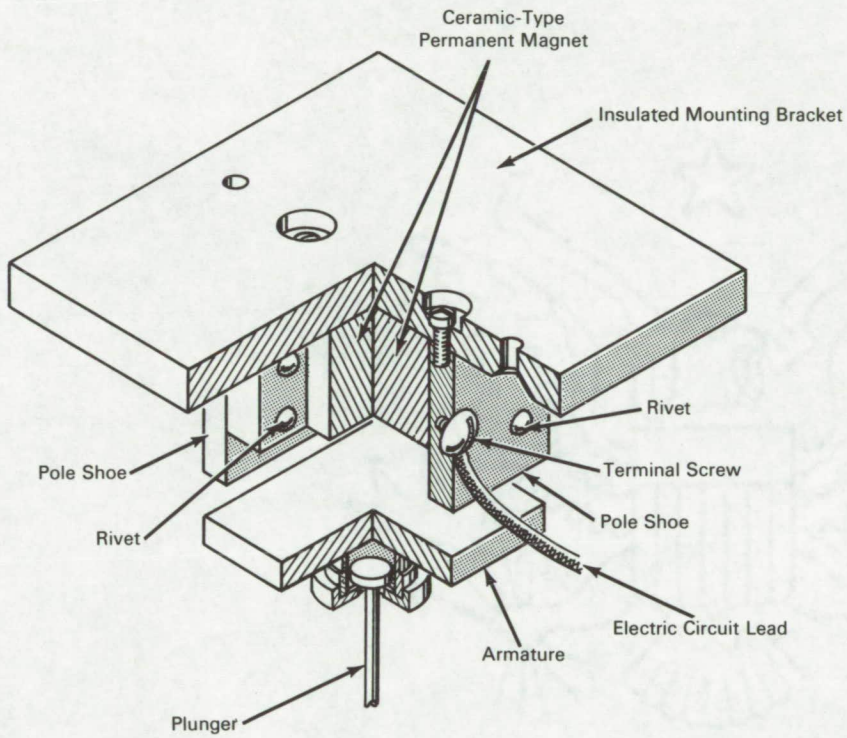
NASA TECH BRIEF

Magnetically Operated Limit Switch Has Improved Reliability, Minimizes Arcing



The problem:

To design a reliable, low travel, snap action limit switch that operates with negligible arcing. Most conventional low travel limit switches use a current-carrying spring and a plunger which requires considerable actuating and holding forces. These switches arc excessively on make and break, and tend to be unreliable because they consist of a relatively large number of parts.

The solution:

A limit switch that employs an electrically nonconductive permanent magnet consisting of a ferrimagnetic ceramic and ferromagnetic pole shoes that form a magnetic and electrically conductive circuit with a ferrous metal armature.

How it's done:

The electrically conductive pole shoes are mounted with rivets on opposite pole faces of the ferrimagnetic, electrically nonconductive ceramic. Terminal screws connect an external electrical monitoring circuit to the pole shoes. The electrically conductive armature is arranged to face the ends of the pole shoes. A movement differential required for snap action is provided by the space between the armature and the

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actuating plunger, which is connected to the device to be monitored.

In operation, the armature will be rapidly attracted to the pole shoes somewhat ahead of the plunger, thereby closing the external electrical circuit. The electrical circuit is broken rapidly, shortly after the start of the downward movement of the plunger. These rapid make and break actions suppress arcing, thereby minimizing contact erosion. Because the current is interrupted within a magnetic field, arcs will also be extinguished by the well-known blowout action.

Note:

Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
Houston, Texas, 77058
Reference: B66-10270

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C., 20546.

Source: Rudolf Steiner
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