Jan. 18, 1955 J. E. HOGAN ET AL 2,699,962

FLUSH-TYPE LATCH

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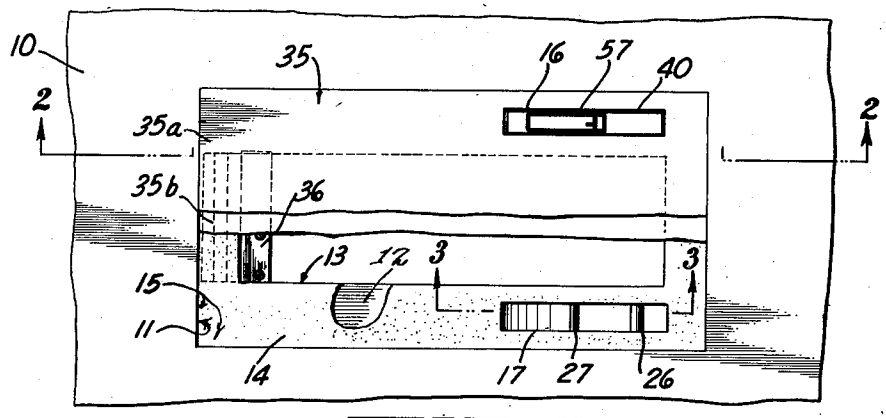



FIG. 1.

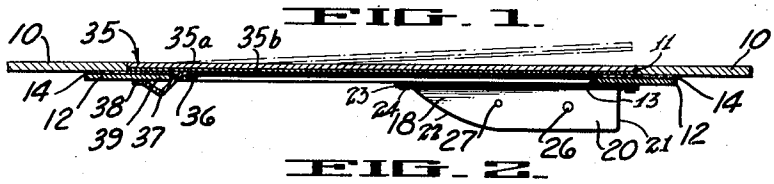



FIG. 2.

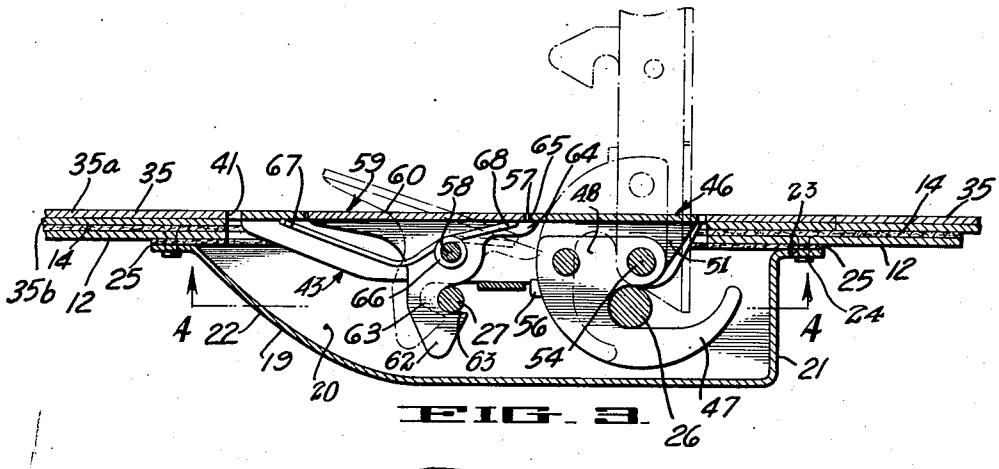



FIG. 3.

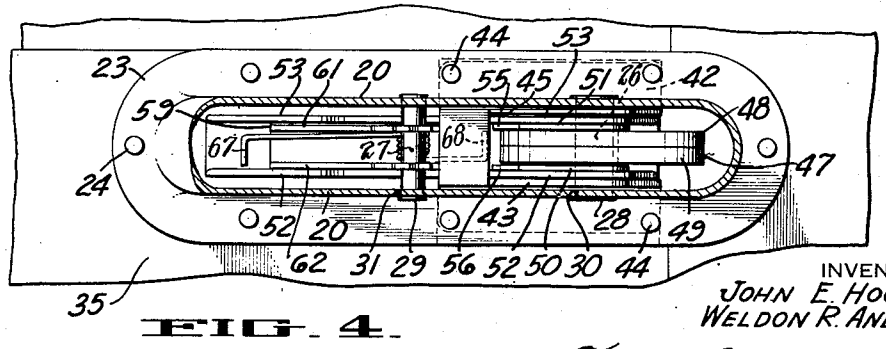



FIG. 4.

