

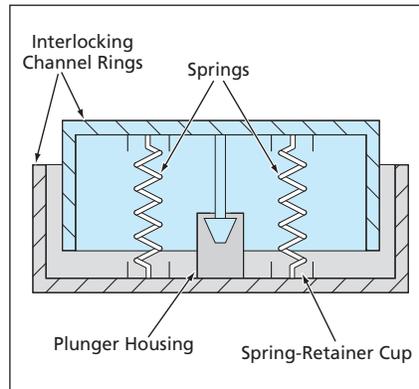
## Variable-Pressure Washer

Clamping force would be applied in a specified nonuniform pattern.

Marshall Space Flight Center, Alabama

The variable-pressure washer (VPW) is a proposed device that is so named because (1) it would play the role similar to that played by an ordinary washer, except that (2) the clamping pressure applied by it would vary with either circumferential or radial position. In a typical contemplated application, the radially varying clamping pressure would be used to obtain more nearly uniform compression on a pair of concentric seals (e.g., an O-ring or a gasket) in an assembly that experiences larger deformations normal to the sealing surface for locations around the outer diameter of the attachment flange when compared to locations around the inner diameter.

The VPW (see figure) would include two interlocking channel rings pushed axially away from each other by compression springlike components located at two or more radial positions. Each spring would have a different stiffness based on the radial location. Overlap-



The Variable-Pressure Washer would contain springs of different stiffnesses at different locations about the central axis.

ping splits in each interlocking channel ring would allow for the non-uniform deformation in the rings. Each spring would be held in place by retaining cups attached to the inner flat surfaces of the channel rings. A plunger attached to one channel ring on the central axis

would be captured in a plunger housing attached to the other channel ring; The capture of the plunger would hold the VPW together.

When the VPW was clamped between two flat surfaces, the clamping force would be distributed unevenly across the face of the washer in the radial direction. The different stiffnesses of the springs would be chosen, in conjunction with other design parameters, to obtain a specified radial variation of clamping pressure in the presence of a specified clamping force.

*This work was done by Stanley S. Smeltzer III and Z. Hector Estrada of Marshall Space Flight Center. For further information, contact Paul Hale at Paul.Hale@msfc.nasa.gov.*

*This invention is owned by NASA, and a patent application has been filed. For further information, contact Sammy Nabors, MSFC Commercialization Assistance Lead, at sammy.a.nabors@nasa.gov. Refer to MFS-31323*