

May 14, 1946.

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2,400,322

FLARE PISTOL INSTALLATION

Filed May 12, 1944

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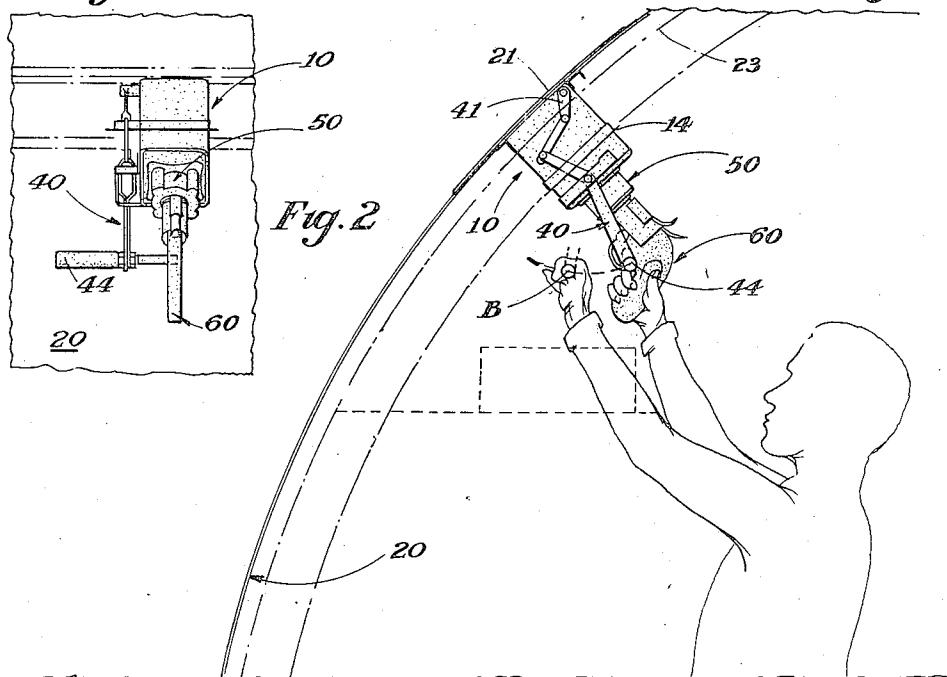
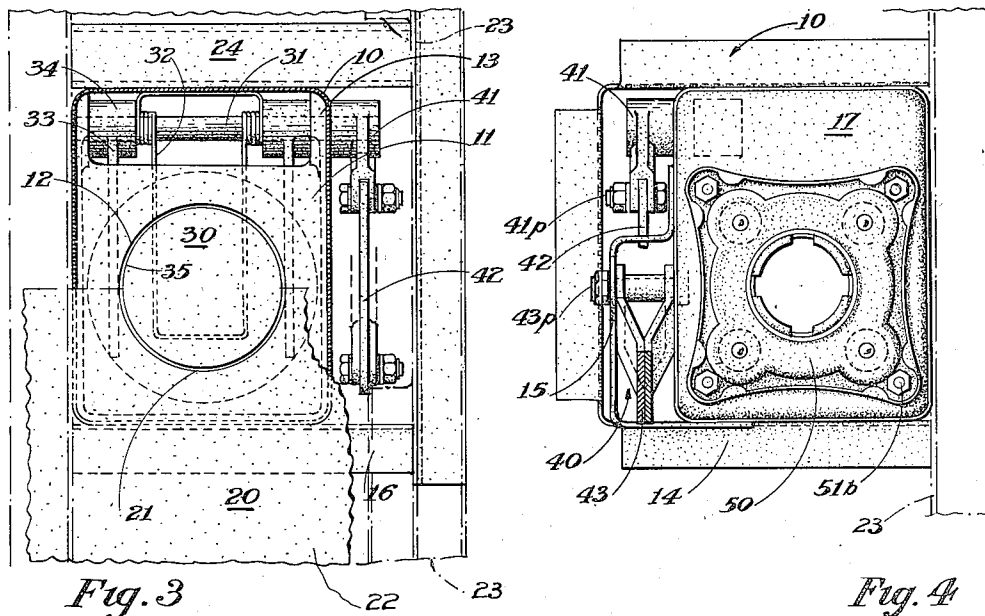