INVENTORS.
JOHN E. HOGAN,
WELDON R. ANDREW.

BY Lyon & Lyon ATTORNEYS.

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FIG. 5

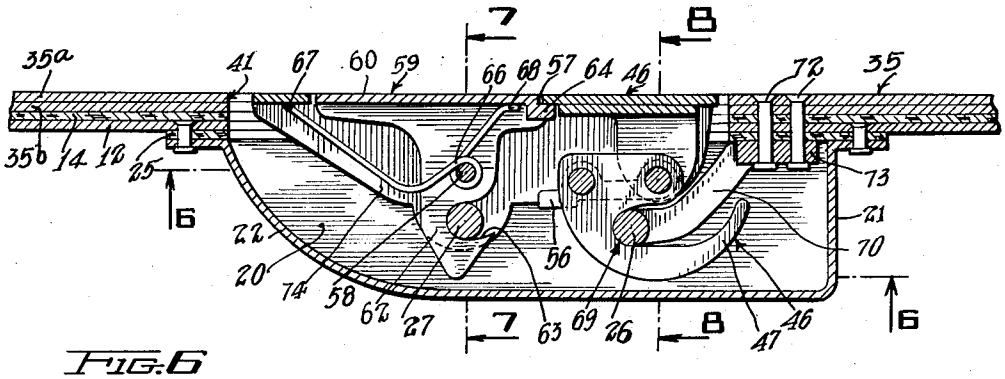



FIG. 6

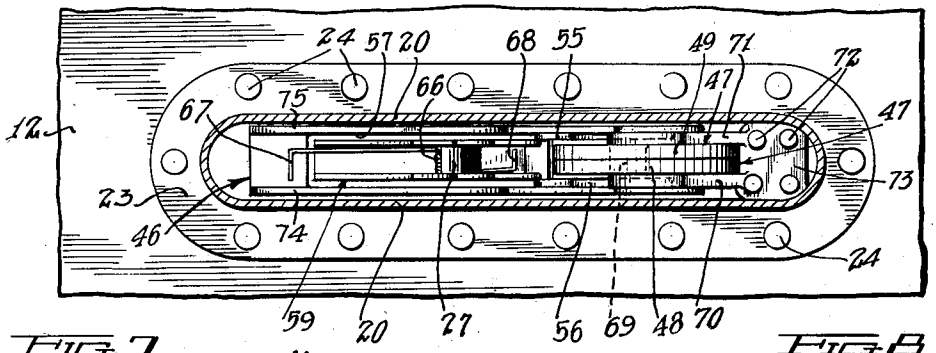



FIG. 7

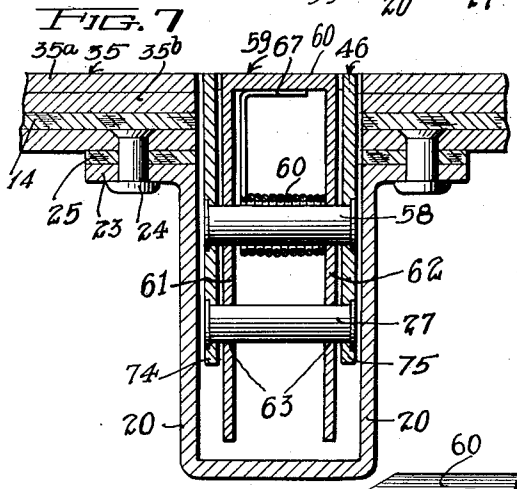



FIG. 8

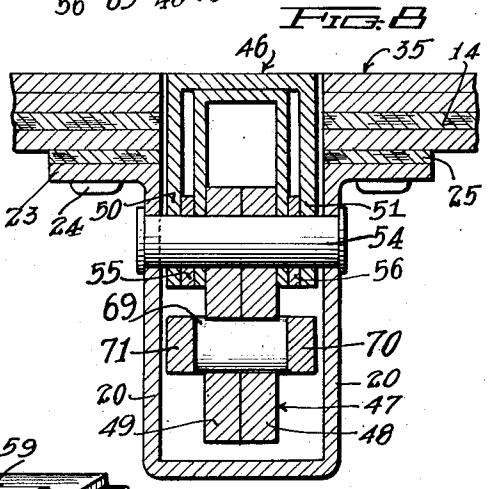
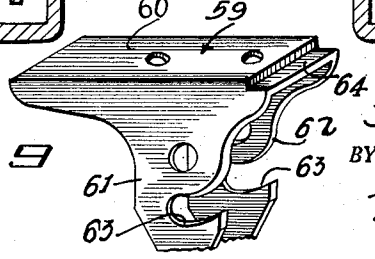



