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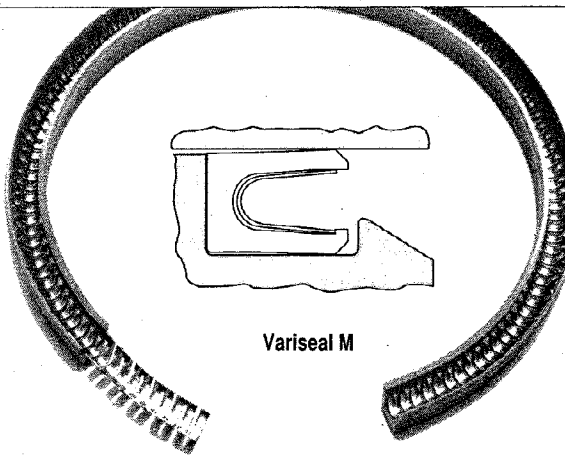
NASA Tech Briefs

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June 1992 Vol 16 Number 6

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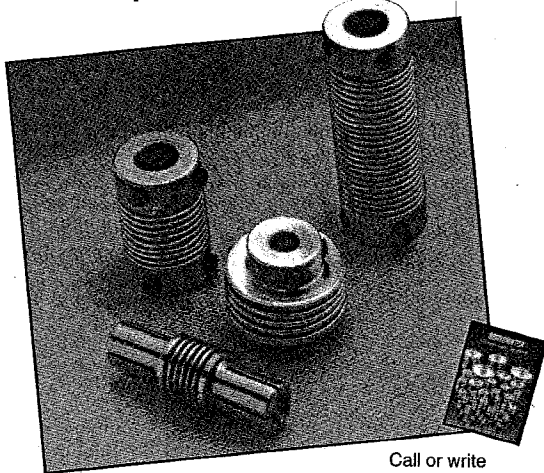


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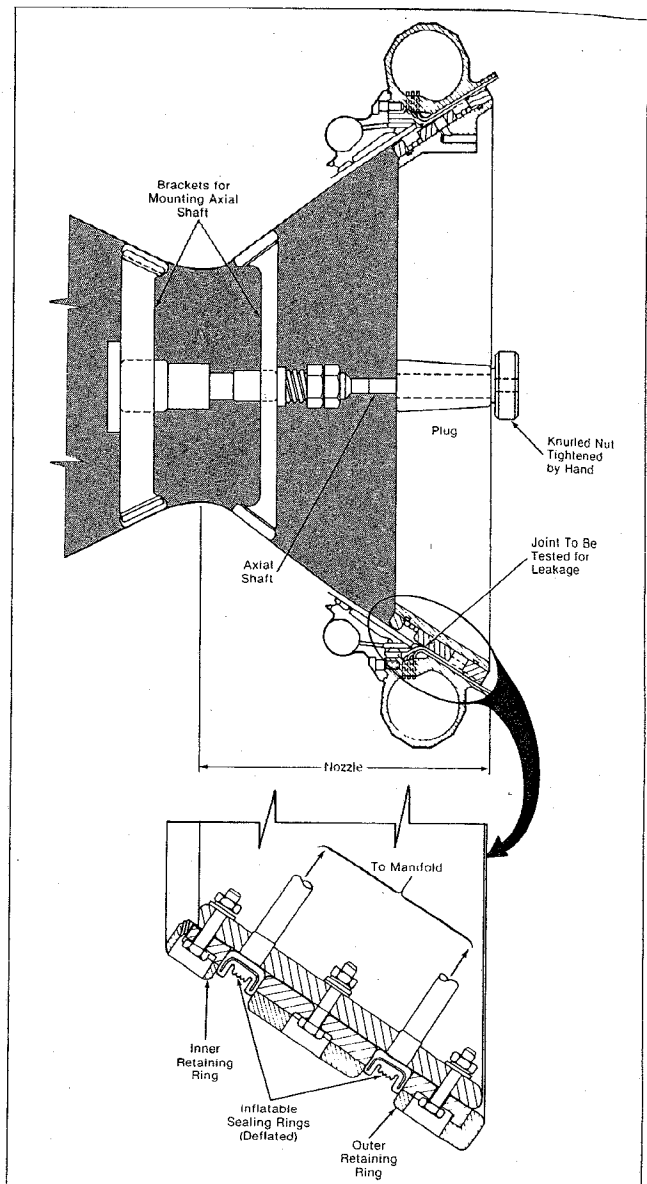
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Inflatable Rings seal a joint. After the rings have been inflated, the space between them is pressurized to test for leakage through the joint.

on the plug, the sealing rings are inflated to a gauge pressure of 25 lb/in.² (0.17 MPa). The joint in the nozzle is then ready for testing.

This work was done by Paul L. Lesh and Cuyler H. Richards of Rockwell International Corp. for **Marshall Space Flight Center**. For further information, Circle 128 on the TSP Request Card. MFS-29810

Improved Helium-Barrier Bag

A controlled artificial atmosphere is formed around a duct.