Fig. 1

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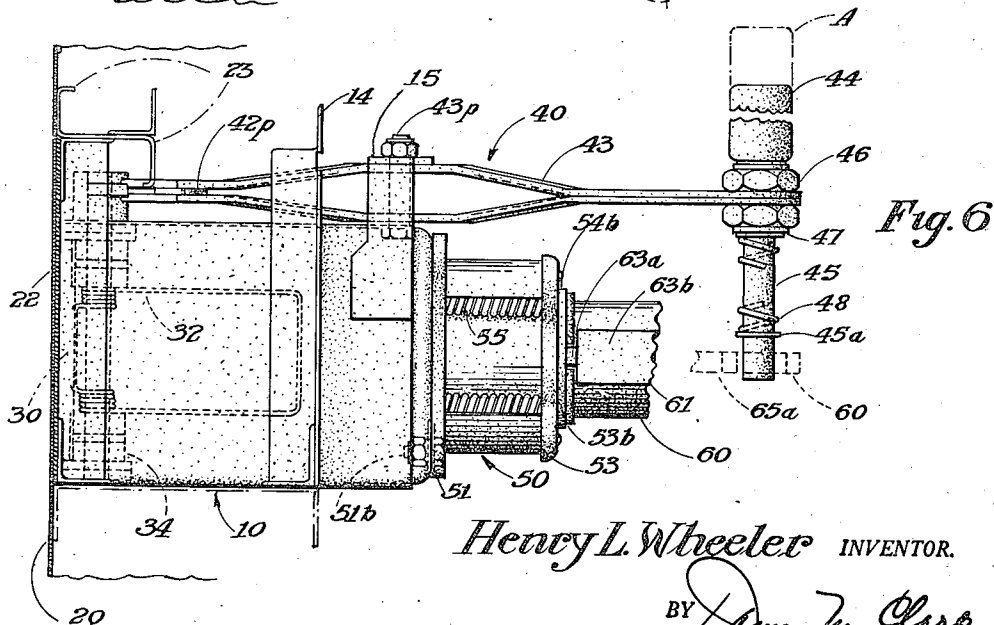
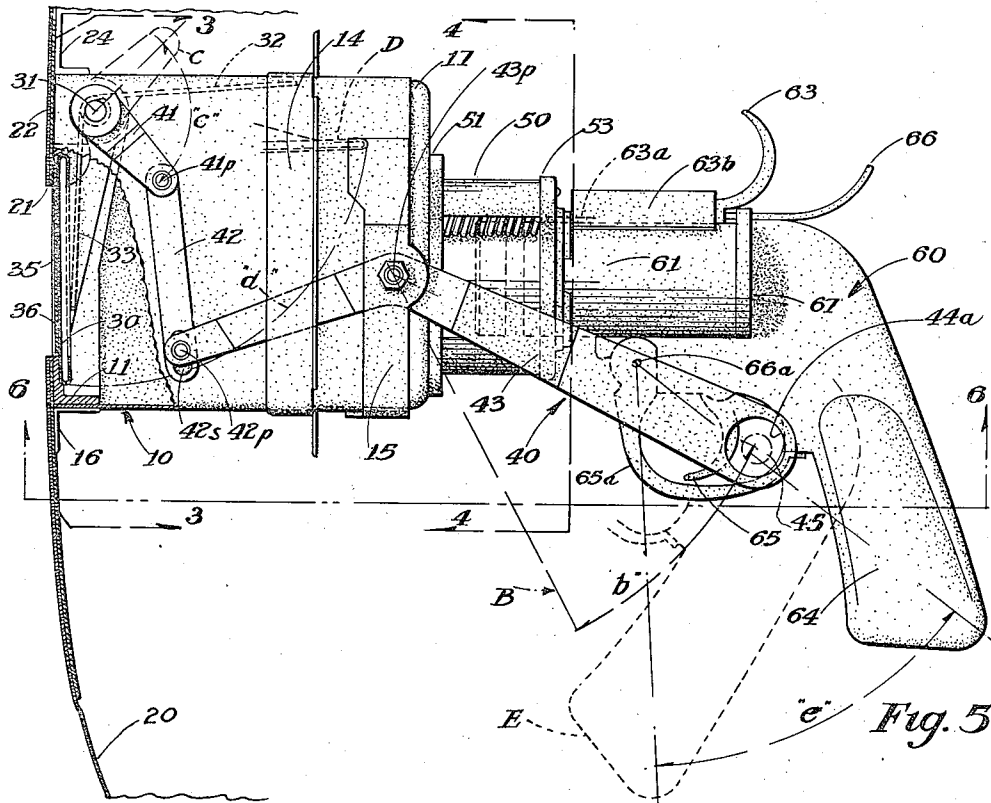
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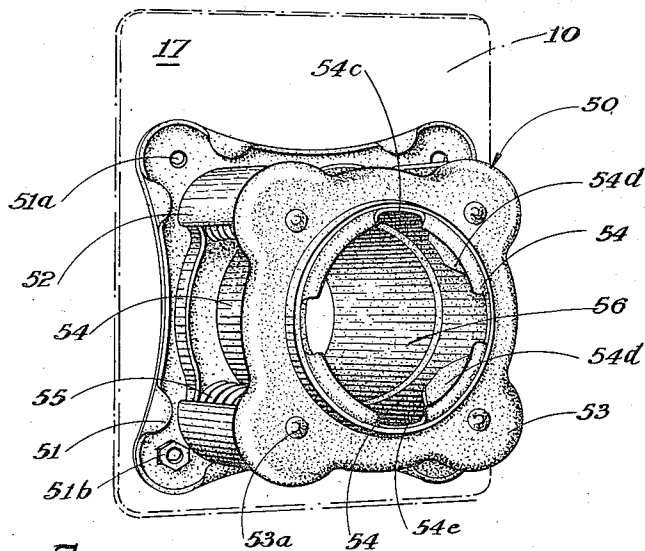


