July 19, 1949. T. H. BECK ET AL 2,476,268

FLUSH LATCH ASSEMBLY

Filed April 16, 1945

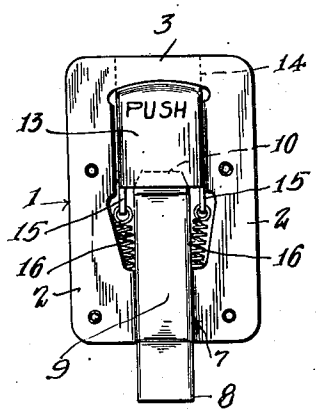


Fig. 1

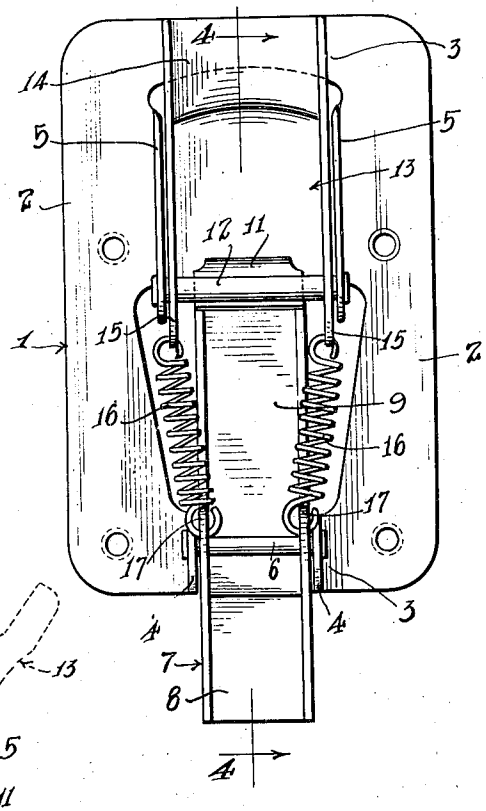


Fig. 2

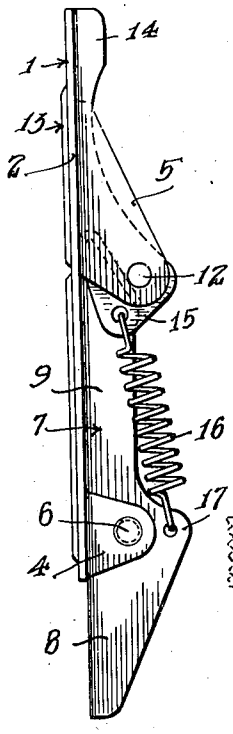


Fig. 3

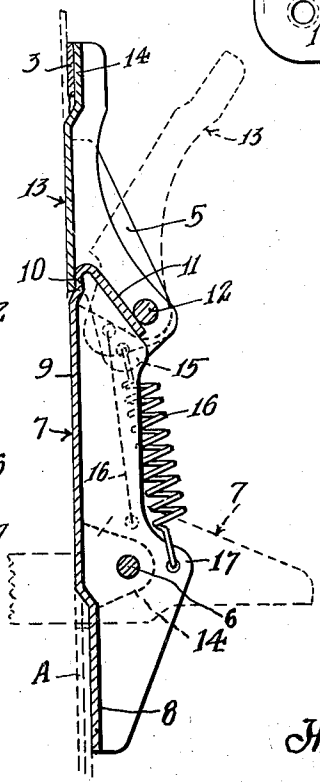


Fig. 4

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Patented July 19, 1949 2,476,268

UNITED STATES PATENT OFFICE

2,476,268

FLUSH LATCH ASSEMBLY

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Application April 16, 1945, Serial No. 588,436

5 Claims. (Cl. 292—229)

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Our invention relates to latch assemblies, more particularly to flush type latch assemblies adapted to be installed in the exterior surfaces of aircraft which must be free of projections or indentations.

Among the objects of our invention are:

First, to provide a latch assembly which is particularly designed for the flush mounting of inspection panels, access doors or the like, in the skin of an aircraft.

Second, to provide a flush type latch assembly which may be constructed without introducing appreciable problems of weight from heavier or stronger material than the structure in which it is mounted, or the panel which it supports, and is particularly designed so that it provides in itself, its own stop or limit means. Thus the loads incidental to latching and unlatching the assembly, are carried by the assembly itself instead of the surrounding structure.

Third, to provide a flush type latch assembly which may be employed in sets to provide the entire interlocking connection between a panel and surrounding structure so that the panel may be bodily removed or the latch assembly may be employed in association with hinge means, if it is desired to so mount the panel.

Fourth, to provide a latch assembly which affords a positive lock unaffected by inertia loads in any direction, or by forces due to the slip stream or otherwise subject to accidental release, but which may be readily and quickly opened when desired without the aid of tools.

With the above and other objects in view as may appear hereinafter, reference is directed to the accompanying drawings in which:

Fig. 1 is an exterior view of our latch assembly.

Fig. 2 is an enlarged interior view of our latch assembly.

Fig. 3 is an enlarged side elevational view of the latch assembly.

Fig. 4 is an enlarged longitudinal sectional view thereof taken through 4—4 of Fig. 2.

