NASA SP-7039(14)
Section 1
Abstracts

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY

Section 1 • Abstracts

JANUARY 1979

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA SP-7039(14) NASA Patent Abstracts Bibliography (Sect 1 • Abstracts) JANUARY 1979

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

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NASA

PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY

Section 1 • Abstracts

Annotated references to NASA-owned inventions covered by U S patents and applications for patent that were announced in *Scientific and Technical Aerospace Reports (STAR)* between July 1978 and December 1978

Scientific and Technical Information Branch JANUARY 1979
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington, D C

This Supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22161, at price code E04 ($7 50 domestic, $15 00 foreign)

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 213 citations published in this issue of the Abstract Section cover the period July 1978 through December 1978 The Index Section contains references to the 3512 citations covering the period May 1969 through December 1978

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 Classification Number(s)
(for issued patents only)

These data elements in the citation of the abstract as depicted in the Typical Citation and Abstract reproduced below and are also used in the several indexes

TYPICAL CITATION AND ABSTRACT

NASA SPONSORED DOCUMENT

NASA ACCESSION NUMBER

TITLE

INVENTOR

NASA CASE NUMBER

ABSTRACT

AVAILABLE ON MICROFICHE

SOURCE

US PATENT APPLICATIONS SERIAL NUMBER

AVAILABILITY

COSATI CODE

N78-19166*# National Aeronautics and Space Administration Hugh L Dryden Flight Research Center Edwards Calif

A PORTABLE DEVICE PARTICULARLY SUITED FOR USE IN STARTING AIR-START UNITS FOR AIRCRAFT Patent Application

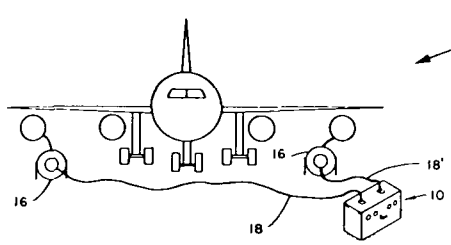
William R Rosier and George C Volk inventors (to NASA) Filed 9 Mar 1978 15 p

(Contract NAS4-2272)

(NASA-Case-FRC-10113-1 US-Patent-Appl-SN-885066) Avail NTIS HC A02/MF A01 CSCL 01E

The invention is embodied in a device including (1) a DC circuit having a pair of terminal plugs each plug being characterized by a first second and third terminal (2) a pair of manually operable switches for connecting the first terminal of each of the plugs to the positive side of a voltage source (3) a circuit lead connecting the second terminal of each plug to the negative side of said source (4) a pair of electrical cables adapted to connect the first and second terminals of each plug to an air-start unit (5) means for connecting each of the cables between the first terminal of one plug and the third terminal of the other plug of the pair and (6) a second pair of manually operable switches for selectively connecting the third terminal of each plug of the pair to the negative side of the voltage source whereby electrical continuity of each cable of the pair may be examined prior to being connected to an air-start unit 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 ($4 00 domestic, $8 00 foreign) Microfiche are sold at price code A01 ($3 00 domestic, $4 50 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
1245.200 Scope of subpart.
1245 201 Definitions
1245 202 Basic considerations.
1245 203 Licenses for practical application of inventions.
1245 204 Other licenses.
1245 205 Publication of NASA inventions available for license.
1245 206 Application for nonexclusive license.
1245 207 Application for exclusive license.
1245 208 Processing applications for license.
1245 209 Royalties and fees.
1245 210 Reports
1245 211 Revocation of licenses.
1245 212 Appeals
1245 213 Litigation.
1245 214 Address of communications.

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

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Section 1 • Abstracts

AERONAUTICS

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

For related information see also *Astronautics*

ASTRONAUTICS

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

For related information see also *Aeronautics*

CHEMISTRY AND MATERIALS

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

ENGINEERING

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

GEOSCIENCES

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

43 EARTH RESOURCES **41**
Includes remote sensing of earth resources by aircraft and spacecraft, photogrammetry, and aerial photography
For instrumentation see *35 Instrumentation and Photography*

44 ENERGY PRODUCTION AND CONVERSION **42**
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*

45 ENVIRONMENT POLLUTION **N.A.**
Includes air, noise, thermal and water pollution, environment monitoring, and contamination control

46 GEOPHYSICS **N.A.**
Includes aeronomy, upper and lower atmosphere studies, ionospheric and magnetospheric physics, and geomagnetism
For space radiation see *93 Space Radiation*

47 METEOROLOGY AND CLIMATOLOGY **N.A.**
Includes weather forecasting and modification

48 OCEANOGRAPHY **N.A.**
Includes biological, dynamic and physical oceanography, and marine resources

LIFE SCIENCES

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

51 LIFE SCIENCES (GENERAL) **50**
Includes genetics

52 AEROSPACE MEDICINE **52**
Includes physiological factors, biological effects of radiation, and weightlessness

53 BEHAVIORAL SCIENCES **N.A.**
Includes psychological factors, individual and group behavior, crew training and evaluation, and psychiatric research

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT **54**
Includes human engineering, biotechnology, and space suits and protective clothing

55 PLANETARY BIOLOGY **N.A.**
Includes exobiology, and extraterrestrial life

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

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) **N.A.**

60 COMPUTER OPERATIONS AND HARDWARE **N.A**
Includes computer graphics and data processing
For components see *33 Electronics and Electrical Engineering*

61 COMPUTER PROGRAMMING AND SOFTWARE **N.A.**
Includes computer programs, routines, and algorithms

62 COMPUTER SYSTEMS **N A.**
Includes computer networks

63 CYBERNETICS **N A.**
Includes feedback and control theory
For related information see also *54 Man/System Technology and Life Support*

64 NUMERICAL ANALYSIS **N.A.**
Includes iteration, difference equations, and numerical approximation

65 STATISTICS AND PROBABILITY **N.A.**
Includes data sampling and smoothing, Monte Carlo method, and stochastic processes

66 SYSTEMS ANALYSIS **N A.**
Includes mathematical modeling, network analysis, and operations research

67 THEORETICAL MATHEMATICS **N A.**
Includes topology and number theory

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*

70 PHYSICS (GENERAL) **N.A.**
For geophysics see *46 Geophysics* For astrophysics see *90 Astrophysics* For solar physics see *92 Solar Physics*

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

Section 2 • Indexes

JANUARY 1979 (Supplement 14)

NASA Patent Abstracts Bibliography

A Semiannual Publication of the National Aeronautics and Space Administration

02 AERODYNAMICS

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

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

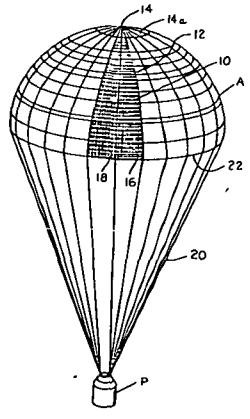
N78-22026*# National Aeronautics and Space Administration John F Kennedy Space Center Cocoa Beach, Fla

SYSTEM AND METHOD FOR REFURBISHING AND PROCESSING PARACHUTES Patent Application

Russell T Crowell, inventor (to NASA) Filed 21 Dec 1977 19 p

(NASA-Case-KSG-11042-1 US-Patent-Appl-SN-862878) Avail NTIS HC A02/MF A01 CSCL 13H

A system and method for refurbishing and processing parachutes is described An overhead monorail conveyor system on which the parachute is suspended for horizontal conveyance is also included The parachute is first suspended in partially open tented configuration wherein open inspection of the canopy is permitted to remove debris and inspect all areas Following inspection, the parachute is transported by the monorail conveyor to a washing and drying station with the parachute canopy mounted on the conveyor in a systematic arrangement which permits water and air to pass through the ribbon like material of the canopy Following drying of the parachute the chute is conveyed into an interior space where it is finally inspected and removed from the monorail conveyor and laid upon a table for folding Following folding operations the chute is once again mounted on the conveyor in an elongated horizontal configuration and conveyed to a packing area for stowing the parachute in a deployment bag NASA



03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations and aircraft accidents

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*

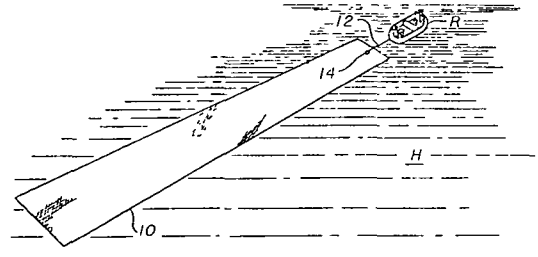
N78-25070*# National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex

HIGH VISIBILITY AIR SEA RESCUE PANEL Patent Application

Jack Naimer and Mathew I Radnofsky inventors (to NASA) Filed 16 Dec 1977 10 p

(NASA-Case-MSC-12564-2 US-Patent-Appl-SN-861389) Avail NTIS HC A02/MF A01 CSCL 06G

A system for air sea rescue was developed utilizing a thin film large area easily deployable highly visible buoyant panel which was formed of a substrate having a specific gravity less than sea water and impregnated with a brilliant fluorescent pigment The panel may be accordion folded for compactness and ease of deployment may have an inflatable periphery to enhance deployment rigidity and buoyancy and may include means for attachment to a floatation device NASA



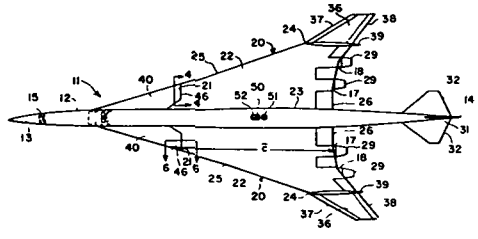
05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology

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

N78-32086* National Aeronautics and Space Administration Langley Research Center Hampton Va
SUPERSONIC TRANSPORT Patent
Paul Coe Jr inventor (to NASA) Issued 6 Jun 1978 7 p Filed 27 Aug 1976 Supersedes N76 31219 (14 22 p 2826)
(NASA-Case-LAR-11932-1, US-Patent-4,093,156
US-Patent-Appl-SN-718244, US-Patent-Class-244-45A
US-Patent-Class-244-46 US-Patent Class 244 218) Avail US Patent Office CSCL 01C

An aircraft of supersonic transport configuration is described, featuring thrust vectoring in conjunction with wing apex segments used as canard surfaces during takeoff landing and low-speed flight The angle of incidence of the wing apex segments, when the segments were functioning as canard surfaces, was variable with respect to the aircraft angle of attack The wing apex segments furthermore formed a portion of the main wing panel swept leading edge when not functioning as canard surfaces The combination of thrust vectoring and deployable wing apex segments resulted in increased aircraft range and improved low speed longitudinal stability while providing acceptable takeoff length capabilities Official Gazette of the U S Patent Office



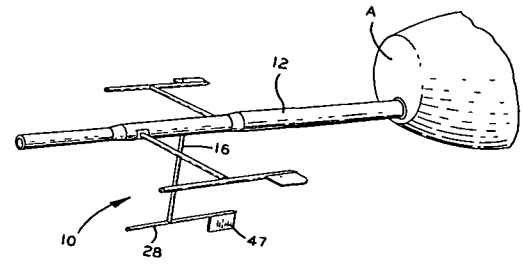
06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices, and flight instruments

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

N78-25088*# National Aeronautics and Space Administration Hugh L Dryden Flight Research Center Edwards, Calif
AIR SPEED AND ATTITUDE PROBE Patent Application
Merle A Economu inventor (to NASA) Filed 30 May 1978 13 p
(NASA-Case-FRC-11009-1 US-Patent-Appl-SN-910708) Avail NTIS HC A02/MF A01 CSCL 01D

A probe was designed which can be mounted on a data boom and extended in parallel with the longitudinal axis of symmetry of an aircraft to provide local air speed and aircraft attitude intelligence The probe employs both static pressure and total pressure transducers mounted in a tubular body supported for wind induced angular displacement about an axis normally related to the longitudinal axis of the aircraft NASA



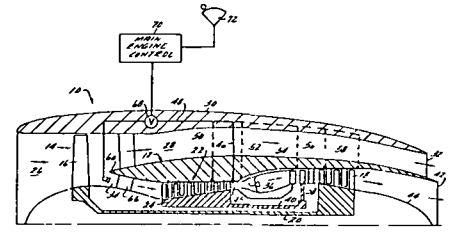
07 AIRCRAFT PROPULSION AND POWER

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*.

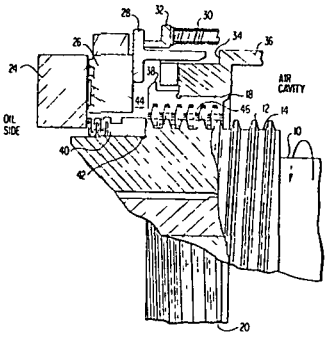
N78-25089* National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio
GAS TURBINE ENGINE WITH RECIRCULATING BLEED Patent
Arthur P Adamson inventor (to NASA) (GE Cincinnati Ohio) Issued 11 Apr 1978 5 p Filed 14 Jun 1976 Sponsored by NASA
(NASA-Case-LEW-12452-1 US-Patent-4 083,181
US-Patent-Appl-SN-695513 US-Patent-Class-60-39 52
US-Patent-Class-60-226R) Avail US Patent Office CSCL 21E

Carbon monoxide and unburned hydrocarbon emissions in a gas turbine engine are reduced by bleeding hot air from the engine cycle and introducing it back into the engine upstream of the bleed location and upstream of the combustor inlet As this hot inlet air is recycled the combustor inlet temperature rises rapidly at a constant engine thrust level In most combustors this will reduce carbon monoxide and unburned hydrocarbon emissions significantly The preferred locations for hot air extraction are at the compressor discharge or from within the turbine whereas the preferred reentry location is at the compressor inlet Official Gazette of the U S Patent Office



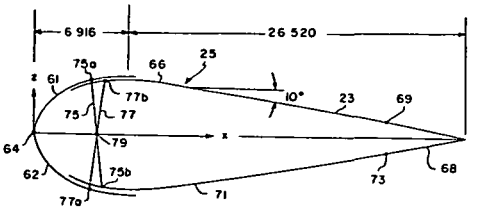
N78-25090* National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio
COUNTER PUMPING DEBRIS EXCLUDER AND SEPARATOR Patent
Lawrence P Ludwig inventor (to NASA) Issued 18 Apr 1978 5 p Filed 31 Mar 1976 Supersedes N76-20487 (14 - 11 p 1394)
(NASA-Case-LEW-11855-1 US-Patent-4 084 825 US-Patent-Appl-SN-672222 US-Patent-Class-277-25 US-Patent-Class-277-134) Avail US Patent Office CSCL 21E

A dirt separator and excluder for removing entrained debris from gas turbine shaft seals is described A helical groove pattern is constructed on the rotating shaft with the pumping pattern such that it tends to pump seal pressurizing gas toward the gas turbine seal A second helical groove pattern is provided on the stationary housing or counter rotating member coaxial with the shaft and this pattern is designed to provide pumping in the direction opposite from that of the groove pattern on the shaft Gas with entrained debris entering this grooved area will be subjected to high centrifugal forces due to the swirl motion induced by the groove pattern and the rotation of the shaft This debris is centrifuged outwardly into the outer groove pattern on the housing or counter rotating member Because the outer groove pattern has a pumping direction opposite from that of the seal dirt is pumped away from the seal and can be collected in a suitable debris trap remote from the seal location
Official Gazette of the U S Patent Office



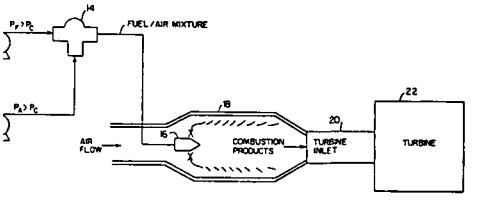
N78-27121* National Aeronautics and Space Administration Langley Research Center Langley Station Va
TWO DIMENSIONAL WEDGE/TRANSLATING SHROUD NOZZLE Patent
Donald L Maiden, inventor (to NASA) Issued 9 May 1978 9 p Filed 31 Mar 1976 Supersedes N76-22202 (14 - 13, p 1618)
(NASA-Case-LAR-11919-1 US-Patent-4 088 270 US-Patent-Appl-SN-672221, US-Patent-Class-239-265 25, US-Patent-Class-60-230 US-Patent-Class-239-265 33) Avail US Patent Office CSCL 21E

A jet propulsion exhaust nozzle is reported for multi-engine installations which produces high internal/external, thrust-minus-drag performance for transonic cruise or transonic acceleration as well as improved performance at subsonic and supersonic speeds A two dimensional wedge/translating shroud provides the variable nozzle exit geometry needed to achieve high engine performance over a wide range of throttle power settings
Official Gazette of the U S Patent Office



N78-27122*# National Aeronautics and Space Administration - Lewis Research Center Cleveland Ohio
SUPERCRITICAL FUEL INJECTION SYSTEM Patent Application
C J Marek and L P Cooper inventors (to NASA) Filed 19 Jun 1978 10 p
(NASA-Case-LEW-12990-1 US-Patent-Appl-SN-916654) Avail NTIS HC A02/MF/A01 CSCL 21E

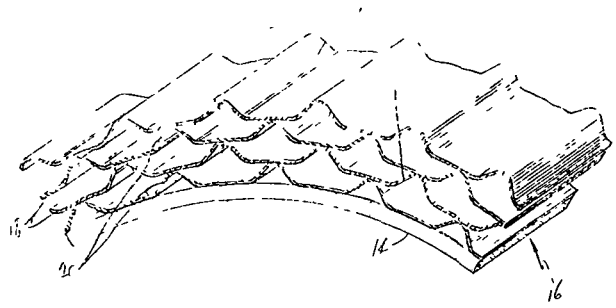
A fuel injection system for gas turbines or the like which includes a pair of high pressure pumps which provide fuel and a carrier fluid such as air at pressures above the critical pressure of the fuel was developed A supercritical mixing chamber mixes the fuel and carrier fluid and the mixture is sprayed into a combustion chamber for burning therein The use of fuel and a carrier fluid at supercritical pressures promotes rapid mixing of the fuel in the combustion chamber so as to reduce the formation of pollutants and promote cleaner burning NASA



N78-31103*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio
GAS PATH SEAL Patent Application
Robert C Bill and Lawrence P Ludwig, inventors (to NASA) Filed 4 Aug 1978 9 p
(NASA-Case-Lew-12131-2, US-Patent-Appl-SN-931090) Avail NTIS HC A02/MF A01 CSCL 21E

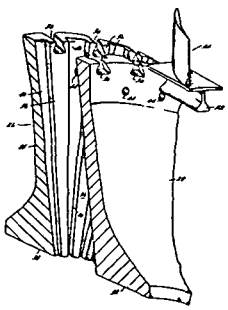
A gas path seal for a turbine engine or compressor is provided The gas path seal comprises a shroud of material wearable or abradable relative to the material of the turbine or compressor blades and closely spaced from the blade tips A compliant backing, preferably of several layers of corrugated metal or a compliant

material covered with a thin layer of ductile material, is provided about the shroud and a rigid mounting surrounds the compliant backing The novel feature is a compliant backing between the shroud and mounting As a result normal forces during a blade rub are limited and wear is reduced and the life of the shroud is lengthened for a design of comparable clearance of blade to shroud NASA



N78-33101* National Aeronautics and Space Administration Lewis Research Center Cleveland, Ohio
REDUNDANT DISC Patent
William N Barack (GE, Cincinnati), Paul A Domas (GE, Cincinnati) and Stephen W Beekman inventors (to NASA) (GE, Cincinnati) Issued 27 Jun 1978 7 p Filed 22 Mar 1976 Sponsored by NASA
(NASA-Case-LEW-12496-1 US-Patent-4 097 194, US-Patent-Appl-SN-668971 US-Patent-Class-416-244A, US-Patent-Class-416-214A, US-Patent-Class-74-572 US-Patent-Class-29-463) Avail US Patent Office CSCL 21E

A rotatable disc is described that consists of parallel plates tightly joined together for rotation about a hub Each plate is provided with several angularly projecting spaced lands The lands of each plate are interposed in alternating relationship between the lands of the next adjacent plate In this manner circumferential displacement of adjacent sectors in any one plate is prevented in the event that a crack develops Each plate is redundantly sized so that in event of structural failure of one plate, the remaining plates support a proportionate share of the load of the failed plate The plates are prevented from separating laterally through the inclusion of generally radially extending splines which are inserted to interlock cooperating circumferentially adjacent lands Official Gazette of the U S Patent Office



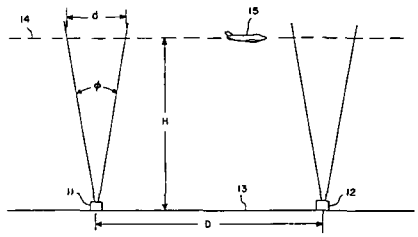
09 RESEARCH AND SUPPORT FACILITIES (AIR)

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)*

N78-22116*# National Aeronautics and Space Administration *Langley Research Center, Langley Station, Va*
APPARATUS FOR MEASURING AN AIRCRAFT'S SPEED AND HEIGHT *Patent Application*
William R Young and Charles W Stump, inventors (to NASA) Filed 9 Mar 1978 14 p
(NASA-Case-LAR-12275-1, US-Patent-Appl-SN-885065) Avail NTIS HC A02/MF A01 CSCL 14B

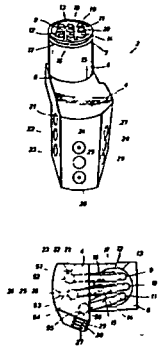
The invention consists essentially of two ground positioned television cameras 11 and 12 separated by a measured distance and placed in line with the projection 13 of the expected path 14 of an aircraft 15 The circuitry is used to start the count on counter 26 when the aircraft passes through the field of view of camera 11 and to stop the count on counter 26 when the aircraft passes through the field of view of camera 12 The resulting count on counter 26 is proportional to the speed of the aircraft The count on counter 27 starts when the aircraft first enters the field of view of camera 11 and stops when the *aircraft leaves the field of view of camera 11 After the speed* has been determined the resulting count on counter 27 is proportional to the height of the aircraft NASA



N78-31129* National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex
MULTI-PURPOSE WIND TUNNEL REACTION CONTROL MODEL BLOCK Patent
Henry S Dresser (Rockwell Intern Corp, Downey, Calif) and Joseph J Daileda, inventors (to NASA) (Rockwell Intern Corp, Downey, Calif) Issued 30 May 1978 6 p Filed 11 Feb 1977 Supersedes N77-19077 (15 - 10, p 1226) Sponsored by NASA
(NASA-Case-MSC-19706-1, US-Patent-4 091,665, US-Patent-Appl-SN-767911, US-Patent-Class-73-147, US-Patent-Class-239-265 25) Avail US Patent Office CSCL 14B

A reaction control system nozzle block is provided for testing *the response characteristics of space vehicles to a variety of* reaction control thruster configurations A pressurized air system is connected with the supply lines which lead to the individual jet nozzles Each supply line terminates in a compact cylindrical plenum volume, axially perpendicular and adjacent to the throat of the jet nozzle The volume of the cylindrical plenum is sized

to provide uniform thrust characteristics from each jet nozzle irrespective of the angle of approach of the supply line to the plenum Each supply line may be plugged or capped to stop the air supply to selected jet nozzles, thereby enabling a variety of nozzle configurations to be obtained from a single model nozzle block. Official Gazette of the U S Patent Office

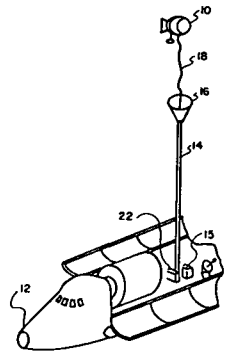


15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters manned orbital laboratories reusable vehicles and space stations

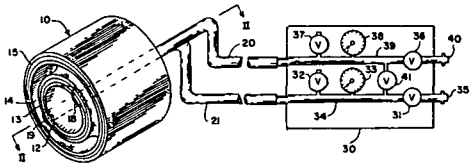
N78-25119* National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala
TETHERLINE SYSTEM FOR ORBITING SATELLITES Patent
Charles C Rupp and Ralph R Kissel inventors (to NASA) 11 Apr 1978 6 p Filed 8 Nov 1976 Supersedes N77-11079 (15 - 02 p 0154)
(NASA-Case-MFS-23564-1 US-Patent-4 083 520 US-Patent-Appl-SN-739908 US-Patent-Class-244-167 US-Patent-Class-244-161) Avail US Patent Office CSCL 22B

A system for tethering one orbiting space vehicle to another was designed so that a tetherline between the vehicles is controlled by a motorized reel which in turn is controlled to deploy retrieve or maintain a constant line length while effecting a stabilizing influence on the line This is accomplished by applying a tension to the line which takes into account the instantaneous length of the line rate of change of the length of the line and certain constants which vary depending upon the mode of operation deployment retrieval or station keeping
Official Gazette of the U S Patent Office



N78-33123*# National Aeronautics and Space Administration Langley Research Center, Hampton Va
STATIC PRESSURE ORIFICE SYSTEM TESTING AND APPARATUS Patent Application
Randolph F Culotta and Donald L Posey inventors (to NASA) Filed 17 Aug 1978 14 p
(NASA-Case-LAR-12269-1, US-Patent-Appl-SN-934576) Avail NTIS HC A02/MF A01 CSCL 14B

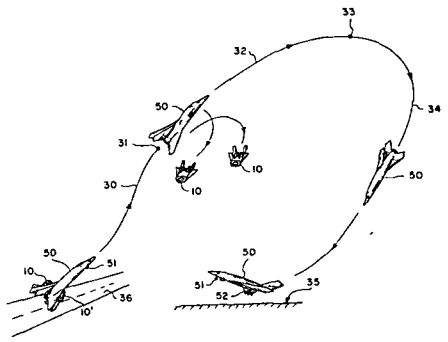
A method and apparatus for pressure testing the static pressure orifices and associated connections used in wind tunnels is presented A cylindrical module, having in one end an open hemispherical calibration pressure chamber separated from and surrounded by an annular vacuum chamber is placed over the orifice of the system to be tested Ports lead from each of the chambers out the other end of the module to tubes connected to a control box consisting of calibration pressure and vacuum supply lines bleeder valves and gauges The vacuum chamber is evacuated to seat the module and seal off the system The center chamber is pressurized and the control box pressure gauge is monitored for changes which would indicate leaks in the system Comparison against the control box pressure gauge allows for calibration of the orifice system pressure receiving gauge NASA



N78-25120*# National Aeronautics and Space Administration Langley Research Center Langley Station Va
SMALL AIR BREATHING LAUNCH VEHICLE Patent Application
Liam R Jackson William J Small John P Weidner and James A Martin inventors (to NASA) Filed 30 May 1978 13 p
(NASA-Case-LAR-12250-1 US-Patent-Appl-SN-910794) Avail NTIS HC A02/MF A01 CSCL 22B

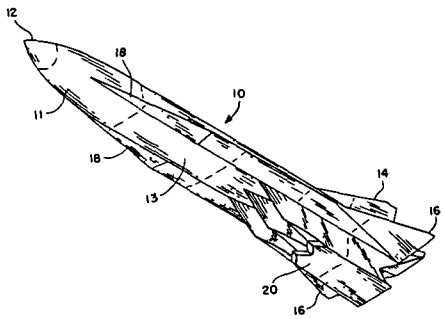
An orbit vehicle launch system was designed which includes reusable turbojet propelled booster vehicles releasably connected to a reusable rocket powered orbit vehicle The coupled orbiter-booster combination takes off horizontally and ascends to staging altitude and speed under booster power with both

orbiter and booster wings providing lift After staging, the booster vehicles fly back to earth for horizontal landing and the orbiter vehicle continues ascending to orbit The wings of both vehicles are designed to induce vortex lift NASA



N78-32168*# National Aeronautics and Space Administration Langley Research Center Hampton, Va
HYPERSONIC AIRBREATHING MISSILE Patent Application
James L Hunt Pierce L Lawing, and Don C Marcum Jr inventors (to NASA) Filed 18 Sep 1978 21 p
(NASA-Case LAR-12264-1 US-Patent-Appl-SN-943087) Avail NTIS HC A02/MF A01 CSCL 16D

A hypersonic airbreathing missile using dual mode scramjet engines for propulsion is described The fuselage is constructed of a material with a high heat sink capacity and is covered with a thermal protective shield and lined with an internal insulating blanket The engine airframe integration uses the flat lower portion of the lower fuselage to precompress the air entering the scramjet engines The precompression of air entering the scramjet inlets increases as the angles of attack This feature results in a highly maneuverable missile which can accelerate as it banks into a turn NASA



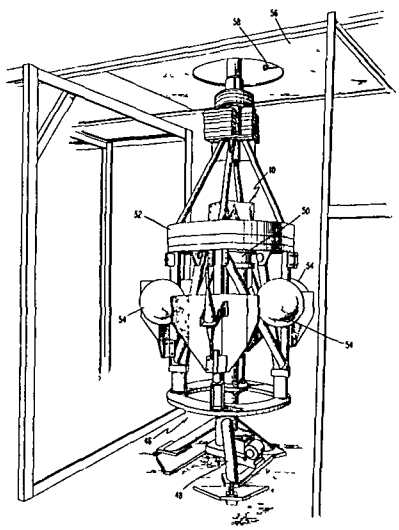
18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control, and attitude control

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

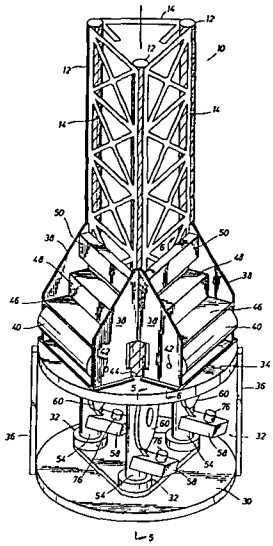
N78-23141*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md
ACTIVE NUTATION CONTROLLER Patent Application
Henry C Hoffman and James H Donohue, inventors (to NASA) Filed 19 Apr 1978 30 p
(NASA-Case-GSC-12273-1, US-Patent-Appl-SN-897830) Avail NTIS HC A03/MF A01 CSCL 22B

An apparatus for controlling nutation motion in a spinning body is described Features of the apparatus include an angular accelerometer with its input axis perpendicular to the spin axis of the body, a flywheel with an axis of rotation perpendicular to the axis of the accelerometer and to the spin axis of the body and a motor for driving the flywheel to attenuate or build nutation The motor is controlled by circuitry that monitors the output of the angular accelerometer and drives the motor clockwise or counterclockwise during predetermined nutation angles synchronized to the zero crossover points of the accelerometer signal and centered about the nutation peaks The use of an angular accelerometer rather than a linear accelerometer or gyro to monitor nutation enables placement of the nutation control apparatus at any location relative to the spin axis of the body requiring only crude orientation and no calibration NASA



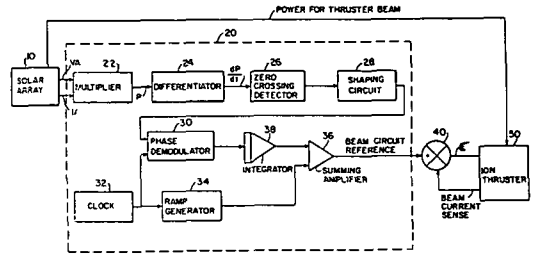
N78-22146*# National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex
STRUCTURAL MEMBERS, METHOD AND APPARATUS Patent Application
Jack A Kinzler inventor (to NASA) Filed 4 Apr 1978 50 p (NASA-Case-MSC-16217-1, US-Patent-Appl-SN-893383) Avail NTIS HC A03/MF A01 CSCL 22A

A lightweight structural member suitable as trusses to be used in the assembly of large structures in space (e g , solar power satellite) is described, together with a compact, fully automated machine for manufacturing such members in a space environment from compactly stowed sheet material The rigid, triangular truss is formed of initially flexible, relatively thin rolled sheet material, and includes three parallel tubular columns formed from a strip of sheet material closed upon itself by helical winding The structural member takes advantage of the space environment, such as low gravitational forces, to utilize construction materials, such as flexible sheet material, and solves the problems of the constraints of manufacturing large space structures such as limited capability for transportation of materials, and stowage of greatest amount of raw material in the most compact form, etc NASA



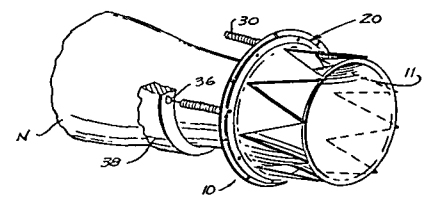
N78-22149*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio
CLOSED LOOP SOLAR ARRAY-ION THRUSTER SYSTEM WITH POWER CONTROL CIRCUITRY Patent Application
Robert P Gruber, inventor (to NASA) Filed 29 Mar 1978 20 p
(NASA-Case-LEW-12780-1 US-Patent-Appl-SN-891370) Avail NTIS HC A02/MF A01 CSCL 21C

A solar array-ion thruster system is described which includes a power control circuit that permits use of the thruster itself in operating the solar array at the maximum power point The power control circuit connected between the solar array and the ion thruster and receiving voltage and current signals from the former, multiplies the voltage and current signals together to produce a power signal which is differentiated with respect to time The differentiator output is detected by a zero crossing detector and, after suitable shaping the detector output is phase compared with a clock in a phase demodulator An integrator receives no output from the phase demodulator when the operating point is at the maximum power point, but is driven toward the maximum power point for non-optimum operation A ramp generator provides minor variations in the beam current reference signal produced by the integrator in order to obtain the first derivative of power NASA



N78-22150*# National Aeronautics and Space Administration Marshall Space Flight Center, Huntsville Ala
A RETRACTABLE ENVIRONMENTAL SEAL Patent Application
Joseph R Dettling, inventor (to NASA) (United Technologies Corp , East Hartford Conn) Filed 29 Mar 1978 15 p Sponsored by NASA
(NASA-Case-MFS-23646-1, US-Patent-Appl-SN-891372) Avail NTIS HC A02/MF A01 CSCL 11A

A retractable environmental seal for use in sealing the opening of the exit cone for a rocket nozzle was devised The seal comprises a diaphragm like cover having a central region adapted to be seated in sealing relation with the periphery of the opening It is characterized by radially extended failure zones for facilitating a pressure induced rupture of the cover A plurality of angularly spaced tension springs is connected with the peripheral portion of the cover for retracting fractured segments of the cover from the opening subsequent to a pressure induced rupture NASA



20 SPACECRAFT PROPULSION AND POWER

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

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

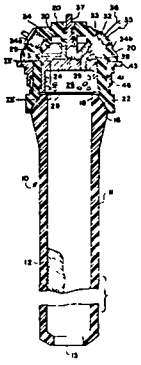
N78-24275* National Aeronautics and Space Administration Langley Research Center Langley Station Va

MOLDED COMPOSITE PYROGEN IGNITER FOR ROCKET MOTORS Patent

Wilbur C Heier and Melvin H Lucy, inventors (to NASA) Issued 28 Mar 1978 10 p Filed 20 Apr 1976 Supersedes N76-29365 (14 - 20 p 2574)

(NASA-Case-LAR-12018-1 US-Patent-4 080,901 US-Patent-Appl-SN-678520 US-Patent-Class-102-49 7 US-Patent-Class-60-39 82E US-Patent-Class-102-39 US-Patent-Class-102-70R US-Patent-Class-285-192) Avail US Patent Office CSCL 21H

A lightweight pyrogen igniter assembly including an elongated molded plastic tube adapted to contain a pyrogen charge was designed for insertion into a rocket motor casing for ignition of the rocket motor charge A molded plastic closure cap provided for the elongated tube includes an ignition charge for igniting the pyrogen charge and an electrically actuated ignition squib for igniting the ignition charge The ignition charge is contained within a portion of the closure cap, and it is retained therein by a noncorrosive ignition pellet retainer or screen which is adapted to rest on a shoulder of the elongated tube when the closure cap and tube are assembled together A circumferentially disposed metal ring is provided along the external circumference of the closure cap and is molded or captured within the plastic cap in the molding process to provide along with O ring seals a leakproof rotary joint Official Gazette of the U S Patent Office



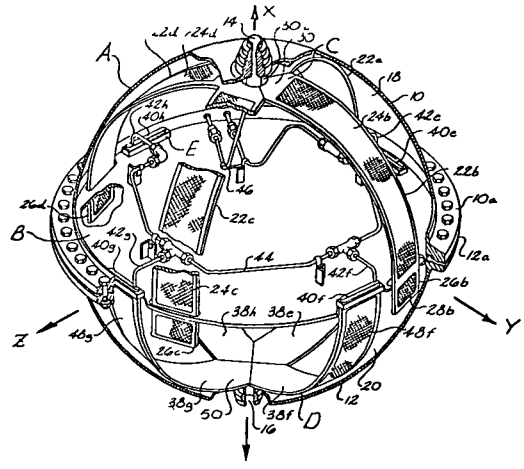
N78-27176*# National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala

PASSIVE PROPELLANT SYSTEM Patent Application

Donald A Hess (McDonnell Douglas Astronautics Co St Louis Mo) William W Regnier (McDonnell Douglas Astronautics Mo), and Virgil L Jacobs inventors (to NASA) Filed 11 Jul 1978 16 p Sponsored by NASA

(NASA-Case-MFS-23642-2 US-Patent-Appl-SN-923758) Avail NTIS HC A02/MF A01 CSCL 20H

The system utilizes a spherical tank structure A separated into two equal volume compartments by a flat bulkhead B Each compartment has four similar gallery channel legs located in the principal vehicle axes ensuring that bulk propellant will contact at least one gallery leg during vehicle maneuvers The forward compartment gallery channel legs collect propellant and feed it into the aft compartment through communication screens which protrude into the aft compartment The propellant is then collected by the screened gallery channels in the aft compartment and supplied to the propellant outlet The invention resides in the independent gallery assembly and screen structure by means of which propellant flow from forward to aft compartments is maintained Liquid surface tension of the liquid on the screens is used to control liquid flow The system provides gas-free propellants in low or zero-g environments regardless of axial accelerations and propellant orientation in bulk regions of the vessel NASA



N78-31162*# National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston, Tex