Fig. 7

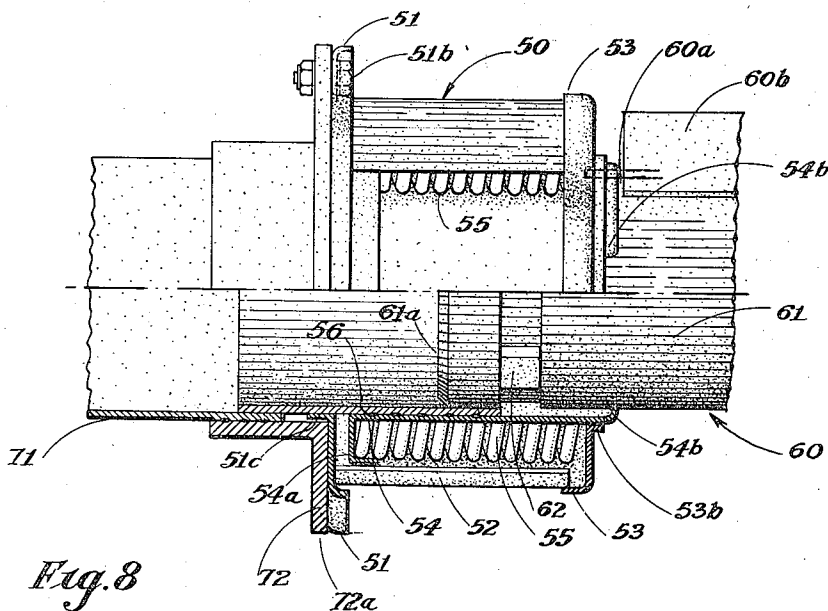


Fig. 8

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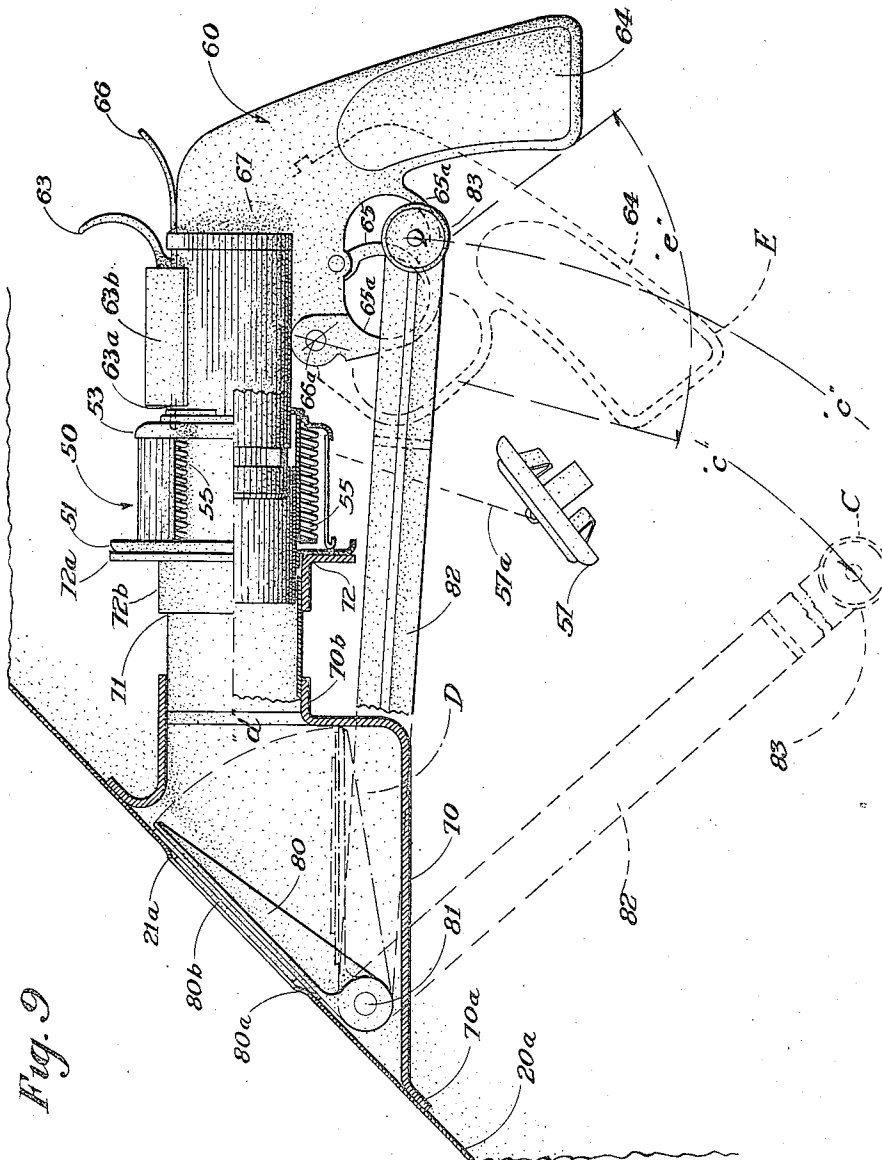
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FLARE PISTOL INSTALLATION

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4 Sheets-Sheet 4



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FLARE PISTOL INSTALLATION

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Application May 12, 1944, Serial No. 535,236

7 Claims. (Cl. 39-37)

The present invention relates to the release or discharge of pyrotechnic and like devices from aircraft, ships and vehicles, and more particularly to flare pistol mounts and installations adapted for firing through the walls of aircraft cabins.

It is a major object of this invention to provide a valved opening in a pressurized cabin for the discharge of a flare pistol into the outside atmosphere while maintaining inside pressure without appreciable loss. A further object is the provision of a fixture or housing permanently attached to the wall structure of an aircraft fuselage without stressing the skin and which housing is adapted to receive a gun or pistol for the firing of ordnance or pyrotechnic flares through the wall or skin of the aircraft body. It is a further object to provide in such a housing a readily actuated valve door by which the opening in the outer skin is prepared for the firing of the flare therethrough and is maintained closed in relatively airtight and watertight condition at all other times. It is a further object to provide actuating mechanism whereby said door is readily moved from its open and closed positions from the exterior of the housing.

A further object of this invention resides in the provision of an adapter unit permanently attached to the valve housing, and provided with an opening and a quick detachable means for the insertion and attachment thereto of a flare pistol of standard make. It is a further and relatively important object of this invention to provide a mechanical interlocking feature associated with the valve actuating mechanism whereby movement of the flare pistol trigger is prevented while the valve is in its closed position. Further objects of the present invention reside in the provision of a flare pistol installation of novel construction and relationship of its component parts, as well as in respect to the wall upon which it is mounted.