FIG. 9




INVENTORS.
JOHN E. HOGAN
BY WELDON R. ANDREWS
Lyon & Lyon
ATTORNEYS

United States Patent Office

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# FLUSH-TYPE LATCH

John E. Hogan, Los Angeles, Calif., and Weldon R. Andrews, Seattle, Wash., assignors to Clark Hartwell and Eleanor M. Hartwell, both of Los Angeles, Calif., doing business as Hartwell Aviation Supply Company, Los Angeles, Calif.

Application January 11, 1951, Serial No. 205,552

6 Claims. (Cl. 292—108)

This invention relates to a flush-type latch, and more particularly to a flush-type latch of the lever operated type, especially adapted for a closure for pressurized compartments of aircraft.

In modern, high-speed, high-altitude aircraft, it is common and necessary to provide pressurized compartments and cabins and it is also necessary that the various openings leading into the compartments be provided with latch mechanisms, which not only positively insure the compartments against accidental opening, but in which the latches are flush with the surface of the outside of the aircraft, thus reducing friction loss at high speed. It is also necessary that the doors to such compartments be provided with a substantially airtight seal.

It is accordingly one object of this invention to provide a flush-type latch of the type described which provides an airtight seal.

It is a further object of this invention to provide a flush-type latch of the type described which has secondary means insuring against accidental opening.

It is a still further object of this invention to provide such a flush-type latch of the lever operated type in which not only the primary latching lever assumes a flush position in latched condition, but in which a secondary lever also assumes a flush position in its dogging position.

These and other objects and advantages of the invention will be apparent from the annexed specification in which:

Figure 1 is a plan view of a closure provided with a flush-type latch embodying the present invention with parts broken away for clarity of illustration;

Figure 2 is a section taken along the line 2—2 of Figure 1;

Figure 3 is an enlarged section taken along the line 3—3 of Figure 1;

Figure 4 is a section taken along the line 4—4 of Figure 3;

Figure 5 is a side elevation of a flush-type latch embodying a modification of this invention;

Figure 6 is a section taken along the line 6—6 of Figure 5;

Figure 7 is a section taken along the line 7—7 of Figure 5;

Figure 8 is a section taken along the line 8—8 of Figure 5;

Figure 9 is a perspective view of the auxiliary latch member.

The numeral 10 represents a plate such as the outer skin of an aircraft or the like having a preferably rectangular opening 11 therein. A plate 12, having a smaller rectangular opening 13, is provided and is preferably riveted to the plate 10 with a cork seal 14 interposed therebetween. The plate 12 and the superposed cork seal 14 extends inwardly on all sides from the edges defining the opening 11 in the plate 10, as indicated at 15. The plate 12 is provided adjacent one end thereof with a pair of openings 16 and 17. Aligned with each of the openings 16 and 17 and affixed to the plate 12 on the rear side thereof are a pair of depending wells 18 and 19. Each of the wells 18 and 19 is provided with side walls 20, an end wall 21, and a sloping end wall 22. The edges of these walls are turned outwardly to form a flange 23, which flange 23 is riveted, as at 24, to the bottom of the plate 12 with a cork seal 25 interposed between the plate 12 and the flange 23 to form an airtight seal.

Each of the wells 18 and 19 is also provided with a



pair of transverse pins or rods 26 and 27. Each of the rods 26 is disposed across the well toward the upper end thereof and each of the rods 27 is disposed across the well toward the lower end thereof, and the pins or rods 26 and 27 may be attached to the side walls 20 by rivets 28 and 29 driven therein through apertures 30 and 31 in the side walls.