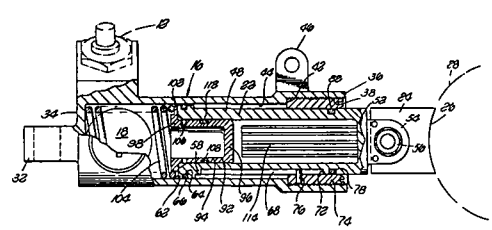
A PRESSURE LIMITING PROPELLANT ACTUATING SYSTEM Patent Application

Paul B Reese (Rockwell International, Downey, Calif) and David W Murphy inventors (to NASA) (Rockwell International, Downey, Calif) Filed 4 Aug 1978 13 p

(Contract NAS9-14000)

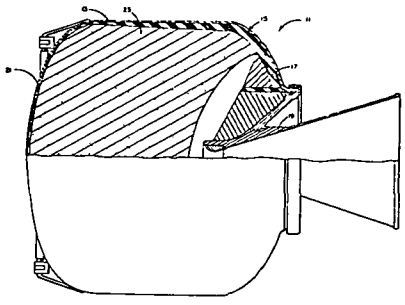
(NASA-Case-MSC-18179-1, US-Patent-Appl-SN-931218) Avail NTIS HC A02/MF A01 CSCL 21H

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



N78-32179* National Aeronautics and Space Administration Pasadena Office Calif
SOLID PROPELLANT MOTOR Patent
John I Shafer (JPL) and Harold E Marsh, Jr inventors (to NASA) (JPL) Issued 26 Sep 1978 8 p Filed 13 May 1970 Sponsored by NASA
(NASA-Case-NPO-11458A US-Patent-4 116 131
US-Patent-Appl-SN-48621 US-Patent-Class-102-103
US-Patent-Class-149-19 4 US-Patent-Class-149-42
US-Patent-Class-149-43 US-Patent-Class-149-44
US-Patent-Class-149-76 US-Patent-Class-149-83
US-Patent-Class-149-85) Avail US Patent Office CSCL 21H

A case bonded end burning solid propellant rocket motor is described A propellant with sufficiently low modulus to avoid chamber buckling on cooling from cure and sufficiently high elongation to sustain the stresses induced without cracking is used The propellant is zone cured within the motor case at high pressures equal to or approaching the pressure at which the motor will operate during combustion A solid propellant motor with a burning time long enough that its spacecraft would be limited to a maximum acceleration of less than 1 g is provided by one version of the case bonded end burning solid propellant motor of the invention Official Gazette of the U S Patent Office



23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry

N78-22154*# National Aeronautics and Space Administration Ames Research Center Moffett Field, Calif
SYNTHESIS OF MULTIFUNCTION TRIARYLTRIFLUOROETHANES Patent Application
William P Kray (Talladega Coll Ala) and Robert W Rosser, inventors (to NASA) (Talladega, Coll , Ala) Filed 30 Mar 1978 17 p Sponsored by NASA
(NASA-Case-ARC-11097-1, US-Patent-Appl-SN-891872) Avail NTIS HC A02/MF A01 CSCL 07C

New 1,1,1-triaryl 2 2 2-trifluoro ethanes in which the aryl radicals carry one or more substituents were prepared by condensing trifluoro acetophenones with substituted aromatic compounds in the presence of catalytic quantities of trifluoro methyl sulfonic acid The reaction can be carried out under reflux in toluene or for strikingly better results in certain cases, reactants are simply stirred at room temperature for about 24 to 48 hours NASA

N78-22155*# National Aeronautics and Space Administration Ames Research Center, Moffett Field Calif
SYNTHESIS OF MULTIFUNCTION TRIARYLTRIFLUOROETHANES Patent Application
William P Kray (Talladega Coll , Ala) and Robert W Rosser, inventors (to NASA) (Talladega Coll Ala) Filed 30 Mar 1978 10 p Sponsored by NASA
(NASA-Case-ARC-11097-2, US-Patent-Appl-SN-891875) Avail NTIS HC A02/MF A01 CSCL 07C

The 1 1 1-triaryl 2 2 2-trifluoro ethanes, in which the aryl radicals have nitrogen containing substituents such as the amino nitrile and acetamido groups were prepared by the acid catalyzed condensation of trifluoro acetophenones with aromatic substrates containing amino groups The amino groups may then be converted to nitriles, acetamides and other derivatives by standard procedures The products obtained may be used as monomers or as crosslinking agents in polymer formation NASA

N78-22156*# National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
CATALYSTS FOR IMIDE FORMATION FROM AROMATIC ISOCYANATES AND AROMATIC DIANHYDRIDES Patent Application
Salvatore Riccitiello Paul M Sawko and Carlos A Estrella inventors (to NASA) Filed 24 Feb 1978 16 p
(NASA-Case-ARC-11107-1 US-Patent-Appl-SN-883961) Avail NTIS HC A02/MF A01 CSCL 07C

This invention relates to the use of metal salts of caprylic (octoic) acid for catalyzing the formation of imide linkages by the reaction of aromatic tetracarboxylic acid dianhydrides with aromatic polyisocyanates The preferred catalysts are stannous, ferric and aluminum octoates The reaction can be carried out in one operation i e , by placing all the ingredients in a mold and heating at a suitable temperature to obtain a foamed product Alternatively and preferably a prepolymer is allowed to form between the reactants, with loss of carbon monoxide equal to about half the theoretical quantity that can be liberated by complete reaction of the ingredients This prepolymer is then placed in a mold and heated to form the final polyimide foam product The product has outstanding thermal and fire performance, as shown by burn-through time and flame spread characteristics NASA

N78-22157*# National Aeronautics and Space Administration Lewis Research Center Cleveland, Ohio
IN SITU SELF CROSS-LINKING OF POLYVINYL ALCOHOL BATTERY SEPARATORS Patent Application
Warren H Philipp L C Hsu and D W Sheibley inventors (to NASA) Filed 19 Apr 1978 13 p
(NASA-Case-LEW-12972-1 US-Patent-Appl-SN-897829) Avail NTIS HC A02/MF A01 CSCL 07C

The method disclosed is used to produce a polyvinyl alcohol sheet material wherein the polyvinyl alcohol is substantially free of 1,2 diol units and has an acetal self cross-linked structure wherein the acetal content is determined by the 1,2 diol content in the sheet material prior to cross-linking The sheet material product exhibits high conductivity and oxidation resistance, as well as minimal distortion of the prefabricated polyvinyl alcohol sheet material NASA

24 COMPOSITE MATERIALS

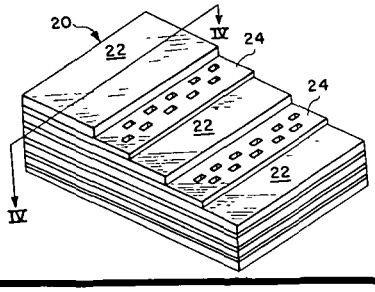
Includes laminates

N78-22162*# National Aeronautics and Space Administration Langley Research Center, Langley Station, Va

PARTIAL INTERLAMINAR SEPARATION SYSTEM FOR COMPOSITES Patent Application

Wolf Elber, inventor (to NASA) Filed 24 Mar 1978 12 p (NASA-Case-LAR-12065-1, US-Patent-Appl-SN-889671) Avail NTIS HC A02/MF A01 CSCL 11D

An interlaminar separation system for composites is described where a thin layer of a perforated foil film is interposed between adjacent laminae of a composite formed from prepreg tapes to permit laminae adherence through the perforations and produce a composite structure having improved physical property characteristics An exemplary composite body was shown formed of a plurality of layers of graphite/epoxy tape with a layer of thin perforated polyester foil disposed between each adjacent two layers of the prepreg tape When this layup is cured, the prepreg epoxy flows through the perforations in foil layer to effect positive bonding of the prepreg layers Although the epoxy does not adhere readily to the polyester separator sheets, the bonding occurring through the perforations ensures an adequate lamination for the entire assembly NASA

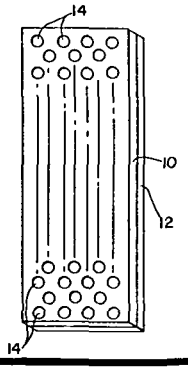


N78-22163*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio

METHOD FOR ALLEVIATING THERMAL STRESS DAMAGE IN LAMINATES Patent Application

C A Hoffman, J W Weeton, and N W Orth, inventors (to NASA) Filed 6 Apr 1978 16 p (NASA-Case-LEW-12493-1 US-Patent-Appl-SN-893857) Avail NTIS HC A02/MF A01 CSCL 11D

According to the method of the invention discontinuities are positively introduced into the interface between layers so as to reduce the thermal stress produced by unequal expansion of the materials which make up the composite Although a plurality of discrete elements could be used to form one of the layers and thus carry out this purpose, the discontinuities are preferably produced by simply drilling holes in the metallic matrix layer or by forming grooves in a grid pattern in this layer The apparent novel feature of the invention is the use of geometrical considerations to introduce discontinuities in the matrix of a composite material This provides for the control of stresses that would otherwise unbound the constituents, cause peeling of the outer layers, and cause the loss of strength properties of the composite when it is subjected to one or more thermal cycles NASA



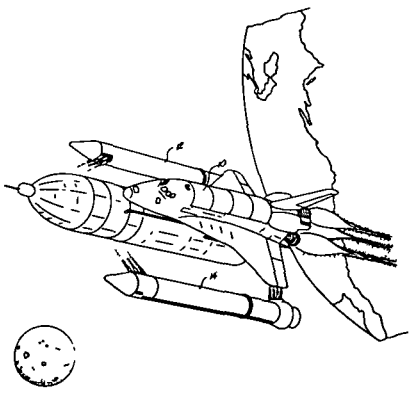
N78-24290* National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala

SPRAYABLE LOW DENSITY ABLATOR AND APPLICATION PROCESS Patent

Max H Sharpe, William E Hill William G Simpson, James M Carter Edwin L Brown Harry M King, Paul H Schuerer, and David D Webb, inventors (to NASA) Issued 7 Mar 1978 8 p Filed 19 Jan 1977 Supersedes N77-15105 (15 - 06, p 0715)

(NASA-Case-MFS-23506-1, US-Patent-4 077 921, US-Patent-Appl-SN-760809, US-Patent-Class-260-2 5B US-Patent-Class-260-2 5BE US-Patent-Class-260-2 5AP US-Patent-Class-260-2 5EP US-Patent-Class-260-2 5AK, US-Patent-Class-260-2 5FP, US-Patent-Class-260-37EP US-Patent-Class-260-29 1R, US-Patent-Class-427-427) Avail US Patent Office CSCL 11D

A sprayable, low density ablative composition is described consisting esentially of (1) 100 parts by weight of a mixture of 25-65% by weight of phenolic microballoons 0-20% by weight of glass microballoons 4-10% by weight of glass fibers, 25-45% by weight of an epoxy-modified polyurethane resin, 2-4% by weight of a bentonite dispersing aid and 1-2% by weight of an alcohol activator for the bentonite, (2) 1-10 parts by weight of an aromatic amine curing agent and (3) 200-400 parts by weight of a solvent Official Gazette of the U S Patent Office



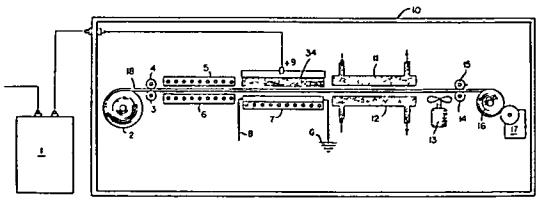
N78-25137*# National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala

CHARGE INJECTION METHOD AND APPARATUS OF PRODUCING LARGE AREA ELECTRETS Patent Application

Edward L Shriver Orville Weaver and Parampukattil K C Pilla inventors (to NASA) (NAS-NRC) Filed 28 Apr 1978 16 p (NASA-Case-MFS-23186-2 US-Patent-Appl-SN-900832) Avail NTIS HC A02/MF A01 CSCL 11D

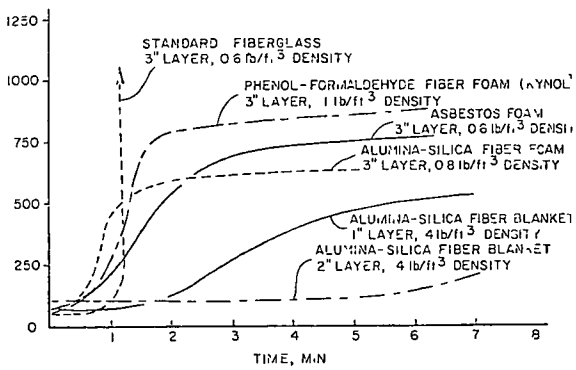
A large area homo-charged type electrojet is produced by continuously passing a roll or sheet of dielectric material through an oven or over a heated metal roller or metal plate of the same width as the dielectric material Emerging from the heater the material is then passed over a heated electrically conductive electrically grounded surface While the material passes over this plate a corona discharge is induced a slight distance above the dielectric by applying a high voltage direct current potential to a wire brush a grid of narrow wires or any other device capable of sustaining an electric corona discharge A corona discharge is produced and due to the slight electrical conductivity of the heated material some of the electrical plasma produced from the discharge is injected into the heated dielectric a small distance beneath its surface The moving dielectric passes over or through a region where it is cooled by a stream of air or water bypassing

over a cooled metal roller or by some other means where no electrically conductive path is provided between opposing sides of the dielectric NASA



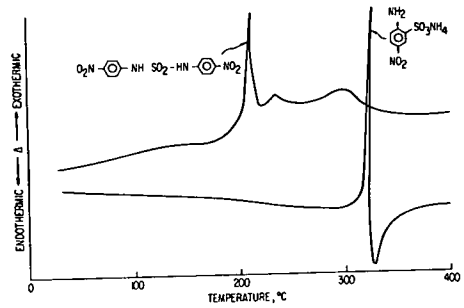
N78-25138*# National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston Tex
CERAMIC FIBER INSULATING MATERIAL AND METHOD OF PRODUCING SAME Patent Application
Ruey Y Lin (Carborundum Co Niagara Falls N Y) and Edward A Struzik inventors (to NASA) (Carborundum Co Niagara Falls N Y) Filed 11 Jun 1978 29 p
(Contract NAS9-13641)
(NASA-Case-MSC-14795-2 US-Patent-Appl-SN-911747) Avail NTIS HC A03/MF A01 CSCL 11D

A lightweight thermal/acoustical insulation foam based on Fiberfrax alumina silica ceramic fibers was developed for general insulation applications The foam which is lightweight has good integrity resiliency and can be easily shaped into various forms during fabrication is produced by admixing insulating fibers such as alumina-silica fibers phenol-formaldehyde fibers glass fibers or their mixtures with a surface active agent and soluble organic resinous binder agitating the mixture to produce a stable homogenous foam dewatering the foam and heat treating the dewatered form to produce a dry porous non-fluid foam One of the significant features of this development is the ability to control the density of the product over a wide range from 0 5 to 1 5 pounds per cubic foot The process used for generating the foam is applicable to other fibrous materials as well as and can be used with very fine or relatively coarse fibers NASA



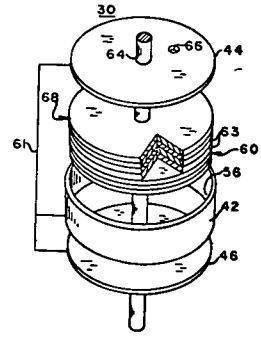
N78-27180* National Aeronautics and Space Administration Ames Research Center Moffett Field Calif
INTUMESCENT-ABLATOR COATINGS USING ENDOTHERMIC FILLERS Patent
Paul M Sawko and Salvatore R Riccitiello inventors (to NASA) Issued 9 May 1978 11 p Filed 23 Dec 1976 Supersedes N77-14372 (15 - 05 p 0609)
(NASA-Case-ARC-11043-1 US-Patent-4 088 806, US-Patent-Appl-SN-753964 US-Patent-Class-428-332 US-Patent-Class-260-33 6EP US-Patent-Class-260-33 6PQ US-Patent-Class-260-33 8EP, US-Patent-Class-260-33 8UA US-Patent-Class-260-37EP US-Patent-Class-260-42 43 US-Patent-Class-260-45 7R US-Patent-Class-260-45 75W US-Patent-Class-260-45 85N US-Patent-Class-260-45 9R, US-Patent-Class-427-386 US-Patent-Class-427-388A US-Patent-Class-428-313, US-Patent-Class-428-921) Avail US Patent Office CSCL 11D

An intumescent-ablator coating composition which contains the ammonium salt of 1 4-nitroaniline-2-sulfonic acid or 4,4 dinitrosul fanilide a polymeric binder system and about 5 to 30% weight of an endothermic filler is reported The filler has a decomposition temperature about or within the exothermic region of the intumescent agent
Official Gazette of the U S Patent Office



N78-27182*# National Aeronautics and Space Administration Marshall Space Flight Center Huntsville, Ala
METHOD OF MANUFACTURE OF BONDED FIBER FLYWHEEL Patent Application
George M Weyler, Jr, inventor (to NASA) Filed 5 Jun 1978 13 p
(NASA-Case-MFS-23674-1 US-Patent-Appl-SN-912276) Avail NTIS HC A02/MF A01 CSCL 11D

The novelty of this invention is that of effecting curing of the epoxy which bonds the fibers together while the fibers are in a stressed state It appears that by doing this a flywheel can be constructed which is capable of being operated at higher rotational speeds enabling a greater storage of energy for a given weight of flywheel NASA



N78-27184*# National Aeronautics and Space Administration Ames Research Center Moffett Field Calif
LOW DENSITY BISMALEIMIDE-CARBON MICROBALLOON COMPOSITES Patent Application
Demetrius A Kourtides and John A Parker inventors (to NASA) Filed 30 Jun 1978 25 p
(NASA-Case-ARC-11040-2 US-Patent-Appl-SN-920878) Avail NTIS HC A02/MF A01 CSCL 11D

A process is described for constructing for a composite laminate structure which exhibits a high resistance to heat and flame provides safer interior structures for aircraft and submarine compartments Composite laminate structures are prepared by the bismaleimide resin preimpregnation of a fiberglass cloth to form a face sheet which is bonded with a bismaleimide hot melt adhesive to a porous core structure selected from the group consisting of polyamide paper and bismaleimide-glass fabric which is filled with carbon microballoons The carbon microballoons are prepared by pyrolyzing phenolic micro-balloons in the presence of nitrogen A slurry of the carbon microballoons is prepared to fill the porous core structure The porous core structure and face sheet are bonded to provide panel structures exhibiting increased mechanical capacities and lower oxygen limit values and smoke density values NASA

N78-28178*# National Aeronautics and Space Administration Ames Research Center, Moffett Field Calif
STRUCTURAL WOOD PANELS WITH IMPROVED FIRE RESISTANCE Patent Application
Paul M Sawko, inventor (to NASA) Filed 28 Jul 1978 13 p
(NASA-Case-ARC-11174-1 US-Patent-Appl-SN-929086) Avail NTIS HC A02/MF A01 CSCL 11D

Wood paneling or other molded wood compositions are prepared from lignocellulosic particles such as finely divided wood chips flour or strands, by bonding such particles with 10 to 33% by weight of a modified novolac resin The resin prepolymer and a hardening agent such as hexamethylene tetramine are sprayed onto the particles and the mix is hot pressed to form the panel or other article and cure the prepolymer to form the resin The prepolymer is formed from an alkaryl ether or halide, e g 1,4-dimethoxy-methylbenzene, and a phenol By using the modified resins panels are formed that have a burn-through time of about 450 seconds as opposed to about 280 seconds when tested under the same condition The incorporation of certain inorganic fillers into the prepolymer will decrease the flame spread index of panels in which this is done, from less than 200 to 60 or 70 The preferred fillers are ammonium phosphate or a mixture of that with ammonium oxalate Such panels meet Class 2 standards of the Unified Building Code NASA

N78-32189*# National Aeronautics and Space Administration Ames Research Center Moffett Field Calif
FIBROUS REFRACTORY COMPOSITE INSULATION Patent Application
Daniel B Leiser (Stanford Univ) Howard E Goldstein and Marnell Smith, inventors (to NASA) Filed 8 Sep 1978 17 p
(NASA-Case-ARC-11169-1 US-Patent Appl-SN-940688) Avail NTIS HC A02/MF A01 CSCL 11D

A high temperature insulating material suitable for reusable reentry heat shielding 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 Aluminoborosilicate fibers and additional free boron oxide up to the 30% limit may be substituted for the aluminosilicate fibers and boron oxide requirements Small quantities of refractory opacifiers such as silicon carbide may be added The composites are characterized by the absence of nonfibrous matrix NASA

N78-32190*# National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala
CORK-RESIN ABLATIVE INSULATION FOR COMPLEX SURFACES AND METHOD FOR APPLYING THE SAME Patent Application
Hill M Walker Max H Sharpe inventors (to NASA) and William G Simpson Filed 17 Oct 1978 10 p
(NASA-Case-MFS-23626-1, US-Patent-Appl-SN-941711) Avail NTIS HC A02/MF A01 CSCL 11D

An ablative insulation material is made from a B-stage curable thermosetting resin and finely divided cork Cork and the selected resin such as a phenolic resin are mixed formed into a block and cured to B-stage The B-stage cured block is sliced into sheets and the sheets are laid up on the surface being insulated Final curing of the resin is then performed By using B-stage cured cork-resin sheets rather than fully cured sheets to the insulated surface problems associated with lack of flexibility in fully cured sheets are avoided and application to complex surfaces is facilitated Improved ablation performance lower density and higher strength are also obtained NASA

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25 INORGANIC AND PHYSICAL CHEMISTRY

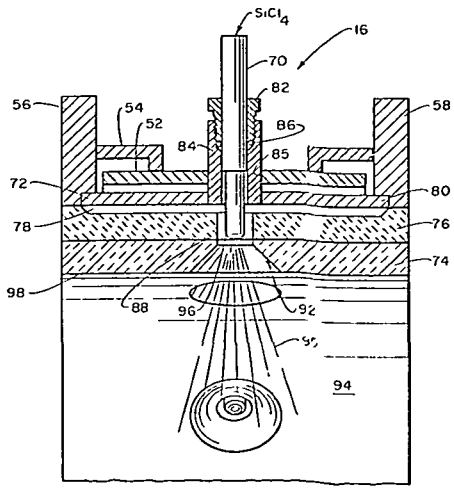
Includes chemical analysis e g , chromatography combustion theory, electrochemistry and photochemistry

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

N78-22186*# National Aeronautics and Space Administration Pasadena Office Calif
LIQUID REACTANT FEEDER FOR ARC ASSISTED METAL REDUCTION REACTOR Patent Application
Charles B Wolf (JPL) and Thomas Nolan Meyer, inventors (to NASA) (JPL) Filed 29 Mar 1978 15 p
(Contract NAS7-100)
(NASA-Case NPO-14382-1 US-Patent-Appl-SN-891373) Avail NTIS HC A02/MF A01 CSCL 07C

The liquid reactant feeder assembly of the invention is suitable for injecting and rapidly dispersing liquid reactant into a high temperature gas stream to enhance turbulence and reaction rate The recessed disposition of the nozzle tip and the special configuration of the entry ports prevent excessive cooling of the interior surfaces by contacting the relatively cool liquid reactant Thus undesired condensation and buildup of sodium reductant, sodium chloride, or silicon product is avoided Liquid feeding is superior to gaseous feeding in that more complete and rapid

dispersion of the reagent occur due to the boiling action of the liquid and by the fact that the liquid will penetrate the axial stream rather than be greatly deflected by it NASA



N78-22187*# National Aeronautics and Space Administration Pasadena Office, Calif

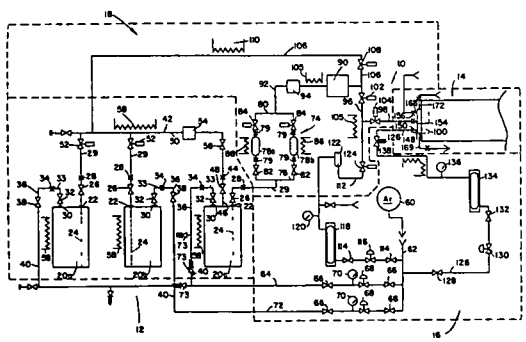
A SODIUM STORAGE AND INJECTION SYSTEM Patent Application

Alvin R Keeton, inventor (to NASA) (Westinghouse Electric Corp Trafford, Pa) Filed 24 Feb 1978 20 p

(Contract NAS7-100)

(NASA-Case-NPO-14384-1 US-Patent-Appl-SN-880728) Avail NTIS HC A02/MF A01 CSCL 07D

A storage and injection system for liquefied sodium having a capability of functioning in a start-up, shut-down, normal operating and emergency mode is described The system is embodied in a sodium storage and injection system Atomized liquid sodium was delivered to a chemical reactor employed in the production of solar grade silicon The system is characterized by a jacketed injection nozzle, adapted to utilize inert gas for atomizing liquefied sodium connected to a supply circuit for delivering liquefied sodium The circuit comprises a plurality of interconnectable individually replaceable, sodium containment vessels, a pump interposed between the vessels and the nozzle and a pressurizing circuit including a source of inert gas connected with the vessel for maintaining the sodium under pressure By employing the system it is possible to deliver and inject a fine spray of high purity sodium into a chemical reactor NASA



N78-25148* National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio

APPARATUS FOR EXTRACTION AND SEPARATION OF A PREFERENTIALLY PHOTO-DISSOCIATED MOLECULAR ISOTOPE INTO POSITIVE AND NEGATIVE IONS BY MEANS OF AN ELECTRIC FIELD Patent

Horst E Wilhelm inventor (to NASA) (Colo State Univ Ft Collins) Issued 18 Apr 1978 5 p Sponsored by NASA

(NASA-Case-LEW-12465-1 US-Patent-4 085 332

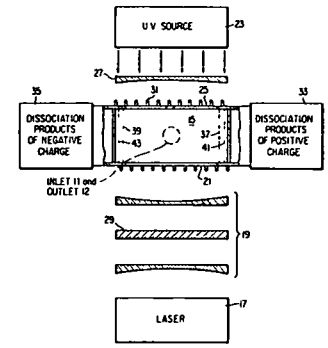
US-Patent-Appl-SN-692413 US-Patent-Class-250-528

US-Patent-Class-55-2 US-Patent-Class-55-100

US-Patent-Class-55-101 US-Patent-Class-250-531

US-Patent-Class-250-423P) Avail US Patent Office CSCL 07D

Molecules of one and the same isotope were preferentially photodissociated by a laser and an ultraviolet source or by multiphoton absorption of laser radiation The resultant ions were confined with a magnetic field moved in opposite directions by an electric field extracted from the photodissociation region by means of screening and accelerating grids and collected in ducts Official Gazette of the U S Patent Office



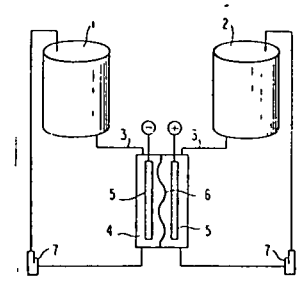
N78-25149*# National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio

FORMULATED PLASTIC SEPARATORS FOR SOLUBLE ELECTRODE CELLS Patent Application

Dean W Sheibley inventor (to NASA) Filed 3 Nov 1977 22 p

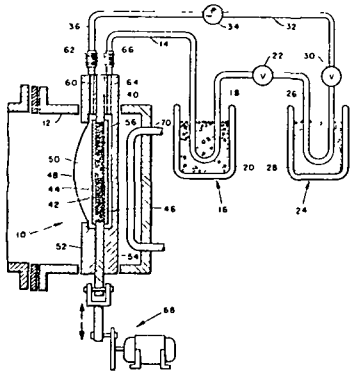
(NASA-Case-LEW-12358-2 US-Patent-Appl-SN-848428) Avail NTIS HC A02/MF A01 CSCL 07D

Membranes comprising a hydrochloric acid-insoluble sheet of a mixture of a rubber and a powered ion transport material were designed for use in oxidation-reduction (REDOX) electrical accumulator cells The sheet of thermoplastic rubber and an ion transport material which may be in the form of a film on a flexible substrate such as asbestos or paper was made by dissolving the rubber in a solvent and mixing with the ion transport material which is 20-50 volume percent as compared with 80-50 volume percent rubber Preferred ion transport materials include a salt or a chloride anion a phosphonium tertiary ammonium or quaternary ammonium cation a metal oxide, and a silicate or boric acid NASA



N78-27226* National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio
TARGETS FOR PRODUCING HIGH PURITY I-123 Patent
James W Blue inventor (to NASA) Issued 9 May 1978 7 p Filed 4 Sep 1973 *Supersedes* N74-10476 (12 - 1, p 0060)
Continuation-in-part of abandoned US Patent Appl SN-266927 filed 28 Jun 1972 which is a continuation in-part of US appl SN-863280 filed 2 Oct 1969 US Patent-3,694,313
(NASA-Case-LEW-10518-3 US-Patent-4,088 532 US-Patent-Appl-SN-394207 US-Patent-Class-176-11 US-Patent-Class-176-16 US-Patent-Class-250-400, US-Patent-Class-250-429 US-Patent-Class-250-492B US-Patent-3 694,313 US-Patent-Appl-SN-266927, US-Patent-Appl-SN-863280) Avail US Patent Office CSCL 07D

Tellurium powder in improved targets is bombarded with a cyclotron beam to produce Xe-123 Flowing gas streams carry the Xe-123 through one cold trap which removes Xe-123 that subsequently decays to I-123 During this bombardment energy is deposited in the target material causing its temperature to rise Some of the tellurium vaporizes and subsequently condenses on surfaces that are cooler than the vaporization temperature Provision is made for the repeated bombardment of this condensed tellurium Official Gazette of the U S Patent Office

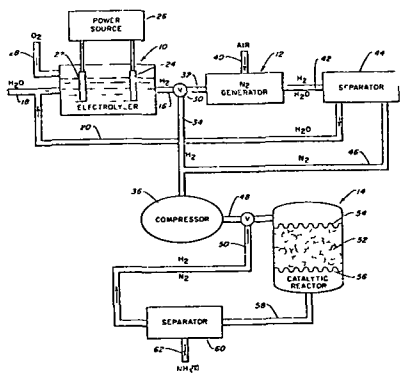


N78-27232*# National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex
FLAME RETARDANT FORMULATIONS AND PRODUCTS PRODUCED THEREFROM Patent Application
Kenneth R Sidman (Little (Arthur D) Inc Cambridge Mass) and Paul Monaghan inventors (to NASA) (Little (Arthur D) Inc Cambridge Mass) Filed 30 May 1978 19 p
(Contract NAS9-13979)
(NASA-Case-MSC-16307-1 US-Patent-Appl-SN-710798) Avail NTIS HC A02/MF A01 CSCL 07D

An elastomeric coating that significantly increases the flame resistance of a flammable polyurethane foam without adversely affecting the desirable physical properties of the foam is presented The coating does not produce smoke, a very significant improvement in crew safety The innovation is a series of formulations based on flame resistant elastomeric binders a thermally stable (i e to 150 C) source of bromine, metal oxide catalyst/acid acceptors, nitrogen-containing curing agents phosphorus containing fillers and hydrated fillers These formulations can be dispersed in organic liquids (such as acetone, MEK or hexane) and then sprayed onto the surface of polyurethane foam After the liquid is evaporated off a thin elastomeric coating remains on the surface Alternately the foam can be saturated with the liquid dispersion squeezed to remove excess liquid, and then dried This latter procedure yields a foam that is uniformly treated throughout The novelty appears to reside in formulations that can be incorporated in formed polyurethane without adversely affecting the characteristics thereof NASA

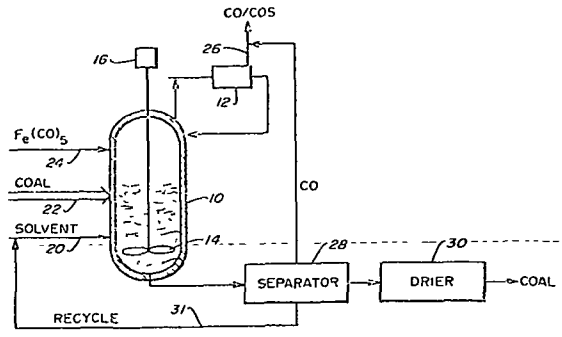
N78-27233*# National Aeronautics and Space Administration Pasadena Office, Calif
ON-SITE AMMONIA PLANT Patent Application
Wu Yi-Chien inventor (to NASA) (JPL) Filed 30 Jun 1978 19 p
(Contract NAS7-100)
(NASA-Case-NPO-14233-1, US-Patent-Appl-SN-920947) Avail NTIS HC A02/MF A01 CSCL 07D

A small-scale ammonia production system is provided in accordance with this invention that can be operated on a farm or farm cooperative to produce an annual supply of ammonia (about 18 tons) adequate for the average size farm (about 400 acres) The only raw materials in addition to catalyst required for the system are renewable hydrogen from water and nitrogen from air The source of electrical power can range from wind power to solar thermal or photovoltaic power and to off-peak utility power with renewable sources preferred to provide complete on-site sufficiency The system generally includes an electrolyzer as a source of hydrogen an air combustion nitrogen generator and a reactor A more detailed system is described which illustrates the use of a continuous water stream to produce steam through output which may be utilized for producing power performing work or for heating purposes such as the heating of farm houses, animal shelters, or greenhouses or for the promotion of anaerobic digestion if a digester is incorporated for the treatment of farm waste for the production of methane The steam can also be used for the generation of electrical power NASA



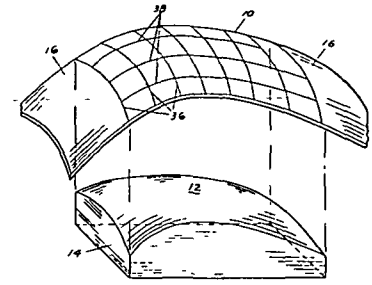
N78-33164*# National Aeronautics and Space Administration Pasadena Office Calif
COAL DESULFURIZATION Patent Application
George C Hsu inventor (to NASA) (JPL) Filed 16 Feb 1978 13 p Sponsored by NASA
(NASA-Case-NPO-14272-1 US-Patent-Appl-SN-878253) Avail NTIS HC A02/MF A01 CSCL 07D

Organic sulfur is removed from coal by treatment with an organic solution of iron pentacarbonyl Organic sulfur compounds can be removed by reaction of the iron pentacarbonyl with coal to generate CO and COS off-gases The CO gas separated from COS can be passed over hot iron fillings to generate iron pentacarbonyl NASA



Fully annealed aluminum sheet is first stretch formed to the complex doubly compound shape of a previously prepared forming die e g , an ejection seat blowout panel of a shuttlecraft The part is then marked with a series of grid lines for monitoring later elongation Thereafter it is solution heat treated and refrigerated to retard hardening While still soft it is stretched a second time on the same die to induce a modicum of work hardening after which it is aged to the desired stress corrosion resistant temper, preferably the T8 level, to provide the desired hardness and stress corrosion resistance

Official Gazette of the U S Patent Office



26 METALLIC MATERIALS

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

N78-22206*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio

HIGH TOUGHNESS-HIGH STRENGTH IRON ALLOY ***Patent Application***

J R Stephens and W R Witkke inventors (to NASA) Filed 13 Dec 1977 12 p

(NASA-Case-LEW-12542-2, US-Patent-Appl-SN-860405) Avail NTIS HC A02/MF A01 CSCL 11F

A steel alloy is provided which exhibits excellent strength and toughness characteristics at cryogenic temperatures The alloy consists essentially of about 10 to 16 percent by weight nickel, about 0 1 to 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 steel alloy is produced by a process which includes using cold rolling at room temperature and subsequent heat treatment at temperatures ranging from 500 to 650 C, and possesses a fracture toughness ranging from 200 to 230 ksi square root of (in) and yield strengths up to 230 ksi NASA

N78-24333* National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex

METHOD OF PRODUCING COMPLEX ALUMINUM ALLOY PARTS OF HIGH TEMPER, AND PRODUCTS THEREOF **Patent**

Irvin J Wilson, inventor (to NASA) (Rockwell International Corp , Downey, Calif) Issued 7 Mar 1978 4 p Filed 26 Jul 1976 Supersedes N76-29401 (14 - 20 p 2579) Sponsored by NASA

(NASA-Case-MSC-19693-1 US-Patent-4 077 813 US-Patent-Appl-SN-708771, US-Patent-Class-148-12 7A US-Patent-Class-148-125) Avail US Patent Office CSCL 11F

N78-27255*# National Aeronautics and Space Administration Pasadena Office Calif

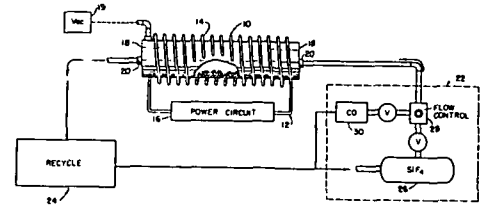
A METHOD OF PREPURIFYING METALLURGICAL GRADE SILICON EMPLOYING REDUCED PRESSURE ATMOSPHERIC CONTROL **Patent Application**

William M Ingle (Motorola Inc Phoenix Ariz) Stephen W Thompson (Motorola, Inc Phoenix, Ariz), and Robert E Chaney, *inventors (to NASA) (Motorola Inc , Phoenix Ariz) Filed 23 Jun* 1978 10 p

(Contracts NAS7-100, JPL-95442)

(NASA-Case-NPO-14474-1, US-Patent-Appl-SN-918537) Avail NTIS HC A02/MF A01 CSCL 11F

A process for use in purification of metallurgical grade silicon was studied A quartz tube is charged with chunks of metallurgical grade silicon and/or a mixture of such chunks and high purity quartz sand Impurities from a class of metals including aluminum, and boron as well as certain transition metals such as nickel iron as and manganese are also included The tube is heated and evacuated to a temperature within a range of 800 C to 1350 C A stream of gas comprising a reactant such as silicon tetrafluoride, continuously is delivered at low pressures through the charge for causing a metathetical reaction of impurities of the silicon and the reactant to occur for forming a volatile halide and leaving a residue of silicon of improved purity The reactant may include carbon monoxide gas whereby impurities such as iron and nickel are permitted to react to form volatile carbonyls NASA