Other objects and advantages of the present invention will become apparent to those skilled in the art after a reading of the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a cross-sectional view of an aircraft fuselage depicting the manner in which the present device is operated;

Fig. 2 is an elevational view of the flare pistol installation shown in Fig. 1 as viewed from the interior of the aircraft;

Fig. 3 is an enlarged view on line 3-3 of Fig.

5 of the valve and housing shown in Figs. 1 and 2 as viewed from the exterior of the aircraft wall;

Fig. 4 is an elevational view on line 4-4 of Fig. 5 of the same installation as viewed from the opposite end with the pistol removed;

Fig. 5 is an enlarged view in side elevation of the installation shown in Fig. 1;

Fig. 6 is a bottom plan view on line 6-6 of Fig. 5 of the installation shown in Fig. 5;

Fig. 7 is a perspective view of the pistol adapter unit;

Fig. 8 is a cross sectional side elevation of the adapter of Fig. 7 showing adjacent portions of the housing and pistol barrel; and

Fig. 9 shows a modified installation in which the valve door is installed in an angular wall portion of a non-pressurized aircraft.

Referring now to Fig. 1 there is shown a cross sectional view of a portion of the side wall of a pressurized fuselage 20 in the exterior of which an opening 21 is provided for the firing of distress or signalling flares, which may be of the parachute or other types. The installation shown in this modification is indicated as disposed on an axis extending upwardly and outwardly from the horizontal at an angle of about 45 degrees and substantially radially with respect to the fuselage wall. The installation comprises essentially a housing 10 within which a valve 30 (Fig. 5) is contained, an actuating mechanism 40 for manual control of the valve, an adapter 50 and a flare pistol 60. Fig. 2 supplements the showing in Fig. 1 by providing an elevational view of the installation as viewed from within the fuselage looking outwardly toward the opening 21.

Referring now to Figs. 3 to 6 inclusive it will be noted that the housing 10 is rectangular in shape, being closed on all four sides and provided with a door seat fitting 11 fitted into and attached to its outer end. The housing 10 is preferably formed from stainless steel sheet to provide a highly resistant material against the flash and fire of the exploding shell. The fitting 11 is provided with a circular seat opening 12 and in its upper corners is provided with apertured lugs 13 adapted to receive the valve door pivot shaft 31. The aforementioned opening in the fuselage wall is formed by a circular opening 21 within the patch plate 22. The housing 10 is preferably attached directly to the fuselage wall structure 20 as by means of the supporting angles 16 and attachments to the reinforced sta-

tion ring 23 and the intermediate longitudinal channel 24. This provides a rigid and strong attachment to absorb the load induced by the pistol's recoil when being fired. To the sides of the housing 10 there is also attached the framing angle 14 which serves as a support for the inner wall finish which may include the attachment of suitable sound-proofing, and the like. At the inner end of the housing there is provided a suitable bracket 15 spaced from its side wall to form a main pivotal support for the valve door actuating mechanism to be described below.

The valve door 30 is of circular shape having a neoprene disc covering 36 and an outer circular patch plate 35 of slightly lesser diameter than the opening 12 in the valve seat. The valve 30 is adapted to rotate about its pivot 31 from which it is supported by the dual integral brackets 33 and the integral apertured lugs 34. A spring 32 of substantially rectangular form having coil portions concentrically disposed about the pivot 31 is arranged to bear upon the back of the valve door or closure 30 and return the door to its closed position.

