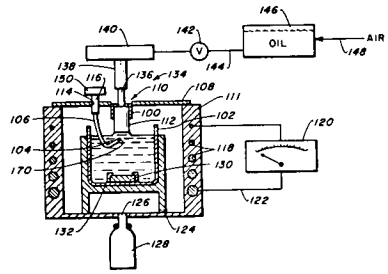
GROWTH OF SILICON CARBIDE CRYSTALS ON A SEED WHILE PULLING SILICON CRYSTALS FROM A MELT Patent

Theodore F. Ciszek (IBM Corp., Hopewell Junction, N. Y.) and Guenther H. Schwuttke, inventor (to NASA) (IBM Corp., Hopewell Junction, N. Y.) Issued 1 May 1979 9 p Filed 29 Jul. 1977 Supersedes N77-30984 (15 - 21, p 2872) Sponsored by NASA

(NASA-Case-NPO-13969-1; US-Patent-4,152,194; US-Patent-Appl-SN-820499; US-Patent-Class-156-617SP; US-Patent-Class-156-DIG.6-8; US-Patent-Class-423-345) Avail: US Patent and Trademark Office CSCL 20B

A saturated solution of silicon and an element such as carbon having a segregation coefficient less than unity is formed by placing a solid piece of carbon in a body of molten silicon having a temperature differential decreasing toward the surface. A silicon carbide seed crystal is disposed on a holder beneath the surface of the molten silicon. As a rod or ribbon of silicon is slowly pulled from the melt, a supersaturated solution of carbon in silicon is formed in the vicinity of the seed crystal. Excess carbon is emitted from the solution in the form of silicon carbide which crystallizes on the seed crystal held in the cool region of the melt.

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



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Section 1: Abstracts

16. Abstract

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