N78-32229* National Aeronautics and Space Administration Ames Research Center Moffett Field Calif

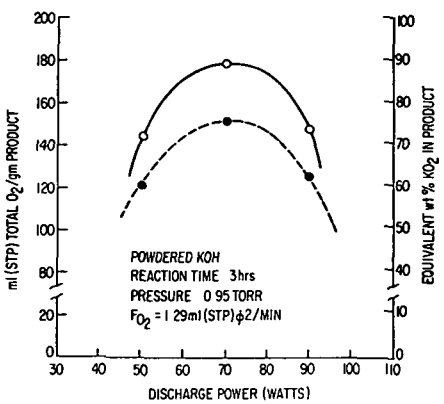
PROCESS FOR PREPARING HIGHER OXIDES OF THE ALKALI AND ALKALINE EARTH METALS Patent

Pasupati Sadhukhan (Occidental Res Corp La Verne Calif) and Alexis Bell inventors (to NASA) (Calif Univ, Berkeley) Issued 13 Jun 1978 6 p Filed 19 Jan 1977 Supersedes N77 17178 (15 - 08, p 0999) Sponsored by NASA

(NASA-Case-ARC-10992 1 US-Patent-4,094 758 US-Patent-Appl-SN 760810 US-Patent-Class-204-164 US-Patent-Class-204-175, US-Patent Class-423-582 US-Patent Class 423-583) Avail US Patent Office CSCL 11F

High purity inorganic higher oxides of the alkali and alkaline earth metals are prepared by subjecting the hydroxide of the alkali and alkaline earth metal to a radio frequency discharge sustained in oxygen The process is particulary adaptable to the production of high purity potassium superoxide by subjecting potassium hydroxide to glow discharge sustained in oxygen under the pressure of about 0 75 to 1 00 torr

Official Gazette of the U S Patent Office



27 NONMETALLIC MATERIALS

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

N78-22231*# National Aeronautics and Space Administration Langley Research Center, Langley Station Va

PROCESS FOR CURING EPOXIDES WITH DIAMINES Patent Application

Terry L StClair and Vernon L Bell, inventors (to NASA) Filed 29 Mar 1978 10 p

(NASA-Case-LAR-11823-1, US-Patent-Appl-SN-891245) Avail NTIS HC A02/MF A01 CSCL 11G

A process for curing epoxides and polyepoxides to produce stronger amine cured resins was developed Isomeric diaminobenzophenones and diaminodiphenylmethanes which have amine groups located at ortho or meta positions to the carbonyl or methylene groups joining the two benzene rings to cure epoxide resins were used The diamine selected may be melted dissolved in a low boiling solvent or slurried in powder form into the liquid epoxide prepolymer NASA

N78-24360*# National Aeronautics and Space Administration Langley Research Center Langley Station Va

CRYSTALLINE POLYIMIDES Patent Application

Terry L StClair and Anne K StClair inventors (to NASA) Filed 16 May 1978 8 p

(NASA-Case-LAR-12099-1 US Patent-Appl-SN-906299) Avail NTIS HC A02/MF A01 CSCL 07C

Aromatic crystalline polimides were disclosed that were synthesized from polyamide-acid and when heated to 200 to 300 C became cyclized to afford an opaque polymer which by X-ray diffraction of the unoriented film exhibited 47 percent crystallinity Differential scanning calorimetry indicated a melt at 425 C with no glass transition in these crystalline polyimides NASA

N78-25216*# National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex

HEAT RESISTANT POLYMERS OF OXIDIZED STYRYL-PHOSPHINE Patent Application

Kazimiera Paciorek inventor (to NASA) (Ultrasystems, Inc Irvine Calif) Filed 19 May 1978 34 p Sponsored by NASA

(NASA-Case-MSC-14903-2 US-Patent-Appl-SN-907435) Avail NTIS HC A03/MF A01 CSCL 07C

Homopolymers copolymers, and terpolymers of a styrene based monomer were prepared by (1) polymerizing at least one oxidized styrylphosphine monomer selected from the group of (C6H5) 2 P (O)N = P(C6H5)2 C6H4CH = CH2 (C6H5O)2 P(O)N = P(C6H5)2 C6H4CH = CH2 (C6H5O)2 C3N3N = P(C6H5)2 C6H4CH = CH2 and (C6H5)C3N3 [N = P(C6H5)2 C6H4C-H = CH2]2 or (2) polymerizing p-diphenyl phosphine styrene and then oxidizing said polymerized p-diphenyl phosphine styrene monomer with an organoazide selected from the group of (C6H5)2 P(O)N3 (C6H5O)2 P(O)N3 (C6H5)2 C3N3(N3) and C6H5C3N3 (N3)2 Copolymers can also be prepared by copolymerizing styrene with at least one oxidized styrylphosphine monomer NASA

N78-25217*# National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex

HEAT RESISTANT POLYMERS OF OXIDIZED STYRYL-PHOSPHINE Patent Application

Kazimiera Paciorek inventor (to NASA) (Ultrasystems, Inc Irvine Calif) Filed 19 May 1978 35 p Sponsored by NASA

(NASA-Case-MSC-14903-3 US-Patent-Appl-SN-907479) Avail NTIS HC A03/MF A01 CSCL 07C

Flame resistant non-toxic vinyl polymers which contain phosphazene groups are presented These polymers did not emit any toxic or corrosive products when they were oxidatively degraded NASA

N78-25218*# National Aeronautics and Space Administration Pasadena Office Calif

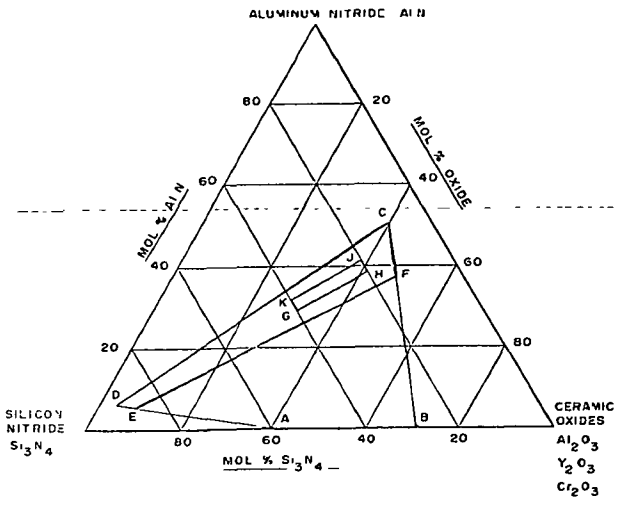
HIGH TEMPERATURE RESISTANT CERMET AND CERAMIC COMPOSITIONS Patent Application

Wayne M Phillips inventor (to NASA) (JPL) Filed 8 Dec 1977 28 p Sponsored by NASA

(NASA-Case-NPO-13690-2 US-Patent-Appl-SN-858766) Avail NTIS HC A03/MF A01 CSCL 11B

Particles of high temperature resistant metal or metal alloy are mixed with a mixture of ceramic components applied to a substrate and hot pressed and sintered at temperatures ranging from 1 700 to 2 000 C at pressures of 1 000 to 10 000, for a period of 10 to 60 minutes A ceramic solid solution which

coats and bonds the metal particles to the ceramic solid solution matrix is formed Properties of the cermet body include high temperature oxidation resistance good abrasion and wear resistance low coefficient of friction high hardness and biocompatibility Areas of application include seals for thermionic converters production of turbine blades reentry shields for space vehicles and medical implants for rebuilding bones and joint structures of the body NASA

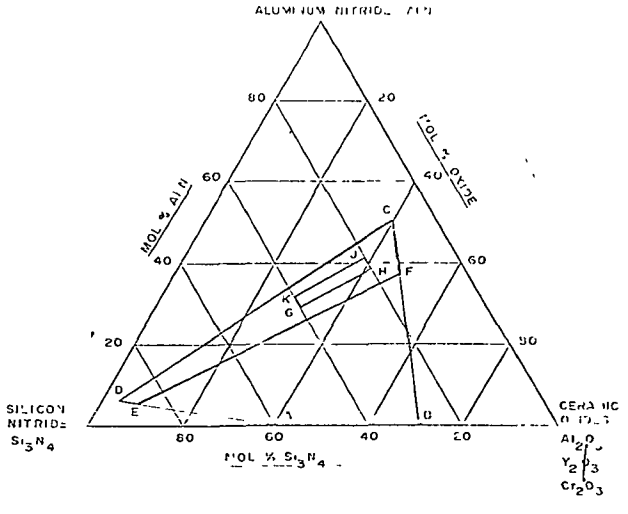


N78-25219*# National Aeronautics and Space Administration Pasadena Office Calif

HIGH TEMPERATURE RESISTANT CERMET AND CERAMIC COMPOSITIONS Patent Application

Wayne M Phillips inventor (to NASA) (JPL) Filed 8 Dec 1977 28 p Sponsored by NASA
(NASA-Case-NPO-13690-3 US-Patent-Appl-SN-858761) Avail NTIS HC A03/MF A01 CSCL 11B

A high temperature oxidation resistant cermet having a high hardness is described which can be adapted for use as cermet seals for thermionic converters as well as for turbine blades reentry shields for space vehicles and for medical implants for rebuilding bones The cermet composition is obtained by mixing particles of high temperature resistant metal or metal alloy such as molybdenum with a mixture of ceramic components NASA

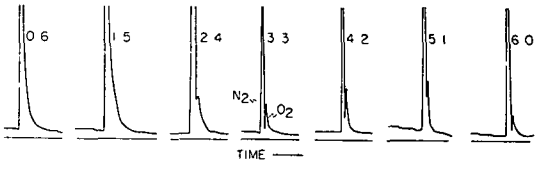


N78-27275*# National Aeronautics and Space Administration Ames Research Center Moffett Field, Calif

CHELATE-MODIFIED POLYMERS FOR ATMOSPHERIC GAS CHROMATOGRAPHY Patent Application

Warren W Christensen Ludwig A Mayer (San Jose State Univ, Calif) and Fritz H Woeller inventors (to NASA) (San Jose State Univ Calif) Filed 30 Jun 1978 20 p Sponsored by NASA (NASA-Case-ARC-11154-1 US-Patent-Appl-SN-921626) Avail NTIS HC A02/MF A01 CSCL 07D

New polymeric materials were developed to serve as the stationary phase in chromatographic columns These materials consist of a crosslinked polymer matrix e g a divinylbenzene polymer into which was embedded an inorganic complexed ion or chelate e g, Co(acacen) which is N,N -ethylene-bis (acetylacetoniminato)cobalt (2) Organic nitrogenous bases such as pyridine, may be incorporated into the chelate-polymer complexes to increase their chromatographic utility Critical factors in obtaining satisfactory chromatographic performance from the polymer-chelate complexes are identified as (1) the nature and concentration of the nonpolar diluent n-heptane and ethylbenzene being preferred, (2) completeness of crosslinking of the matrix (3) the chelate content of the complex, and (4) the nature and concentration of the coordinating organic base employed NASA



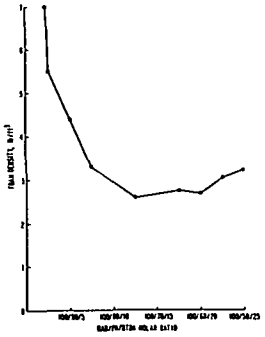
N78-31232* National Aeronautics and Space Administration Ames Research Center Moffett Field Calif

POLYMERIC FOAMS FROM CROSS-LINKABLE POLY-N-ARYLENEBENZIMIDAZOLES Patent

Edward S Harrison (Whittaker Corp San Diego) Chadwick B Delano (Whittaker Corp San Diego) and Salvatore R Riccitello inventors (to NASA) (Whittaker Corp San Diego) Issued 30 May 1978 10 p Filed 26 Jul 1976 Supersedes N76-28421 (14 - 19 p 2447) Sponsored by NASA
(NASA-Case-ARC-11008-1 US-Patent-4 092 274
US-Patent-Appl-SN-708951 US-Patent-Class-260-2 5N
US-Patent-Class-260-47CP US-Patent-Class-260-63N
US-Patent-Class-260-78 41) Avail US Patent Office CSCL 07D

Foamed cross-linked poly-N-arylenebinzimidazoles are prepared by mixing an organic tetraamine and an ortho substituted aromatic dicarboxylic acid anhydride in the presence of a blowing agent and then heating the prepolymer to a temperature sufficient to complete polymerization and foaming of the reactants In another embodiment of the process, the reactants are heated to form a prepolymer The prepolymer is then cured at higher temperatures to complete foaming and polymerization

Official Gazette of the U S Patent Office



N78-31233* National Aeronautics and Space Administration Ames Research Center, Moffett Field Calif

BORON TRIFLUORIDE COATINGS FOR THERMOPLASTIC MATERIALS AND METHOD OF APPLYING SAME IN GLOW DISCHARGE Patent

Ronald Michael Kubacki inventor (to NASA) (Bell and Howell Chicago) Issued 23 May 1978 4 p Filed 17 Jun 1977 Supersedes N77-26308 (15 - 17 p 2243) Sponsored by NASA

(NASA-Case-ARC-11057-1, US-Patent-4,091 166 US-Patent-Appl-SN-807762, US-Patent-Class-428-411 US-Patent-Class-350-165, US-Patent-Class-350-175NG US-Patent-Class-427-40, US-Patent-Class-427-41, US-Patent-Class-427-164, US-Patent-Class-428-412 US-Patent-Class-428-422 US-Patent-Class-428-447 US-Patent-Class-428-515, US-Patent-Class-428-523 US-Patent-Class-428-538) Avail US Patent Office CSCL 07D

Plastic surfaces can be improved physically and optically by treating them with a plasma of boron trifluoride The trifluoride can be the sole reactant or be part of a mixture also containing an organic monomeric substance such as perfluorobutene-2 or an organosilane The boron trifluoride-containing coating can also serve as an intermediate coating between the plastic surface and a plasma deposited organic polymer

Official Gazette of the U S Patent Office

N78-32260* National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif

REACTION CURED GLASS AND GLASS COATINGS Patent

Howard E Goldstein (Stanford Univ), Daniel B Leiser (Stanford Univ), and Victor W Katvala, inventors (to NASA) (Stanford Univ) Issued 6 Jun 1978 8 p Filed 29 Oct 1976 Supersedes N77-10201 (15 - 01 p 0031) Sponsored by NASA

(NASA-Case-ARC-11051-1 US-Patent-4 093 771 US-Patent-Appl-SN-736910 US-Patent-Class-428-312 US-Patent-Class-65-30R US-Patent-Class-65-60D US-Patent-Class-106-48 US-Patent-Class-106-54 US Patent-Class-427-215 US-Patent-Class 427-376A US-Patent-Class-427-376B US-Patent-Class-427-379 US-Patent-Class-427-380, US-Patent-Class-428-325 US-Patent-Class-428-331 US-Patent-Class-428-341 US-Patent-Class-428 427 US-Patent-Class-428-428 US Patent Class-428-446 US-Patent-Class-428-920 US-Patent-Class-428-406) Avail US Patent Office CSCL 11B

The invention relates to reaction cured glass and glass coatings prepared by reacting a compound selected from the group consisting of silicon tetraboride silicon hexaboride other boron silicides boron and mixtures with a reactive glass frit composed of a porous high silica borosilicate glass and boron oxide The glassy composites of the present invention are useful as coatings on low density fibrous porous silica insulations used as heat shields and for articles such as reaction vessels that are subjected to high temperatures with rapid heating and cooling and that require resistance to temperature and repeated thermal shock at temperatures up to about 1482C (2700PF)

Official Gazette of the U S Patent Office

N78-32268* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex

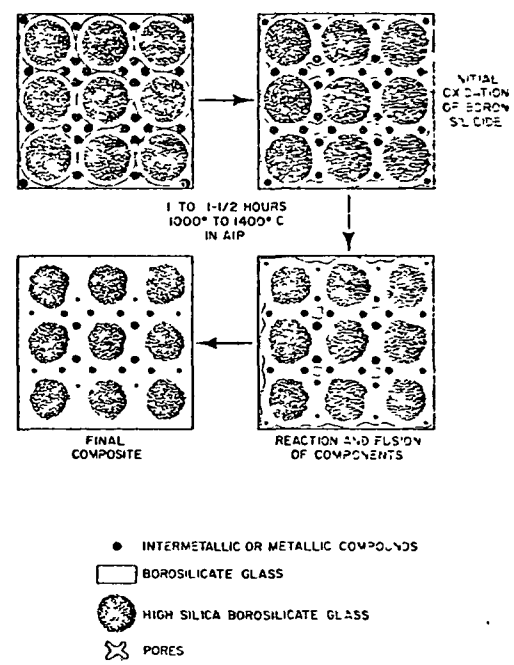
HEAT RESISTANT POLYMERS OF OXIDIZED STYRYL-PHOSPHINE Patent

Kazimiera Jola Liliana Paciorek, inventor (to NASA) (Ultrasystems, Inc., Irvine, Calif) Issued 30 May 1978 12 p Filed 19 Jul 1976 Supersedes N76-28425 (14 - 19, p 2447) Sponsored by NASA

(NASA-Case-MSC-14903-1 US-Patent-4,092,466, US-Patent-Appl-SN-706424, US-Patent-Class-526-13, US-Patent-Class-260-2P US-Patent-Class-260-551P, US-Patent-Class-260-606-5P, US-Patent-Class-260-959, US-Patent-Class-526-23 US-Patent-Class-526-27 US-Patent-Class-526-49 US-Patent-Class 526-50 US-Patent-Class-526-275, US-Patent-Class-526-276 US-Patent-Class-526-278, US-Patent-Class-544-195) Avail US Patent Office CSCL 07D

Homopolymers copolymers and terpolymers of a styrene based monomer are prepared by polymerizing at least one oxidized styrylphosphine monomer or by polymerizing p-diphenylphosphinestyrene and then oxidizing the polymerized monomer with an organoazide Copolymers can also be prepared by copolymerizing styrene with at least one oxidized styrylphosphine monomer Flame resistant vinyl based polymers whose degradation products are non toxic and non corrosive are obtained

Official Gazette of the U S Patent Office



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*

N78-32261* National Aeronautics and Space Administration Langley Research Center Hampton Va

PROCESS FOR PREPARING THERMOPLASTIC AROMATIC POLYMIDES Patent

Vernon L Bell inventor (to NASA) Issued 13 Jun 1978 5 p Filed 28 Mar 1975 Supersedes N75-29181 (13 - 20 p 2496) Continuation-in-part of abandoned US Patent Appl SN-448321 filed 5 Mar 1974

(NASA-Case-LAR-11828-1 US-Patent-4 094 862 US-Patent-Appl-SN-562992 US-Patent-Class-260-65 US Patent-Class-260-47CP US-Patent-Class-260-49 US-Patent Class-260-63R US-Patent-Class-260-63N US-Patent-Class-260-78TF US-Patent Appl-SN-448321) Avail US Patent Office CSCL 11G

A method of preparing insoluble thermoplastic aromatic polyimides is described having uniquely low softening temperatures by reacting in a suitable solvent an aromatic dianhydride and a meta substituted aromatic diamine

Official Gazette of the U S Patent Office

N78-32262* National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala

PROCESS FOR SPINNING FLAME RETARDANT ELASTOMERIC COMPOSITIONS Patent

John T Howarth (Arthur D Little Co Cambridge) Suresh Sheth (Arthur D Little, Co Cambridge) Kenneth R Sidman (Author D Little Co Cambridge) and Arthur A Massucco, inventors (to NASA) (Arthur D Little Co Cambridge) Issued 13 Sep 1978 10 p Filed 13 Feb 1976 Supersedes N76-24405 (14 - 15 p 1913) Division of US Patent Appl SN-374421 filed 28 Jun 1973 US Patent-3 956 233 Sponsored by NASA (NASA-Case-MSC-14331 3 US Patent-4 094 943 US-Patent-Appl-SN-657998 US-Patent-Class-264-130 US-Patent-Class 264-184 US-Patent-Class-264-211 US-Patent-Class 264-236 US-Patent-3 956 233 US-Patent-Appl-SN-374421) Avail US Patent Office CSCL 11E

Flame retardant elastomeric compositions comprised of either spandex type polyurethane having halogen containing polyols incorporated into the polymer chain conventional spandex type polyurethanes in physical admixture with flame retardant additives or fluoroelastomeric resins in physical admixture with flame retardant additives were developed Methods are described for preparing fibers of the flame retardant elastomeric materials and manufactured articles as well as nonelastic materials such as polybenzimidazoles fiberglass and nylons for high oxygen environments Official Gazette of the U S Patent Office

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N78-33228* National Aeronautics and Space Administration Pasadena Office Calif

THERMOPLASTIC RUBBER COMPRISING ETHYLENE-VINYL ACETATE COPOLYMER, ASPHALT AND FLUXING OIL Patent

Frank J Hendel inventor (to NASA) (JPL) Issued 8 Sep 1970 3 p Filed 24 Oct 1966 Continuation-in-part of US Patent Appl SN-508864 filed 19 Nov 1965 Sponsored by NASA (NASA-Case-NPO-8835 US-Patent-3,527 724 US-Patent-Appl-SN-588721 US-Patent-Class-260-28 5) Avail US Patent Office CSCL 11G

A thermoplastic rubber is made from a mixture of between about 10 percent and about 50 percent of asphalt between about 5 percent and about 30 percent fluxing oil and between about 35 percent and about 70 percent of a copolymer of polyethylene and vinyl acetate

Official Gazette of the U S Patent Office

N78-24365* National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio

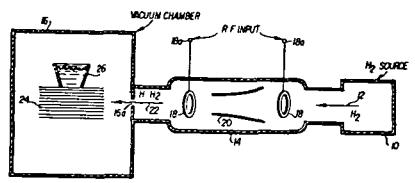
ATOMIC HYDROGEN STORAGE METHOD AND APPARATUS Patent

John A Woollam, inventor (to NASA) Issued 7 Mar 1978 4 p Filed 13 Apr 1976 Supersedes N76-22399 (14 - 13 p 1644)

(NASA-Case-LEW-12081-1 US-Patent-4,077 788 US-Patent-Appl-SN-676432, US-Patent-Class-62-48 US-Patent-Class-34-15 US-Patent-Class-62-100 US-Patent-Class-250-492R, US-Patent-Class-423-648R) Avail US Patent Office CSCL 21D

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

Official Gazette of the U S Patent Office



N78-25237*# National Aeronautics and Space Administration Pasadena Office Calif

SURFACTANT-ASSISTED LIQUEFACTION OF PARTICULATE CARBONACEOUS SUBSTANCES Patent Application

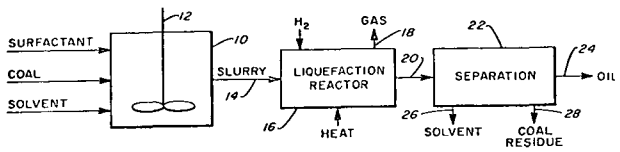
George C Hsu, inventor (to NASA) (JPL) Filed 7 Oct 1976 20 p

(Contract NAS7-100)

(NASA-Case-NPO-13904-1 US-Patent-Appl-SN-730468) Avail NTIS HC A02/MF A01 CSCL 21D

Enhanced and improved quality yields are achieved in coal liquefaction by adding to the coal slurry in solvent a small amount of an oil soluble organic surfactant capable of dispersing the asphaltene particles The liquefaction system described includes a slurrying means having a stirrer in which is formed a slurry of surfactant particulate coal or other carbonaceous substance and solvent The slurry is converted in the liquefaction reactor under the influence of heat and high pressure hydrogen to a gaseous hydrocarbon product and to a product slurry which is then separated into a light and heavy oil product solvent and coal

residue by process steps which include extraction filtration and distillation The effects of surfactant on coal conversion product distribution conversion rate and filtration time are demonstrated NASA

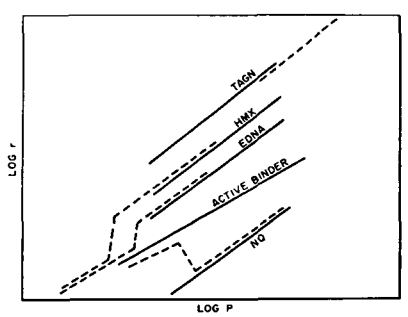


N78-31255* National Aeronautics and Space Administration Pasadena Office, Calif

NITRAMINE PROPELLANTS Patent

Norman S Cohen (JPL) and Leon D Strand inventors (to NASA) (JPL) Issued 30 May 1978 8 p Filed 16 May 1977 Supersedes N77-25346 (15 - 16 p 2112) Sponsored by NASA (NASA-Case-NPO-14103-1, US-Patent-4,092 188 US-Patent-Appl-SN-797210 US-Patent-Class-149-19 4 US-Patent-Class-149-19 8 US-Patent-Class-149-88, US-Patent-Class-149-92, US-Patent-Class-149-93, US-Patent-Class-149-105, US-Patent-Class-149-111) Avail US Patent Office CSCL 21I

Nitramine propellants without a pressure exponent shift in the burning rate curves are prepared by matching the burning rate of a selected nitramine or combination of nitramines within 10% of burning rate of a plasticized active binder so as to smooth out the break point appearance in the burning rate curve Official Gazette of the U S Patent Office



31 ENGINEERING (GENERAL)

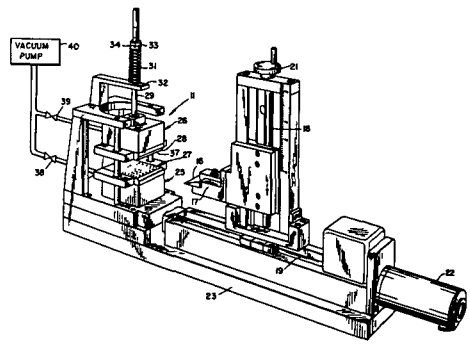
Includes vacuum technology, control engineering display engineering and cryogenics

N78-24386*# National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt Md

METHOD AND APPARATUS FOR SLICING CRYSTALS Patent Application

John S J Benedicto Bruce E Woodgate, and Federick C Hallberg inventors (to NASA) Filed 15 May 1978 13 p (NASA-Case-GSC-12291-1 US-Patent-Appl-SN-906298) Avail NTIS HC A02/MF A01 CSCL 13H

A method and apparatus are described for slicing crystals into slices having a thickness on the order of 5 mils The concept involves slicing a crystal having flat opposed, parallel end faces This is accomplished by cleaving the crystal while the two opposed parallel end faces are gripped and are being urged apart, so that a sliced portion of the crystal including the first face is pulled away from the remainder of the crystal when the crystal has been cleaved An important feature of the invention is that the gripped face that is pulled away from the remainder of the crystal is held on the platen by a vacuum NASA

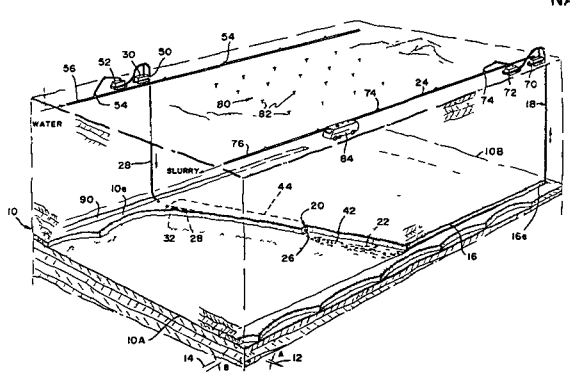


N78-24387*# National Aeronautics and Space Administration Pasadena Office, Calif

UNDERGROUND MINERAL EXTRACTION Patent Application

Charles G Miller (JPL) and James B Stephens, inventors (to NASA) Filed 19 Apr 1978 27 p (Contract NAS7-100) (NASA-Case-NPO-14140-1 NASA-Case-NPO-14381-1 US-Patent-Appl-SN-897832) Avail NTIS HC A03/MF A01 CSCL 08I

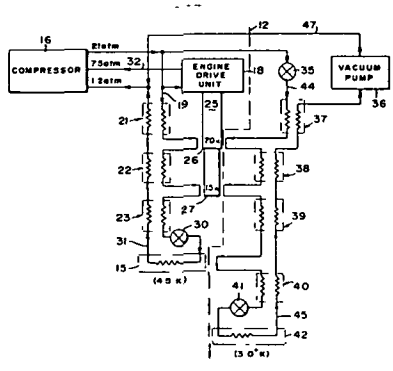
A method is described for mining coal or other minerals from underground seams without requiring personnel underground The method involves a jet head which emits a high pressure water stream in a coal seam to comminute the coal around the jet heat as it moves along a passage that is cuts in the seam The jet head is connected to a pipeline that extends along the passage and up to the surface of the earth where a pumper rig pumps water from a water line into the pipeline The coal slurry resulting from the mixture of water and comminuted coal, flows down an inclined passage to a previously cut drain gallery that carries the slurry to a lifting apparatus so it can be pumped into a slurry pipeline Each passage cut in the coal seam is formed by advancing the jet head forwardly while the head emits water in a forward direction to cut a pilot hole Then the jet head retreats along the pilot hole while emitting water sidewardly to comminute coal along a wide passage The effectiveness of the jet heat in breaking up coal is increased by injecting droplets of an explodeable material into the water stream The droplet vaporizes to produce an explosion that drives a water slug into cracks in the seam and helps fracture the coal NASA



N78-25256* National Aeronautics and Space Administration Pasadena Office Calif
MULTISTATION REFRIGERATION SYSTEM Patent
Ervin R Wiebe inventor (to NASA) (JPL) Issued 7 Mar 1978 5 p Filed 9 Aug 1976 Supersedes N77-15219 (15 - 06 p 0733) Sponsored by NASA
(NASA-Case-NPO-13839-1 US-Patent-4 077 231 US-Patent-Appl-SN-712981 US-Patent-Class-62-514R US-Patent-Class-250-332 US-Patent-Class-313-22) Avail US Patent Office CSCL 13A

A closed cycle refrigeration (CCR) system is disclosed for providing cooling at different parts of a maser The CCR includes a first station for cooling the maser s parts except the amplifier portion to 4 5 K The CCR further includes means with a 3 0 K station for cooling the maser s amplifier to 3 0 K and, thereby increases the maser s gain and/or bandwith by a significant factor The means which provide the 3 0 K cooling include a pressure regulator heat exchangers an expansion valve and a vacuum pump which coact to cause helium provided from a compressor to liquefy and thereafter expand so as to vaporize The heat of vaporization for the helium is provided by the maser amplifier which is thereby cooled to 3 0 K

Official Gazette of the U S Patent Office



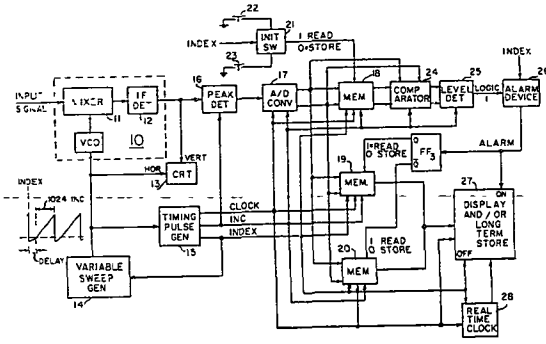
32 COMMUNICATIONS

Includes land and global communications, communications theory, and optical communications

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

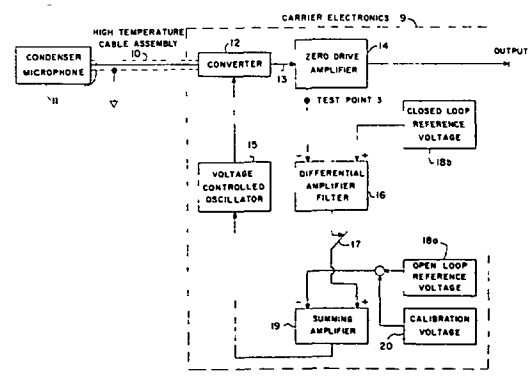
N78-22268*# National Aeronautics and Space Administration Pasadena Office, Calif
AUTOMATIC COMMUNICATION SIGNAL MONITORING SYSTEM Patent Application
Albert J Bernstein, inventor (to NASA) (JPL) Filed 4 Mar 1977 19 p
(Contract NAS7-100)
(NASA-Case-NPO-13941-1, US-Patent-Appl-SN-774384) Avail NTIS HC A02/MF A01 CSCL 17B

A system for automatic monitoring of a communication signal in the RF or IF spectrum utilizes a superheterodyne receiver technique with a VCO to select and sweep the frequency band of interest A first memory is used to store one band sweep as a reference for continual comparison with subsequent band sweeps Any deviation of a subsequent band sweep by more than a predetermined tolerance level produces an alarm signal which causes the band sweep data temporarily stored in one of the two buffer memories to be transferred to long-term store while the other buffer memory is switched to its store mode to assume the task of temporarily storing subsequent band sweeps In a second embodiment the roles of the two buffer memories are switched at the end of each heterodyne receiver band sweep for display of successive band sweeps at a faster rate and for automatic long-term store of any band sweep producing an alarm NASA



N78-23275*# National Aeronautics and Space Administration Langley Research Center, Langley Station, Va
HIGH-TEMPERATURE MICROPHONE SYSTEM Patent Application
Allan J Zuckerwar, inventor (to NASA) (Old Dominion Univ Research Foundation Norfolk, Va) Filed 28 Apr 1978 22 p Sponsored by NASA
(NASA-Case-LAR-12375-1, US-Patent-Appl-SN-900842) Avail NTIS HC A02/MF A01 CSCL 17B

Apparatus for measuring pressure fluctuations in air or other gases that is suitable for use in areas of elevated temperature is reported The microphone is modified to decrease the undesirable increase in microphone sensitivity at high temperatures, the connection between the microphone and the carrier electronics is modified to operate as a half-wavelength transmission line and to provide a large temperature gradient between the microphone and carrier electronics, and the carrier electronics is modified by using a voltage controlled oscillator for automatic tuning control thereby permitting control without the addition of capacitors in parallel with the microphone NASA



N78-24391* National Aeronautics and Space Administration Pasadena Office Calif

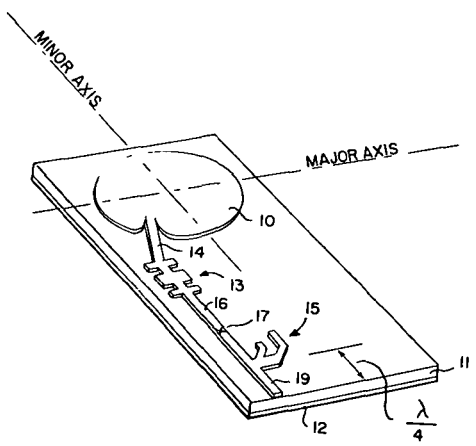
THIN CONFORMAL ANTENNA ARRAY FOR MICROWAVE POWER CONVERSIONS Patent

Richard M Dickinson inventor (to NASA) (JPL) Issued 14 Mar 1978 8 p Sponsored by NASA

(NASA-Case-NPO-13886-1 US-Patent-4,079 268, US-Patent-Appl-SN-730045, US-Patent-Class-307-151 US-Patent-Class-361-395 US-Patent-Class-343-700MS) Avail US Patent Office CSCL 09C

A structure of a circularly polarized thin conformal antenna array which may be mounted integrally with the skin of an aircraft employs microstrip elliptical elements and interconnecting feed lines spaced from a circuit ground plane by a thin dielectric layer The feed lines are impedance matched to the elliptical antenna elements by selecting a proper feedpoint inside the periphery of the elliptical antenna elements Diodes connected between the feed lines and the ground plane rectify the microwave power and microstrip filters (low pass) connected in series with the feed lines provide dc current to a microstrip bus Low impedance matching strips are included between the elliptical elements and the rectifying and filtering elements

Official Gazette of the U S Patent Office



N78-24401*# National Aeronautics and Space Administration Pasadena Office Calif

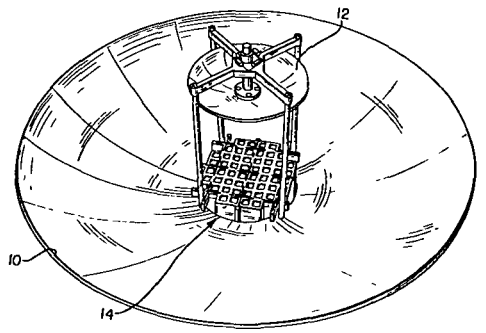
LIMITED SCAN DUAL-BAND HIGH GAIN ANTENNA Patent Application

Kenneth E Woo (JPL) and Paul W Cramer inventors (to NASA) (JPL) Filed 28 Apr 1978 11 p

(Contract NAS7-100)

(NASA-Case-NPO-14038-1 NASA-Case-NPO 14076-1 US-Patent Appl-SN-901054) Avail NTIS HC A02/MF A01 CSCL 17B

A dual-band limited scan antenna with high gain and large aperture is comprised of a Cassegrainian antenna system with a dual-band phased array feed positioned so that the subreflector of the antenna system is in the near field of the feed thereby enabling the antenna system to be scanned many beamwidths from boresight by phase scanning the feed The phased array for scanning applications at S-band and X-band includes X-band waveguides in a matrix with S-band crossed-slot waveguides interleaved in the spaces between rows and columns of the X-band waveguides NASA



N78-24402*# National Aeronautics and Space Administration Pasadena Office Calif

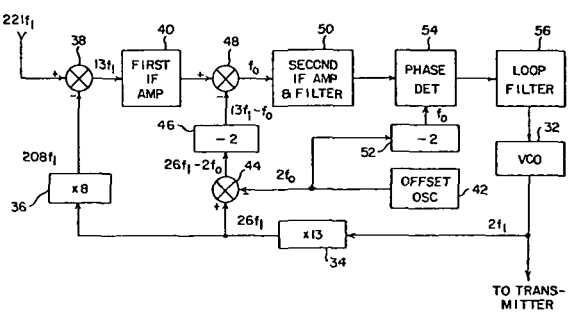
VERSATILE TRANSPONDER RECEIVER Patent Application

Arthur J Kline inventor (to NASA) (Motorola Scottsdale Ariz) Filed 28 Apr 1978 10 p