The valve door actuating mechanism 40 consists essentially of a series of pivotally interconnected levers extending from the door pivot 31 to the handle 44. The latter is disposed to swing in an arc which brings it into a position where it blocks the movement of the pistol trigger, as will be described below. A lever 41 having a suitably apertured lug portion is fixedly keyed or attached to the outer end of the pivot 31. The outer terminal of the lever 41 is also suitably apertured and bifurcated to receive the apertured end of the link 42 to which it is attached by the pivot pin 41p. The link 42 is provided with a slotted opening 42s at its lower terminal and is pivotally attached to an end of the bellcrank lever 43 by means of the pivot pin 42p. The bellcrank lever 43 is made up of two spaced parallel bars having converging ends and is pivotally supported from the housing 10 at its intermediate spaced portion by means of the pivot pin 43p mounted within a suitable aperture in the supporting bracket 15. The inner end of the bellcrank lever 43 is suitably apertured at 44a for a transverse handle 44. The handle is provided with a cylindrical shank portion 45 and is movably supported within the opening 44a of the bellcrank lever 43 by means of the pair of lock nuts 46 threadedly engaging the outer surface of the sleeve 47 within which the shank 45 is adapted to slide freely against the pressure of the coil spring 48 attached at its outer end to the shank as by the washer at 45a. It will accordingly be seen that downward and outward rotation of the handle 44 into the position indicated at B in Fig. 5 causes rotation of the bellcrank 43 about its pivot 43p and corresponding upward movement of the link 42 imparting counterclockwise rotation through approximately 90 degrees to the lever 41 to its position C, thereby opening the valve 30 to the dotted position indicated at D. The spring loading of the valve door 30 keeps it secure when closed inasmuch as the air pressure alone acting on the inside of the door does not in all cases maintain a complete seal. Due to the leverage ratio of the actuating mechanism, however, a relatively small control force exerted upon the handle 44 will open the valve. It will also be apparent from the bottom view in Fig. 6 that the handle 44 can be pulled laterally or outwardly away from the pistol 60 into its dotted position

at A, the shank portion 45 sliding through the sleeve 47 to compress the spring 48. When outward pull on the handle 44 is discontinued the spring 48 will again serve to bring the handle back into the full line position as shown in Fig. 6.

The adapter 50, as more clearly shown in Figs. 7 and 8, consists essentially of two relatively telescoping portions between which are resiliently interposed a plurality of springs. The first of these two portions comprises the mounting flange 51 having apertures 51a through which it is attached by bolts 51b to the end plate 17 of the housing 10. Extending from the mounting flange is a framework 52, the end of which is covered by a cap or cover plate 53 attached to the mounting flange 51 by means of the several bolts 53a. Concentrically disposed within the frame 52 and the end plate 53 is an annular tube 54 having an outwardly turned flange portion 54a adapted to partially embrace the recoil springs 55, and having an inwardly turned portion at 54b adapted to closely embrace the barrel of the flare pistol. The recoil springs 55 are concentrically disposed about the bolts 53a, being retained between the opposed faces of the elements 53 and 54 and 90 degrees apart about the pistol axis. An inner annular flange 53b is provided on the cover plate 53 to provide a slip fit with respect to the main cylindrical portion of the tube 54. A cylindrical tube 56 is spot welded or otherwise fixedly attached to the inner surface of the tubular element 54 and slidably fits over the intumed flange portion 51c of the mounting flange or plate 51.

The adapter which is shown in the perspective view in Fig. 7 is preferably the form which would be used with the modification shown in Figs. 1 to 6 inclusive, and the adapter shown in Fig. 8 is preferably for use with the modification shown in Fig. 9. The flare pistol 60 is of the same construction in both modifications, however, and it will be noted by reference to Fig. 8 that its barrel portion 61 terminates in a muzzle end 61a and is provided adjacent thereto with a plurality of radially extending lugs 62, four being provided at 90 degrees apart. The intumed flange 54b of the tube 54 is provided with cut-out portions 54c also spaced 90 degrees apart to receive the lugs 62 on the pistol barrel 61. The inner cylindrical surface of the mount tube 54 is provided with a like number of lugs 54d having tapered side faces 54e which serve as cams when the pistol 60 is rotated to force the lugs 62 thereof forwardly against the inner end of the tube 56. The lugs 62 and the detents 54d accordingly serve as a bayonet retaining joint for the pistol which can be readily removed by rotation through approximately 45 degrees in either direction from its normal central position. The pistol is provided with a trigger 63 having a tongue portion 63a and an intermediate portion adapted to slide in the guide 63b. The tongue 63a is adapted to engage within the notch 54c (through which the upper lug 62 also passes), as more clearly shown in Fig. 7, in order to prevent rotation of the pistol within the mount and thereby avoid its undesired release.

