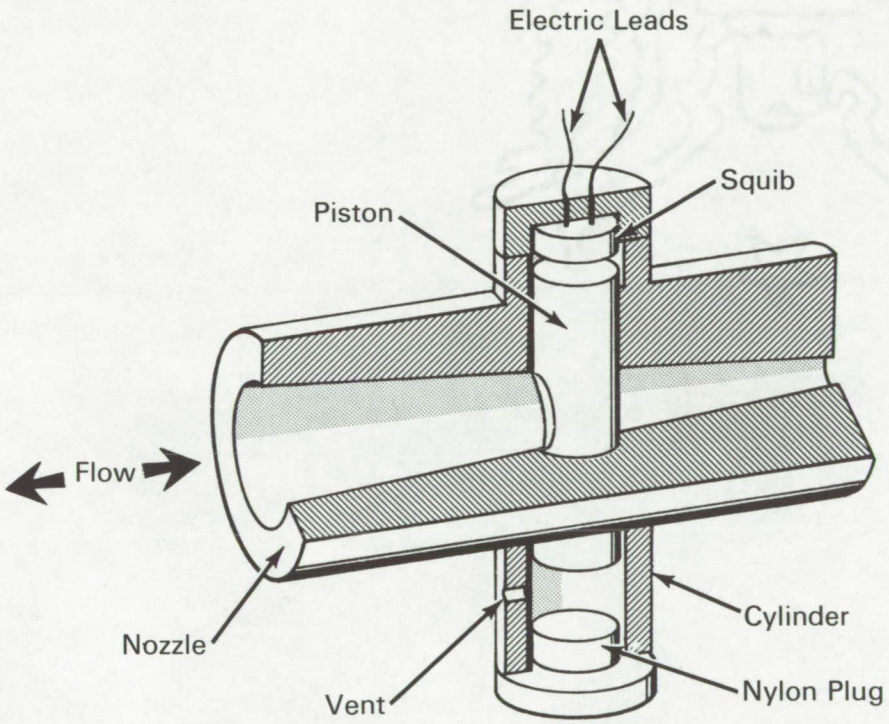
NASA TECH BRIEF

Quick-Closing Valve Is Actuated by Explosive Discharge



The problem:

To devise a remotely controlled valve that will shut off a high-pressure (4600 psi), high-temperature (10,000° F) gas flow in a few milliseconds.

The solution:

A plug-type valve that is actuated by a commercially available electrically initiated squib of low explosive power.

How it's done:

The valve incorporates a piston that is inserted with a light interference fit in a cylindrical bore extending transversely through the flow nozzle. The piston has a radial hole which is concentrically aligned with the axis of the nozzle to provide unobstructed flow when the valve is in the open position. The squib is mounted at a small standoff in a cap above the top of the piston. When the flow is to be shut off, the squib is initiated from a remote voltage source. The resulting detonation drives the piston down the cylinder until it is stopped by the nylon plug. In this closed position, the piston provides a tight seal against the gas flow. Time for complete closure after initiation of the squib is 6 to 8 milliseconds.

(continued overleaf)

Notes:

1. This valve has been used for quick shutoff operation only. Valves of this type can also be designed for remote reverse actuation by mechanical, hydraulic, or explosive means.
2. More rapid closure is attainable with squibs containing heavier explosive charges.
3. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Ames Research Center
   Moffett Field, California 94035
   Reference: B66-10233

Patent status:

No patent action is contemplated by NASA.

Source: Stanley J. Majeski
(ARC-55)