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CANOPY UNLOCK THRUSTER
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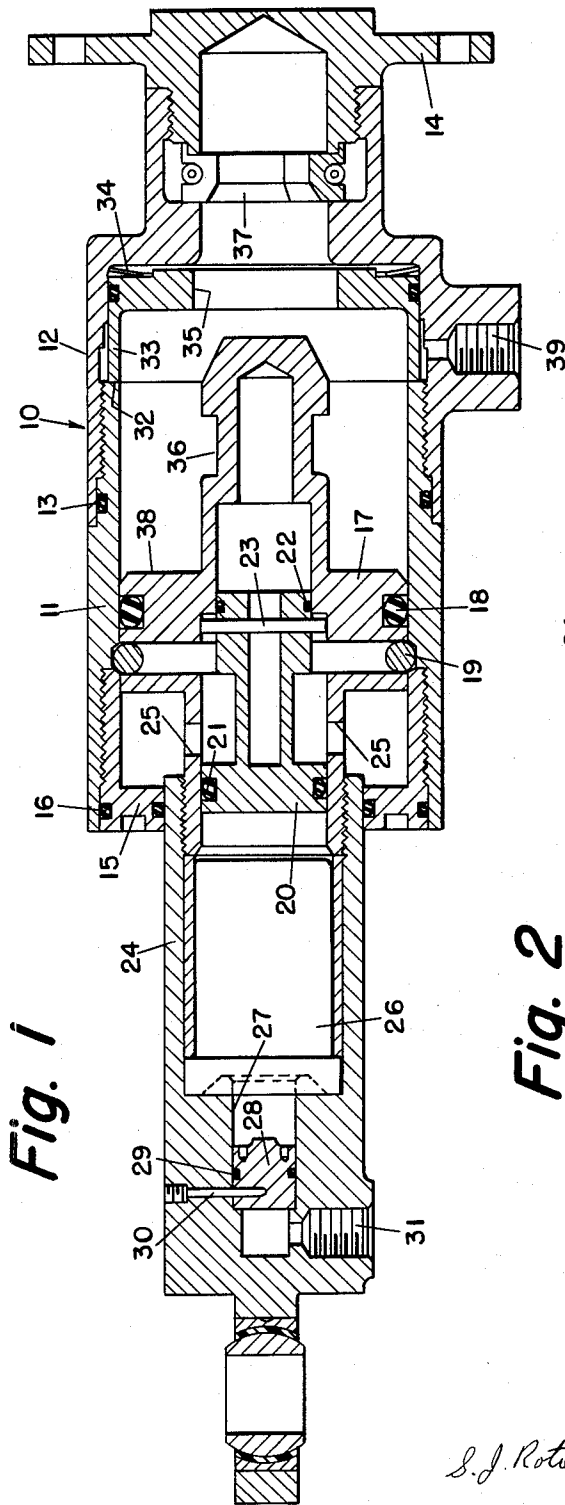
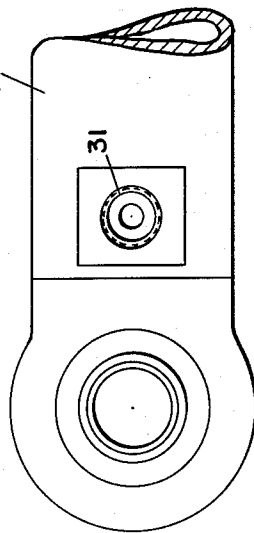


Fig. 1

Fig. 2



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CANOPY UNLOCK THRUSTER

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1 Claim. (Cl. 121—40)
(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to us of any royalty thereon.

This invention relates to means designed to generate a gas pressure for operating a load device such as the canopy remover of an aircraft. Its principal object is the provision of an improved gas pressure generating device which makes its generated gas pressure available for use only at a predetermined point in its operating cycle.

Aircraft escape systems wherein explosive cartridges are fired to generate gas pressures for operating different load devices in a predetermined sequence are well known. The gas for operating the firing pin of such cartridges is frequently generated by a cartridge operated device known as an initiator, or other cartridge actuated devices designed to allow venting of gas after completion of their primary function. To properly time the firings of the cartridges, it is desirable that the operating gas be delivered from the devices only near the end of their operating cycle. The present invention accomplishes this result by the provision of a valve which is actuated by the piston near the end of its stroke to open the outlet through which the operating gas is applied to the firing pin of the cartridge through which the load device is operated.