A closure plate 35 is provided, preferably formed of two sheets 35*a* and 35*b* spot welded together and having riveted thereto adjacent the lower edge thereof a plate 36. The plate 36 has a V-shaped channel portion 37 and a marginal flat flange 38, as clearly shown in Figure 2. The plate 35 is adapted to be placed with its edges conforming to the inner margins of the opening 11 and with the flange 38 of the plate 36 extending behind the lower margin 39 of the plate 12. The plate 36 thus forms a hinge or hook for the plate 35 which also permits complete removal of the plate 35 from the closure. The plate 35, toward its upper end and toward its sides, is provided with a pair of slots or openings 40 and 41 adapted to register with the openings 16 and 17, respectively. The under side of the plate 35 is recessed on either side of the slots 40 and 41 and toward the upper end thereof by cutting out a portion of plate 35*b* in order to permit the flush reception of the flange 42 of a channel shaped member 43. The flanges 42 are riveted to the under side of plate 35*a* as at 44. Channel shaped member 43 has the bottom thereof cut out as at 45. Pivoted in the walls of the channel shaped member 43 adjacent the upper end thereof is a latch bar 46.

The latch bar 46 is channel shaped and toward its upper end is provided with a latching member or hook 47. In constructing the hook 47, two C-shaped pieces 48 and 49 are preferably spot welded together to form a united member and side plates 50 and 51 are also spot welded thereto. The members 48 and 49, 50 and 51 are bored upon a common axis and secured to the walls 52 and 53 of the channel member 46 by means of hollow rivet 54. The hollow rivet 54 also forms a bearing upon which the latch bar 46 pivots. The side plates 50 and 51 have extensions 55 and 56 forming stops for the upper end of the auxiliary latch hereinafter described.

As shown in Figure 3, the hook 47 is adapted in one position to engage under the pin 26 and latch the closure in closed position and, in another position, to disengage the pin 26 for opening of the closure plate.

The latch bar 46 has a longitudinal rectangular opening 57 formed therein and, pivoted from the side walls of the latch bar by means of a pin 58 is an auxiliary latch member 59. The auxiliary latch member 59 has an upper surface 60 adapted in closed position to be flush with the surface of the latch bar 46 and is itself channel shaped in cross section, having two side walls 61 and 62. The side walls 61 and 62 are continued downwardly and provided with extensions forming a hook 63 adapted to engage the pin 27. The side walls 61 and 62 are continued beyond the forward limit of the top surface 60 as at 64 to form projections adapted to engage the stops 55 and 56 to limit the opening of the auxiliary latch 59 and also to engage underneath the edge of the top surface of the latch bar 46, as at 65.

A coiled spring 66 is wound about the pin 58 and has one end 67 thereof engaging the under surface of the latch bar 46 beyond the limits of the opening 57. The other end of the coiled spring 66 engages the under side of the latch 59 as at 68, thus serving to constantly urge the latch 59 toward flush or latching position, in which case, the pin 27 engages within the hook 63.

Referring now to Figures 5 through 9, wherein a modified form of this invention is illustrated and where other parts having the same function are designated by the same numerals. In this modification pin 26 is removed and a pin 69 is substituted therefor, the pin 69 being retained by arms 70 and 71 which are suitably attached at one extremity to opposed extremities of the pin 69 and which, at their opposite extremities of the arms, are secured to the plate 35 by rivets 72 which pass through suitable apertures in plates 35 and 12 and through the flanged portion 73 of the arms 70 and 71.

This mounting of the pin 69 provides greater strength than the mounting of pin 26 in the prior embodiment.

In the prior embodiment, in the event of a force attempting to move the latch to the left, as seen in Figure 3, the pins 26 and 27 being mounted in the side walls 20 remain stationary so that both the primary and auxiliary latch members will disengage the pins 26 and 27 permitting the whole latch structure to be freed.

In the modified form the pin 27 is retained in suitable apertures in the extensions 74 and 75 of the side walls 61 and 62 instead of in the side walls 20 of wells 18 and 19. By thus providing the pin integral with the door, when a force to the left, with respect to Figure 5, is applied upon the latch member the pin 27 is carried with the latch so that the auxiliary latch means 59 is not unlatched by this lateral motion and continues to retain the primary latch means in the locked position.

The operation of the device is as follows:

Assuming the plate 35 is in position and fully latched and it is desired to unlatch the latches to remove or open the plate, an operator must first unlatch the latches 59 by pivoting the latches about the pins 58 in order to disengage the hooks 63 from the pin 27. With the auxiliary latch thus disengaged from the pin 27, the main latch bar 46 may be pivoted to the upright position shown in phantom in Figure 3 in which the hook 47 disengages the pin 26. When both of the main latches have thus been disengaged, the plate 35 may be either bodily removed from the closure or pivoted into open position.

