# NASA TECH BRIEF

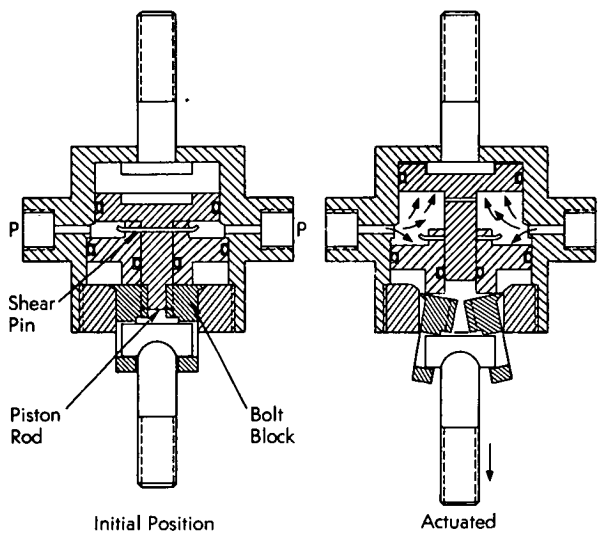
*NASA Pasadena Office*



## Squib-Actuated Disconnect Device

### The problem:

An explosive disconnect-device was needed to release a circular band that was under tension and that held together two stages of a spacecraft, but the escape of the gases released by the explosion had to be prevented.




### The solution:

A piston-operated device which retains the gases released by explosive squibs.

### How it's done:

The device is constructed essentially as shown in the diagram; the ends of the circular band which holds together the spacecraft stages are connected to the protruding bolts. The housing contains two pistons in a cylindrical bore; the lower piston in the diagram is of slightly larger diameter than the upper. As indicated in the left-hand side of the diagram, the two pistons are initially held together by a shear pin passed through the piston rod of the upper piston. The piston rod acts as a separator for a pair of bolt blocks and thus retains the bolt blocks in the position shown in the left-hand side of the diagram. In turn, the bolt blocks support the lower T-head bolt. Squib actuators are attached to the ports P.

When the squibs are fired, the resulting gas pressure is applied to the annulus between the two pistons; the shear pin is cut and the pistons are separated. The piston rod is thus retracted from its position between the bolt blocks and they are free to come together; simultaneously, the boss on the lower piston is forced against the bolt blocks, and since their upper rims are beveled, the blocks are forced by the lower piston into the position shown in the right-hand side of the diagram.

When the lower piston is at the end of its travel, the bolt blocks will have been forced out of the device to free the T-bolt completely. The gases released by the squib will remain confined between the two pistons.

### Note:

Requests for further information may be directed to:

Technology Utilization Officer
NASA Pasadena Office
4800 Oak Grove Drive
Pasadena, California 91103
Reference: TSP72-10097

(continued overleaf)

**Patent status:**

No patent action is contemplated by NASA.

Source: Douglas P. Davis of
Caltech/JPL
under contract to
NASA Pasadena Office
(NPO-11544)