Marshall Space Flight Center, Alabama

A specially designed bag maintains a helium atmosphere around a large, low-temperature duct. The bag is easy to install, durable, and reusable. It is intended to prevent the cryopumping that would occur if air or nitrogen were allowed to make contact with the cold surface of the duct. The bag was designed for use on the low-pressure fuel duct of the Space Shuttle main engine but could easily be modified to fit other ducts or vessels around which controlled atmospheres are needed.

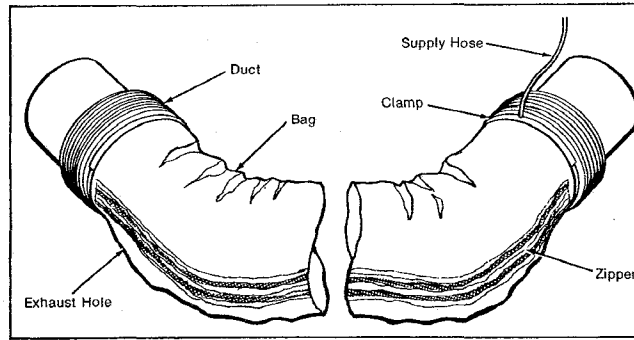
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The bag (see figure) includes an outer, lightweight layer of polytetrafluoroethylene reinforced with fibers, chosen for its strength and resistance to tears and abrasion; and an inside layer of fluorinated ethylene/propylene, chosen for its strength and better adhesion. A zipper of molded polytetrafluoroethylene runs the length of the bag (see figure). The zipper and the two layers are joined together by heat bonding.

The unzipped bag is placed around the duct. The bag is zippered, and its ends are attached to the duct by adhesive tape reinforced by hoop clamps.

Helium is supplied through a hose connected to an inlet fitting at one end of the bag. The helium leaves through a 1/8-in.



The Bag Covers a Duct to maintain a controlled atmosphere around the duct.

(3.2-mm) hole at the opposite end of the bag. The zipper forms an almost leak-tight seal.

This work was done by Brent J. Viger,

Robert F. Logan, and Jeffrey E. Fink of Rockwell International Corp. for Marshall Space Flight Center. No further documentation is available. MFS-29809

Magnetically Operated Holding Plate and Ball-Lock Pin

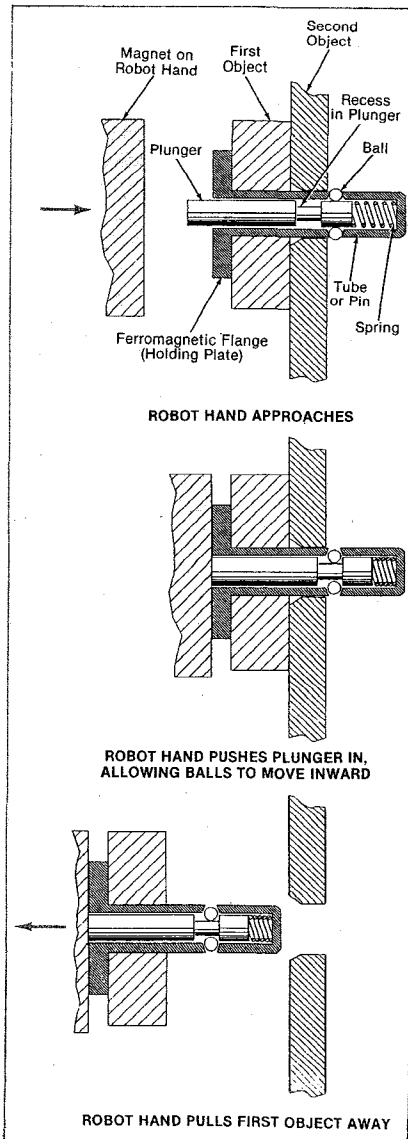
This relatively simple, inexpensive mechanism is suitable for robotic applications.

Lyndon B. Johnson Space Center, Houston, Texas



The Magnetically Operated Holding Plate and Ball-Locking-Pin Mechanism is part of the first object, which is to be attached to, or detached from, the second object. Here, the magnetic end of a robot hand simultaneously takes hold of the first object and operates the mechanism to release it from the second object.

A quick-engagement, quick-release ball-locking-pin mechanism is intended to be operated by a robot while maneuvering a first object (e.g., a tool) and attaching the first object to, or detaching it from, a second object (e.g., a tool holder). In comparison with motorized latches that have been designed for the same purpose, this mechanism is simpler and less expensive.





-269°C to +650°C

Measure shaft position

PROBLEM: A rocket engine designer must measure the orbit of a shaft in a cryogenic pump for the space shuttle. Environments are extreme, ranging from the severe cold of liquid oxygen to the intense heat of turbine exhaust.

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