NASA TECH BRIEF

John F. Kennedy Space Center

High-Volume Pressure Relief Valve

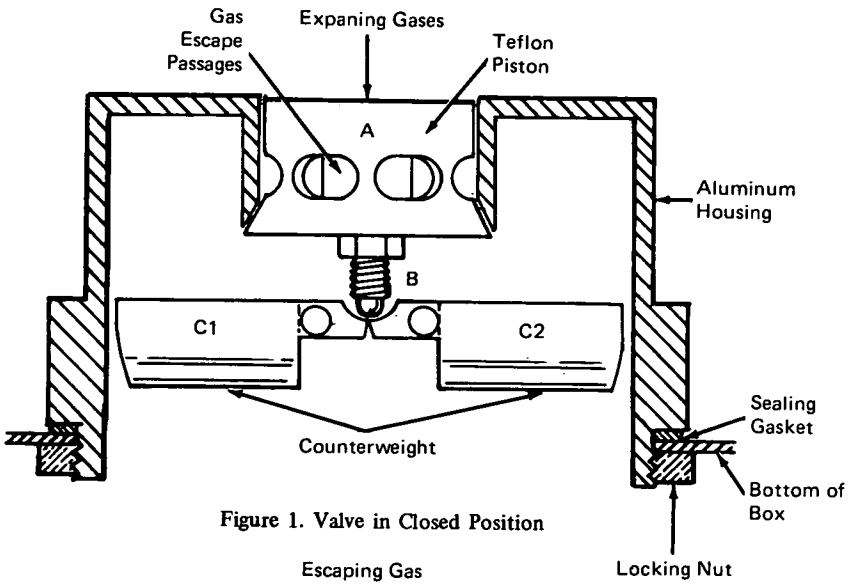

Figure 1. Valve in Closed Position

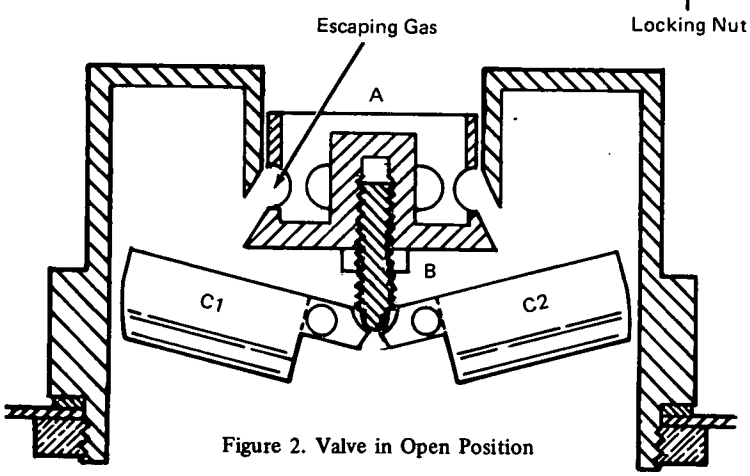

Figure 2. Valve in Open Position

The problem:

Large enclosed systems that build up extreme gas pressure in a short time, as from an explosion, require some way of quickly releasing the gas without damaging the system. Currently used valves cannot release a large quantity of gas quickly, while blow out discs leave the system permanently open.

The solution:

Valves have been designed to use counterweights to assist in opening and/or closing. They can release large volumes of gas almost instantaneously and provide an air-tight seal under normal conditions.

(continued overleaf)

How it's done:

Figures 1 and 2 show the valve in the closed and open position, respectively. As shown here, the valve is mounted inside the enclosure in a vertical position with the Teflon piston A at the top. Under normal pressure, the two counterweights, C-1 and C-2, exert pressure on pin B of the Teflon piston, and the valve is closed. When pressure on the top of A is great enough to cause the downward force on the pin B to exceed the upward force from the counterweights, C-1 and C-2 pivot upwards, and the Teflon piston lowers inside the valve housing. This releases gas through the openings in the piston. A cut-out in the counterweights serves as a gas passage to the outside.

This simply constructed valve requires little maintenance. Similar valves may be designed for a wide range of pressures by using different counterweights.

Notes:

1. This valve could also be used as a coarse pressure regulator for low pressure systems.
2. Requests for further information may be directed to:
   Technology Utilization Officer
   Kennedy Space Center
   Code AD-PAT
   Kennedy Space Center, Florida 32899
   Reference: B72-10536

Patent status:

NASA has decided not to apply for a patent.

Source: Wendall H. Dillard of
Bendix Corp.
under contract to
Kennedy Space Center
(KSC-10707)