(Contracts NAS7-100 JPL-953706)

(NASA-Case-NPO-14248 1 US-Patent-Appl-SN-901056) Avail NTIS CSCL 17B

A versatile configuration is described for a transponder receiver using a VCO in a PLL to generate a retransmitted carrier at a frequency 2f sub 1 The second IF amplifier and bandpass filters operate at a frequency which is one-half the frequency of an offset oscillator The output of the offset oscillator is added to the output of the first IF amplifier while the frequency of the first IF amplifier is substracted and then the offset frequency is effectively substracted in the loop phase detector NASA



N78-25274*# National Aeronautics and Space Administration Marshall Space Flight Center Huntsville, Ala

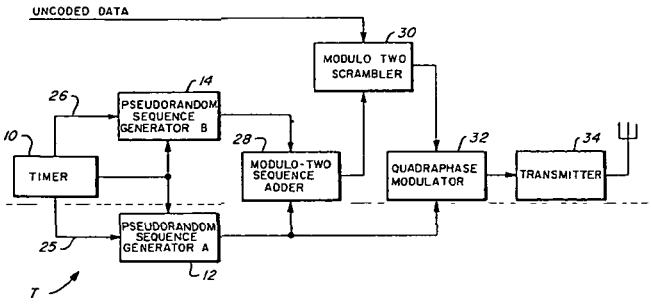
SECURE COMMUNICATION SYSTEM Patent Application

George D Doland inventor (to NASA) (Lockheed Electronics Co Inc Houston Tex) Filed 28 Apr 1978 21 p Sponsored by NASA

(NASA-Case-MSC-16462-1 US-Patent-Appl-SN-900841) Avail NTIS HC A02/MF A01 CSCL 17B

A product code formed from the pseudorandom sequences of digital bits is used to encipher or scramble data prior to transmission The two pseudorandom sequences (one of which

is transmitted continuously with the scrambled data for synchronization) are changed before they have had time to repeat The communication system comprises a master timer a message encoder/transmitter and a message decoder/receiver and employs an electronically randomized variant of quadraphase modulation and demodulation between two synchronized transcievers Messages are encoded by using the combined outputs of two pseudo-random-sequence generators which are 41 stage shift register devices NASA



N78-25275*# National Aeronautics and Space Administration Pasadena Office Calif

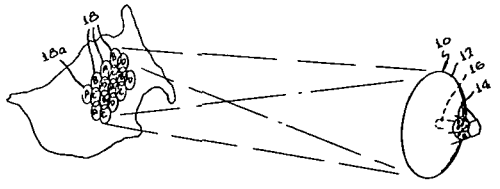
SATELLITE PERSONAL COMMUNICATIONS SYSTEM Patent Application

Norman B Reilly (JPL) and Joel G Smith inventors (to NASA) (JPL) Filed 30 May 1978 23 p

(Contract NAS7-100)

(NASA-Case-NPO-14480-1 US-Patent-Appl-SN-910707) Avail NTIS HC A02/MF A01 CSCL 17B

A mobile communication system was designed that can be utilized to reliably interconnect large numbers of dispersed mobile units over a wide area such as the continental United States The system includes a geostationary satellite with a large diameter reflector antenna with a matrix of feed horns for transmitting narrow beams that each cover a specific limited area or sector of the United States The feed horn matrix also enables the detection of the specific sector from which a transmission is received This permits the satellite to detect the particular sectors in which a caller and called party are located and to retransmit signals between them utilizing narrow beams that do not cover other sectors of the country Thus the same frequency band can be utilized in each of many different sectors of the United States utilizing only a moderate band width of the radio frequency spectrum NASA



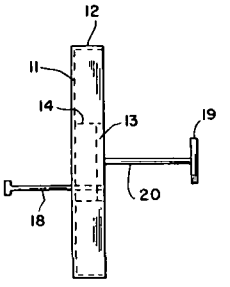
N78-29310*# National Aeronautics and Space Administration Langley Research Center Langley Station Va

MICROSTRIP BACK-FIRE ANTENNA Patent Application

Thomas G Campbell and Norman V Cohen inventors (to NASA) (Old Dominion University Norfolk Va) Filed 26 Jul 1978 8 p

(NASA-Case-LAR-12172-1 US-Patent-Appl-SN-928132) Avail NTIS HC A02/MF A01 CSCL 20N

A backfire antenna that is fed by a rectangular microstrip resonator is presented The microstrip resonator is either flush mounted with or mounted in front of the large circular reflector of the backfire antenna The small reflector of the backfire antenna can be either rectangular or circular in shape and is positioned in front of the rectangular resonator at a spacing of about 0 35 wavelengths of the operating frequency For excellent gain the rectangular microstrip resonator is 0 5 wavelength by 1 5 wavelength (in the dielectric material) the small rectangular reflector is 0 4 wavelength by 0 9 wavelength and the small circular reflector is 0 4 wavelength in diameter The electrical dimensions for all of the reflectors used are expressed in wavelengths in free space NASA



N78-31321* National Aeronautics and Space Administration Pasadena Office Calif

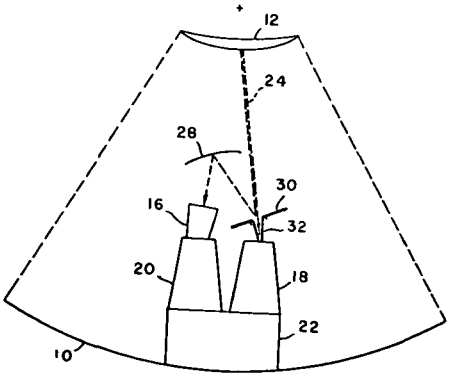
REFLEX FEED SYSTEM FOR DUAL FREQUENCY ANTENNA WITH FREQUENCY CUTOFF MEANS Patent

Robert W Hartop, inventor (to NASA) (JPL) Issued 30 May 1978 4 p Filed 24 Mar 1977 Supersedes N77-24338 (15 - 15, p 1976) Sponsored by NASA

(NASA-Case-NPO-14022-1, US-Patent-4,092 648, US-Patent-Appl-SN-780728, US-Patent-Class-343-782 US-Patent-Class-343-837 US-Patent-Class-343-781CA) Avail US Patent Office CSCL 09C

A reflex feed system is described for a dual frequency antenna such as one which transmits and receives both S and X band signals The dichroic plate, normally employed for directing X band radiation away from the X band horn is replaced by a flange about the opening of the X band horn

Official Gazette of the U S Patent Office



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*

N78-22298*# National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex

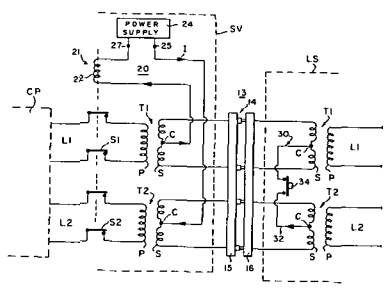
SYSTEM FOR AUTOMATICALLY SWITCHING TRANSFORMER COUPLED LINES Patent Application

William S Dwinell inventor (to NASA) (Rockwell Intern , Downey, Calif) Filed 9 Mar 1978 10 p

(Contract NAS9-14000)

(NASA-Case-MSC-16697-1 US-Patent-Appl-SN-885067) Avail NTIS HC A02/MF A01 CSCL 09C

A system is provided 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 disconnection of the AC lines Normally-open switching means are provided in at least one AC line The switching controller automatically opens the switching means when the AC lines become separated NASA



N78-22299*# National Aeronautics and Space Administration *Pasadena Office Calif*

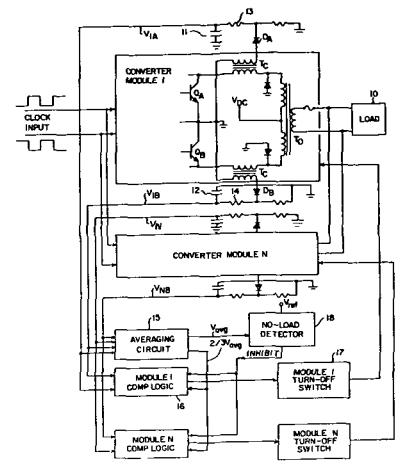
MODULE FAILURE ISOLATION CIRCUIT FOR PARALLELED INVERTERS Patent Application

Satoshi Nagano, inventor (to NASA) (JPL) Filed 9 Feb 1978 13 p

(Contract NAS7-100)

(NASA-Case-NPO-14000-1 US-Patent-Appl-SN-876431) Avail NTIS HC A02/MF A01 CSCL 09C

A circuit is proposed which detects current occurring in each module of a multimodule paralleled inverter system and compares it with the average current of all the modules to determine when there is a failure in any one module and to shut down the failing module Such a failure isolation circuit is useful in power conditioning systems for spacecraft, data processing systems, and the like, and for all forms of solar energy conversion systems NASA



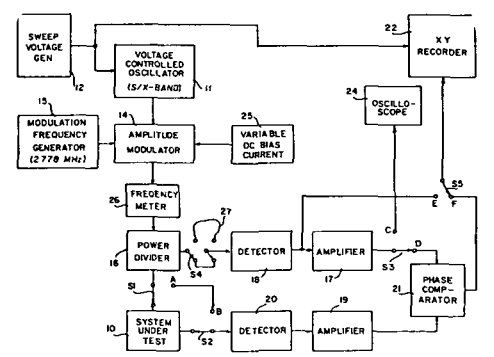
N78-25319* National Aeronautics and Space Administration Pasadena Office Calif

SWEPT GROUP DELAY MEASUREMENT Patent

David L Trowbridge, inventor (to NASA) (JPL) Issued 11 Apr 1978 5 p Filed 24 Nov 1976 Supersedes N77-17358 (15 - 08 p 1025 Sponsored by NASA

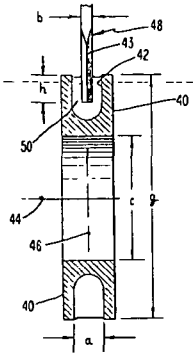
(NASA-Case-NPO-13909-1 US-Patent-4,084 132, US-Patent-Appl-SN-744477 US-Patent-Class-324-57DE, US-Patent-Class-324-57SS, US-Patent-Class-324-58A) Avail US Patent Office CSCL 09C

Direct recording of group delay measurements on a system under temperature and stress tests employs modulated carrier frequency sweep over an S or X band Reference path and test paths to separate detectors utilize a power divider e g a directional coupler or a hybrid T junction An initially balanced phase comparator is swept in frequency by modulated carrier over the band of interest for different conditions of temperature and/or mechanical stress to obtain characteristic group delay curves Official Gazette of the U S Patent Office



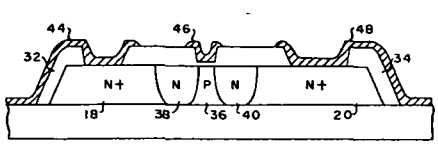
N78-25323*# National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio
LIQUID METAL SLIP RING Patent Application
Frank D Berkopec Robert R Lovell and David H Culp, inventors (to NASA) Filed 17 Apr 1978 11 p
(NASA-Case-LEW-12277-2 US-Patent-Appl-SN-896955) Avail NTIS HC A02/MF A01 CSCL 09C

The liquid metal electrical device includes a rotor with a channel for retaining the liquid by tension The device also includes a stator in the form of a brush partially immersed in the metal The brush is bidirectionally symmetrical so that whichever direction the rotor turns the probe presents the same physical resistance and affords the same electrical conductivity as a connection between the probe and the rotor NASA



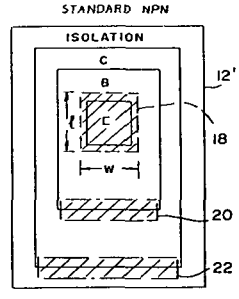
N78-27326* National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala
FIELD EFFECT TRANSISTOR AND METHOD OF CONSTRUCTION THEREOF Patent
William R Fletner inventor (to NASA) Issued 9 May 1978 6 p Filed 23 Jun 1976 Supersedes N76-26394 (14 - 17 p 2181)
(NASA-Case-MFS-23312-1 US-Patent-4 087 902 US-Patent-Appl-SN-699012, US-Patent-Class-29-571 US-Patent-Class-29-578 US-Patent-Class-357-91) Avail US Patent Office CSCL 09A

A field effect transistor is constructed by placing a semiconductor layer on an insulating substrate so that the gate region is separated from source and drain regions The gate electrode and gate region of the layer are of generally reduced length, the gate region being of greatest length on its surface closest to the gate electrode This is accomplished by initially creating a relatively large gate region of one polarity and then reversing the polarity of a central portion of this gate region by ion bombardment thus achieving a narrower final gate region of the stated configuration
Official Gazette of the U S Patent Office



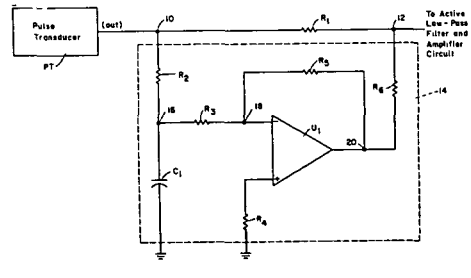
N78-27330*# National Aeronautics and Space Administration Pasadena Office Calif
METHOD FOR ANALYZING RADIATION SENSITIVITY OF INTEGRATED CIRCUITS Patent Application
Michael Gauthier (JPL) and A G Stanley inventors (to NASA) (JPL) Filed 30 Jun 1978 21 p
(Contract NAS7-100)
(NASA-Case-NPO-14350-1 US-Patent-Appl-SN-921627) Avail NTIS HC A02/MF A01 CSCL 09C

A technique for analyzing integrated circuits for radiation sensitivity is provided The method includes applying an intense penetrating radiation beam such as a 30 keV beam from a scanning electron microscope which is narrow enough to irradiate only one component (such as a single transistor) of the circuit at a time The circuit is operated during irradiation of each component in sequence with a predetermined radiation dose such as 1 000 000 rad until the circuit fails Then a new integrated circuit is substituted for the failed one the beam is narrowed further to cover only a portion of the failed component such as the beam which covers the base emitter junction of the failed transistor and a high radiation dosage is applied to component portions in sequence In this way it is possible to determine precisely which portions of which components of a circuit give rise to radiation sensitivity of the circuit NASA



N78-28339*# National Aeronautics and Space Administration Hugh L Dryden Flight Research Center, Edwards, Calif
A SIGNAL ATTENUATOR Patent Application
John T Polhemus (Martin Marietta Aerospace, Denver, Colo) and Wilbur H Cash, inventors (to NASA) (Martin Marietta Aerospace, Denver Colo) Filed 26 Jul 1978 10 p
(Contract NAS4-2387)
(NASA-Case-FRC-11012-1, US-Patent-Appl-SN-928137) Avail NTIS HC A02/MF A01 CSCL 09A

An artifact signal attenuator for a pulse rate sensor is described The circuit for attenuating background noise signals is connected with a pulse rate transducer which has a light source and a detector for light reflected from blood vessels of a living body The heart signal provided consists of a modulated dc signal voltage indicative of pulse rate The artifact signal resulting from light reflected from the skin of the body comprises both a constant dc signal voltage and a modulated dc signal voltage The amplitude of the artifact signal is greater and the frequency less than that of the heart signal The signal attenuator circuit includes an operational amplifier for canceling the artifact signal from the output signal of the transducer and has the capability of meeting packaging requirements for wrist-watch-size packages NASA



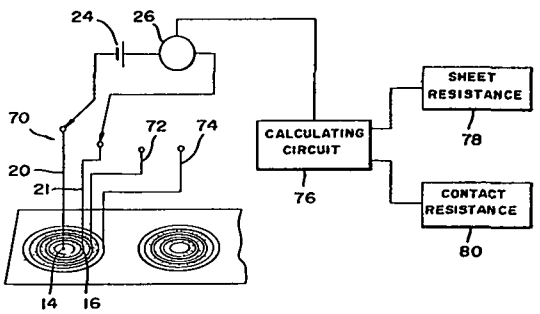
N78-28340*# National Aeronautics and Space Administration Pasadena Office, Calif

APPARATUS FOR MEASURING SEMICONDUCTOR DEVICE RESISTANCE Patent Application

Walter J Matzen, inventor (to NASA) (Texas Instruments, Inc, Dallas, Tex) Filed 23 Jun 1978 18 p
(Contract NAS7-100)
(NASA-Case-NPO-14424-1, NASA-Case-NPO-144340-1, US-Patent-Appl-SN-918534) Avail NTIS HC A02/MF A01 CSCL 09A

A test structure for accurately measuring the sheet resistance of the diffused region of a semiconductor during processing is provided The novel feature is that one of the terminals extends in a closed path around the other terminal so that all current flowing during the resistance measurement flows through only the ring of semiconductor material lying between the terminals

G Y



N78-32338* National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt, Md

QUADRAPHASE DEMODULATION Patent

Carl R Ryan inventor (to NASA) (Motorola, Inc, Scottsdale, Ariz) Issued 30 May 1978 6 p Filed 21 Jun 1977 Supersedes N77-27272 (15 - 18 p 2372) Sponsored by NASA
(NASA-Case-GSC-12137-1, US-Patent-4 092 606, US-Patent-Appl-SN-808510, US-Patent-Class-329-124 US-Patent-Class-331-4, US-Patent-Class-331-12, US-Patent-Class-331-64) Avail US Patent Office CSCL 09C

A received suppressed carrier, quadraphase shift key modulated (QPSK)signal is demodulated with a phase locked loop including a variable frequency, coherent reference that drives first and second channels also responsive to the QPSK signal The channels respectively derive first and second replicas of binary signals that modulated the suppressed carrier The replicas are combined to derive a variable amplitude error signal for controlling the coherent reference frequency The frequency of the coherent reference is dithered at a low rate so that there is derived a relatively low level tracking error phase from the locked loop The frequency of the coherent reference is swept when the phase of the error signal differs from the dithering phase by a predetermined value that is appreciably less than 90 degrees

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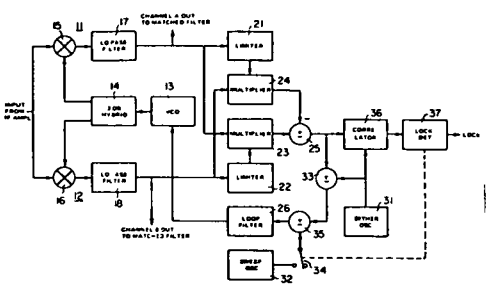


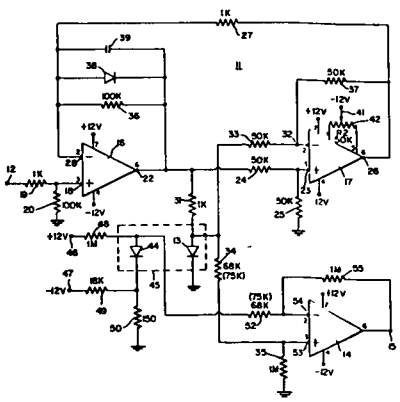
N78-32339* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt Md

LOGARITHMIC CIRCUIT WITH WIDE DYNAMIC RANGE Patent

Paris H Wiley (Va Polytechnic Inst and State Univ) and Eugene A Manus, inventors (to NASA) (Va Polytechnic Inst and State Univ) Issued 23 May 1978 5 p Filed 16 Feb 1977 Supersedes N77-19319 (15 - 10 p 1301) Sponsored by NASA
(NASA-Case-GSC-12145-1 US-Patent-4,091,329 US-Patent-Appl-SN-769149 US-Patent-Class-328-145 US-Patent-Class-307-229, US-Patent-Class-307-230) Avail US Patent Office CSCL 09C

A circuit deriving an output voltage that is proportional to the logarithm of a dc input voltage susceptible to wide variations in amplitude includes a constant current source which forward biases a diode so that the diode operates in the exponential portion of its voltage versus current characteristic above its saturation current The constant current source includes first and second, cascaded feedback dc operational amplifiers connected in negative feedback circuit An input terminal of the first amplifier is responsive to the input voltage A circuit shunting the first amplifier output terminal includes a resistor in series with the diode The voltage across the resistor is sensed at the input of the second dc operational feedback amplifier The current flowing through the resistor is proportional to the input voltage over the wide range of variations in amplitude of the input voltage

Official Gazette of the U S Patent Office



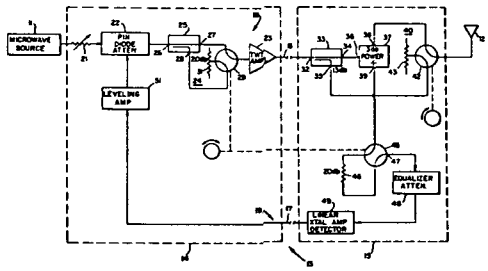
N78-32340* National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

WIDE POWER RANGE MICROWAVE FEEDBACK CONTROLLER Patent

Leo E Titus, inventor (to NASA) (Hughes Aircraft Co) Issued 30 May 1978 6 p Filed 29 Mar 1977 Supersedes N77-21322 (115 - 12, p 1577) Sponsored by NASA
(NASA-Case-GSC-12146-1 US-Patent-4,092 617 US-Patent-Appl-SN-782480 US-Patent-Class-333-17R, US-Patent-Class-325-159, US-Patent-Class-325-187 US-Patent-Class-333-81R) Avail US Patent Office CSCL 09C

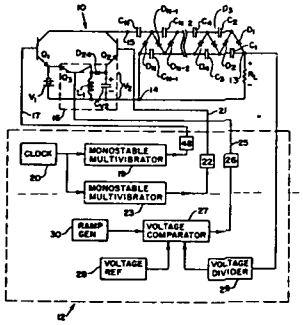
A substantially constant power level is derived over a predetermined frequency band in each of a plurality of relatively widely spaced power ranges, from a microwave load having a predetermined amplitude versus frequency response, such as an antenna A microwave source of substantially constant amplitude drives a forward path connected between the source and the load A feedback path responsive to the microwave power level in the forward path derives a control voltage for the PIN attenuator The equalizer attenuator drives a linear crystal amplitude detector Attenuating means included in the forward and feedback paths are selectively connected in circuit to maintain the power level of the microwave input to the amplitude detector substantially constant, even though different power ranges are supplied to the load by the forward path

Official Gazette of the U S Patent Office



which compares the output voltage of the capacitor-diode voltage multiplier to the reference source

Official Gazette of the U S Patent Office



N78-32341* National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio

REGULATED HIGH EFFICIENCY, LIGHTWEIGHT CAPACITOR-DIODE MULTIPLIER dc TO dc CONVERTER Patent

William T Harrigill Jr and Ira T Myers inventors (to NASA) Issued 30 May 1978 5 p Filed 27 May 1977 Supersedes N77-24385 (15 - 15 p 2011)

(NASA-Case-Lew-12791-1, US-Patent-4,092 712 US-Patent-Appl-SN-801432 US-Patent-Class-363-60, US-Patent-Class-363-16 US-Patent-Class-363-101) Avail US Patent Office CSCL 09C

A voltage multiplier having a capacitor-diode voltage multiplying network is disclosed which is fed with voltage pulses from a dc source through a first switching means Pulses of a second polarity are also supplied through a second switching means to the input of the capacitor-diode voltage multiplier from a second dc source whose voltage is adjustable to change the voltage of the pulses of second polarity The switching means are alternately rendered conducting by signals from a control circuit The second dc source may be controlled by a voltage comparator

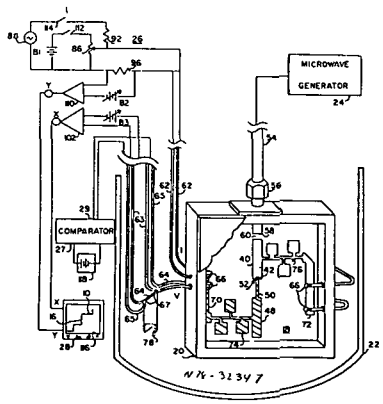
N78-32347*# National Aeronautics and Space Administration Marshall Space Flight Center, Huntsville, Ala

MICROWAVE INTEGRATED CIRCUIT FOR JOSEPHSON VOLTAGE STANDARDS Patent Application

Louis B Holdeman (NBS Washington D C), Jaan Toots (NBS Washington D C), and Chu-Cheng Chang inventors (to NASA) (NBS Washington D C) Filed 31 Aug 1978 21 p Sponsored by NASA

(NASA-Case-MFS-23845-1 US-Patent-Appl-SN-938298) Avail NTIS HC A02/MF A01 CSCL 09C

An invention is presented which relates to voltage standards wherein a precise voltage is obtained by observation of the voltage-current characteristics of a Josephson junction a cross which is applied a microwave signal of a precisely known frequency The novelty of the invention lies in simplifying the structure significantly wherein a single junction is employed and a quite simple biasing system employed with it NASA



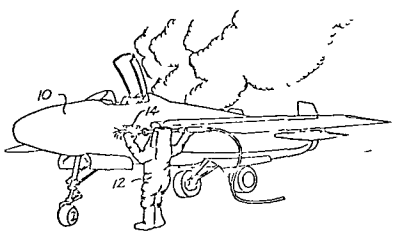
34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers hydrodynamics fluidics mass transfer and ablation cooling

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

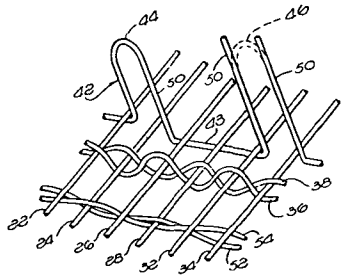
N78-22328*# National Aeronautics and Space Administration John F Kennedy Space Center, Cocoa Beach, Fla
PENETRATOR NOZZLE Patent Application
Norris C Gray, Robert M Senseny (Boeing Aerospace Co , Seattle) and Phillip N Bolton, inventors (to NASA) (Boeing Aerospace Co , Seattle) Filed 19 Apr 1978 10 p
(NASA-Case-KSC-11064-1, US-Patent-Appl-SN-897840) Avail NTIS HC A02/MF A01 CSCL 20D

A nozzle for use with a fire extinguishing apparatus delivering an extinguishing agent through a barrier surrounding a structure into the interior thereof The nozzle includes an elongated tubular body which has a pointed penetrating head carried on one end of the tubular body A source of extinguishing agent is coupled to the opposite end of the tubular body and is fed therethrough and passes through and passes through passages adjacent the head for delivering the extinguishing agent to the interior of the structure A slidable mass is carried on the tubular body on a remote end of the tubular body from the penetrating head By manipulating the slidable mass and bringing such in contact with an abutment the force imparted to the tubular body causes the head to penetrate the structure NASA



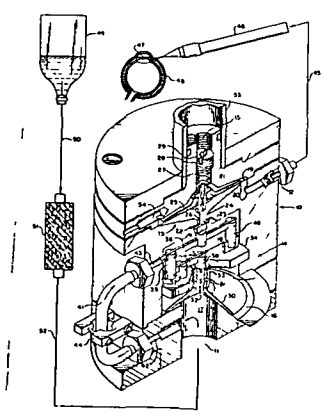
N78-25350* National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston Tex
FLEXIBLE PILE THERMAL BARRIER INSULATOR Patent
George Edward Anderson(Rockwell Intern Downey Calif) Donald Maurice Fell (Rockwell Intern Downey Calif) and Jerry Stanley Tesinsky inventors (to NASA) (Rockwell Intern Downey Calif) Issued 7 Mar 1978 5 p Filed 28 Apr 1976 Supersedes N76-23585 (14 - 14 p 1803) Sponsored by NASA
(NASA-Case-MSC-19568-1 US-Patent-4 078 110
US-Patent-Appl-SN-681000 US-Patent-Class-428-93,
US-Patent-Class-49-479 US-Patent-Class-49-485
US-Patent-Class-49-DIG 1 US-Patent-Class-428-94,
US-Patent-Class-428-95 US-Patent-Class-428-96
US-Patent-Class-428-97 US-Patent-Class-428-913) Avail US Patent Office CSCL 20D

A flexible pile thermal barrier insulator included a plurality of upstanding pile yarns A generally planar backing section supported the upstanding pile yarns The backing section included a plurality of filler yarns forming a mesh in a first direction A plurality of warp yarns were looped around said filler yarns and pile yarns in the backing section and formed a mesh in a second direction A binder prevented separation of the yarns in the backing section Official Gazette of the U S Patent Office



N78-25351* National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio
FLOW COMPENSATING PRESSURE REGULATOR Patent
Edward F Baehr inventor (to NASA) Issued 18 Apr 1978 5 p Filed 21 Mar 1977 Supersedes N77-20408 (15 - 11 p 1453)
(NASA-Case-LEW-12718-1 US-Patent-4 084 612
US-Patent-Appl-SN-779428 US-Patent-Class-137-484 2
US-Patent-Class-137-501 US-Patent-Class-137-505 16) Avail US Patent Office CSCL 20D

An apparatus for regulating pressure of treatment fluid during ophthalmic procedures is described Flow sensing and pressure regulating diaphragms are used to modulate a flow control valve The pressure regulating diaphragm is connected to the flow control valve to urge the valve to an open position due to pressure being applied to the diaphragm by bias means such as a spring The flow sensing diaphragm is mechanically connected to the flow control valve and urges it to an opened position because of the differential pressure on the diaphragm generated by a flow of incoming treatment fluid through an orifice in the diaphragm A bypass connection with a variable restriction is connected in parallel relationship to the orifice to provide for adjusting the sensitivity of the flow sensing diaphragm A multiple lever linkage system is utilized between the center of the second diaphragm and the flow control valve to multiply the force applied to the valve by the other diaphragm and reverse the direction of the force Official Gazette of the U S Patent Office



N78-27357* National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio

DIRECT HEATING SURFACE COMBUSTOR Patent

Donald G Beremand, Lloyd I Shire and Thaddeus S Mroz inventors (to NASA) Issued 9 May 1978 6 p Filed 26 Jul 1976 Supersedes N76-28646 (14 - 19 p 2478)

(NASA-Case-LEW-11877-1 US-Patent-4 087 962 US-Patent-Appl-SN-708660, US-Patent-Class-60-39 65 US-Patent-Class-431-7 US-Patent-Class-431-10 US-Patent-Class-431-328 US-Patent-Class-60-39 69R) Avail US Patent Office CSCL 20D

The combustor utilizes a non-adiabatic flame to provide low-emission combustion for gas turbines A fuel-air mixture is directed through a porous wall the other side of which serves as a combustion surface A radiant heat sink disposed adjacent to and spaced from the combustion surface controls the combustor flame temperature in order to prevent the formation of oxides of nitrogen A secondary air flow cools the heat sink Additionally, up to 100% of secondary air flow is mixed with the combustion products at the direct heating surface combustor to dilute such products thereby reducing exit temperature However, if less than 100% secondary air is mixed to the combustor, the remainder may be added to the combustion products further downstream

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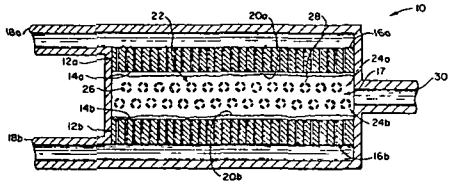


35 INSTRUMENTATION AND PHOTOGRAPHY

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*

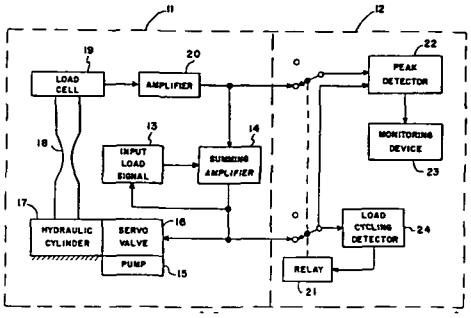
N78-22346*# National Aeronautics and Space Administration Langley Research Center, Langley Station, Va

FATIGUE FAILURE LOAD INDICATOR Patent Application

Leland A Imig, William T Davis, and David C Davis, inventors (to NASA) Filed 24 Mar 1978 11 p

(NASA-Case-LAR-12027-1, US-Patent-Appl-SN-889670) Avail NTIS HC A02/MF A01 CSCL 14B

A device for measuring the load on a fatigue test specimen at the instant the specimen breaks is reported The invention consists essentially of a conventional fatigue testing machine connected to a fatigue failure load indicator Alternate tension and compression dc load signals were applied to a summing amplifier by means of an input load signal device These signals caused a hydraulic cylinder to alternately apply tension and compression loads to the specimen A load cell was attached to the specimen to produce dc voltage proportional to the load on the specimen This signal was amplified to subtract from the load signals from the input load signal device A peak detector has its measuring input connected through a closed contact of relays to the output of the amplifier and has its reset input connected through another closed contact of relays to the output of the summing amplifier NASA



N78-22347*# National Aeronautics and Space Administration Pasadena Office, Calif

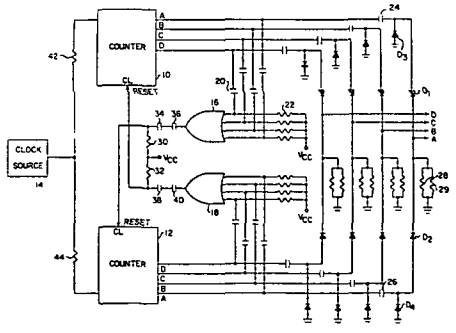
REDUNDANT OPERATION OF COUNTER MODULES Patent Application

Satoshi Nagano, inventor (to NASA) (JPL) Filed 4 Apr 1978 20 p

(Contract NAS7-100)

(NASA-Case-NPO-14162-1, NASA-Case-NPO-14167-1, NASA-Case-NPO-14169-1, US-Patent-Appl-SN-893903) Avail NTIS HC A02/MF A01 CSCL 14B

Redundant operation of counter modules is maintained by detecting the zero state of each counter and clearing the other to that state, thus periodically resynchronizing the counters, and obtaining an output from both counters through ac coupled diode-OR gates Redundant operation of counter flip-flops is maintained in a similar manner, and synchronous operation of redundant squarewave clock generators of the feedback type is effected by connecting together the feedback inputs of the squarewave generators through a coupling resistor, and obtaining an output from both generators through ac coupled diode-OR gates NASA



N78-22348*# National Aeronautics and Space Administration Pasadena Office, Calif

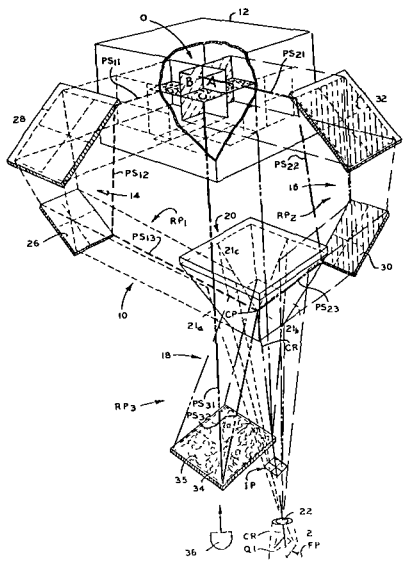
SYSTEM FOR FORMING A QUADRIFID IMAGE COMPRISING ANGULARLY RELATED FIELDS OF VIEW OF A THREE DIMENSIONAL OBJECT **Patent Application**

Frederick R Chamberlain, inventor (to NASA) (JPL) Filed 20 Mar 1978 13 p

(Contract NAS7-100)

(NASA-Case-NPO-14219-1, US-Patent-Appl-SN-888432) Avail NTIS HC A02/MF A01 CSCL 14E

A system is presented for forming a composite image to be photographed and more particularly to an improved system for forming a quadrifid composite image consisting of separate images of a plurality of angularly related fields of view of a three dimensional object The present invention is embodied in a system which includes a first, second and third subsystem, and each of which includes a combination of reflecting surfaces adapted to reflect images of orthogonally related fields of view to provide a quadrifid image for a camera The camera lens, in turn focuses the quadrifid image on a film frame, in the film plane for photographically recording the quadrifid image By employing the system of the instant invention, a simultaneous photographing of the images of orthogonally related fields of view is facilitated NASA



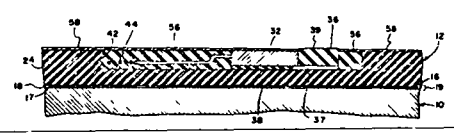
N78-24515* National Aeronautics and Space Administration Langley Research Center Langley Station Va

NON-DESTRUCTIVE METHOD FOR APPLYING AND REMOVING INSTRUMENTATION ON HELICOPTER ROTOR BLADES **Patent**

Walt C Long and Milton L Williams inventors (to NASA) Issued 4 Apr 1978 8 p Filed 19 Apr 1977 Supersedes N77-22452 (15 - 13 p 1725)

(NASA-Case-LAR-11201-1 US-Patent-4 082 001 US-Patent-Appl-SN-788705 US-Patent-Class-73-756 US-Patent-Class-73-456 US-Patent-Class-416-61 US-Patent-Class-416-144) Avail US Patent Office CSCL 14B

A nondestructive method of applying and removing instrumentation on airfoils Official Gazette of the U S Patent Office



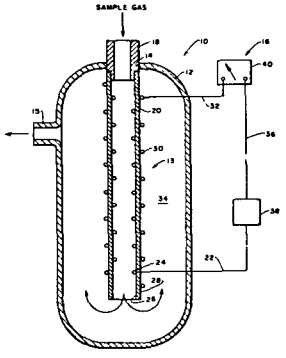
N78-25391* National Aeronautics and Space Administration Pasadena Office Calif

POLYMERIC ELECTROLYTIC HYGROMETER **Patent**

Daniel D Lawson inventor (to NASA) (JPL) Issued 11 Apr 1978 5 p Filed 21 Dec 1976 Sponsored by NASA (NASA-Case-NPO-13948-1, US-Patent-4 083,765 US-Patent-Appl-SN-752748 US-Patent-Class-204-195W, US-Patent-Class-73-336 5) Avail US Patent Office CSCL 14B