It will be noted that it is first necessary to disengage the auxiliary latches 59, and even with the auxiliary latches 59 disengaged, it still remains to disengage the main latch bars 46. By this dual latching means, accidental opening of the closure is prevented. This is an important consideration in aircraft, and especially military aircraft, as it insures against the accidental opening of the closure on being struck by a missile in warfare. It will also be noted that despite the complex and dual nature of the latching mechanism, there is achieved by this invention a completely flush-type latch which minimizes skin effect or air friction on the surface of the aircraft.

While there has been described what at present is considered a preferred embodiment of the present invention, it will be appreciated by those skilled in the art that various changes and modifications can be made therein without departing from the essence of the invention and it is intended to cover herein all such changes and modifications as come within the true spirit and scope of the appended claims.

What is claimed is:

1. A flush-type latch for use in a wall having an opening therein and adapted to engage a pair of pins mounted within the opening, said flush-type latch comprising: a plate adapted to close said opening; said wall adjacent said plate having an opening formed therein; a latch member pivoted on said plate and movable in said opening; said latch member having means engageable with one of said pins to latch said plate in closing engagement with said wall; said latch member being provided with an opening; an auxiliary latch member pivoted on said latch member and movable in said opening in said latch member; said auxiliary latch member having means engageable with the other of said pins to lock said latch in latching engagement with said first pin.

2. A flush-type latch for use in a wall having an opening therein and adapted to engage a pair of pins mounted within the opening, said flush-type latch comprising: a plate adapted to close said opening; said wall adjacent said plate having an opening formed therein; a latch member pivoted on said plate and movable in said opening; said latch member having means engageable with one of said pins to latch said plate in closing engagement with said wall; said latch member being provided with an opening; an auxiliary latch member pivoted on said latch member and movable in said opening in said latch member; said auxiliary latch member having means



engageable with the other of said pins to lock said latch in latching engagement with said first pin; said latch member and said auxiliary latch member having their outer surfaces flush with the outer surface of said plate when in latched position.

3. A flush-type latch for use in a wall having an opening therein and adapted to engage a pair of pins mounted within the opening, said flush-type latch comprising: a plate adapted to close said opening; said plate having an opening formed therein; a latch member pivoted on said plate and movable in said opening; said latch member having hook means engageable with one of said pins to latch said plate in closing engagement with said wall; said latch member being provided with an opening; an auxiliary latch member pivoted on said latch member and movable in said opening in said latch member; said auxiliary latch member having hook means engageable with the other of said pins to lock said latch in latching engagement with said first mentioned pin.

4. A flush-type latch for use in a wall having an opening therein and adapted to engage a pair of pins mounted within the opening, said flush-type latch comprising: a plate adapted to close said opening; said plate having an opening formed therein; a latch member pivoted on said plate and movable in said opening; said latch member having hook means engageable with one of said pins to latch said plate in closing engagement with said wall; said latch member being provided with an opening; an auxiliary latch member pivoted on said latch member and movable in said opening in said latch member; said auxiliary latch member having hook means engageable with the other of said pins to lock said latch in latching engagement with said first mentioned pin; said latch member and said auxiliary latch member having their outer surfaces flush with the outer surfaces of said plate when in latched position.

5. In a flush-type latch, the combination of: a latch member having a web portion and a pair of depending walls forming a channel-shaped body member, said web being provided with an opening therein; a hook member depending from said body member; an auxiliary latch member pivoted on said body member and movable in said opening from a closed position to an open position, said auxiliary latch member being provided with a hook member; and spring means for biasing said auxiliary latch member toward said closed position.

6. In a flush-type latch, the combination of: a latch member having a web portion and a pair of depending walls forming a channel-shaped body member, said web being provided with an opening therein; a hook member depending from said body member; a stop member carried on said body member below said web; an auxiliary latch member pivoted on said body member and movable in said opening from a closed position to an open position, said auxiliary latch member being provided with a hook member; spring means for biasing said auxiliary latch member toward said closed position; and a projection on said auxiliary latch member, said projection being positioned to contact said web for limiting pivotal movement of said auxiliary latch in one direction and to contact said stop member for limiting pivotal movement of said auxiliary latch in the other direction.

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