It will accordingly be seen that the adapter mount 50 provides a means for absorbing the recoil resulting from firing of the flare pistol as well as a quickly detachable mount for readily inserting the barrel of the pistol and locking the same rigidly in place. Firing of the pistol 60 as viewed in Fig. 8 results in a recoil or reaction tending to move the pistol backwards or to the

right. Inasmuch as the lugs 62 are firmly abutting or shouldered against the lugs 54d, backward translation of the pistol barrel causes similar movement to be imparted to the inner mount cylinder 54. This translation is, however, opposed by the compression coil springs 55 which absorb the recoil and return the pistol to its initial position after the reaction forces have been spent. The out-turned flange portion 54a is suitably apertured for the rods or bolts 53a such that relative rotation between the members 53 and 54 is prevented and the latter element is guided and restrained in an axial direction by the pins or through-bolts 53a.

The pistol 60 is of a standard pyrotechnic type adapted to fire parachute or other flares and includes the aforementioned barrel 61, attachment and release mechanism 62 and 63, a butt or handle portion 64, a trigger 65, and a trigger guard 65a. The gun is also provided with a reloading release latch 66 by means of which the pistol may be "broken", or opened for reloading, by downward rotation about the pivot axis 66a to the dotted position E in which the breech cover 67 exposes the pistol breech permitting removal of the fired flare cartridge and the reloading with a new cartridge. The firing of the cartridge and its reloading is well known and its further description is not considered necessary.

In the modification shown in Fig. 9 which is an angular valve type for a non-pressurized cabin, the gun 60 is shown installed in a sloping fuselage wall 20a in which there is provided an opening 21a. A valve housing 70 is attached as by the flanges 70a to the fuselage wall and provides a casing for the valve 80. The housing 70 is provided with a circular throat or opening at 70b into which is fitted and attached the blast tube 71. The inner end of the blast tube is provided with an angular flange 72, the transverse face portion 72a of which is attached to the mounting plate 51 of the adapter 50 and is similarly apertured to receive the mounting bolts 51b. The hub portion 72b of the flange 72 is spot-welded or otherwise fastened to the outer cylindrical surface of the blast tube 71.

The valve 80 is attached to the axis pivot 81 which extends through the side wall of the casing 70 as in the earlier modification, and has attached to its projecting portion an actuating lever 82 to the end of which there is attached a movable handle 83 having its shank portion projectible into the space behind the trigger 65 and within the trigger guard 65a. The valve door 80 is substantially similar to that in the modification shown in Fig. 5 with the exception that it is not spring-pressed and for installations in which the cabin is not pressurized the neoprene disc or gasket may also be dispensed with. The valve disc is preferably provided with a raised portion 80a which seats closely against the fuselage patch plate 20a, and also has a further raised portion 80b which fits into the opening 21a. The opening 21a and the valve disc is preferably elliptical in shape, the clearance being determined by the projection of the circular gun bore through the inclined plane of the sloping fuselage wall. When the pistol is entirely removed from the adapter 50 the hole in the latter is preferably capped or plugged by the cap fitting 57 retained to the adjacent structure by means of the chain 57a.

The operation of the valve doors and the firing, reloading and removal of the pistol in each modification is substantially the same. Referring now to the modification shown in Fig. 5, it will be

noted that in the full line position shown in this figure the shank of the handle 44 projects into the space within the trigger guard behind the trigger 65 preventing the firing of the pistol 60 as long as the handle is in this position and the door remains closed. Lateral pull on the handle 44 releases its shank from its blocking position within the pistol trigger guard and the bellcrank 43 can be rotated downwardly through the angle b to the position B, during which movement the lever 41 rotates through the angle c to its position C. As a result of this movement the valve door 30 is rotated from its closed to its fully opened position D passing through the angle d, against the opposition of the coil spring 32. In this modification sufficient clearance is provided about the handle shank 45 and within the trigger guard and behind the trigger 65 to permit approximately a six degree movement of the bellcrank 43 to facilitate positioning the shank and during which movement the slot 42s in the link 42 serves as a lost-motion device and prevents opening movement to be transmitted to the valve door. As indicated above, the pistol is removed from the adapter by outward pull on the release trigger 63, whereupon the tongue 63a permits rotation of the gun about its axis in either direction to release its lugs 62 from the bayonet joint. On the other hand, if it is desired to reload the pistol the breech is opened by pressure upon the latch 66 whereupon the butt 63 can be rotated through the angle e to its dotted position E, being rotated about the pivot 66a while the handle 44 has been withdrawn to permit this rotation. The adapter in this modification is also provided with a similar lug 57 for capping of the opening in the adapter with the gun removed in order to prevent inadvertent placing of objects within the casing 10 causing fouling of either the door or the ejected flare, and for other obvious reasons.