An improved flow-through electrolytic hygrometer is described which utilizes a long lasting oxidation-resistant, hollow fiber formed from persulfonic acid substituted polytetrafluoroethylene having closely spaced noble metal electrodes in contact with the inner and outer surfaces of the fiber The fiber is disposed within a chamber so that the moisture-bearing gas passes in contact with at least one surface of the fiber The electrodes are connected in series to a dc voltage supply and an ammeter As the gas passes through the chamber moisture absorbed into the wall of the fiber is electrolyzed to hydrogen and oxygen by the closely spaced electrodes The amount of electricity required for electrolysis is proportional to the absorbed moisture and is observed on the ammeter

Official Gazette of the U S Patent Office



N78-27384* National Aeronautics and Space Administration Langley Research Center Langley Station Va

REMOTE WATER MONITORING SYSTEM **Patent**

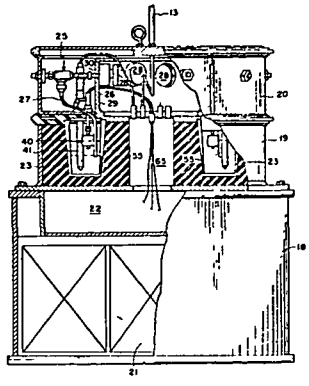
David C Grana and David P Haynes inventors (to NASA) Issued 16 May 1978 11 p Filed 4 Aug 1977 Supersedes N77-28563 (15 - 19, p 2548)

(NASA-Case-LAR-11973-1, US-Patent-4,089 209 US-Patent-Appl-SN-821681 US-Patent-Class-73-61R US-Patent-Class-73-170A US-Patent-Class-73-425 4R) Avail US Patent Office CSCL 14B

A remote water monitoring system is described that integrates the functions of sampling sample preservation sample analysis data transmission and remote operation The system employs a floating buoy carrying an antenna connected by lines to one or more sampling units containing several sample chambers Receipt of a command signal actuates a solenoid to open an intake valve outward from the sampling unit and communicates the water sample to an identifiable sample chamber Such response to each signal receipt is repeated until all sample chambers are filled in a sample unit Each sample taken is analyzed by an electrochemical sensor for a specific property and the data obtained is transmitted to a remote sending and receiving station Thereafter the samples remain isolated in the sample chambers

until the sampling unit is recovered and the samples removed for further laboratory analysis

Official Gazette of the U S Patent Office



N78-27385*# National Aeronautics and Space Administration Pasadena Office Calif

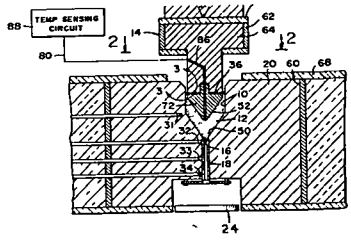
VISCOSITY MEASURING INSTRUMENT Patent Application

Samuel P Feinstein inventor (to NASA) Filed 23 Jun 1978 16 p

(Contract NAS7-100)

(NASA-Case-NPO-14501-1, US-Patent-Appl-SN-918535) Avail NTIS HC A02/MF A01 CSCL 14B

An instrument for measuring the viscosity of coal samples at an elevated temperature such as 500F is presented when they partially decompose into gases, to aid in the design of equipment for feeding coal into combustion chambers A preheated cylinder holds a coal sample while a preheated piston presses on the sample to force it through a narrow tube The cylinder has a concave end wall while the piston has a convex end to increase the surface area of contact with the sample to more rapidly heat the sample The piston has a seal of compressed carbon material, which self sizes itself to the cylinder to form a seal therewith that prevents the escape of volatiles NASA



N78-28411* National Aeronautics and Space Administration John F Kennedy Space Center Cocoa Beach, Fla

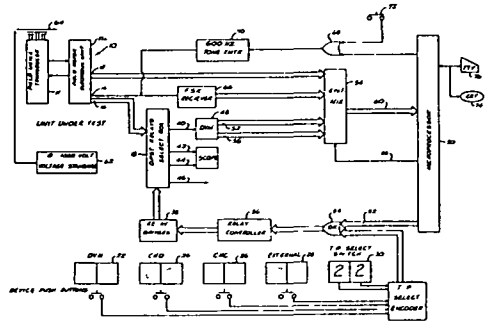
MICROCOMPUTERIZED ELECTRIC FIELD METER DIAGNOSTIC AND CALIBRATION SYSTEM Patent

Larry D Holley and Jerry W Mason, inventors (to NASA) (Federal Electric Corp , Paramus, N J) Issued 9 May 1978 6 p Filed 24 Mar 1977 Supersedes N77-20343 (15 - 11 p 1444)

(NASA-Case-KSC-11035-1, US-Patent-4,088,951, US-Patent-Appl-SN-780874, US-Patent-Class-324-130 US-Patent-Class-324-32 US-Patent-Class-324-74) Avail US Patent Office CSCL 14B

A computerized field meter calibration system which includes an apparatus for testing the calibration of field meters normally utilized for measuring electromagnetic field potentials is described A reference voltage is applied to the field meter for causing signals to be produced on the output terminals thereof A bank of relays is provided for selectively connecting output terminals of the field meter to a multiplexer by means of a digital voltmeter and an oscilloscope A frequency-shift-keyed receiver is also connected to one of the terminals of the field meter for transmitting and converting a frequency shift keyed signal to a digital signal which is, subsequently applied to the multiplexer

Official Gazette of the U S Patent Office



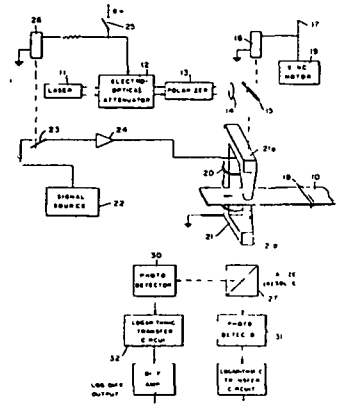
N78-29421* National Aeronautics and Space Administration Pasadena Office Calif

MAGNETO-OPTIC DETECTION SYSTEM WITH NOISE CANCELLATION Patent

George W Lewicki (JPL) and John E Guisinger inventors (to NASA) (JPL) Issued 27 Nov 1973 5 p Filed 25 Feb 1972 Sponsored by NASA

(NASA-Case-NPO-11954-1 US-Patent-3 775,570 US-Patent-Appl-SN-229287 US-Patent-Class-179-100 2CH, US-Patent-Class-340-174YC US-Patent-Class-340-174 1M US-Patent-Class-350-151) Avail US Patent Office CSCL 14E

In a magneto-optic readout system, a polarized beam of light from a laser is subjected to the magneto-optical effect of a magnetic record medium and then passed through an analyzer which resolves the beam into two orthogonal vector components so oriented that the two components are of equal amplitude when the angle of rotation due to the magneto-optic effect is zero Separate photodetectors produce two output signals which are proportional to the amplitudes of the vector components The two output signals are combined in a differential amplifier through separate logarithmic transfer circuits to produce an output signal proportional to the ratio of the two original detector signals Official Gazette of the U S Patent Office



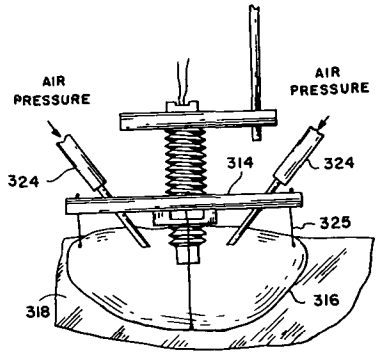
N78-31406*# National Aeronautics and Space Administration Langley Research Center Hampton, Va

DISPLACEMENT PROBES WITH SELF-CONTAINED EXCITING MEDIUM Patent Application

Robert Miserentino and Bruce Flagge, inventors (to NASA) Filed 26 Jul 1978 10 p

(NASA-Case-LAR-11690-1 US-Patent-Appl-SN-928129) Avail NTIS HC A02/MF A01 CSCL 14B

A device for measuring the displacement of a vibrating surface is presented This device is especially useful in determining the displacement of a vibrating nonhomogeneous surface The novel feature of the invention is the inclusion of a self-contained target with a noncontacting probe This facilitates measurements of nonhomogeneous surfaces to which it is difficult or impossible to attach fixed targets NASA



N78-32395* National Aeronautics and Space Administration Ames Research Center, Moffett Field Calif

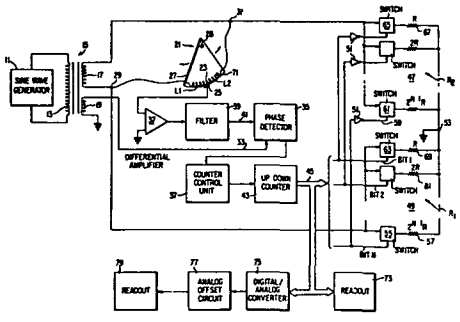
ANGLE DETECTOR Patent

Gilbert T Parra inventor (to NASA) Issued 13 Jun 1978 8 p Filed 10 Nov 1976 Supersedes N77-11364 (15 - 02, p 0194)

(NASA-Case-ARC-11036-1 US-Patent-4 094 073, US-Patent-Appl-SN-740457 US-Patent-Class-33-366) Avail US Patent Office CSCL 14B

An angle detector for determining a transducer's angular disposition to a capacitive pickup element is described The transducer comprises a pendulum mounted inductive element moving past the capacitive pickup element The capacitive pickup element divides the inductive element into two parts L sub 1 and L sub 2 which form the arms of one side of an a-c bridge Two networks R sub 1 and R sub 2 having a plurality of binary weighted resistors and an equal number of digitally controlled switches for removing resistors from the networks form the arms of the other side of the a-c bridge A binary counter controlled by a phase detector balances the bridge by adjusting the resistance of R sub 1 and R sub 2 The binary output of the counter is representative of the angle

Official Gazette of the U S Patent Office



N78-32396* National Aeronautics and Space Administration Marshall Space Flight Center Huntsville, Ala

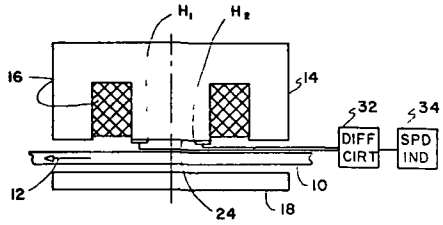
VELOCITY MEASUREMENT SYSTEM Patent

Walter Haeussermann, inventor (to NASA) Issued 6 Jun 1978 7 p Filed 6 Oct 1976 Supersedes N76-33469 (14 - 24 p 3133)

(NASA-Case-MFS-23363-1 US-Patent-4,093,917 US-Patent-Appl-SN-730046 US-Patent-Class-324-173 US-Patent-Class-324-207) Avail US Patent Office CSCL 14B

A velocity sensor is described for sensing the speed of a moving conductive body, employing an E-shaped magnetic core, having a pair of spaced Hall effect devices positioned on the end of the central core The ends of all cores were arranged adjacent to the path of the moving conductive body The difference in output voltage registered by the two Hall effect devices was indicative of the speed of the conductive body

Official Gazette of the U S Patent Office



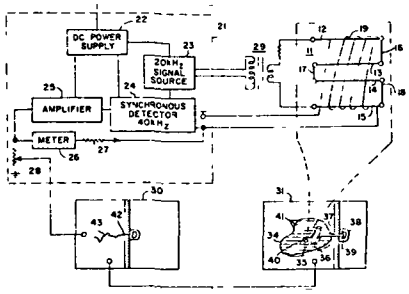
N78-32397* National Aeronautics and Space Administration Langley Research Center Hampton, Va

MAGNETOMETER WITH A MINIATURE TRANSDUCER AND AUTOMATIC SCANNING Patent

William J Jr Debnam, Carl L Fales Jr, Roger A Breckenridge, and Arthur V Pohm, inventors (to NASA) (Iowa State Univ of Sci and Technol) Issued 9 May 1978 5 p Filed 19 Mar 1976 Supersedes N77-17430 (15 - 08 p 1035) Continuation of abandoned US Patent Appl SN-547072 filed 4 Feb 1975 (NASA-Case-LAR-11617-2 US-Patent-4,088,954 US-Patent-Appl-SN-668771 US-Patent-Class-324-249, US-Patent-Appl-SN-547072) Avail US Patent Office CSCL 14B

The magnetometer is based on the time variation of the magnetic permeability in the magnetic material of its transducer however, its operation is substantially different from the ordinary flux-gate magnetometer The transducer uses 0 05 mm diameter plated magnetic wire and is made flat enabling it to make measurements of transverse magnetic fields as close as 0 08 mm from the surface and it has very good spatial resolution because of its small active region of approximately 0 64 mm by 0 76 mm The magnetometer uses an inexpensive clip-on millimeter for driving and processing the electrical signals and readout It also utilizes an automatic scanning technique which is made possible by a specially designed transducer holding mechanism that replaces the ink pen on an X-Y recorder

Official Gazette of the U S Patent Office



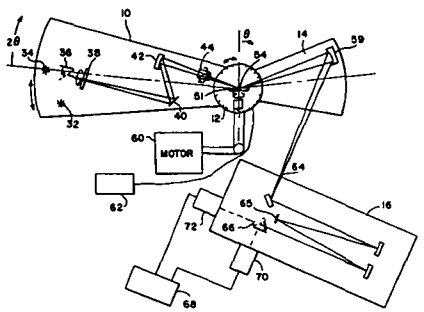
N78-32398*# National Aeronautics and Space Administration Langley Research Center Hampton Va

VISIBLE AND INFRARED POLARIZATION RATIO SPECTRO REFLECTOMETER Patent Application

Carmen E Batten inventor (to NASA) Filed 28 Jul 1978 19 p

(NASA-Case-LAR-12285-1 US-Patent-Appl-SN-929087) Avail NTIS HC A02/MF A01 CSCL 14B

The invention relates to an instrument for determining the optical constants of a sample material by causing light of various angles of polarization to impinge upon the sample at various angles of incidence and measuring the intensity of the reflected light at various wavelength The ratio of the intensity of the reflected light for parallel polarized light to that for perpendicular polarized light at two different angles of incidence can be used to determine the optical constants of the sample The novel feature of the invention appears to reside in a spectroreflectometer employing coordinated rotating platforms which enable the automatic alignment of the instrument at a wide variety of angles of incidence NASA



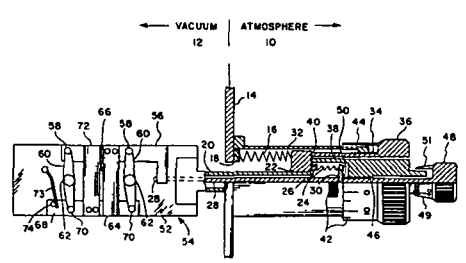
N78-32399*# National Aeronautics and Space Administration Langley Research Center Hampton Va

DUAL ACTING SLIT CONTROL MECHANISM Patent Application

Gustav L Struthoff inventor (to NASA) (Rensselaer Polytechnic Inst Troy N Y) Filed 8 Sep 1978 13 p Sponsored by NASA

(NASA-Case-LAR-11370-1 US-Patent-Appl-SN-940689) Avail NTIS HC A02/MF A01 CSCL 14B

The invention relates to an apparatus for the adjustment of the collimating slit width and centering of the collimating slit of a mass spectrometer while using only one vacuum penetration Coaxial shafts each with independent vacuum bellows are used to independently move the entire collimating assembly and to adjust the slit dimension through a parallelogram linkage The novelty of the invention is in securing two independent control functions through a single penetration in a vacuum barrier with a simple and inexpensive mechanism NASA



36 LASERS AND MASERS

Includes parametric amplifiers

N78-22359*# National Aeronautics and Space Administration Pasadena Office, Calif

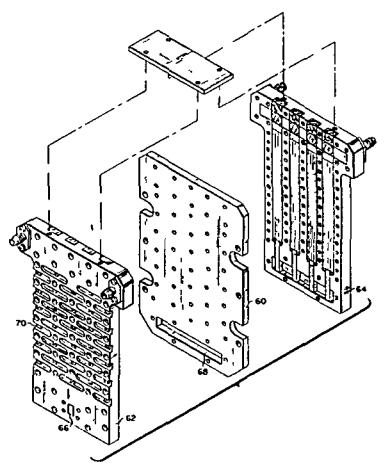
DIELECTRIC-LOADED WAVEGUIDE CIRCULATOR FOR CRYOGENICALLY COOLED AND CASCADED MASER WAVEGUIDE STRUCTURES Patent Application

Robert C Clauss (JPL) and Rex B Quinn inventors (to NASA) (JPL) Filed 9 Feb 1978 13 p

(Contract NAS7-100)

(NASA-Case-NPO-14254-1, US-Patent-Appl-SN-876432) Avail NTIS HC A02/MF A01 CSCL 20E

An assembly of four cascaded reflected-wave masers embodied in a structure are schematically illustrated Each maser is connected to another maser by a dielectrically loaded four-port waveguide circulator The first and third ports are connected waveguides loaded with dielectric material, for example magnesium titanate having a dielectric constant equal to 13 in 1/4 inch wide waveguides for a signal at 0 GHz The second port is connected to a reflected-wave maser by a matching transformer comprised of two rectangular pieces of dielectric material with a sheet of conductive material, such as indium, pressed between them This transformer couples signal energy between the circulator and the maser, and blocks pumping energy from a source distributed to the masers by a chamber through filters each comprised of a waveguide filled with an alumina rod The fourth port of each circulator is connected to a waveguide filled with microwave energy absorbing material NASA



N78-25409*# National Aeronautics and Space Administration Pasadena Office Calif

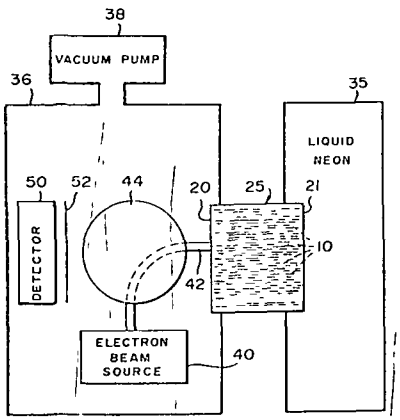
SOFT X-RAY LASER USING CRYSTAL CHANNELS AS DISTRIBUTED FEEDBACK CAVITIES Patent Application

Frank J Grunthaner inventor (to NASA) (JPL) Filed 29 Mar 1978 17 p Sponsored by NASA

(NASA-Case-NPO-13532-2 US-Patent-Appl-SN-891246) Avail NTIS HC A02/MF A01 CSCL 20E

Liquid neon in a container is forced through channels in a zeolite crystal to a low vacuum chamber An electron beam is directed into the channels to bombard the flowing neon atoms to produce the characteristic excitation of neon at which X-ray photons are emitted The channels have periodic changes in their cross sections leading to distributed feedback, so that from the channels in which the neon excitation takes place laser beams

are emitted Using an electron beam with a cross section on the order of 1 micron the combined laser beams emitted from the various channels form an X-ray beam of a cross section comparable to that of the electron beam NASA



N78-27402* National Aeronautics and Space Administration Pasadena Office Calif

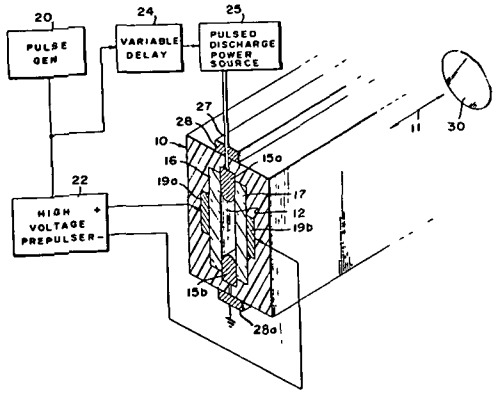
CHARGE TRANSFER REACTION LASER WITH PREIONIZATION MEANS Patent

James B Lauderslager (JPL) and Thomas J Pacala, inventors (to NASA) (JPL) Issued 9 May 1978 9 p Filed 12 Jul 1976 Supersedes N77-19418 (15 - 10 p 1314) Sponsored by NASA

(NASA-Case-NPO-13945-1 US-Patent-4 088 965 US-Patent-Appl-SN-704180 US-Patent-Class-331-94 5G US-Patent-Class-331-94 5PE, US-Patent-Class-331-94 5P) Avail US Patent Office CSCL 20E

A helium-nitrogen laser is described in which energy in the visible range is emitted as a result of charge transfer reaction between helium ions and nitrogen molecules The helium and nitrogen are present in a gas mixture at several atmospheres pressure with a nitrogen partial pressure on the order of a pair of main discharge electrodes the gas mixture is preionized to prevent arcing when the discharge pulse is applied The preionization is achieved by the application of a high voltage across a pair of secondary electrodes which are spaced apart in a direction perpendicular to the spacing direction of the main discharge electrodes and the longitudinal axis of the space in which the gas mixture is contained Feedback by means of a pair of appropriately spaced mirrors is provided to produce coherent energy pulses at a selected wavelength

Official Gazette of the U S Patent Office

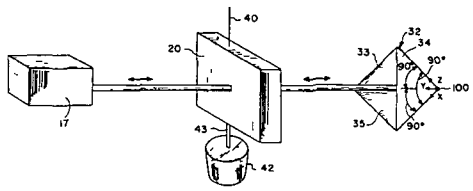


N78-29435*# National Aeronautics and Space Administration Langley Research Center Langley Station, Va

LASER DOPPLER VELOCITY SIMULATOR Patent Application

John M Franke inventor (to NASA) Filed 28 Jul 1978 17 p (NASA-Case-LAR-12176-1 US-Patent-Appl-SN-929083) Avail NTIS HC A02/MF A01 CSCL 20E

A laser Doppler velocity simulator for testing and calibration of reference beam laser velocimeters by simulating the movement of a target object is described A rotating glass block continuously changes the optical path length of the laser velocimeter reference beam thus inducing a Doppler frequency shift The magnitude of the frequency shift is a function of the known rate of change of the optical path length The Doppler frequency shift registered by the velocimeter was compared to the calculated true Doppler frequency shift for calibration NASA



37 MECHANICAL ENGINEERING

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

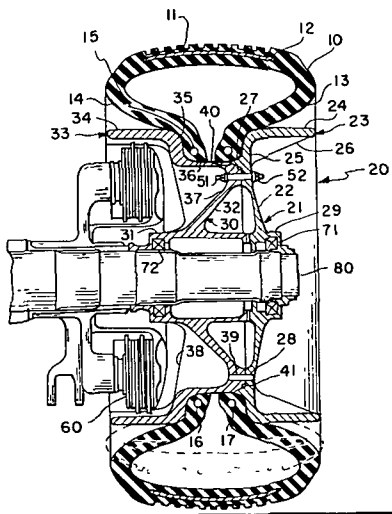
N78-22374*# National Aeronautics and Space Administration Langley Research Center, Langley Station, Va

IMPROVED TIRE/WHEEL CONCEPT Patent Application

Philip M Harper, Sr., inventor (to NASA) (Boeing Commercial Airplane Co, Seattle) Filed 6 Apr 1978 12 p Sponsored by NASA

(NASA-Case-LAR-11695-1, US-Patent-Appl-SN-893865) Avail NTIS HC A02/MF A01 CSCL 01C

A tire and wheel assembly is described in which a low profile pneumatic tire has sidewalls which deflect inwardly under load and a wheel has a rim featuring a narrow central channel and extended rim flanges from the combination The extended rim flanges support the tire sidewalls under static and dynamic loading conditions to produce a combination particularly suited to aircraft applications NASA



N78-22375*# National Aeronautics and Space Administration Pasadena Office, Calif

HIGH-TORQUE OPEN-END WRENCH Patent Application

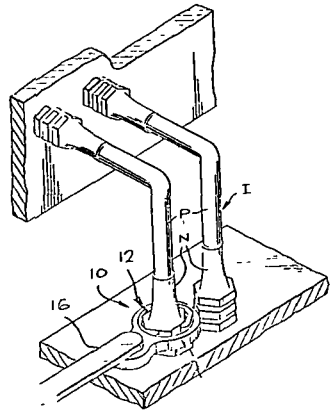
Anthony Giandomenico (JPL), James M Dame (JPL), and Harold Behimer, inventors (to NASA) (JPL) Filed 29 Aug 1977 10 p

(Contract NAS7-100)

(NASA-Case-NPO-13541-1, US-Patent-Appl-SN-828262) Avail NTIS. HC A02/MF A01 CSCL 13I

A wrench for tightening nuts in tight situations where pipes or the like passing through the nut prevent access by a typical socket wrench, and where the nuts are too close to one another or to other structures to permit the use of an open end wrench (which must be thick to apply high torque) is reported The primary novel feature is the use of two wrench elements with gaps with the first element engaging a nut and the second surrounding the first to apply torque to it, wherein the second element extends over the gap in the first to prevent expansion of the first element which could cause it to slip on the nut

NASA



N78-22376*# National Aeronautics and Space Administration Pasadena Office, Calif

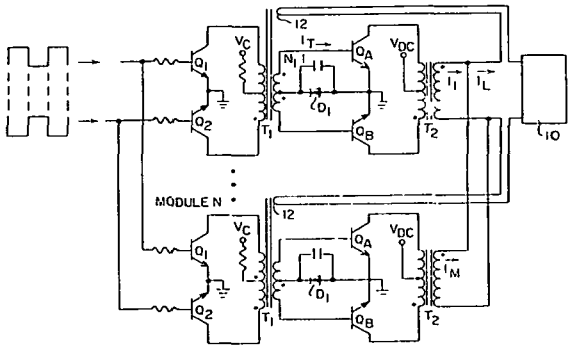
IMPROVED BASE DRIVE FOR PARALLELED INVERTER SYSTEMS Patent Application

Satoshi Nagano, inventor to (NASA) (JPL) Filed 16 Feb 1978 14 p

(Contract NAS7-100)

(NASA-Case-NPO-14163-1, US-Patent-Appl-SN-878541) Avail NTIS HC A02/MF A01 CSCL 13I

In a paralleled inverter system, a positive feedback current derived from the total current from all of the modules of the inverter system is applied to the base drive of each of the power transistors of all modules, thereby to provide all modules protection against open or short circuit faults occurring in any of the modules, and force more equal current sharing among the modules during turn-on of the power transistors NASA



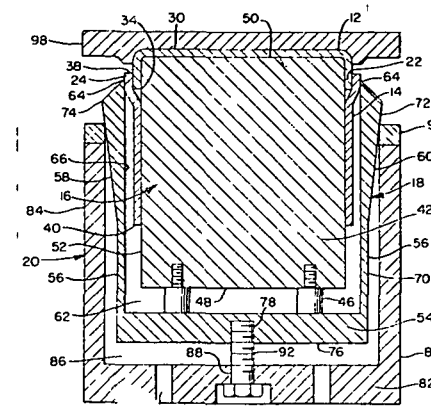
N78-23434*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

METHOD AND APPARATUS FOR HOLDING TWO SEPARATE METAL PIECES TOGETHER FOR WELDING Patent Application

Sidney R McClure inventor (to NASA) Filed 6 Apr 1978 18 p

(NASA-Case-GSC-12318-1 US-Patent-Appl-SN-894213) Avail NTIS HC A02/MF A01 CSCL 13I

An invention is presented which relates generally to a method and apparatus for holding two separate overlapping metal pieces together under constant and equal pressure so that no air pockets form between the overlapping portions which would prevent proper welding NASA



N78-24544* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex

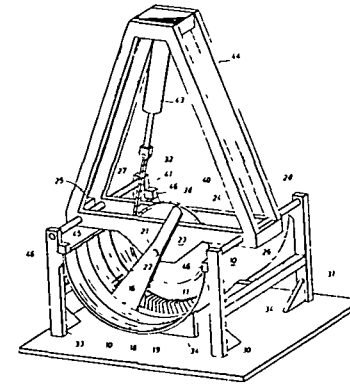
STATOR ROTOR TOOLS Patent

Donald D Diamond inventor (to NASA) (Serv-Air Inc Houston Tex) Issued 14 Mar 1978 6 p Filed 8 Nov 1976 Supersedes N77-13062 (15 - 04 p 0426) Sponsored by NASA

(NASA-Case-MSC-16000-1 US-Patent-4 078 290 US-Patent-Appl-SN-739915 US-Patent-Class-29-252 US-Patent-Class-29-244 US-Patent-Class-29-23 5, US-Patent-Class-29-156 8R) Avail US Patent Office CSCL 13I

An apparatus and method for removing and reinserting base member segments in an arcuate slot in an engine part are described Each base member separately includes blades or stators holding the engine part in place while manipulating fingers or an arm onto an interfitting abutting relationship with most of the blades A torque force is applied to the base of the blades to move a base member relative to such an arcuate slot

Official Gazette of the U S Patent Office



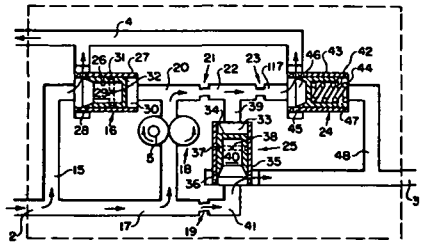
N78-24545* National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio

AUTOMOTIVE GAS TURBINE FUEL CONTROL Patent

Harold Gold, inventor (to NASA) Issued 14 Mar 1978 14 p Filed 8 Nov 1976 Supersedes N77-13426 (15 - 04, p 0477) (NASA-Case-LEW-12785-1 US-Patent-4,078 378, US-Patent-Appl-SN-739909 US-Patent-Class-60-39 28R) Avail US Patent Office CSCL 21A

A fuel control system is reported for automotive-type gas turbines and particulary advanced gas turbines utilizing variable geometry components to improve mileage and reduce pollution emission The fuel control system compensates for fuel density variations inlet temperature variations, turbine vane actuation acceleration and turbine braking These parameters are utilized to control various orifices spool valves and pistons

Official Gazette of the U S Patent Office



N78-24554*# National Aeronautics and Space Administration Pasadena Office Calif

PORTABLE HEATABLE CONTAINER Patent Application

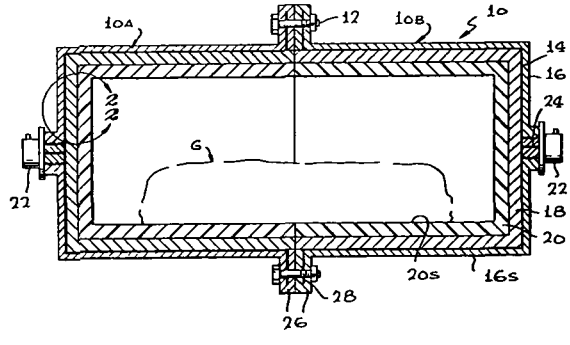
Lien C Yang inventor (to NASA) (JPL) Filed 19 Apr 1978 12 p

(Contract NAS7-100)

(NASA-Case-NPO-14237-1 US-Patent-Appl-SN-897831) Avail NTIS HC A02/MF A01 CSCL 13D

A container is described which can be designed to heat its outer surface as to sterilize it or to heat its inner surface and any contents within In a container that self sterilizes its outer surface the container includes a combustible layer of thermit type pyrotechnic material which can be ignited to generate considerable heat Thin casing around the combustible layer which is of highly thermally conductive materials such as aluminum can be heated to a high temperature by the ignited combustible layer A buffer layer which may be of metal lies within the combustible layer and a layer of insulation such as Teflon lies within the buffer layer to insulate the contents of the container from the heat The thicknesses of the thermit type charge of the combustible layer and of the casing are chosen so that the amount of heat from the charge heats the casing to a temperature which is only moderately high to avoid melting the casing

Official Gazette of the U S Patent Office



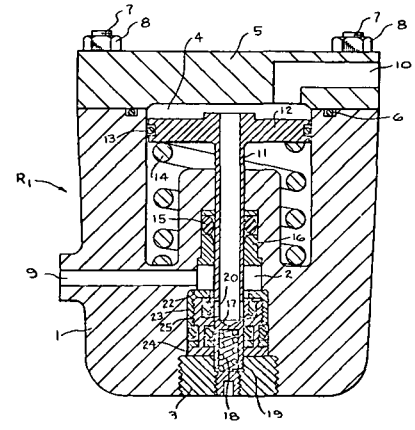
N78-25426* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex

FLUID VALVE ASSEMBLY Patent

William C Huber, inventor (to NASA) Issued 11 Apr 1978 6 p Filed 27 May 1976 Supersedes N76-26511 (14 - 17 p 2197)

(NASA-Case-MSC-12731-1 US-Patent-4 083,380 US-Patent-Appl-SN-690816 US-Patent-Class-137-505 25, US-Patent-Class-137-625 3 US-Patent-Class-137-625 38) Avail US Patent Office CSCL 13K

A valve assembly is reported for controlling the flow of fluids between the inlet and outlet of a fluid valve The valve assembly contains a barrier element which is porous for providing fluid communication between the valve inlet and outlet The valve assembly also includes a sealing element that is movable relative to the barrier element between a first position in which fluid flow through the porous portion of the barrier element is blocked preventing fluid communication between the valve inlet and outlet and a second position in which the porous portion is unblocked, permitting fluid communication between the valve inlet and outlet Official Gazette of the U S Patent Office



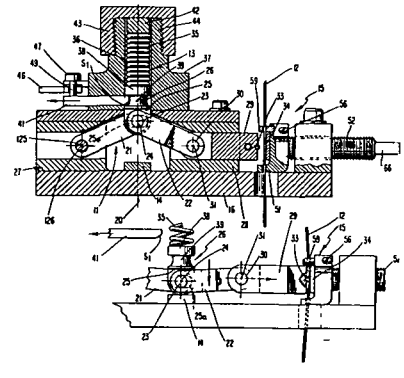
N78-25428*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt Md

TOGGLE MECHANISM FOR PINCHING METAL TUBES Patent Application

Edwin O Stengard, inventor (to NASA) Filed 19 May 1978 16 p

(NASA-Case-GSC-12274-1, US-Patent-Appl-SN-909100) Avail NTIS HC A02/MF A01 CSCL 13I

An apparatus is described that uses a toggle mechanism driven by a stored energy source, for pinching a metal tube and to maintain the tube in a pinched condition without fracturing it The device is applicable to the multiple gas sampling system for a spectrometer on a Venus probe NASA



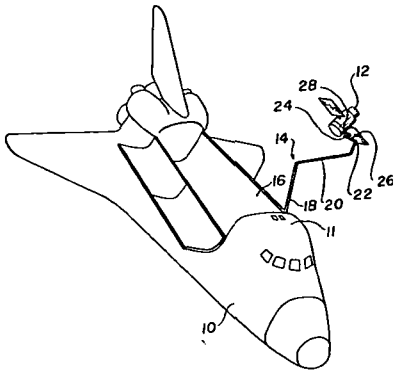
N78-25429*# National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt Md

COUPLING DEVICE FOR MOVING VEHICLES Patent Application

Arthur A Rudmann inventor (to NASA) Filed 19 May 1978 23 p

(NASA-Case-GSC-12322-1 US-Patent-Appl-SN-907436) Avail NTIS HC A02/MF A01 CSCL 13I

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



N78-25430*# National Aeronautics and Space Administration Pasadena Office Calif

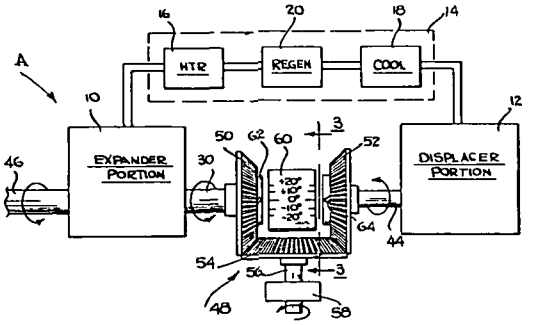
POWER CONTROL FOR HOT GAS ENGINES Patent Application

William F MacGlashan Jr inventor (to NASA) (JPL) Filed 19 May 1978 25 p

(Contract NAS7-100)

(NASA-Case-NPO-14220-1 US-Patent-Appl-SN-907421) Avail NTIS HC A02/MF A01 CSCL 10B

A hot gas engine is considered in which the expander piston of the engine is connected to an expander crankshaft and a displacer piston is connected to a separate displacer crankshaft Between the two crankshafts is a phase angle control mechanism containing a mating bevel gear that meshes with the first two bevel gears to provide power control NASA



N78-25431*# National Aeronautics and Space Administration Pasadena Office Calif

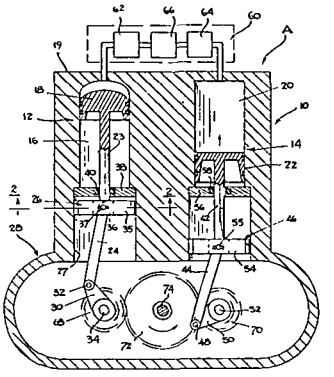
HOT GAS ENGINE WITH DUAL CRANKSHAFTS Patent Application

Allan R McDougal inventor (to NASA) (JPL) Filed 19 May 1978 29 p

(Contract NAS7-100)

(NASA-Case-NPO-14221-1 US-Patent-Appl-SN-907431) Avail NTIS HC A03/MF A01 CSCL 10B

A hot gas engine was designed in which the expander portion is connected to and operates upon an expander crankshaft and the displacer portion is connected to and operable by a separate displacer crankshaft and which crankshafts are synchronized for operation The engine design inherently produces a compact and rigid hot gas engine construction Modules of the basic engine component can be assembled in such a way that a very compact highpowered gas engine can be achieved The engine design also permits the crankcase to adopt more of a cylindrical shape capable of withstanding the high pressures encountered and thus the entire engine including the crankcase can be operated at the same pressure NASA



N78-25432*# National Aeronautics and Space Administration Pasadena Office Calif

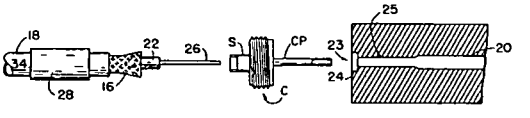
A TOOL FOR USE IN JOINING CONNECTORS TO SHIELDED CABLES Patent Application

Waldo E Brown, inventor (to NASA) (JPL) Filed 30 May 1978 9 p

(Contract NAS7-100)

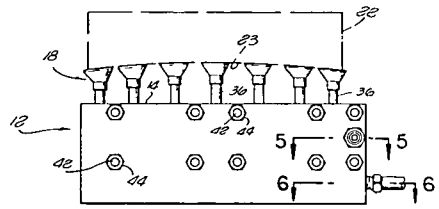
(NASA-Case-NPO-14296-1, US-Patent-Appl-SN-910709) Avail NTIS HC A02/MF A01 CSCL 13I

