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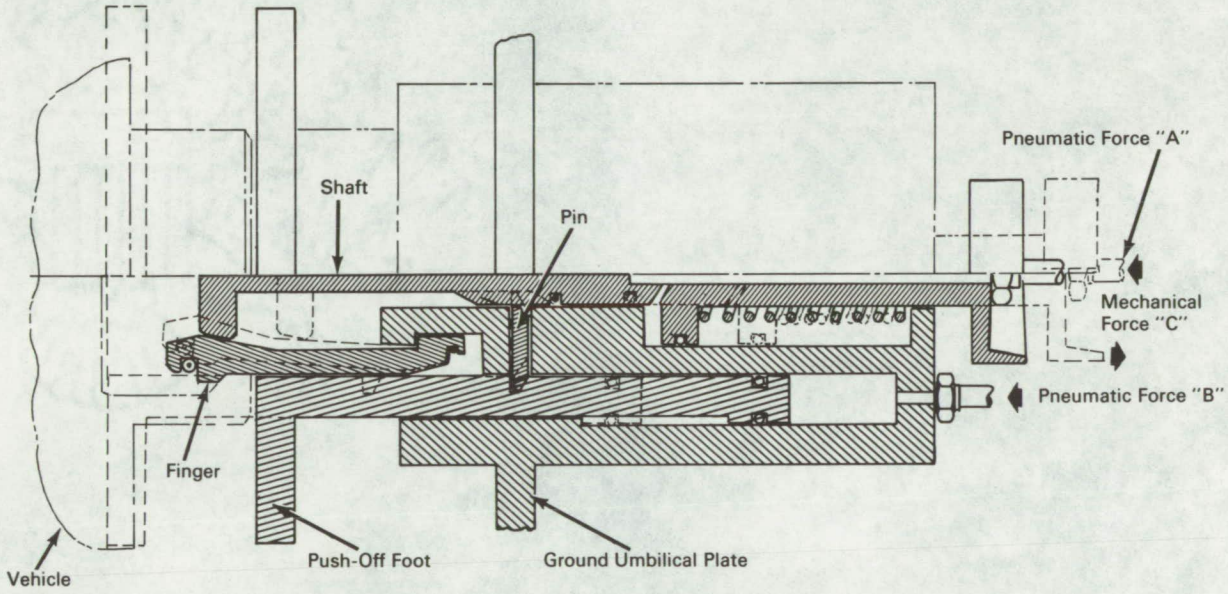
NASA TECH BRIEF

Lock–Disconnect Mechanism Gives Positive Release to Joined Bodies



The problem:

In most conventional umbilical systems, the locking and releasing devices involve multiple pawls or balls in a complex series of mechanical linkages. The magnitude of parts, plus the requirement that all smoothly operate simultaneously to achieve the desired separation, comprise a system often unreliable.

The solution:

A mechanism that locks and unlocks through an internal collet device that is locked and released by the action of a single reciprocating shaft. The appreciable reduction in the number of parts required to operate the mechanism results in a level of reliability higher than in previous systems.

How it's done:

The mechanism, in the locked position, joins the vehicle and the ground umbilical plate. Prior to disconnect, a pneumatic force "B" is applied to preload the push-off foot, which preload is withheld from the vehicle by a series of pins that engage the foot shaft. Upon command to unlock, either a pneumatic force "A" or a mechanical force "C" is applied to the actuator shaft. As the shaft is forced to the right, the fingers collapse toward the centerline of the mechanism, allowing the ground umbilical plate to be unlocked from the vehicle. Upon completion of the unlocking function, the pins begin to ride down the ramp of the actuator shaft. When they reach a predetermined point, the push-off foot is released and its preload forces it against the vehicle, thus separating vehicle and ground umbilical plate.

(continued overleaf)

Note:

Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10123

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: Charles E. Beaver
of The Boeing Company
under contract to
Marshall Space Flight Center
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