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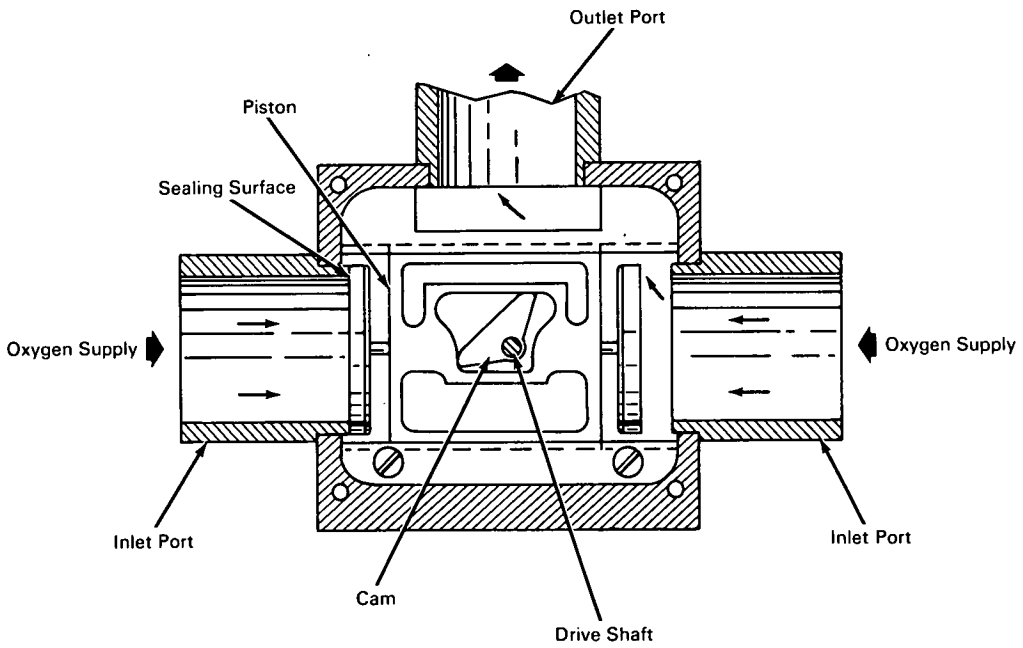
Brief 65-10369

NASA TECH BRIEF

Respiratory Transfer Valve Has Fail-Safe Feature



The problem: To design a quick-acting, remote-controlled valve that will connect either one of two oxygen or air supplies to a breathing tube. The valve must be fail-safe; that is, if there is a malfunction in the mechanism for operating the valve, one or both of the gas supplies must remain connected to the breathing tube. In addition, the valve must offer a low resistance to breathing and be capable of operating at a pressure differential of 5 psi when subjected to omnidirectional accelerations up to 20g.

The solution: A valve incorporating a cammed piston arrangement that is driven by a remote-controlled reversible rotary solenoid or reversible electric motor to connect either one of two oxygen (or air) supplies to a breathing tube.

How it's done: The valve chamber is fitted with two inlet ports, which are connected to separate oxygen supplies, and an outlet port, which is connected to a breathing tube. The chamber is preferably made of transparent plastic to permit visual inspection of the valve interior.

When the shaft, which is connected to a rotary drive mechanism, is rotated counterclockwise, the cam drives the piston to the left, thus sealing the left-hand port from one oxygen supply and opening the right-hand port to the second oxygen supply. Conversely,

(continued overleaf)

the left-hand port is opened and the right-hand port is closed when the shaft is rotated clockwise. Once either port is closed, the rotary drive mechanism may be switched off and the closed port will remain closed until the mechanism is again switched on. If the drive mechanism malfunctions during a switching operation, both inlet ports will be partially open, allowing an uninterrupted flow of oxygen to the outlet port.

Notes:

1. This valve should find application in basal metabolism equipment or other clinical respiratory equipment requiring remote, fail-safe operation.
2. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Ames Research Center
   Moffett Field, California, 94035
   Reference: B65-10369

Patent status: NASA encourages the immediate commercial use of this invention. It is owned by NASA, and patent application has been filed. When patented, royalty-free non-exclusive licenses for its commercial use will be available. Inquiries concerning license rights should be made to NASA, Code AGP, Washington, D.C., 20546.

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