A tool was designed for use in joining connectors to shielded cables such as coaxial cables and the like characterized by a conductor coaxial to a metallic shield The tool comprises a rigid elongated body configured and dimensioned to be received and held in the palm of a users hand and includes at one end a truncated flaring cone for flaring the shield and a receiver at the other end for holding the central pin element of the connector prior to the usual crimping operation The tool is used to exert forces to join and seat the central pin element on the central wire and to engage the insulating material to the full extent of its intended engagement NASA



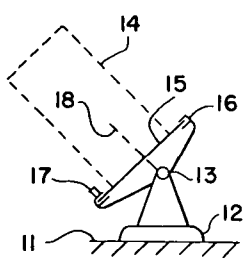
N78-27423* National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston Tex
VARIABLE CONTOUR SECURING SYSTEM Patent
Paul P Zebus (Rockwell International Downey Calif) Poley N Packer (Rockwell International, Downey Calif) and Cyrus C Haynie inventors (to NASA) (Rockwell International, Downey, Calif) Issued 9 May 1978 8 p Filed 27 Sep 1977 Supersedes N78-10434 (16-1, p 0064) Sponsored by NASA
(NASA-Case-MSC-16270-1 US-Patent-4,088,312
US-Patent-Appl-SN-837260 US-Patent-Class-269-21
US-Patent-Class-269-266) Avail US Patent Office CSCL 13I

A variable contour securing system has a retaining structure for a member whose surface contains a variable contour The retaining mechanism includes a spaced array of adjustable spindles mounted on a housing Each spindle has a base member support cup at one end A vacuum source is applied to the cups for seating the member adjacent to the cups A locking mechanism sets the spindles in a predetermined position once the member has been secured to the spindle support cups
Official Gazette of the U S Patent Office



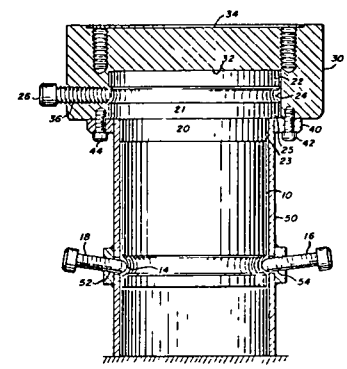
N78-27424* National Aeronautics and Space Administration Langley Research Center Langley Station Va
MAGNETIC SUSPENSION AND POINTING SYSTEM Patent
Willard W Anderson and Nelson J Groom, inventors (to NASA) Issued 9 May 1978 5 p Filed 17 Jun 1977 Supersedes N78-10433 (16 - 1, p 0064) Division of US Patent Appl SN-662182 filed 27 Feb 1976
(NASA-Case-LAR-11889-2 US-Patent-4 088 018
US-Patent-Appl-SN-807703 US-Patent-Class-73-178R, US-Patent-Class-308-10, US-Patent-Appl-SN-662182) Avail US Patent Office CSCL 13I

An apparatus is reported for accurate pointing of instruments on a carrier vehicle and for isolation of the instruments from the vehicle s motion disturbances The apparatus includes two assemblies with connecting interfaces The first assembly is attached to the carrier vehicle and consists of an azimuth gimbal and an elevation gimbal which provide coarse pointing 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 plase which provides appropriate magnetic circuits for the actuators and the roll motor segments The vernier pointing assembly provides attitude fine pointing and roll positioning of the instruments as well as six degree-of-freedom isolation from carrier motion disturbances
Official Gazette of the U S Patent Office



N78-27425* National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
ROTARY LEVELING BASE PLATFORM Patent
Robert W Delaplaine and Daniel L Mossolani inventors (to NASA) Issued 9 May 1978 5 p Filed 2 Nov 1976 Supersedes N77-10498 (15 - 01, p 0069)
(NASA-Case-ARC-10981-1 US-Patent-4 088,291,
US-Patent-Appl-SN-738218 US-Patent-Class-248-186
US-Patent-Class-248-178) Avail US Patent Office CSCL 13I

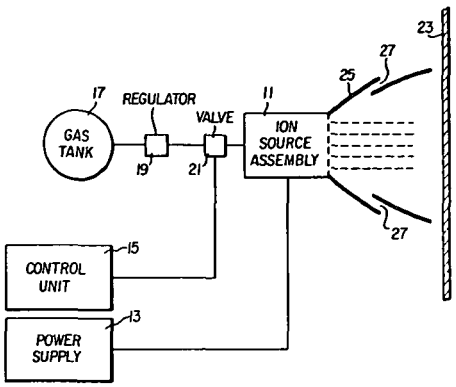
A leveling apparatus for the precise adjustment of a scientific instrument is reported A base member is provided having a hollow cylindrical shape A table for supporting the instrument rests on the base and has a shaft portion extending below the table The upper portion of the shaft fits tightly into the hollow portion of the base member whereas the lower portion of the shaft is machined to fit loosely The lower portion of the shaft is provided with a groove Adjusting screws are threaded through the hollow cylindrical portion and are adapted to enter the groove By adjusting the screws the lower portion of the shaft is moved in a vertical plane since the shaft is loosely fitted into the cylinder The upper portion of the shaft which is tightly fitted into the upper end of the cylinder causes the cylinder to deform slightly providing a fulcrum point which allows the table to be leveled in response to the adjustment of the adjusting screws Official Gazette of the U S Patent Office



N78-28459*# National Aeronautics and Space Administration Lewis Research Center Cleveland, Ohio
METHOD OF COLD WELDING USING ION BEAM TECHNOLOGY Patent Application
Bernard L Sater inventor (to NASA) Filed 28 Jul 1978 10 p
(NASA-Case-LEW-12982-1 US-Patent-Appl-SN-929084) Avail NTIS HC A02/MF A01 CSCL 13H

A method is described for cold welding metals in a vacuum using ion beams to prepare the surfaces of metals to be joined The figure is a schematic diagram of an ion beam apparatus for carrying out the method An expellant gas is stored in a high pressure tank and delivered to the ion source assembly The ion source produces a unidirectional beam of gas molecules with uniform energies which, in a vacuum environment is directed onto each surface to be cleaned and effectively sputters away the contamination oxide layer to expose clean underlying metal When the surfaces to be jointed are sufficiently clean, they are pressed together with pressure adequate to assure that their asperities are brought into intimate contact throughout the area

to be joined This process provides a solid state cold weld with metal-to-metal bonding without causing gross deformation due to plastic flow and thinning of the material at the joint NASA

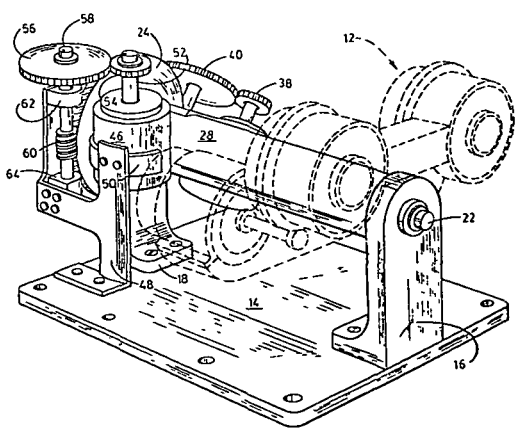


N78-28460*# National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala

REDUNDANT MOTOR DRIVE SYSTEM Patent Application

John A Calvert, inventor (to NASA) Filed 4 Aug 1978 15 p (NASA-Case-MFS-23777-1, US-Patent-Appl-SN-931217) Avail NTIS HC A02/MF A01 CSCL 13I

Two separate gear trains each including a motor adapted to perform a driving function without backdriving the other are included in a redundant motor drive system A base supports parallel pillars which in turn supports a shaft having a worm gear affixed A bearing housing of sleeve-like configuration is concentrically related to the shaft and is supported by the shaft for free rotation A first and second normally quiescent drive train alternatively activatable is provided for imparting rotation to the bearing housing Each of the gear trains includes a selectively energizable motor for driving a worm meshed ith worm gear The motor of the first gear train is mounted on bearing housing while the motor of the second gear train is mounted on the base Each gear train is adapted to restrain the worm gear against rotation as the worm of the other gear train advances with respect to the worm gear in order to rotate the bearing housing NASA

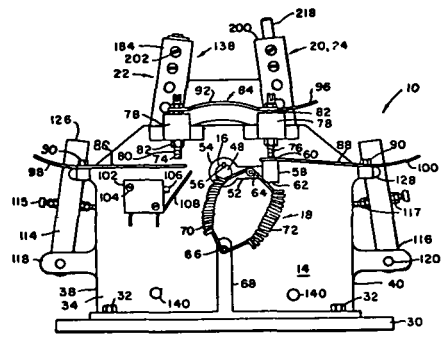


N78-31426* National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt, Md

ACTUATOR MECHANISM Patent

William C Stange inventor (to NASA) Issued 6 Jun 1978 10 p Filed 6 Dec 1976 Supersedes N77-15400 (15 - 06 p 0757) Continuation-in-part of US Patent Appl SN-596787, filed 17 Jul 1975 US-Patent-4 010,455
(NASA-Case-GSC-11883-2 US-Patent-4 092 874, US-Patent-Appl-SN-747675 US-Patent-Class-74-100R US-Patent-Class-60-527 US-Patent-4,010 455 US-Patent-Appl-SN-596787) Avail US Patent Office CSCL 13I

An actuator mechanism is described having a frame with a rotatable shaft supported in the frame, a positioning mechanism coupled to the shaft for rotating the shaft in two rotary positions, disposed approximately 180 degrees apart, and a pair of plungers coupled to the shaft Each plunger is responsive to a control signal for applying bi-directional rotation to the shaft
Official Gazette of the U S Patent Office

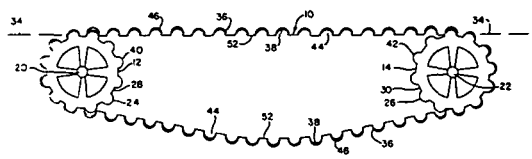


N78-32429*# National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt Md

BELT FOR COUPLING DRIVEN MEMBERS Patent Application

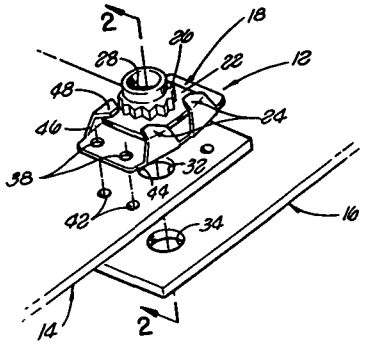
Hossein Bahiman inventor (to NASA) Filed 22 Aug 1978 10 p
(NASA-Case-GSC-12276-1 US-Patent-Appl-SN 935811) Avail NTIS HC A02/MF A01 CSCL 13I

An invention is offered which relates to drive belts for coupling driving and driven members where the belts cannot be easily replaced Such belts should be sufficiently flexible to conform to the curvature of the driving and driven members, sufficiently immune to stretching to thereby prevent slippage and sufficiently immune to degradation when subjected to harsh environmental conditions to insure long life of the belt This invention has potential application in all types of spacecraft using belt drive systems and in environments such as mining and other hazardous situations where belt replacement would be difficult if not impossible NASA



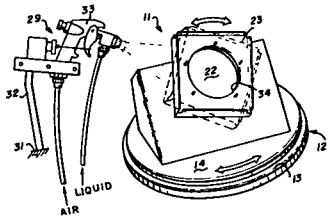
N78-32431*# National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston Tex
A FLOATING NUT RETENTION SYSTEM Patent Application
James F Charles (Rockwell International) and Harry Theakston, inventors (to NASA) (Rockwell International) Filed 31 Aug 1978 12 p
(Contract NAS9-14000)
(NASA-Case-MSC-16938-1 US-Patent-Appl-SN 938582) Avail NTIS HC A02/MF A01 CSCL 20I

The nut was secured to an innerretainer plate with the nut aperture being aligned with the inner retainer plate opening An outer retainer base plate with an opening was placed adjacent to the surface of the inner retainer in such a way that it floats and forms a bearing surface for the inner retainer plate The radial flow prevents misalignment in high torque applications
NASA



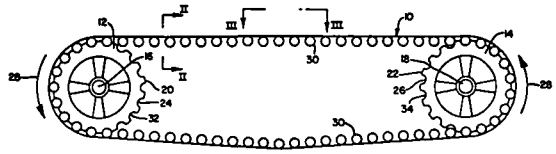
N78-32434*# National Aeronautics and Space Administration Ames Research Center Moffett Field Calif
SPRAY COATING APPARATUS HAVING A ROTATABLE WORKPIECE HOLDER Patent Application
Marnell Smith, Victor W Katvala, and Ernest E Porter inventors (to NASA) Filed 22 Sep 1978 12 p
(NASA-Case-ARC-11110-1 US-Patent-Appl-SN-945040) Avail NTIS HC A02/MF A01 CSCL 13H

A spray coating apparatus is described for rotating a workpiece relative to a spray station to obtain a uniform coating of the workpiece The apparatus for rotating the workpiece includes a base support with a rotatable stage for rotation in the horizontal plane and a rotatable stage for rotation in a second plane inclined at an angle to the horizontal plane The workpiece is rotatable in both of two planes of rotation The workpiece support is detachable from the first rotatable stage and the workpiece is readily detachable from the workpiece support to facilitate off loading of the spray coated workpiece The workpiece holder includes a spray guard extending around the periphery of the workpiece to shield that surface of the workpiece where no coating is desired The two degrees of freedom provided in the rotation of the workpiece relative to the spray station permits the various facets of the ceramic tile to be sequentially rotated into an orthogonal relationship to the spray station for uniform coating
NASA



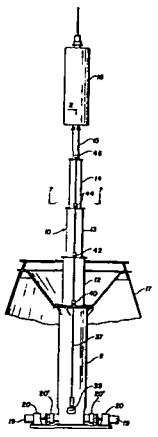
N78-32435*# National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt Md
BELT FOR TRANSMITTING POWER FROM A DRIVING MEMBER TO A DRIVEN MEMBER Patent Application
Hossein Bahiman inventor (to NASA) Filed 18 Sep 1978 10 p
(NASA Case-GSC-12289-1 US-Patent-Appl SN-943086) Avail NTIS HC A02/MF A01 CSCL 13I

A belt for transmitting power from one wheel sprocket to another is described for use in spacecraft permanently encased equipment equipment used in tunnel and mine shafts and sealed machines The belt has flexible teeth spaced along the direction of its travel Each of the teeth has a longitudinal axis transverse to the direction of belt travel The belt also includes inextensible fasts spaced transversely to the direction of the belt travel The fasts extend in the direction of belt travel adjacent to the teeth and are looped around preselected numbers of the teeth NASA



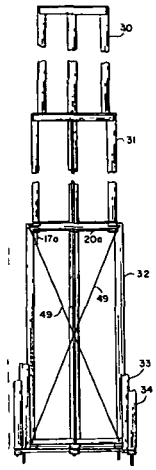
N78-32436*# National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt Md
ANTENNA DEPLOYMENT MECHANISM Patent Application
William A Leavy and Charles Russell Griffin inventors (to NASA) Filed 18 Sep 1978 19 p
(NASA-Case-GSC-12331-1 US-Patent-Appl-SN-943088) Avail NTIS HC A02/MF A01 CSCL 13I

A mechanism is described for the powered deployment of an antenna mast on a spacecraft or the like and for caging or latching the mast in a retracted position A redundant drive rotates a drum to reel in a cable for deploying a multi-section telescoping antenna mast The drum is releasably coupled through a fork device for the ratchet serving to lock the antenna mast in a deployed position A spring biased latching or caging mechanism for the interior mast section includes cam operated latch bolts and cooperating interfitting latch elements mounted for relative movement in the base of mast section A rigid terminal tube for the cable drives the mast section toward its deployed position through engagement with tunnel slots in the latch components The caging means releases and engages automatical lv by cam action
NASA



N78-33446*# National Aeronautics and Space Administration Langley Research Center Hampton, Va
TELESCOPING COLUMNS Patent Application
John T Mazur, inventor (to NASA) (Harris Corp , Melbourne, Fla) Filed 29 Sep 1978 16 p Sponsored by NASA (Contract NAS1-13943)
(NASA-Case-LAR-12195-1, US-Patent-Appl-SN-946991) Avail NTIS HC A02/MF A01 CSCL 13I

A power operated telescoping column is described for the deployment and retraction of a large parabolic antenna for space applications The column consists of several axially elongated rigid structural sections nested within one another The outermost and each intermediate section includes several rotatable screws extended longitudinally Sprockets, rigidly attached to the screws and interconnected by a chain, provide simultaneous rotation of the screws of a single section Threaded legs are attached at the base end of the section and are oriented to engage the screws of the next outer section The column is extended and retracted by selectively rotating the screws of the sections with a motor and engagement mechanism As the screws of one section are rotated, the next inner section is extended or retracted NASA

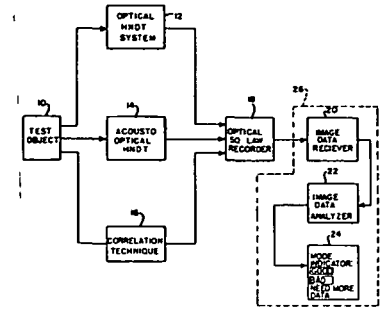


38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques and quality control

N78-32447* National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala
HYBRID HOLOGRAPHIC NON DESTRUCTIVE TEST SYSTEM Patent
Robert L Kurtz, inventor (to NASA) Issued 6 Jun 1978 9 p Filed 14 May 1976 Supersedes N76-24529 (14 15 p 1929)
(NASA-Case-MFS-23114-1 US-Patent-4 093 382
US-Patent-Appl-SN-686331, US-Patent-Class-356-72
US-Patent-Class-73-603 US-Patent-Class-350-3 5
US-Patent-Class-356-73) Avail US Patent Office CSCL 14D

An automatic hybrid holographic non-destructive testing (HNDT) method and system capable of detecting flaws or debonds contained within certain materials are described This system incorporates the techniques of optical holography acoustical/optical holography and holographic correlation in determining the structural integrity of a test object An automatic processing system including a detector and automatic data processor is used in conjunction with the three holographic techniques for correlating and interpreting the information supplied by the non-destructive systems The automatic system also includes a sensor which directly translates an optical data format produced by the holographic techniques into electrical signals and then transmits this information to a digital computer for indicating the structural properties of the test object The computer interprets the data gathered and determines whether further testing is necessary as well as the format of this new testing procedure *Official Gazette of the U S Patent Office*



43 EARTH RESOURCES

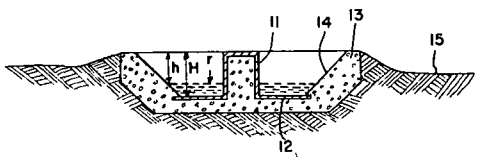
Includes remote sensing of earth resources by aircraft and spacecraft photogrammetry and aerial photography
For instrumentation see *35 Instrumentation and Photography*

N78-22436*# National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt Md
DISTRIBUTED-SWITCH DICKE RADIOMETER Patent Application
Curt A Levis, inventor (to NASA) (Ohio State Univ Columbus) Filed 29 Mar 1978 19 p Sponsored by NASA
(NASA-Case-GSC-12219-1 US-Patent-Appl-SN-891356) Avail NTIS HC A02/MF A01 CSCL 14B

A radiometer was designed with an array of transducers which simultaneously feed a number of processing channels that are periodically connected to be responsive to noise sources at a predetermined noise temperature The noise sources are utilized to control the gain of the processing channels to enable each processing channel to derive an output that is an accurate replica of the amplitude and phase of the radiometric signal supplied to it The array of antenna elements or subapertures transduces electromagnetic energy from a terrestrial or atmospheric region being monitored into electric signals Output signals from each channel, indicative of radiation from the region being monitored, are combined in a beam former that derives one or more signals that are replicas of the radiant energy from subregions of the total region being monitored The signals derived from the beam former are amplitude detected to derive the required information NASA

N78-33511*# National Aeronautics and Space Administration Langley Research Center Hampton, Va
RADAR TARGET REMOTELY SENSING HYDROLOGICAL PHENOMENA ***Patent Application***
Wilford E Sivertson Jr inventor (to NASA) Filed 22 Sep 1978 18 p
(NASA-Case-LAR-12344-1 US-Patent-Appl-SN-945041) Avail NTIS HC A02/MF A01 CSCL 08H

Apparatus for remotely measuring and accessing water status at selected locations on the surface of the earth is disclosed A radar target whose radar cross-section varies as a function of the height of the water level within the target is described The target consists essentially of a right circular cylinder with its central axis perpendicular to the ground level, a flat circular plate symmetrically attached to the lower end of the cylinder and parallel to the ground level surface, and a catch basin including said circular cylinder and said circular plate for catching and retaining water The circular cylinder and the flat circular plate are made from a material (electrical conductor) that reflects radar signals such as aluminum, copper and stainless steel The brightness of the image taken by a radar from a satellite or an airplane decreases as the level of the water increases The level of water in a radar target is indicative of the water status at the location of that particular radar target NASA



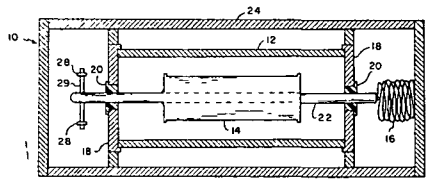
44 ENERGY PRODUCTION AND CONVERSION

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*

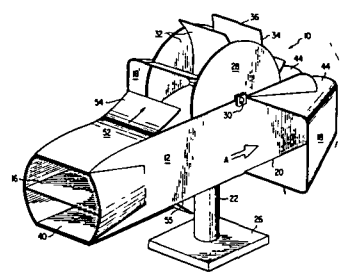
N78-22468*# National Aeronautics and Space Administration Langley Research Center, Langley Station, Va
KINE-PAK A SELF-CONTAINED, ELECTRICAL POWER GENERATOR SYSTEM ***Patent Application***
David C Grana and Richard T Wilem, inventors (to NASA) Filed 3 Mar 1978 9 p
(NASA-Case-LAR-11551-1, US-Patent-Appl-SN-883090) Avail NTIS HC A02/MF A01 CSCL 10A

A self contained electrical generator which is powered by random environmental movement such as wave action is described The self contained generator is used in a buoy, or other devices, to generate electrical power to operate test equipment or weather observation equipment and eliminate or reduce the replacement rate of batteries The generator is comprised of a rotor, a stator a helical spring, and a housing The rotor is rotated relative to the stator and electrical current is generated as the armature winding cuts the lines of magnetic force The current is supplied to batteries or instruments NASA



N78-22469*# National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala
WIND WHEEL ELECTRIC POWER GENERATOR ***Patent Application***
John W Kaufman, inventor (to NASA) Filed 24 Feb 1978 16 p
(NASA-Case-MFS-23515-1 US-Patent-Appl-SN-880726) Avail NTIS HC A02/MF A01 CSCL 10A

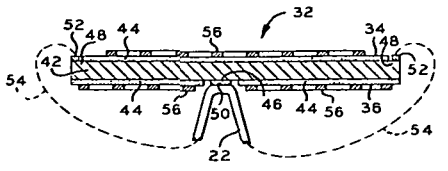
An electric generator driven by the wind is described Primary and auxiliary funnel-type, venturi ducts are mounted upon a housing for capturing wind currents and conducting the currents to a bladed wheel connected to generator apparatus Additional air flows are also conducted onto the bladed wheel, rotating the wheel The auxiliary ducts are disposed at an acute angle with respect to the longitudinal axis of the housing, and together with the rotatability of the housing and the ducts, permits capture of wind currents within a variable directional range NASA



N78-22470*# National Aeronautics and Space Administration Pasadena Office Calif
DOUBLE-SIDED SOLAR CELL PACKAGE ***Patent Application***
Benjamin Shelpuk, inventor (to NASA) (JPL) Filed 29 Mar 1978 17 p
(Contract NAS7-100)
(NASA-Case-NPO-14199-1, NASA-Case-NPO-14200-1, US-Patent-Appl-SN-891243) Avail NTIS HC A02/MF A01 CSCL 10A

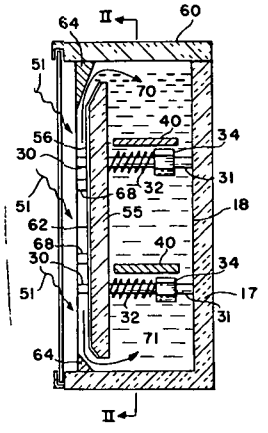
A solar cell array for terrestrial use is described The solar cell package consists of a double sided photovoltaic cell having a metallized P contact and N contact provided on opposite faces of the cell, a transparent tubular body forming a transparent enclosure for the cell a supporting pedestal formed of conductive metallic material electrically connected with the cell, and a reflector having a surface disposed in substantially opposed relation with

one face of the cell for redirecting light to impinge thereon whereby the cell is subjected to incident radiation at each of the opposite faces thereof By employing the double sided solar cell supported by a pedestal forming a path for heat and electrical currents the overall efficiency of the array was enhanced NASA



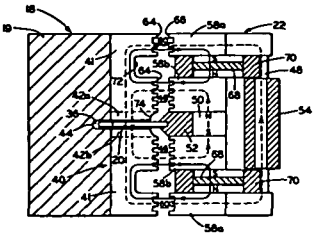
N78-23567*# National Aeronautics and Space Administration Langley Research Center Langley Station Va
COMBINED SOLAR COLLECTOR AND ENERGY STORAGE SYSTEM Patent Application
Ronald N Jensen inventor (to NASA) Filed 28 Apr 1978 12 p
(NASA-Case-LAR-12205-1 US-Patent-Appl-SN-900843) Avail NTIS HC A02/MF A01 CSCL 10A

A solar heating system comprised of a combined solar energy collector fluid chiller and energy storage system was developed A movable interior insulated panel in a storage tank is positionable flush against the storage tank wall to insulate the tank for energy storage The movable interior insulated panel is alternately positionable to form a solar collector or fluid chiller through which the fluid flows by natural circulation NASA



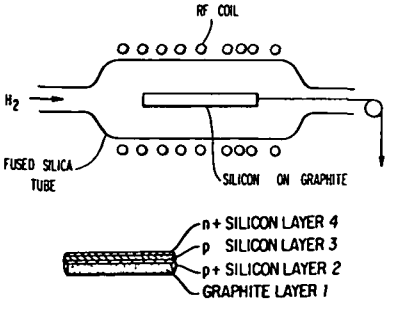
N78-24608* National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt Md
ENERGY STORAGE APPARATUS Patent
Philip A Studer and Harold E Evans inventors (to NASA) Issued 7 Mar 1978 9 p Filed 30 Jul 1976 Supersedes N76-30652 (14 - 21, p 2749)
(NASA-Case-GSC-12030-1 US-Patent-4,077 678
US-Patent-Appl-SN-710035, US-Patent-Class-308-10,
US-Patent-Class-310-153 US-Patent-Class-310-269,
US-Patent-Class-310-154 US-Patent-Class-310-178) Avail US Patent Office CSCL 10B

A high efficiency flywheel type energy storage device which comprises an electronically commutated d c motor/generator unit having a massive flywheel rotor magnetically suspended around a ring shaped stator is presented During periods of low energy demand, the storage devices were operated as a motor and the flywheel motor was brought up to operating speed Energy was drawn from the device functioning as a generator as the flywheel rotor rotated during high energy demand periods
Official Gazette of the U S Patent Office



N78-24609* National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt Md
PROCESS FOR UTILIZING LOW-COST GRAPHITE SUBSTRATES FOR POLYCRYSTALLINE SOLAR CELLS Patent
Ting L Chu inventor (to NASA) (Southern Methodist Univ) Issued 7 Mar 1978 16 p Filed 4 Jun 1976 Supersedes N76-26695 (14 - 17, p 2218) Continuation-in-part of US Patent Appl SN-576488 filed 12 May 1975 US Patent-3,961,997 Sponsored by NASA
(NASA-Case-GSC-12022-2 US-Patent-4,0778 818
US-Patent-Appl-SN-693074 US-Patent-Class-148-174
US-Patent-Class-29-572, US-Patent-Class-136-89SG,
US-Patent-Class-357-30 US-Patent-Class-357-59
US-Patent-Class-427-86 US-Patent-Class-427-113
US-Patent-Class-427-248J, US-Patent-Class-427-249
US-Patent-3,961,997 US-Patent-Appl-SN-576488) Avail US Patent Office CSCL 10A

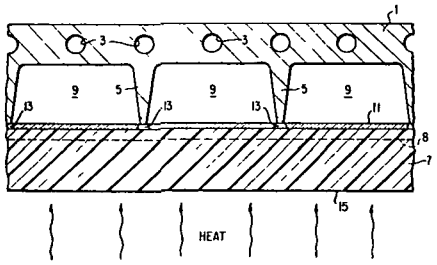
Low cost polycrystalline silicon solar cells supported on substrates were prepared by depositing successive layers of polycrystalline silicon containing appropriate dopants over supporting substrates of a member selected from the group consisting of metallurgical grade polycrystalline silicon, graphite and steel coated with a diffusion barrier of silica borosilicate phosphosilicate, or mixtures thereof such that p-n junction devices were formed which effectively convert solar energy to electrical energy To improve the conversion efficiency of the polycrystalline silicon solar cells the crystallite size in the silicon was substantially increased by melting and solidifying a base layer of polycrystalline silicon before depositing the layers which form the p-n junction
Official Gazette of the U S Patent Office



N78-25527* National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio
SOLAR CELL COLLECTOR Patent
John C Evans Jr inventor (to NASA) Issued 4 Apr 1978 5 p Filed 22 Feb 1977 Supersedes N77-17564 (15 - 08, p 1052)
(NASA-Case-LEW-12552-1 US-Patent-4 082 569 US-Patent-Appl-SN-770869, US-Patent-Class-136-89CC, US-Patent-Class-357-30 US-Patent-Class-357-65 US-Patent-Class-357-67 US-Patent-Class-29-572, US-Patent-Class-427-75 US-Patent-Class-427-261) Avail US Patent Office CSCL 10A

A method is provided for the fabrication of a photovoltaic device which possesses an efficient collector system for the conduction of the current generated by incident photons to the external circuitry of the device

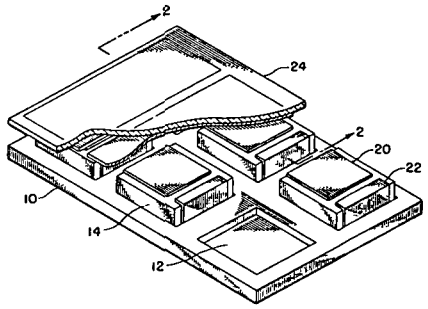
Official Gazette of the U S Patent Office



N78-25528* National Aeronautics and Space Administration Lewis Research Center Cleveland, Ohio
METHOD OF MAKING ENCAPSULATED SOLAR CELL MODULES Patent
Evelyn Anagnostou and Americo F Forestieri inventors (to NASA) Issued 11 Apr 1978 4 p Filed 30 Nov 1976 Supersedes N77-15490 (15 - 06, p 0769)
(NASA-Case-LEW-12185-1 US-Patent-4,083,097 US-Patent-Appl-SN-746269 US-Patent-Class-29-572 US-Patent-Class-29-628 US-Patent-Class-136-89P US-Patent-Class-136-89H) Avail US Patent Office CSCL 10A

Electrical connections to solar cells in a module are made at the same time the cells are encapsulated for protection The encapsulating material is embossed to facilitate the positioning of the cells during assembly

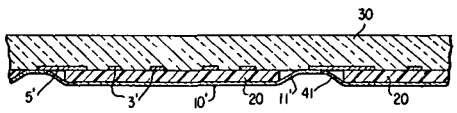
Official Gazette of the U S Patent Office



N78-25529* National Aeronautics and Space Administration Lewis Research Center, Cleveland Ohio
METHOD FOR PRODUCING SOLAR ENERGY PANELS BY AUTOMATION Patent
John C Evans Jr inventor (to NASA) Issued 18 Apr 1978 11 p Filed 25 Apr 1977 Supersedes N77-22615 (15 - 13, p 1744)
(NASA-Case-LEW-12541-1, US-Patent-4 084,985 US-Patent-Appl-SN-790637, US-Patent-Class-136-89P US-Patent-Class-29-572 US-Patent-Class-136-89H, US-Patent-Class-136-89CC US-Patent-Class-156-633) Avail US Patent Office CSCL 10A

A solar cell panel was fabricated by photoetching a pattern of collector grid systems with appropriate interconnections and bus bar tabs into a glass or plastic sheet These regions were then filled with a first, thin conductive metal film followed by a layer of a mixed metal oxide, such as InAsO or InSnO The multiplicity of solar cells were bonded between the protective sheet at the sites of the collector grid systems and a back electrode substrate by conductive metal filled epoxy to complete the fabrication of an integrated solar panel

Official Gazette of the U S Patent Office



N78-25530* National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio
INORGANIC-ORGANIC SEPARATORS FOR ALKALINE BATTERIES Patent
Dean W Sheibley inventor (to NASA) Issued 18 Apr 1978 4 p Filed 7 Sep 1976 Supersedes N76-31674 (14 - 22, p 2890)
(NASA-Case-LEW-12649-1 US-Patent-4 085 241 US-Patent-Appl-SN-720521 US-Patent-Class-427-385B, US-Patent-Class-427-385C, US-Patent-Class-429-254) Avail US Patent Office CSCL 10C

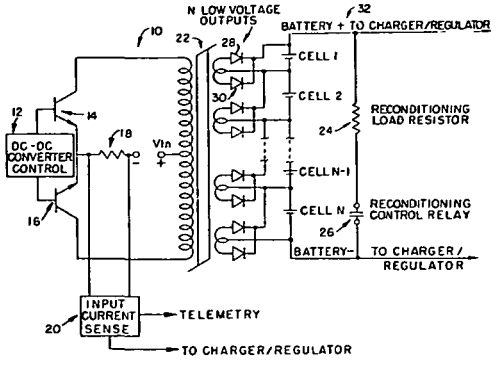
A flexible separator is reported for use between the electrodes of Ni-Cd and Ni-Zn batteries using alkaline electrolytes The separator was made by coating a porous substrate with a battery separator composition The coating material included a rubber-based resin copolymer a plasticizer and inorganic and organic fillers which comprised 55% by volume or less of the coating as finally dried One or more of the filler materials whether organic or inorganic is preferably active with the alkaline electrolyte to produce pores in the separator coating The plasticizer was an organic material which is hydrolyzed by the alkaline electrolyte to improve conductivity of the separator coating

Official Gazette of the U S Patent Office

N78-25531* National Aeronautics and Space Administration Marshall Space Flight Center, Huntsville Ala
METHOD AND APPARATUS FOR CONDITIONING OF NICKEL-CADMIUM BATTERIES Patent
Robert E Kapustka inventor (to NASA) Issued 11 Apr 1978 5 p Filed 24 Nov 1976 Supersedes N77-12511 (15 - 03 p 0353)
(NASA-Case-MFS-23270-1 US-Patent-4 084 124 US-Patent-Appl-SN-744573 US-Patent-Class-320-9, US-Patent-Class-320-13, US-Patent-Class-320-15 US-Patent-Class-320-32 US-Patent-Class-320-39) Avail US Patent Office CSCL 10C

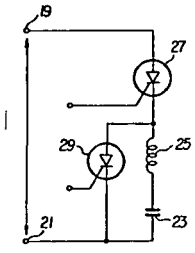
A method and apparatus are described for reconditioning batteries utilizing a dc-dc converter During a discharge of the

batteries, each cell is monitored by the converter When the voltage of a cell decreases to a predetermined level a converter will assume the load of this cell and inhibit the voltage from reaching zero thereby preventing voltage reversal of that cell
Official Gazette of the U S Patent Office



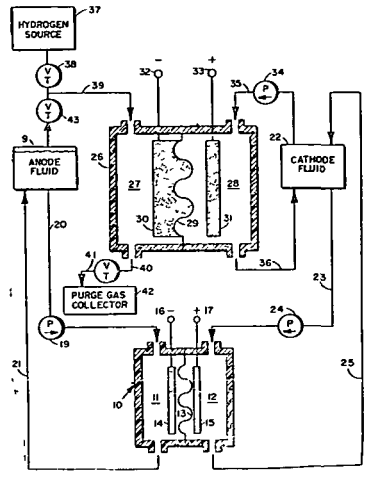
N78-25553*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio
SOLAR CELL SYSTEM HAVING ALTERNATING CURRENT OUTPUT Patent Application
J C Evans Jr inventor (to NASA) Filed 9 Jun 1978 11 p (NASA-Case-LEW-12806-1 US-Patent-Appl-SN-915050) Avail NTIS HC A02/MF A01 CSCL 10A

A P-N junction solar cell modified by fabricating an integrated circuit inverter on the back of the cell to produce a device capable of generating an alternating current output was developed In another embodiment, integrated circuit power conditioning electronics is incorporated in a module containing a solar cell power supply NASA



N78-25554*# National Aeronautics and Space Administration Lewis Research Center Cleveland, Ohio
ELECTROCHEMICAL CELL FOR REBALANCING REDOX FLOW SYSTEM Patent Application
Lawrence H Thaller inventor (to NASA) Filed 9 Jun 1978 12 p
(NASA-Case-LEW-13150-1 US-Patent-Appl-SN-914260) Avail NTIS HC A02/MF A01 CSCL 10A

Electricity producing cells which utilize reduction and oxidation of anode and cathode fluids are called REDOX cells The fluids were aqueous solutions of HCl each including a different metal chloride salt and were separated by a membrane which was permeable to certain ions A provision of a rebalancing cell is provided which utilized gas from undesirable side reactions and/or from an independent source to rebalance the anode and cathode fluids in a REDOX system NASA