The invention will be better understood from the following description when considered in connection with the accompanying drawings and its scope is indicated by the appended claim.

Referring to the drawings:

FIG. 1 is a sectional view of the device, and

FIG. 2 illustrates a detail.

The device includes an enclosure 10 which consists of a cylinder 11, a member 12 threaded onto the member 11 with a seal ring 13 therebetween, a member 14 threaded into the outer end of the member 12, and a member 15 threaded into the member 11 with a seal ring 16 therebetween.

A piston 17 encircled by a seal ring 18 is movable in the enclosure 10 and is associated with (1) lock means 19 for interlocking it with the enclosure and (2) lock control means 20. The lock control means 20 is encircled by seal rings 21 and 22, and is held in its illustrated position by a shear pin 23. In this position, it maintains the lock members 19 in engagement with the enclosure 10 and provides a partition between the interior of a firing chamber member 24 and ports 25 in the piston 17.

The firing chamber member 24 is threaded onto the end of the piston 17, encloses a cartridge 26 and has at its outer end a guideway 27 for a firing pin 28 which is encircled by a seal ring 29 and is fixed to the firing chamber member 24 by a shear pin 30. A gas pressure for actuating the firing pin 28 to fire the cartridge 26 is applied through a port 31.

Formed inside the enclosure 10 by the member 11 is an internal shoulder 32 which is aligned with the rim of a cup-shaped member 33. The cup-shaped member 33 is biased against the shoulder 32 by a partially com-

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pressed Belleville spring 34 and has in its bottom an opening 35. As the piston 17 nears the end of its stroke, it extends through the opening 35 and receives in a groove 36 a spring-biased three piece collet 37 by which it is locked in its final position.

Assuming the various parts of the device to be as illustrated, the firing pin 28 is actuated by a gas pressure applied through the orifice 31 and fires the cartridge 26. The gas pressure generated by the firing of the cartridge 26 shears the pin 23 and forces the lock control means 20 into the piston 17 far enough to release the lock members 19 and open the ports 25 to the pressure from firing chamber so that a gas pressure is applied to the piston 17. Thereupon the piston 17 moves, compressing the gas ahead of it until its shoulder 38 engages the bottom of the cup-shaped member 33 and compresses the spring 34. When this happens, the rim of the cup-shaped member 33 is separated from the inner shoulder 32 and the compressed gas escapes through the outlet 39.

The design thus restricts gas flow through the outlet until piston stroke is completed, thereby insuring that premature functioning of the next device in the operating sequence will not occur. Choking off of the opening to the gas outlet, resulting from a return of the piston due to tolerance buildup in the locks, is prevented because the cup shaped member is not fixed to the piston. It is held in the open position by the gas pressure acting on its peripheral edge to oppose the force of the Belleville spring.

It will be noted that the seal ring 18 enters the cup-shaped member 33 before the compressed gas is admitted to the outlet 39. This has the important advantage that the seal ring 18 does not pass any holes or grooves which could injure it and result in the leakage or blocking of the outlet. As will be appreciated by those skilled in the art, this feature is also applicable in reciprocating pneumatic and hydraulic systems.

We claim:

Means forming an enclosure with an inner shoulder intermediate its ends and with an outlet, a cup-shaped member movable in said enclosure, means biasing the rim of said cup-shaped member against said shoulder to close said outlet, a piston movable in said enclosure to engage the bottom of said cup-shaped member, a lock member movable to an interlock position to couple said piston to said enclosure and to a release position, lock member control means movable to a first position to maintain said lock member in said interlock position and to a second position to release said lock member, severable means for maintaining said lock member control means in said first position, means for applying to said lock member control means a gas pressure whereby said severable means is severed, said lock member control means is moved to said second position, said lock member is moved to said release position, said piston is moved into engagement with said cup-shaped member, and said cup-shaped member is moved away from said shoulder to provide an opening between said enclosure and said outlet.

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