The operation of the modification shown in Fig. 9 is briefly as follows: Lateral pull on the handle 83 releases its shank from within the trigger guard 65a, as in the previous modification, and permits rotation of the lever 82 through the angle c to its dotted position at C. During this movement the valve door 80 has been rotated through the angle d to its dotted position at D wherein an unobstructed opening is provided for the firing of the flare by actuation of the pistol trigger 65. The removal of the flare pistol from the adapter 50 and the method of its reloading by actuation of the trigger and latch mechanism 63 and 66 respectively is identical with the corresponding operation in connection with the previously described modification.

While in the modifications shown the wall through which the gun is fired is described as a fuselage wall, it will be understood that the term "wall" also implies the surface, skin or enclosure of any like body and may likewise be the exterior shell of a shield, turret or other body. Other forms and modifications of the disclosed subject matter, both with respect to its general arrangement and the details of its respective parts, which become apparent to those skilled in the art after reading the present disclosure, are intended to come within the scope and spirit of the present invention as more particularly set forth in the following claims.

I claim:

1. A pistol installation comprising an aircraft wall, an opening in said wall, valve means for said opening arranged to prevent loss of air pressure

therethrough, a pistol supported from said wall, said pistol having a firing trigger operating within a trigger guard, actuating mechanism connected to said valve means including a plurality of interconnected levers, a manually actuated detent supported by said actuating mechanism normally disposed in the closed position of said valve means between said trigger and trigger guard to prevent firing of said pistol, and a lost-motion device associated with said actuating mechanism arranged to prevent opening of said valve within limited movements of said actuating mechanism as defined by movement of said detent between said trigger and trigger guard.

2. The combination with a pyrotechnic installation including a wall, an opening in said wall, a pistol supported from said wall aimed to fire through said opening, said pistol having a firing trigger, closure means for closing said opening, and actuating mechanism arranged for said closure means, of interlocking means associated with said closure actuating mechanism arranged in one of its positions and in the closed position of said closure means to block firing movement of said trigger.

3. In a pyrotechnic installation, a wall, an opening in said wall, valve means for closing said opening, a pistol fixedly supported from said wall aimed through said opening, means for firing said pistol, and manually movable interlocking means operatively carried by said valve means arranged in one of its positions to block said firing means in the closed condition of said valve means.

4. In an ordnance installation, a wall, an opening in said wall, valve means for closing said opening, a housing supported from said wall adjacent said opening and said valve means, an ordnance member supported by said housing aimed for firing through said wall opening, and actuating means for said valve means arranged in one of its positions and in the closed condition of said wall opening to prevent discharge of said ordnance member.

5. A pistol installation comprising an aircraft wall, an opening in said wall, valve means for closing said opening, a pistol supported from said wall aimed to fire through said opening, said pistol having a firing trigger, actuating means arranged for the opening and closing of said valve means, and a movable detent carried by said valve actuating means arranged in one of the positions of said detent in the closed position of said valve means to block firing movement of said trigger.

6. A pistol installation comprising an aircraft wall, an opening in said wall, valve means for closing said opening, a pistol supported from said wall aimed to fire through said opening, said pistol having a firing trigger, actuating mechanism for the operation of said valve means, safety means movably carried upon said actuating mechanism arranged in the closed position of said valve actuating means to block firing movement of said pistol and resilient means urging said safety means into said blocking position.

7. A flare pistol installation comprising an aircraft wall, an opening in said wall, an airtight housing attached to said wall in surrounding relationship with said opening, said housing having an aperture in its end opposite said wall opening, a valve closure pivotally mounted within said housing for closing said opening, resilient means arranged to urge said valve closure into its closed position, a flare pistol releasably supported within the end aperture of said housing, mechanism for actuating said valve closure including a lever, a handle movably mounted upon said lever having a blocking portion, said flare pistol having a firing trigger operable within a trigger guard, the said blocking portion of said handle arranged to extend between said trigger and said trigger guard in the closed position of said valve closure and actuating mechanism to prevent firing of said flare pistol.

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