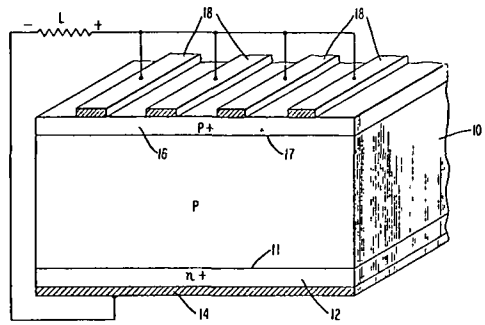
N78-25555*# National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio
CESIUM THERMIONIC CONVERTERS HAVING IMPROVED ELECTRODES Patent Application
James F Morris inventor (to NASA) Filed 1 May 1978 9 p (NASA-Case-LEW-12038-3 US-Patent-Appl-SN-901892) Avail NTIS HC A02/MF A01 CSCL 10A

A high electric-power output thermionic converter is reported that uses a combination of lanthanum hexaboride emitter and collector electrodes in a cesium medium The interaction between the lanthanum hexaboride electrodes and cesium vapor which is adsorbed on the lanthanum hexaboride electrodes results in lower emitter and collector work functions to produce a thermionic converter with high current density and voltage output The *lanthanum hexaboride emitter and collector electrodes employed* in the cesium thermionic converter can be either in the monocrystalline or polycrystalline state NASA

N78-25556*# National Aeronautics and Space Administration Lewis Research Center Cleveland, Ohio
IMPROVED BACK WALL CELL Patent Application
Henry W Brandhorst, Jr inventor (to NASA) Filed 24 Apr 1978 13 p
(NASA-Case-LEW-12236-2, US-Patent-Appl-SN-899123) Avail NTIS HC A02/MF A01 CSCL 10A

Back-wall solar wells are described that consist of a first material of one conductivity type with one face more heavily doped to form a field region to receive radiant energy A layer of opposite conductivity or a metallic layer forming a Schottky barrier was applied to the opposite face A gridded contact previous to the radiant energy was applied to the region of the heavily doped material for electrical contact Separate control of

either the p-n junction or the Schottky diode junction provided for efficient collection of light NASA



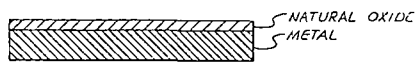
N78-25557*# National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala

STAINLESS STEEL PANEL FOR SELECTIVE ABSORPTION OF SOLAR ENERGY AND THE METHOD OF PRODUCING SAID PANEL Patent Application

Marion L Roberts Max H Sharpe and Albert C Krupnick inventors (to NASA) Filed 30 May 1978 23 p

(NASA-Case-MFS-23518-3 US-Patent-Appl-SN-910793) Avail NTIS HC A02/MF A01 CSCL 10A

A composite panel is reported that contains a coated metal substrate which absorbs solar energy selectively The panel consisted either of an aluminum substrate with zinc and nickel layers and an outer coating of nickel oxide or a copper substrate with nickel and nickel oxide layers NASA



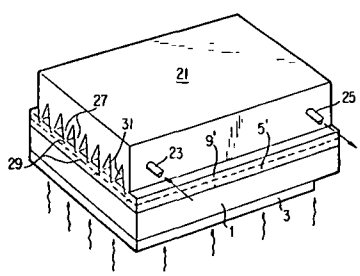
N78-25558*# National Aeronautics and Space Administration *Lewis Research Center Cleveland, Ohio*

METHOD FOR FABRICATING SOLAR CELLS HAVING INTEGRAL COLLECTOR GRIDS Patent Application

John C Evans Jr inventor (to NASA) Filed 23 Dec 1977 17 p

(NASA-Case-LEW-12819-2, US-Patent-Appl-SN-863770) Avail NTIS HC A02/MF A01 CSCL 10A

A photovoltaic device was designed which possesses an integral mixed metal oxide coating in which is embedded a metallic network which functions as an efficient collector for electrons set in motion by the photovoltaic process The metal grid system is formed from the metal elements of the transparent conductive mixed metal oxide coating which is in contact with the oxide coating which constitutes the barrier of the devices with the semiconductor substrate NASA



N78-25559*# National Aeronautics and Space Administration Pasadena Office Calif

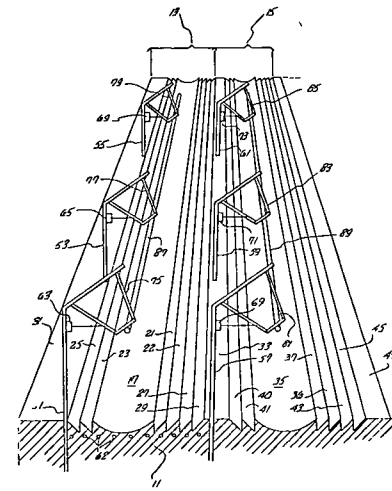
LOW COST SOLAR ENERGY COLLECTION SYSTEM Patent Application

Charles G Miller (JPL) and James B Stephens inventors (to NASA) (JPL) Filed 15 May 1978 23 p

(Contract NAS7-100)

(NASA-Case-NPO-13579-4 US-Patent-Appl-SN-906297) Avail NTIS HC A02/MF A01 CSCL 10A

A fixed linear ground based primary reflector was designed for use in a tracking solar energy collection system The primary reflector was constructed at ground level by slip forming in concrete or stabilized dirt a trough with a segmented one dimensional circular cross section profile This profile was covered with an inexpensive light-reflective material The axis of the primary reflector was optimally aligned with respect to the sun path in the area NASA



N78-25560*# National Aeronautics and Space Administration Pasadena Office, Calif

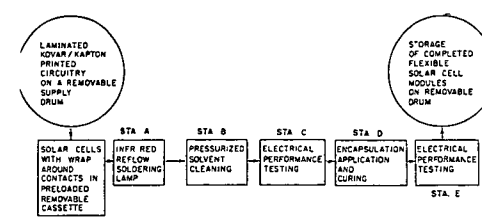
A SOLAR ARRAY STRIP AND A METHOD FOR FORMING THE SAME Patent Application

Robert L Mueller (JPL) and Robert K Yasui inventors (to NASA) (JPL) Filed 29 Mar 1978 15 p

(Contract NAS7-100)

(NASA-Case-NPO-13652-3 US-Patent-Appl-SN-891358) Avail NTIS HC A02/MF A01 CSCL 10A

A method is provided for forming a flexible solar array strip adapted for storage in a helically wound roll The method is applicable to automated production techniques where a continuous solar arrays strip may be used economically in converting solar flux to electrical energy NASA



N78-27515* National Aeronautics and Space Administration Pasadena Office Calif

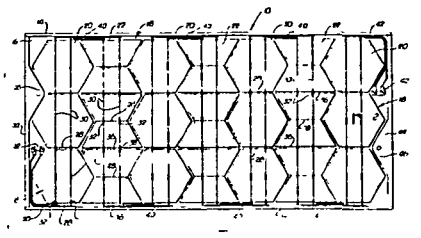
HEXAGON SOLAR POWER PANEL Patent

Irwin Rubin inventor (to NASA) Issued 16 May 1978 5 p Filed 28 Jul 1976

(NASA-Case-NPO-12148-1 US-Patent-4 089 705 US-Patent-Appl-SN-709415 US-Patent-Class-136-89P) Avail US Patent Office CSCL 10A

A solar energy panel support is described upon which silicon cells are arrayed The cells are wafer thin and of two geometrical types both of the same area and electrical rating namely hexagon cells and hourglass cells The hourglass cells are composites of half hexagons A near perfect nesting relationship of the cells achieves a high density packing whereby optimum energy production per panel area is achieved

Official Gazette of the U S Patent Office



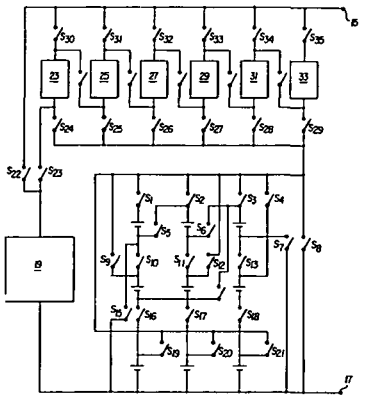
N78-27520*# National Aeronautics and Space Administration Lewis Research Center Cleveland Ohio

SELF-RECONFIGURING SOLAR CELL SYSTEM Patent Application

Robert P Gruber, inventor (to NASA) Filed 19 Jun 1978 18 p

(NASA-Case-LEW-12586-1 ,US-Patent-Appl-SN-916655) Avail NTIS HC A02/MF A01 CSCL 10A

An improved solar cell system is reported that utilizes control circuits to switch some of its cells so that they can be either in series or in shunt within the array to match the load for maximum power transfer Automatic control is provided by a sensor solar cell mounted into the configurable array its open circuit voltage multiplied by a constant is equal to cell voltage at maximum power point NASA



N78-27521*# National Aeronautics and Space Administration Pasadena Office Calif

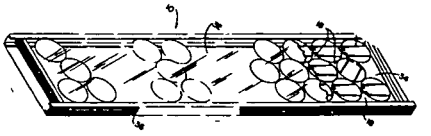
A TRANSPARENT PHOTOVOLTAIC MODULE Patent Application

Dan R Lott (Lockheed Missile and Space Co Sunnyvale Calif) Paul A Dillard (Lockheed Missile and Space Co Sunnyvale Calif) Walter M Fritz (Lockheed Missile and Space Co Sunnyvale Calif), and Gene J Antonides inventors (to NASA) (Lockheed Missile and Space Co Sunnyvale Calif) Filed 26 Jun 1978 13 p

(Contract JPL-954653)

(NASA-Case-NPO-14304-1 US-Patent-Appl-SN-918867) Avail NTIS HC A02/MF A01 CSCL 10A

The invention relates to a photovoltaic module and more particularly to a photovoltaic module adapted to accommodate passage of solar radiation whereby substantially all energy not used by the cells to produce electricity exits the module The module includes a planar support panel formed of glass highly pervious to solar radiation a plurality of contiguously related solar cells of substantially circular configurations each cell of the plurality being characterized by a silicon wafer having a surface layer defining a P-N junction near one face of the cell a transparent adhesive bonding each cell of the array to the support panel, a plurality of electrical interconnects connecting the cells in series and electrical leads for connecting the module in an electrical circuit NASA



N78-27541*# National Aeronautics and Space Administration Pasadena Office Calif

AN IMPROVED SOLAR CELL AND METHOD OF FORMING THE SAME Patent Application

Kenneth R Bube inventor (to NASA) (RCA Corp Moorestown New Jersey) Filed 30 Jun 1978 8 p

(Contract NAS7-100)

(NASA-Case-NPO-14205-1 US-Patent-Appl-SN-920879) Avail NTIS HC A02/MF A01 CSCL 10A

An improved solar cell and a method of forming the same is characterized by a semiconductor silicon wafer to P-type material having diffused therein a shallow N-type region a sintered silver contact affixed to the surface of the N-type region It is formulated from silver powder blended with silver metaphosphate for establishing beneath the contact a zone of increased carrier concentration and an aluminum or silver/aluminum alloy contact affixed to the wafer at the outer surface thereof opposite the N-type region The instant invention provides an improved solar cell characterized by an improved contact affixed to the N-type region thereof which serves to establish a zone of increased carrier concentration without excessive metallization penetration whereby conductivity is enhanced without sacrificing efficiency

NASA

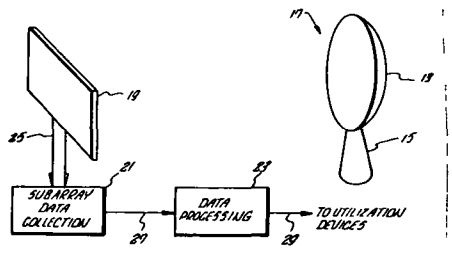
N78-28594* National Aeronautics and Space Administration Pasadena Office Calif

RF BEAM CENTER LOCATION METHOD AND APPARATUS FOR POWER TRANSMISSION SYSTEM Patent

Richard M Dickinson, inventor (to NASA) (JPL) Issued 9 Mar 1978 7 p Filed 21 May 1976 Supersedes N76-26692 (14 - 17 p 2218) Sponsored by NASA

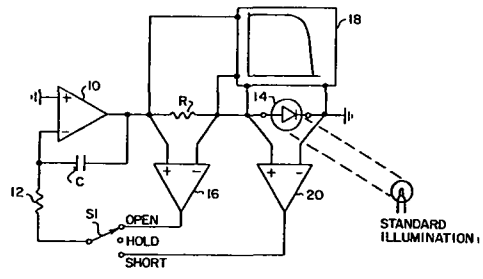
(NASA-Case-NPO-13821-1 US-Patent-4 088,999, US-Patent-Appl-SN-688852 US-Patent-Class-343-113R US-Patent-Class-343-119, US-Patent-Class-343-16M) Avail US Patent Office CSCL 10B

The receiving element in wireless power transmission systems intercepts the greatest possible portion of the transmitted energy beam Summing the output energy of all receivers in a planar array makes it possible to determine the location of the center of energy of the incident beam on a receiving array of antenna elements so that the incident beam is in the microwave region
Official Gazette of the U S Patent Office



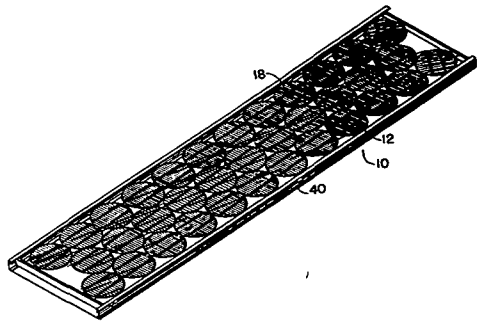
N78-28625*# National Aeronautics and Space Administration Pasadena Office Calif
DRIVER FOR SOLAR CELL I-V CHARACTERISTIC PLOTS Patent Application
Gary B Turner, inventor (to NASA) (JPL) Filed 26 Jul 1978 15 p
(Contract NAS7-100)
(NASA-Case-NPO-14096-1 US-Patent-Appl-SN-928128) Avail NTIS HC A02/MF A01 CSCL 10A

An apparatus for the evaluation of the current versus voltage (I-V) parameter of solar cells is described The apparatus can be used in laboratory research and production quality control An I-V graph for a solar cell produced with the driver was illustrated in such a way that the solar cell is driven from a short circuit condition to an open circuit condition A load line moves to a position A-B through the origin and the approximate center of the knee in the curve, and from there to the final position A'-B' The rate that the load line moves is constant so that the recording rate from B to B is approximately the same as from B to A' NASA



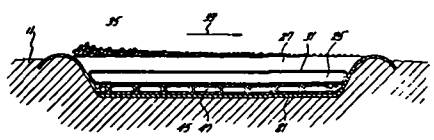
N78-28626*# National Aeronautics and Space Administration Pasadena Office, Calif
METHOD OF FABRICATING A PHOTOVOLTAIC OF A SUBSTANTIALLY TRANSPARENT CONSTRUCTION Patent Application
Paul A Dillard (Lockheed Missile and Space Co, Inc Sunnyvale Calif), Walter M Fritz (Lockheed Missile and Space Co, Inc, Sunnvale, Calif), and Dan R Lott, inventors (to NASA) (Lockheed Missile and Space Co, Inc, Sunnyvale, Calif) Filed 26 Jul 1978 12 p
(Contracts NAS7-100)
(NASA-Case-NPO-14303-1 NASA-Case-NPO-14305-1, US-Patent-Appl-SN-928133) Avail NTIS HC A02/MF A01 CSCL 10A

A method of fabricating a photovoltaic module transparent to all energy not used by the cells to produce electricity was examined The method is characterized by the steps of registering a plurality of uniformly dimensioned photovoltaic cells of circular configurations, with a plurality of circular openings formed in a planar tool for affording access to the P contact surface of each of the cells The N contact surface of alternate cells was connected to the P contact surface of the cells interposed between, removing residue from solder flux NASA



N78-31525* National Aeronautics and Space Administration Pasadena Office, Calif
SOLAR POND Patent
Charles G Miller (JPL) and James B Stephens, inventors (to NASA) (JPL) Issued 30 May 1978 9 p Filed 30 Jun 1977 Supersedes N77-28584 (15 - 19 p 2550) Continuation of abandoned US Patent Appl SN-590975, filed 27 Jun 1975 sponsored by NASA
(NASA-Case-NPO-13581-2, US-Patent-4,091,800 US-Patent-Appl-SN-811815, US-Patent-Class-126-271 US-Patent-Class-237-1A, US-Patent-Appl-SN-590975) Avail US Patent Office CSCL 10C

Shallow pools of liquid to collect low-temperature solar generated thermal energy are described Narrow elongated trenches, grouped together over a wide area, are lined with a heat-absorbing black liner The heat-absorbing liquid is kept separate from the thermal energy removing fluid by means such as clear polyethylene material The covering for the pond may be a fluid or solid If the covering is a fluid, fire fighting foam continuously generated, or siloons are used to keep the surface covering clean and insulated If the thermal energy removing fluid is a gas a fluid insulation layer contained in a flat polyethlene tubing is used to cover the pond The side of the tube directed towards the sun is treated to block out ultraviolet radiation and trap in infrared radiation
Official Gazette of the U S Patent Office

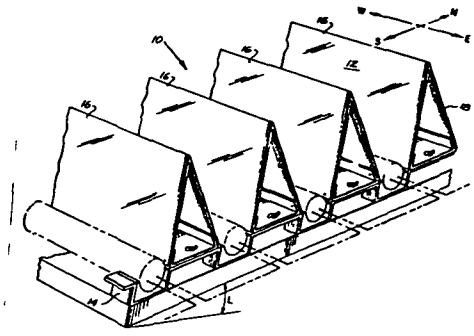


N78-31526* National Aeronautics and Space Administration Pasadena Office, Calif

NON-TRACKING SOLAR ENERGY COLLECTOR SYSTEM Patent

M Kudret Selcuk, inventor (to NASA) (JPL) Issued 30 May 1978 7 p Filed 3 Feb 1977 Supersedes N77-19579 (15 - 10 p 13358) Sponsored by NASA
(NASA-Case-NPO-13813-1, NASA-Case-NPO-13914-1, US-Patent-4,091,798, US-Patent-Appl-SN-765139, US-Patent-Class-126-271, US-Patent-Class-126-270 US-Patent-Class-350-299) Avail US Patent Office CSCL 10A

A solar energy collector system characterized by an improved concentrator for directing incident rays of solar energy on parallel vacuum-jacketed receivers or absorbers is described Numerous individually mounted reflector modules of a common asymmetrical triangular cross-sectional configuration are supported for independent reorientation Asymmetric vee-trough concentrators are defined Official Gazette of the U S Patent Office

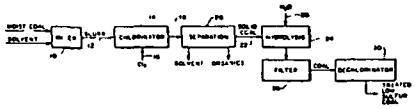


N78-31527* National Aeronautics and Space Administration Pasadena Office Calif

COAL DESULFURIZATION PROCESS Patent

George C Hsu (JPL), George R Gavalas (JPL), Partha S Ganguli (JPL) and Sarkis H Kalfayan (JPL) Issued 28 Mar 1978 7 p Sponsored by NASA
(NASA-Case-NPO-13937-1 US-Patent-4 081,250 US-Patent-Appl-SN-718137 US-Patent-Class-44-1R, US-Patent-Class-44-2 US-Patent-Class-201-17) Avail US Patent Office CSCL 07D

A method for chlorinolysis of coal is an organic solvent at a moderate temperautre and atmospheric pressure has been proven to be effective in removing sulfur particularly the organic sulfur from coal Chlorine gas is bubbled through a slurry of moist coal in chlorinated solvent The chlorinated coal is separated, hydrolyzed and the dechlorinated Preliminary results of treating a high sulfutr (4 77%S) bituminous coal show that up to 70% organic sulfur 90% hyritic sulfur and 76% total sulfur can be removed The treated coal is dechlorinated by heating at 500 C The presence of moisture helps to remove organic sulfur Official Gazette of the U S Patent Office

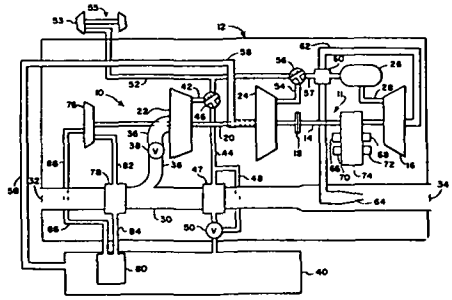


N78-32539* National Aeronautics and Space Administration Langley Research Center, Hampton Va

INDEPENDENT POWER GENERATOR Patent

Richard N Young inventor (to NASA) Issued 30 May 1978 6 p Filed 30 Jul 1976 Supersedes N78-10096 (16 - 01, p 14)
(NASA-Case-LAR-11208-1 US-Patent-4 091 613 US-Patent-Appl-SN-710036 US-Patent-Class-60-39 07 US-Patent-Class-60-39 14 US-Patent-Class-60-39 33 US-Patent-Class-98-1 5 US-Patent-Class-417-88) Avail US Patent Office CSCL 10B

A gas turbine powered aircraft auxiliary power system is described which is capable of efficiently supplying all aircraft auxiliary services both in flight and on the ground and is further capable of operating independently of the aircraft main engines The system employs multiple gas turbine compressor stages, thereby accomplishing cabin pressurization ventilation and heating Official Gazette of the U S Patent Office

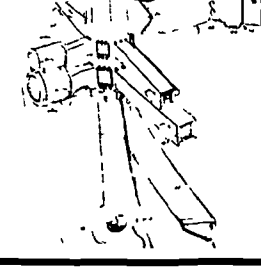


N78-32542* National Aeronautics and Space Administration John F Kennedy Space Center Cocoa Beach Fla

OCEAN THERMAL PLANT Patent

Lester J Owens inventor (to NASA) Issued 9 May 1978 10 p Filed 29 Mar 1977 Supersedes N77-21666 (15 - 12 p 1621)
(NASA-Case-KSC-11034-1, US-Patent-4 087,975 US-Patent-Appl-SN-782481 US-Patent-Class-60-641 US-Patent-Class-60-671) Avail US Patent Office CSCL 10A

A floating energy converter is described which uses large volumes of sea water to produce electrical power In this plant a fluid working medium is pumped to an evaporator where is is heated by a flow of warm surface sea water The fluid in liquid form boils to a pressurized gas vapor which is routed to drive a turbine that in turn drives a generator for producing electricity The gas vapor then enters a condenser immersed in cold sea water pumped from lower depths condenses to its original liquid form and then pumped to the evaporator to repeat the cycle Modular components can be readily interchanged on the ocean thermal unit and inlet pipes for the sea water are provided with means for maintaining the pipes in alignment with the oncoming current The modular construction allows for the testing of various components to provide a more rapid optimization of a standardized plant Official Gazette of the U S Patent Office



N78-33526* National Aeronautics and Space Administration Pasadena Office Calif

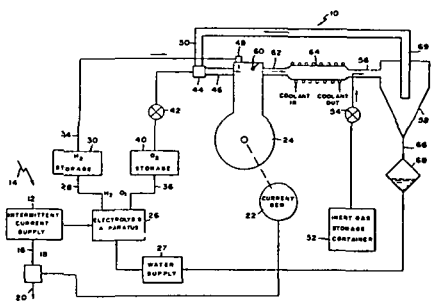
HYDROGEN-FUELED ENGINE Patent

Eugene A Lauman (JPL) and Rollins K Reynolds inventors (to NASA) (JPL) Issued 12 Sep 1978 6 p Filed 27 Aug 1976 Supersedes N77-11398 (15 - 02 p 0200) Sponsored by NASA

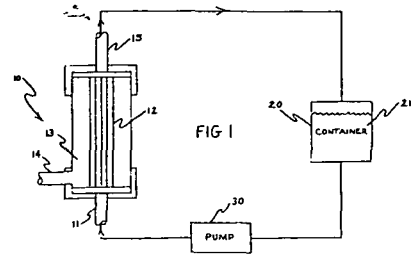
(NASA-Case-NPO-13763-1 US-Patent-4 112 875, US-Patent-Appl-SN-718268 US-Patent-Class-123-DIG 12 US-Patent-Class-123-1A US-Patent-Class-123-3) Avail US Patent Office CSCL 10A

A hydrogen-oxygen fueled internal combustion engine is described, which utilizes an inert gas such as argon, as a working fluid to increase the efficiency of the engine, eliminate pollution, and facilitate operation of a closed cycle energy system In a system where sunlight or other intermittent energy source is available to separate hydrogen and oxygen from water, the oxygen and inert gas are taken into a diesel engine into which hydrogen is injected and ignited The exhaust is cooled so that it contains only water and the inert gas The inert gas in the exhaust is returned to the engine for use with fresh oxygen while the water in the exhaust is returned to the intermittent energy source for reconversion to hydrogen and oxygen

Official Gazette of the U S Patent Office



of water borne bacteria was provided Systems are presented for automating the assays NASA



N78-22586*# National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex

METHOD AND APPARATUS FOR CONTINUOUS MEASUREMENT OF BACTERIAL CONTENT OF AQUEOUS SAMPLES Patent Application

Eldon L Jeffers (Boeing Aerospace Houston Tex) Reuben E Taylor, Grace L Picciolo (Food and Drug Admin) Richard R Thomas (Boeing Aerospace, Houston Tex) and Emmett W Chappelle inventors (to NASA) Filed 29 Mar 1978 41 p (NASA-Case-MSC-16779-1, US-Patent-Appl-SN-891247) Avail NTIS HC A03/MF A01 CSCL 06I

The methods and apparatus for automatically and continuously making quantitative determinations of the bacteria present in water samples such as waste water, effluent or fresh water are presented A bacteria adenosine triphosphate was used to determine the number of live bacteria present and the iron porphyrin assay to determine the total number of bacteria alive and dead present in the sample NASA

51 LIFE SCIENCES (GENERAL)

Includes genetics

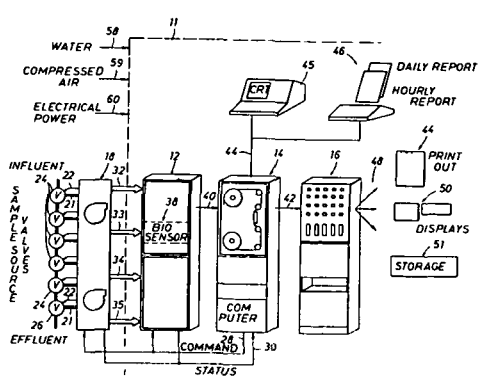
N78-22585*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

RAPID, QUANTITATIVE DETERMINATION OF BACTERIA IN WATER Patent Application

Emmett W Chappelle Grace L Picciolo, Richard R Thomas (Boeing Co Seattle) Eldon L Jeffers (Boeing Co Seattle), and Jody Deming, inventors (to NASA) (Hahnemann Hospital) Filed 20 Mar 1978 40 p

(NASA-Case-GSC-12158-1 US-Patent-Appl-SN-888434) Avail NTIS HC A03/MF A01 CSCL 06I

The methods and apparatus for the quantitative determination of bacteria in salt or fresh water sewage effluent drinking supply water or estuaries are presented A synthetic polymer hollow fiber filter/concentrator was employed to concentrate bacteria in a water sample by forcing the water across a filter or by recirculating the water through the filter to remove the filtrate A bioluminescent assay for making a quantitative determination



N78-22587*# National Aeronautics and Space Administration Pasadena Office Calif

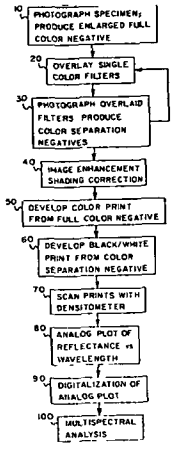
BIOCONTAMINATION AND PARTICULATE DETECTION SYSTEM Patent Application

Jacqueline M Jacobs inventor (to NASA) (JPL) Filed 24 Feb 1978 14 p

(Contract NAS7-100)

(NASA-Case-NPO-13953-1, US-Patent-Appl-SN-880727) Avail NTIS HC A02/MF A01 CSCL 06M

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



N78-22588*# National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston Tex

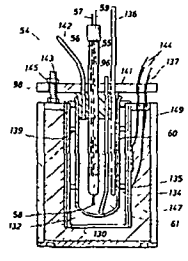
METHOD AND AUTOMATED APPARATUS FOR DETECTING COLIFORM ORGANISMS Patent Application

Reuben E Taylor W Preston Dill (Boeing Co, Houston, Tex), and Eldon L Jeffers, inventors (to NASA) (Boeing Co Houston Tex) Filed 4 Apr 1978 36 p

(Contract NAS9-13333)

(NASA-Case-MSC-16777-1 US-Patent-Appl-SN-893657) Avail NTIS HC A03/MF A01 CSCL 06C

Method and apparatus are presented for automatically making periodic quantitative determinations of coliform organisms present in water such as waste water effluent or fresh water by using electrochemical techniques based on detection of metabolic hydrogen liberated by the coliform organisms utilizing changes in electrode potentials NASA



N78-22589*# National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston Tex

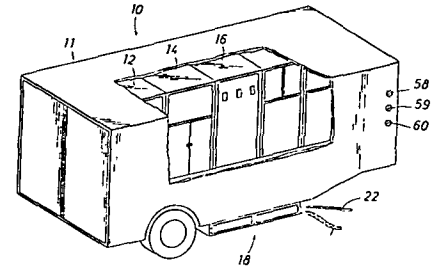
WATER QUALITY MONITORING SYSTEM Patent Application

Reuben E Taylor, Richard R Brooks (Boeing Co Houston, Tex), Gerald D Poel (Boeing Co Houston, Tex), Eldon L Jeffers (Boeing Co Houston Tex) and Arthur T Linton, inventors (to NASA) (Boeing Co Houston Tex) Filed 4 Apr 1978 29 p

(Contract NAS9-13333)

(NASA-Case-MSC-16778-1 US-Patent-Appl-SN-893648) Avail NTIS HC A03/MF A01 CSCL 06C

Methods and apparatus are presented for automatically and rapidly performing electrical chemical, and biological assays for continuous monitoring water quality at a water treatment plant to ascertain the effectiveness of the treatment during the process flow The invention is transportable in order that a single system may be utilized to service a number of separate or remote wastewater processing facilities NASA



N78-22590*# National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex

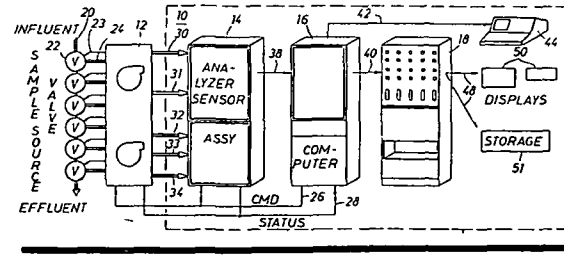
FLUID SAMPLE COLLECTION AND DISTRIBUTION SYSTEM Patent Application

Richard R Brooks inventor (to NASA) (Boeing Co Houston, Tex) Filed 4 Apr 1978 21 p

(Contract NAS9-13333)

(NASA-Case-MSC-16841-1 US-Patent-Appl-SN-893382) HC A02/MF A01 CSCL 06C

Methods and apparatus are presented for automatically and continuously collecting samples from any one of a plurality of sampling points filtering part of the samples collected and delivering both unfiltered and filtered samples to various analyzing sensors in order to determine the quality of the aqueous supply from which the sample is taken through various electrical chemical and biological means NASA



N78-27733* National Aeronautics and Space Administration Ames Research Center Moffett Field Calif

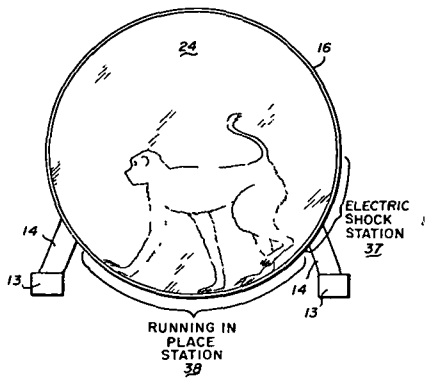
TREAD DRUM FOR ANIMALS Patent

Wayne H Howard inventor (to NASA) Issued 9 May 1978 7 p Filed 31 Mar 1976 Supersedes N76 20485 (14 - 11 p 1394)

(NASA-Case-ARC-10917-1 US-Patent-4 088 094 US-Patent-Appl-SN-672223 US-Patent-Class-119-29) Avail US Patent Office CSCL 06B

A device for exercising animals such as primates is described which includes a cylindrical housing mounted for rotation about a horizontal axis of revolution and has a cylindrical treadway portion on which the animal treads while the drum is rotated by means of a motorized drive The treadway portion of the drum includes an electrode structure with sectors being independently energizable by means of a commutator and source of potential so that an electrical shock station is created behind a running-in-place station on the moving treadway In this manner if the animal should fall behind its running-in-place station it may be shocked by treading on the energized electrode structure One end of the tread drum comprises a transparent wall for unobstructed viewing of the animal being exercised

Official Gazette of the U S Patent Office



52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation, and weightlessness

N78-25760*# National Aeronautics and Space Administration Pasadena Office, Calif

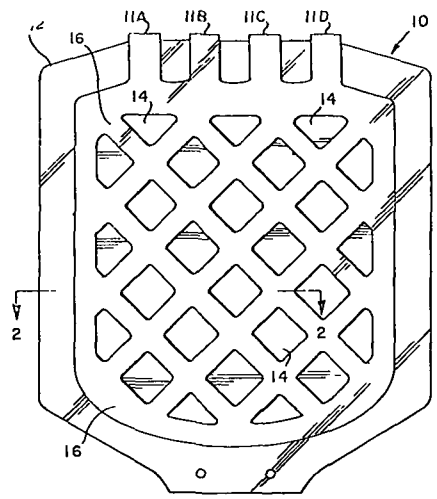
BAG FOR STORING WHOLE BLOOD Patent Application

Herman Bank (JPL) and Edward L Cleland, inventors (to NASA) (JPL) Filed 26 Jun 1976 10 p

(Contract NAS7-100)

(NASA-Case-NPO-13930-1, US-Patent-Appl-SN-700467) Avail NTIS HC A02/MF A01 CSCL 06B

The shelf life of stored whole blood may be doubled by adding a buffer which maintains a desired pH level However this buffer causes CO2 to be generated which if not removed at a controlled rate will shorten the life of the stored blood A blood storage container was provided which will permit the CO2 to diffuse into the atmosphere, at a controlled rate thereby maintaining the desired pH value while providing a bag strong enough to permit handling NASA



N78-25761*# National Aeronautics and Space Administration Pasadena Office Calif

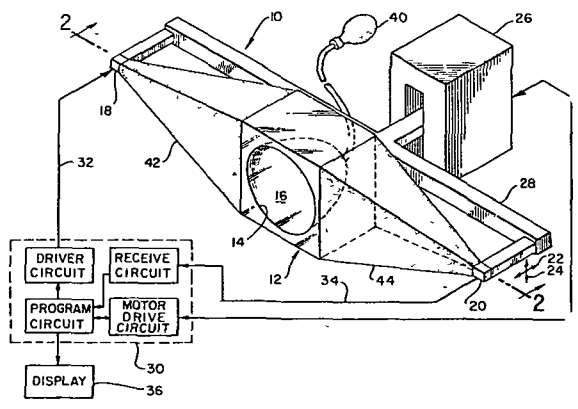
COUPLING APPARATUS FOR ULTRASONIC MEDICAL DIAGNOSTIC SYSTEM Patent Application

Robert E Frazer, inventor (to NASA) (JPL) Filed 15 Nov 1976 10 p

(Contract NAS7-100)

(NASA-Case-NPO-13935-1, NASA-Case-NPO-13944-1 US-Patent-Appl-SN-741749) Avail NTIS HC A02/MF A01 CSCL 06B

An apparatus is provided for assuring sonic coupling between transducers and a tissue to be ultrasonically diagnosed without requiring the tissue to be immersed in a fluid or to be directly contacted by the transducers The apparatus allows transducers to be moved relative to the tissue being scanned by utilizing a cavity with solid walls to receive the tissue, and by utilizing a vacuum to draw the tissue into intimate contact with the cavity walls NASA



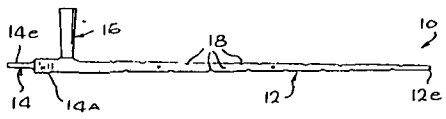
N78-25762*# National Aeronautics and Space Administration Pasadena Office Calif

PROCESS FOR MANUFACTURING CANNULA Patent Application

Howard F Broyles (JPL) Edward F Cuddihy (JPL) and Jovan Moacanin inventors (to NASA) (JPL) Filed 11 Jul 1977 11 p Sponsored by NASA

(NASA-Case-NPO-14073-1 US-Patent-Appl-SN-814384) Avail NTIS HC A02/MF A01 CSCL 06B

Manufacturing of a T shaped cannula is described The tube was formed of dip-molded materials so that the opposite ends of the cross of the T taper to the smallest diameter The process included dipping a tapered mandrel into dip-molding material and later removing the coating from the mandrel by dipping it into a swelling fluid which is absorbed by the coating material A stub with a small diameter was inserted into the short end of the swelled coating as the swelling agent evaporated the short end of the coating shrank tightly around the stub to form a leak-tight seal NASA



N78-27750*# National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex

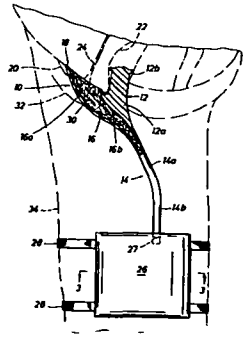
URINE COLLECTION DEVICE Patent Application

Roger B Michaud inventor (to NASA) (Martin Marietta Corp Denver Colo) Filed 30 May 1978 27 p

(Contract NAS9-14796)

(NASA-Case-MSC-16433-1 US-Patent-Appl-SN-910992) Avail NTIS HC A03/MF A01 CSCL 06B

The invention relates to a urine collection device particularly adapted to the female anatomy The device is designed for use primarily by incontinent women but also has application in those circumstances which preclude access to normal bathroom facilities for example where the woman is bed-ridden or is in an occupation which demands long periods at a duty station or in protective clothing (pilots or astronauts) The device successfully overcomes many of the problems associated with present devices such as absorbent garments (akin to diapers or sanitary napkins) external receptacles strapped to the body and catheters which problems usually include leakage urine contact with the body discomfort infection interference with freedom of movement and limitations on choice of clothing NASA



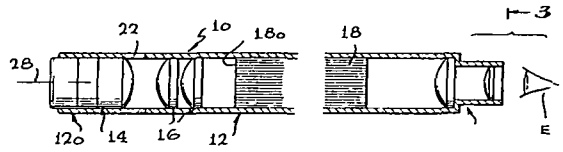
N78-33715*# National Aeronautics and Space Administration Pasadena Office Calif

OPTICAL PROBE Patent Application

Robert E Frazer inventor (to NASA) (JPL) Filed 6 Mar 1978 11 p Sponsored by NASA

(NASA-Case-NPO-14247-1 US-Patent-Appl-SN-883383) Avail NTIS HC A02/MF A01 CSCL 06B

A rectal probe which provides a view to the side of the probe end instead of just a straight ahead view is disclosed The probe includes a ring-shaped window and a reflective coating on a lens located near the window The reflective coating directs light passing in through the window towards the eye piece end of the probe The probe includes a fiber optic bundle The reflective coating and lenses focus the light onto the end of the fiber optic bundle Another set of lenses focuses light from in front of the probe onto the center of the fiber optic bundle NASA



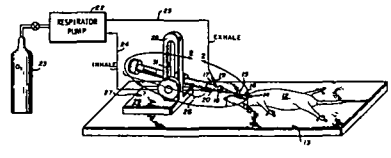
N78-33717*# National Aeronautics and Space Administration Ames Research Center Moffett Field, Calif

MICRO-FLUID EXCHANGE COUPLING APPARATUS Patent Application

John E Johnson (San Francisco Univ Calif) and Paul F Swartz inventor (to NASA) Filed 16 Oct 1978 13 p

(NASA-Case-ARC-11114-1, US-Patent-Appl-SN-951422) Avail NTIS HC A02/MF A01 CSCL 06B

In a microfluid exchange apparatus for exchanging fluid with an organ, such as the trachea or a blood vessel of a small animal a syringe needle is provided for penetrating the fluid conduit of the animal The syringe needle is coupled to a plenum chamber having an inlet and outlet port The plenum chamber is coupled to the syringe needle via the intermediary of a standard quick disconnect coupling fitting The plenum chamber is carried at the end of a drive rod which is coupled to a micrometer drive head The micrometer drive head is slidably and pivotably coupled to a pedestal for adjusting the height and angle of inclination of the needle relative to a reference base support The needle is positioned adjacent to the incised trachea or a blood vessel of a small animal and the micrometer drive head is operated for penetrating the fluid conduit of the animal NASA

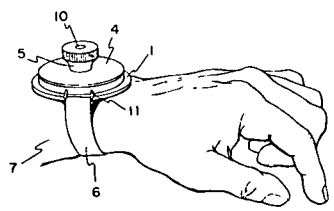


54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering, biotechnology, and space suits and protective clothing

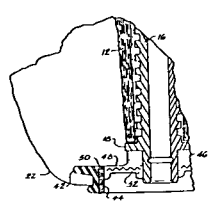
N78-22720*# National Aeronautics and Space Administration Ames Research Center Moffett Field, Calif
SWEAT COLLECTION CAPSULE Patent Application
John E Greenleaf and Robert W Delaplaine inventors (to NASA) Filed 19 Apr 1978 10 p
(NASA-Case-ARC-11031-1, US-Patent-Appl-SN-897828) Avail NTIS HC A02/MF A01 CSCL 06B

A sweat collection capsule permitting quantitative collection of sweat is described The capsule was comprised of a frame held immobile on the skin a closure secured to the frame and absorbent material located next to the skin in a cavity formed by the frame and the closure The absorbent materials was removed from the device by removing the closure from the frame while the frame was held immobile on the skin NASA



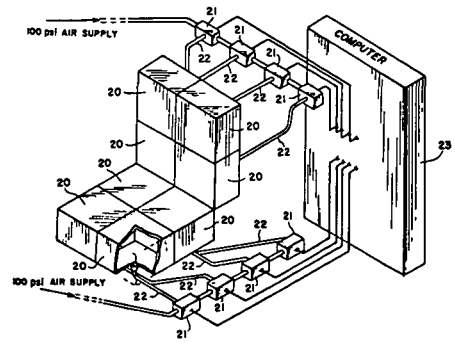
N78-22721*# National Aeronautics and Space Administration John F Kennedy Space Center Cocoa Beach, Fla
A PROSTHESIS COUPLING Patent Application
Vert Mooney (Rancho Los Amigos Hospital Rehabilitation Center Downey Calif) James B Reswick (Rancho Los Amigos Hospital Rehabilitation Center Downey, Calif), Charles W Bright, and Lester J Owens inventors (to NASA) Filed 9 Feb 1978 11 p
(NASA-Case-KSC-11069-1 US-Patent-Appl-SN-876438) Avail NTIS HC A02/MF A01 CSCL 06B

A coupling for use in apparatus for connecting a prosthesis to a bone of a stump of an amputated limb is presented The apparatus includes a tubular female socket having an open lower end adapted to be inserted within the intermedullary cavity of the bone A biocompatible sleeve provides an interface between the female socket and the skin directly below the opening in the socket A lock pin is carried by the prosthesis and has a stem portion adapted to be coaxially disposed and slideably within the tubular female socket for securing the prosthesis to the stump The coupling is constructed of resilient material with one end thereof being attached to the socket and the other end thereof being attached by any suitable material to the biocompatible sleeve NASA



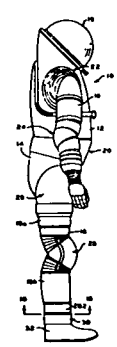
N78-30821*# National Aeronautics and Space Administration Langley Research Center, Langley Station, Va
A SEAT CUSHION TO PROVIDE REALISTIC ACCELERATION CUES FOR AIRCRAFT SIMULATOR PILOTS Patent Application
Billy R Ashworth inventor (to NASA) Filed 26 Jul 1978 15 p
(NASA-Case-LAR-12149-2, US-Patent-Appl-SN-928131) Avail NTIS HC A02/MF A01 CSCL 04H

A seat cushion for providing realistic acceleration cues to aircraft simulator pilots is presented The novel feature of the invention appears to lie in the simulation of the events that happen in a seat cushion during actual flight to impact acceleration cues to the pilot Also the novel controller has the ability to control the air pressure with sufficient response time and smoothness to adequately drive the seat cushion Prior controllers were unable to adequately do this NASA



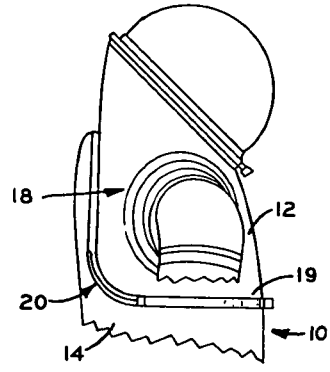
N78-31735* National Aeronautics and Space Administration Ames Research Center, Moffett Field Calif
SPACESUIT MOBILITY JOINTS Patent
Hubert C Vykukal inventor (to NASA) Issued 30 May 1978 22 p Filed 23 Dec 1976 Supersedes N77-15641 (15 - 06 p 0789)
(NASA-Case-ARC-11058-1, US-Patent-4,091,464 US-Patent-Appl-SN-753965, US-Patent-Class-2-2 1A US-Patent-Class-285-235) Avail US Patent Office CSCL 05H

Joints for use in interconnecting adjacent segments of an hermetically sealed spacesuit which have low torques, low leakage and a high degree of reliability are described Each of the joints is a special purpose joint characterized by substantially constant volume and low torque characteristics Linkages which restrain the joint from longitudinal distension and a flexible, substantially impermeable diaphragm of tubular configuration spanning the distance between pivotally supported annuli are featured 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
Official Gazette of the U S Patent Office



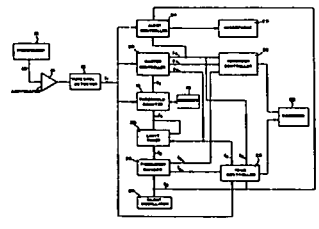
N78-31736* National Aeronautics and Space Administration Ames Research Center, Moffett Field Calif
SPACESUIT TORSO CLOSURE Patent
Bruce W Webbon and Hubert C Vykukal, inventors (to NASA) Issued 30 May 1978 8 p Filed 23 Mar 1977 Supersedes N77-25784 (15 - 16, p 2170)
(NASA-Case-ARC-11100-1 US-Patent-4,091 465 US-Patent-Appl-SN-780569, US-Patent-Class-2-2 1A) Avail US Patent Office CSCL 05H

A simple economical and reliable entry closure is described for joining opposite halves of a torso section for a pressure suit in a manner which simplifies self-donning A single coupling joins coaxially aligned, axially separable tubular segments of a hard spacesuit along an angulated zone of separation, adapted to be mated in an hermetrically sealing relation A releasable C section clamp secures the members in their mated relationship Official Gazette of the U S Patent Office



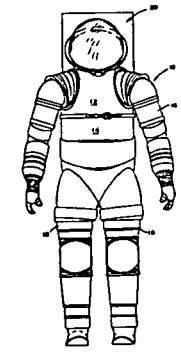
N78-32720* National Aeronautics and Space Administration Lyndon B Johnson Space Center Houston Tex
CONDITION SENSOR SYSTEM AND METHOD Patent
John T Polhemus Joseph E Morgan and Arthur Mandell inventors (to NASA) Issued 30 May 1978 6 p Filed 21 May 1976 Supersedes N76-26448 (14 -17 p 2189)
(NASA-Case-MSC-14805-1, US-Patent-4 092,633 US-Patent-Appl-SN-688856 US-Patent-Class-340-213R US-Patent-Class-340-262 US-Patent-Class-340-279 US-Patent-Class-340-285, US-Patent-Class-340-309 1) Avail US Patent Office CSCL 05H

The condition sensor system comprises a condition detector which produces a pulse when a parameter of the monitored condition exceeds a desired threshold A resettable condition counter counts each pulse A resettable timer is preset to produce a particular time frame The counter produces a condition signal when the accumulated number of pulses within the time frame is equal to or greater than a preset count Control means responsive to the incoming pulses and to the condition signal produce control signals that control utilization devices After a suitable delay the last detected pulse simultaneously resets the pulse counter and the timer and prepares them for sensing another condition occurrence within the time frame The invention has particular utility in the process of detecting rocking motions of blind people A controlled audible bio-feedback signal is provided which constitutes a warning to the blind person that he is rocking Official Gazette of the U S Patent Office



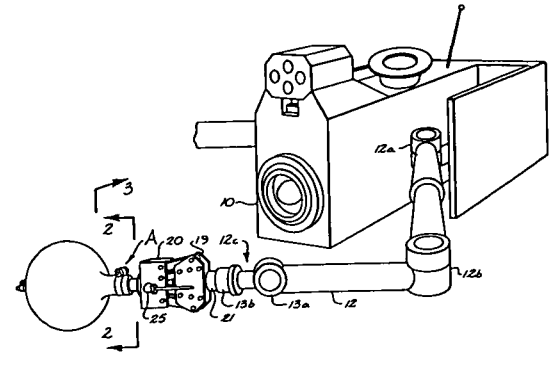
N78-32721* National Aeronautics and Space Administration Washington, D C
COOLING SYSTEM FOR REMOVING METABOLIC HEAT FROM AN HERMETICALLY SEALED SPACESUIT Patent
Bruce W Webbon, Hubert C Vykukal and Bill A Williams inventors (to NASA) Issued 20 Jul 1978 8 p Filed 23 Dec 1976 Supersedes N77-14743 (15 - 05 p 0661)
(NASA-Case-ARC-11059-1, US-Patent-4,095,593 US-Patent-Appl-SN-753978 US-Patent-Class-128-142 7 US-Patent-Class-62-259) Avail US Patent Office CSCL 06Q

An improved cooling and ventilating system is described for removing metabolic heat waste gases and water vapor generated by a wearer of an hermetically sealed spacesuit The cooling system was characterized by a body suit having a first circuit for simultaneously establishing a cooling flow of water through the thorax and head sections of the body suit Circulation patches were included mounted in the thorax section and head section of the body suit A second circuit for discharing a flow of gas throughout the spacesuit and a disconnect unit for coupling the circuits with a life support system externally related to the spacesuit were provided
Official Gazette of the U S Patent Office



N78-32724*# National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala
PNEUMATIC INFLATABLE END EFFECTOR Patent Application
Keith H Clark and James D Johnston inventors (to NASA) 22 Sep 1978 11 p
(NASA-Case-MFS-23696-1 US-Patent-Appl-SN-945044) Avail NTIS HC A02/MF A01 CSCL 05H

An invention is presented which relates to an end effector for use on the end of a remotely controlled manipulator arm of a robot or teleoperator device The end effector grasps an object by being inflated after insertion into an open area of the object Novelty of the invention is believed to reside in the use of a balloon-type inflatable end member for a remote manipulator and in the spline and reinforced sections of the balloon NASA



71 ACOUSTICS

Includes sound generation transmission and attenuation

For noise pollution see *45 Environment Pollution*

N78-22859*# National Aeronautics and Space Administration Pasadena Office, Calif

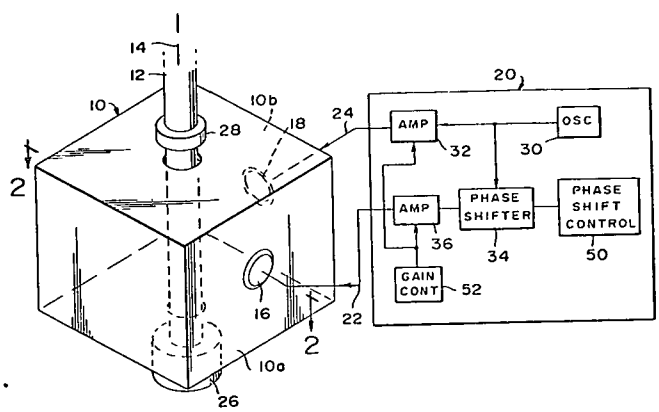
ACOUSTIC DRIVING OF ROTOR Patent Application

Hilda Kanber (JPL), Isadore Rudnick (JPL), and Taylor G Wang inventors (to NASA) (JPL) Filed 5 Jul 1977 9 p

(Contract NAS7-100)

(NASA-Case-NPO-14005-1, US-Patent-Appl-SN-812447) Avail NTIS HC A02/MF A01 CSCL 20A

The object of the invention is to provide a system for utilizing sound to rotate a suspended object, with large and controlled torque An enclosure of square cross-section is utilized together with transducers at walls which are at right angles to each other A circuit drives the transducers at the same frequency, but at a constant phase difference such as 90 deg This causes rotation of air molecules and therefore rotation of a shaft which extends through the enclosure, as a first order effect The torque or speed of rotation are controlled by controlling the intensity at which the transducers are driven The major novel feature of this invention is the driving of two transducers on orthogonal walls of an enclosure of square cross section, at the same frequency but at a constant phase difference, to produce torque as a first order effect NASA



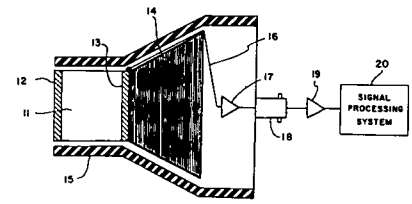
N78-29871*# National Aeronautics and Space Administration Langley Research Center Langley Station Va

A PHASE INSENSITIVE ULTRASONIC TRANSDUCER Patent Application

Joseph S Heyman inventor (to NASA) Filed 26 Jul 1978 16 p

(NASA-Case-Lar-12304-1 US-Patent-Appl SN-928130) Avail NTIS HC A02/MF A01 CSCL 20A

An ultrasonic transducer that is phase insensitive includes a cadmium sulfide crystal with two electrodes attached The crystal is annealed for a period of time and at a temperature to provide substantially maximum acoustic attenuation at the operating frequency of the transducer This is done by making the ultrasonic angular frequency equal to the conductivity frequency where the conductivity frequency is the conductivity divided by the dielectric permittivity When connected in a receiver circuit one of the electrodes of the transducer is placed as a reference for the electronics and the other electrode is connected through amplifier means to a signal processing system An external backing material matched to the acoustic impedance of the crystal is attached to one electrode NASA



72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra

N78-24906*# National Aeronautics and Space Administration Pasadena Office Calif

NEGATIVE ION SOURCE Patent Application

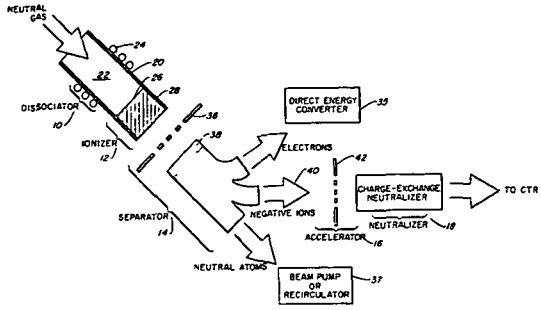
Raymond Goldstein (JPL) and James E Graf inventors (to NASA) (JPL) Filed 28 Apr 1978 15 p

(Contract NAS7-100)

(NASA-Case-NPO-14113-1 US-Patent-Appl-SN-900848) Avail NTIS HC A02/MF A01 CSCL 20H

This invention relates to an improved negative ion source and more particularly to a system including said ionizer in combination with dissociator separator and neutralizating means for providing an energetic neutral beam for a controlled thermonuclear reactor (CTR) The negative ion source in accordance with this invention includes a porous ionizer material configured such that the neutral source gas flows through it, rather than impinging on it The material can be configured as a porous plug rolled foil or bundle of wires The material is in the form of a high work function material such as nickel tungsten, or tantalum coated with a film of low work function material such as CsO BaO/SrO By using such a configuration an increased portion of the source gas such as deuterium is ionized while the negatively excited deuterium ion beam is better collimated and has a higher current density A complete system employing

a porous low work function surface ionizer in the production of a high energy neutral beam is shown NASA



73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles, and reactor theory

For space radiation see *93 Space Radiation*

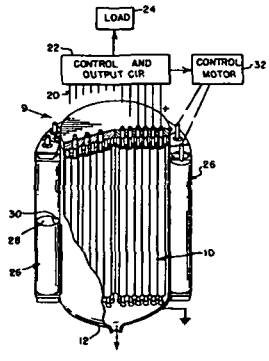
N78-28913* National Aeronautics and Space Administration Pasadena Office Calif

CONTROL FOR NUCLEAR THERMIONIC POWER SOURCE Patent

Craig D Sawyer inventor (to NASA) (JPL) Issued 18 Apr 1978 9 p Filed 21 Nov 1975 Supersedes N76-15573 (14 - 06 p 0738) Continuation-in-part of abandoned US Patent Appl SN-294738 filed 3 Oct 1972

(NASA-Case-NPO-13114-2 US-Patent-4 085 004 US-Patent-Appl-SN-634214, US-Patent-Appl-SN-294738, US-Patent-Class-176-22, US-Patent-Class-176-39, US-Patent-Class-176-33) Avail US Patent Office CSCL 10B

A control for a power source which includes nuclear fuel interspersed with thermionic converters is described A power regulator maintains a substantially constant output voltage to a variable load and a control circuit drives a neutron flux regulator in accordance with the current supplied to the power regulator and the neutron flux density in the region of the converters The control circuit generates a control signal which is the difference between the neutron flux density and a linear function of the current, and drives the neutron regulator in a direction to decrease or increase the neutron flux according to the polarity of the control signal Official Gazette of the U S Patent Office



N78-32848* National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt Md

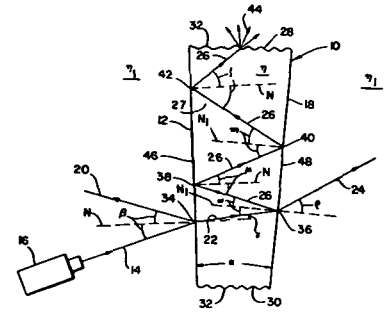
METHOD AND APPARATUS FOR SPLITTING A BEAM OF ENERGY Patent

Walter Robert Leeb inventor (to NASA) (National Academy of Sciences) Issued 6 Jun 1978 13 p Filed 23 Dec 1975 Supersedes N76-15451 (14 - 06 p 0721)

(NASA-Case-GSC-12083-1 US-Patent-4 093 354 US-Patent-Appl-SN-643897 US-Patent-Class-350-320 US-Patent-Class-350-170 US-Patent-Class-350-173 US-Patent-Class-350-174 US Patent-Class-350-286) Avail US Patent Office CSCL 20H

A wedge shaped beam splitting device is described which has a first surface for splitting an incident beam energy into an externally reflected beam and an internally transmitted beam a second surface spaced from the first surface splits the internally transmitted beam into an externally transmitted beam and into an internally reflected beam and intersects the first surface at an angle that impinges the internally transmitted beam on the second surface at an angle of incidence that is less than the minimum angle necessary for substantially total internal reflection and impinges the internally reflected beam on the first surface at an angle of incidence that exceeds the minimum angle necessary for substantially total internal reflection The device may also be used as a beam combiner

Official Gazette of the U S Patent Office



N78-22890*# National Aeronautics and Space Administration Pasadena Office Calif

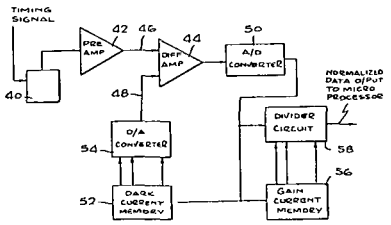
MULTISPECTRAL IMAGING AND ANALYSIS SYSTEM Patent Application

Alexander F H Goetz (JPL) and Frederick P Landauer, Jr, inventors (to NASA) (JPL) Filed 5 Mar 1976 15 p (Contract NAS7-100)

(NASA-Case-NPO-13691-1, US-Patent-Appl-SN-664091) Avail NTIS HC A02/MF A01 CSCL 20F

The invention concerns a system for collecting and processing in real time incident spectral reflectance data while the system is airborne The novelty of the present invention appears to reside in the capability of having spectral reflectance data collected and analyzed in real time aboard an airborne craft Such capability is not only more economical from the standpoint of data processing but further, and perhaps more importantly, eliminates the common delay of several months between collection of the data and analysis thereof Hence, the subject invention permits data analysis to be timely as well as prompt The importance of such capability is exemplified by the potential use of the invention for detecting oil spills or algal growth wherein prompt analysis

of the spectral reflectance data permits quick indentification and a solution to be promptly implemented NASA



N78-22891*# National Aeronautics and Space Administration Pasadena Office Calif

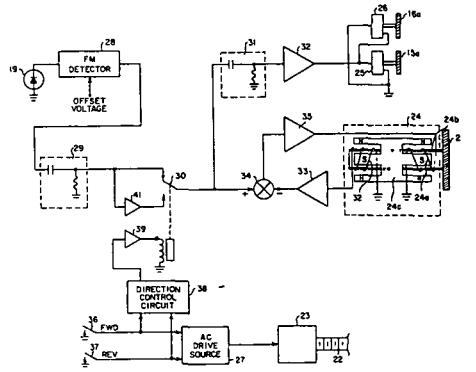
VELOCITY SERVO FOR CONTINUOUS SCAN FOURIER INTERFERENCE SPECTROMETER Patent Application

Rudolf A Schindler inventor (to NASA) (JPL) Filed 24 Feb 1978 12 p

(Contract NAS7-100)

(NASA-Case-NPO-14093-1 US-Patent-Appl-SN-880729) Avail NTIS HC A02/MF A01 CSCL 20F

The invention relates to interferometers utilizing double-pass retroreflectors and more particularly to an improvement in a continuous scan interferometer using an open-loop lead-screw drive system The novelty of the invention resides in the arrangement for driving the lead screw in an open loop and in providing reference fringe detection for the purpose of producing a compensation signal for any deviation of the actual scan rate from a desired scan rate NASA



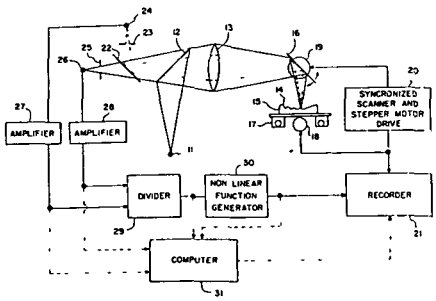
N78-27904* National Aeronautics and Space Administration Langley Research Center Langley Station Va

DEVICE FOR MEASURING THE CONTOUR OF A SURFACE Patent

Ernest E Burcher Stephen J Katzberg, and William L Kelly, IV inventors (to NASA) Issued 9 May 1978 6 p Filed 8 Nov 1976 Supersedes N77-10497 (15 - 01 p 0069)

(NASA-Case-LAR-11869-1, US-Patent-4 088,408 US-Patent-Appl-SN-740155 US-Patent-Class-356-120 US-Patent-Class-356-167) CSCL 20F

Light from a source is imaged by a lens onto a surface so that the energy from the source is concentrated into a spot As the spot across the surface is scanned the surface moves relative to the point of perfect focus When the surface moves away from perfect focus the spot increases in size, while the total energy in the spot remains virtually constant The lens then reimages the light reflected by the surface onto two detectors through two different sized apertures The light energy going to the two detectors is separated by a beam splitter This second path of the light energy through the lens further defocuses the spot but as a result of the different sizes of the apertures in each light detector path the amount of defocus for each is different The ratio of the outputs of the two detectors which are indicative of the contour of the surface is obtained by a divider Official Gazette of the U S Patent Office



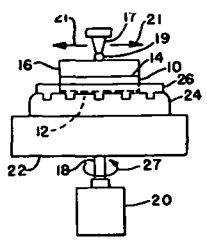
N78-29902*# National Aeronautics and Space Administration Goddard Space Flight Center, Greenbelt, Md

METHOD OF FORMING A SHARP EDGE ON AN OPTICAL DEVICE Patent Application

George J Bergen inventor (to NASA) Filed 28 Jul 1978 21 p

(NASA-Case-GSC-12348-1 US-Patent-Appl-SN-929088) Avail NTIS HC A02/MF A01 CSCL 20F

An edge having a sharpness of less than 2 and preferably about 0 3 micron can be formed on a wedge shaped piece of optical material in a relatively short period of time without breaking the edge peeling the optical material away from the edge or forming an uneven edge The technique described involves placing the optical device in a holding mechanism and grinding one surface until it is so-planar with the surface of the holding mechanism The surfaces of both the optical device and the holding mechanism are then polished with felt until the optical surface adjacent to the holder has an edge of sharpness of less than 2 micron Optical materials formed in this manner will be used as beam splitters in the ultraviolet spectrapolarimeter to be flown on the Solar Maximum Mission NASA



N78-32854* National Aeronautics and Space Administration Ames Research Center Moffett Field Calif

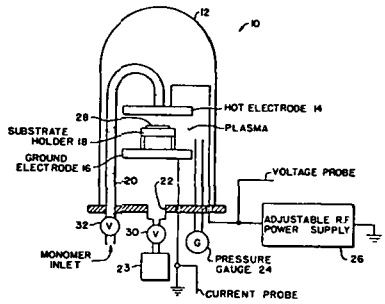
PROCESS FOR PRODUCING A WELL-ADHERED DURABLE OPTICAL COATING ON AN OPTICAL PLASTIC SUBSTRATE Patent

Ronald M Kubacki, inventor (to NASA) (Bell and Howell Chicago) Issued 20 Jun 1978 7 p Filed 15 Dec 1976 Sponsored by NASA

(NASA-Case-ARC-11039-1 US-Patent-4 096 315 US-Patent-Appl-SN-750655 US-Patent-Class-428-412 US-Patent-Class-351-166 US-Patent-Class-427-38 US-Patent-Class-427-41 US-Patent-Class-427-44 US-Patent-Class-427-164 US-Patent-Class-427-302 US-Patent-Class-427-322 US-Patent-Class-427-387 US-Patent-Class-428-447) Avail US Patent Office CSCL 20F

A low temperature plasma polymerization process is described for applying an optical plastic substrate such as a polymethyl methacrylate lens with a single layer abrasive resistant coating to improve the durability of the plastic

Official Gazette of the U S Patent Office



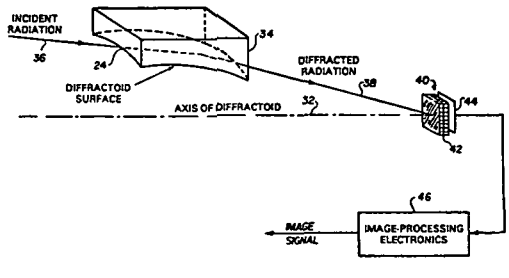
N78-32857*# National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt Md

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

Sidney O Kastner inventor (to NASA) Filed 18 Sep 1978 16 p

(NASA-Case-GSC-12357-1 US-Patent-Appl-SN-943089) Avail NTIS HC A02/MF A01 CSCL 20F

An aspheric concave diffraction surface grating is reported that produces a stigmatic image of a designated wavelength at grazing angles of incidence The reflecting surface grating does not have a constant radius but is a surface of revolution defined by a non-linear differential equation specified in terms of a selected grating parameter NASA



N78-33913* National Aeronautics and Space Administration Pasadena Office, Calif

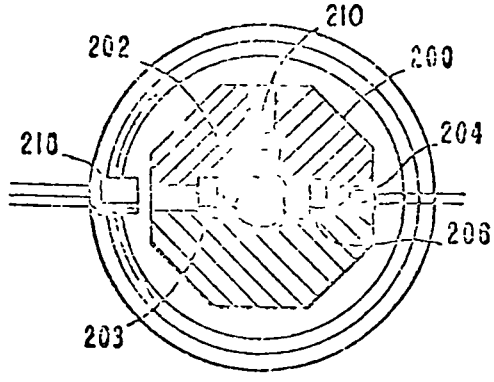
PLURAL OUTPUT OPTIMETRIC SAMPLE CELL AND ANALYSIS SYSTEM Patent

Floyd C Haley, inventor (to NASA) (JPL) Issued 6 Apr 1971 8 p Filed 28 Mar 1968 Sponsored by NASA

(NASA-Case-NPO-10233-1 US-Patent-3 573,470 US-Patent-Appl-SN-716885 US-Patent-Class-250-218 US-Patent-Class-250-227, US-Patent-Class-250-239, US-Patent-Class-356-208) Avail NTIS Avail US Patent Office CSCL 20F

An apparatus suitable for receiving a sample for optimetric analysis includes a sample cell comprising an opaque hollow tube Several apertures are defined in the wall of the tubing and a lens barrel which extends beyond to opposite surfaces of the wall is supported within at least one of the apertures A housing is provided with one channel for receiving the sample cell and a series of channels extending from the exterior housing to the sample cell apertures A filter element is housed in each of these latter channels These channels slidingly receive an excitation light source for a photodetector cell to permit selective focusing A sample cell containing at least three apertures in the walls can be mounted for rotation relative to a light source or photoconduction means for simultaneous or alternative optimetric determination of the components of a single sample The sample cell is fabricated by supporting a lens barrel within the aperture A molten portion of glass is deposited in the lens barrel and cooled while in a horizontal position to form a lens having an acceptable angle

Official Gazette of the U S Patent Office



75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion

For ionospheric plasmas see *46 Geophysics* For space plasmas see *90 Astrophysics*

N78-27913* National Aeronautics and Space Administration Marshall Space Flight Center Huntsville Ala

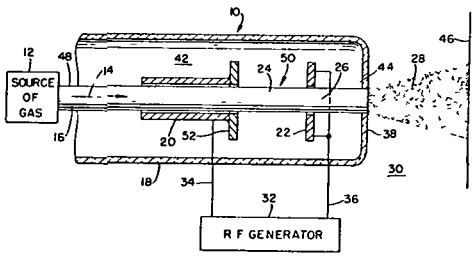
PLASMA CLEANING DEVICE Patent

Roger L Shannon (Boeing Co Seattle) and Roger B Gillette inventors (to NASA) (Boeing Co Seattle) Issued 9 May 1978 6 p Filed 10 May 1976 Supersedes N76-24001 (14 - 14 p 1857) Sponsored by NASA

(NASA-Case-MFS 22906-1 US-Patent-4 088 926

US-Patent-Appl-SN-684807 US-Patent-Class-315-111 2 US Patent-Class-29-81C US Patent-Class-313 231 3) Avail US Patent Office CSCL 20I

High vacuum cleaning of contaminated surfaces such as hydrocarbon containment films can be accomplished by a plasma cleaning device which includes a plasma discharge housing to permit generation of a plasma in an environment having a higher pressure than the surface which is to be cleaned A ground electrode and a radio frequency electrode partially surround a quartz plasma tube for the introduction of an ionizable gas These electrodes ionize the gas and help generate the plasma This plasma flows through a non-constrictive aperture through the plasma discharge housing and then on to the contaminated surface Official Gazette of the U S Patent Office



76 SOLID-STATE PHYSICS

Includes superconductivity

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

N78-23969*# National Aeronautics and Space Administration Pasadena Office Calif

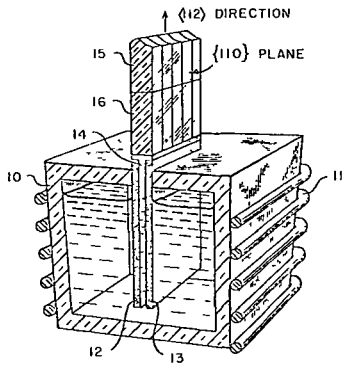
METHOD OF CONTROLLING DEFECT ORIENTATION IN SILICON CRYSTAL RIBBON GROWTH Patent Application

Martin H Leipold inventor (to NASA) (JPL) Filed 16 Jul 1976 11 p

(Contract NAS7-100)

(NASA-Case-NPO-13918-1 US-Patent-Appl-SN-706073) Avail NTIS HC A02/MF A01 CSCL 20B

An invention is presented that is directed to controlling the orientation of anomalies such as twinning defects in crystal silicon ribbon for use in fabricating solar cells on a commercial basis The novelty of the invention resides in the use of a starting seed crystal having a specific (110) crystallographic plane and <112> crystallographic direction determinable by conventional X-ray diffraction techniques in order that anomalies occur parallel to the length of the ribbon Without such seed crystal, anomalies occur randomly and in an uncontrolled manner and as much as five feet of ribbon crystal may be grown before the anomalies stabilize in the preferred orientation NASA



N78-24950* National Aeronautics and Space Administration Marshall Space Flight Center, Huntsville Ala

APPARATUS FOR USE IN EXAMINING THE LATTICE OF A SEMICONDUCTOR WAFER BY X-RAY DIFFRACTION Patent

Donald L Parker (Texas A and M Univ) and Wilbur A Porter inventor (to NASA) (Texas A and M Univ) Issued 7 Mar 1978 5 p Filed 20 Sep 1976 Supersedes N76-32029 (14-22, p 2938) Sponsored by NASA

(NASA-Case-MFS-23315-1, US-Patent-4 078,175 US-Patent-Appl-SN-724874, US-Patent-Class-250-277CH, US-Patent-Class-250-280) Avail US Patent Office CSCL 20L

An improved apparatus for examining the crystal lattice of a semiconductor wafer utilizing X-ray diffraction techniques was presented The apparatus is employed in a method which includes the step of recording the image of a wafer supported in a bent configuration conforming to a compound curve, produced through the use of a vacuum chuck provided for an X-ray camera The entire surface thereof is illuminated simultaneously by a beam of incident X-rays which are projected from a distant point-source and satisfy conditions of the Bragg Law for all points on the surface of the water

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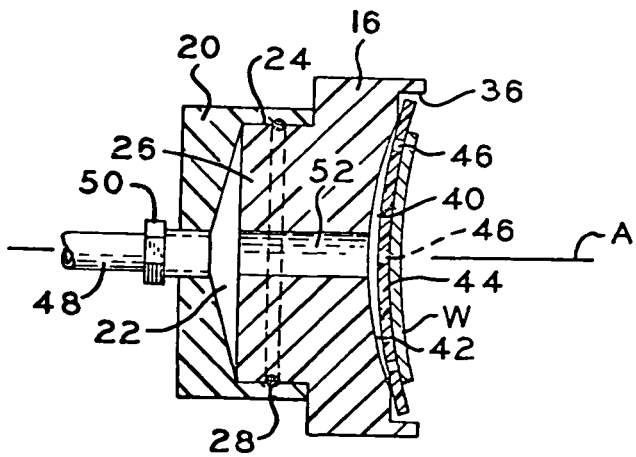


N78-24952*# National Aeronautics and Space Administration Pasadena Office Calif

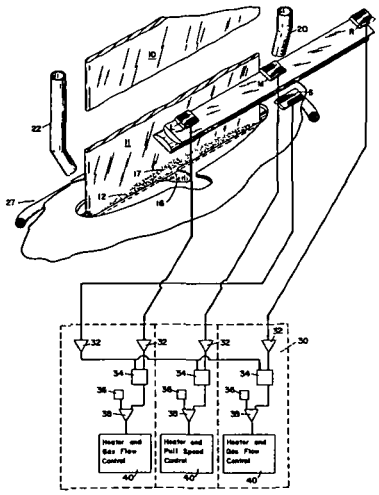
A METHOD OF GROWING A RIBBON CRYSTAL PARTICULARLY SUITED FOR FACILITATING AUTOMATED CONTROL OF RIBBON WIDTH **Patent Application**

Theodore F Ciszek, inventor (to NASA) (IBM Hopewell Junction, N Y) Filed 28 Apr 1978 18 p

(Contracts NAS7-100, JPL-954144)

(NASA-Case-NPO-14295-1, US-Patent-Appl-SN-901055) Avail NTIS HC A02/MF A01 CSCL 20L

A method of growing a ribbon crystal is reported wherein a meniscus of molten semiconductor material attached to vertical movable seed is lifted at a rate substantially equal to the rate at which the meniscus freezes The method is characterized by the steps of continuously sensing the brightness of the growth region of the ribbon in selected areas across the width for detecting changes in brightness intensity Modifying the temperature of the meniscus and the pulling speed in response to changes detected in the intensity controls ribbon geometry NASA



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12 Sponsoring Agency Name and Address		13 Type of Report and Period Covered 14 Sponsoring Agency Code

15 Supplementary Notes

Section 1 - Abstracts

16 Abstract

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