The latch assembly includes a mounting plate 1 formed of sheet material. The mounting plate is divided to form two side flanges 2 by means of a longitudinal slot extending the length of the mounting plate except for a narrow web 3 at one end.

A portion of the material removed to form the slot, is bent at right angles to the side flanges 2 to form an inwardly extending pair of latch lever bearings ears or lugs 4 and similar keeper lever bearing ears or lugs 5. The latch lever ears are disposed adjacent the end of the plate

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remote from the web 3, and are connected by a latch lever journal pin 6 which journals a latch lever 7 intermediate its ends.

The latch lever is formed of sheet material and is channel shape in cross-section. The latch lever includes an arm 8 the surface of which is offset inwardly from the normal surface of the lever so as to underlie the margins A of an opening as indicated in Fig. 4.

The other arm 9 of the latch lever is flush, that is, it is intended to occupy a position when closed, flush with the surface of the panel on which the latch assembly is mounted, as well as the surrounding structure. The extended end of the arm 9 is provided with an inwardly offset lip 10. The extremity of the arm is doubled backward to form a cam face 11 extending in angular relation with the outer surface of the arm. The side walls of the channel shape latch lever 7 may taper at their extremities to form marginal supports for the cam face 11.

The bearing lugs 5 are connected by a journal pin 12 which journals a keeper lever 13. The keeper lever 13 is likewise channel shape in cross-section but preferably substantially wider than the latch lever. The face of the cross portion of the channel shape keeper lever is, when in its closed position, flush with the arm 9 of the latch lever. The end of the keeper lever adjacent the latch lever is cut back from its side walls and its edge portion forms with the journal pin 12 a slot which receives the offset tip 10 and cam face 11 of the latch lever 7, as shown best in Fig. 4.

The extended end of the keeper lever 13 is offset as indicated by 14, to fit under and bear against the web 3 when the keeper lever is in its closed position.

The side walls of the keeper lever are directed forwardly of the journal pin 12, forming extensions 15 to which are attached the extremities of a pair of springs 16. The remaining ends of the springs 16 are joined to inwardly directed extensions 17 formed by the side walls of the latch lever 7. The relative positions of the connections between the springs 16 and the extensions 15 and 17 with respect to the journal pins 6 and 12, are such that the force exerted by the springs, tends to rotate the latch lever into right-angular position with the mounting plate 1, with its arm 9 projecting outwardly as shown by dotted lines in Fig. 4 and to urge the keeper lever 13 from its dotted line position to its solid line position shown in Fig. 4.

The side flanges 2, arm 9, and keeper lever 13, are all substantially flush and coplanular. The

side flanges, however, are offset slightly so that they may underlie a panel slotted to accommodate the arm 9 and keeper lever 13. By reason of the fact that the material from which the panel or the like is formed is extremely thin, the amount of offset is correspondingly slight.

The margins A of the panel opening are usually reinforced in order to provide adequate support for the periphery of the panel or the like; consequently, the offset provided in arm 8 is normally greater than that of the side flanges 2. It will be noted that the only portion of the levers comprising the latch assembly which bear against the structure in which the latch is mounted, is the offset arm 8 extending under the necessarily reinforced margins of the panel opening. The remaining arm 9 of the latch lever 7 bears against the keeper lever 13 and the offset end 14 of the keeper lever bears against the web 3. Without adding appreciable weight, the latch may be constructed of steel or other material more readily adapted than the panel to withstand wear. Furthermore, particularly by reason of the web 3 and its engagement by the keeper lever, the latch assembly may be latched in its flush or secured relation before assembling, whereas without the web 3 there would be no means of controlling the keeper lever until installation.

It will also be noted that the journal pins 6 and 12 tie the two side flanges 2 rigidly together and supplement the connection afforded by the web 3. The pin 12 also serves as a stop to limit inward movement of the arm 9 as the latch lever is forced to its closed position.

Operation of the latch assembly is as follows: The latch assembly is unlocked by pressing inwardly on the keeper lever at a point remote from its engagement with the latch lever. The latch assembly is locked by pressing inwardly on the arm 9, causing its cam face 11 to ride on the adjacent edge of the keeper lever and move the keeper lever toward its dotted line position shown in Fig. 4, until the offset tip 10 of the arm 9 clears the keeper lever, whereupon the keeper lever snaps to its closed position.

Many other embodiments of the invention may be resorted to without departing from the spirit of the invention.

We claim:

1. A flush latch structure, comprising: a mounting plate including coplanular side flanges connected at one end by an end web and defining a longitudinal slot extending from said web to the other end of said plate, and journal lugs bordering said slot; tandem disposed levers each of channel cross-section, fitting within said slot between said journal lugs, and adapted to occupy coplanular closed positions and angular open positions; and pins journalling said levers extending between said lugs and coacting with said web to space said side flanges; the first of said levers pivoted at one end by its pin and including a lip engageable with said web when said lever is in its closed position; the second of said levers pivoted intermediate its ends to form opposed arms, one arm terminating in a lip adapted to fit under the journalled end of the first lever when said second lever is in its closed position, the other arm of said second lever forming a latching element.

2. A flush latch structure, comprising: a mounting plate including coplanular side flanges connected at one end by an end web and defining a longitudinal slot extending from said web to the other end of said plate, and journal lugs bordering said slot; tandem disposed levers each of channel cross-section, fitting within said slot between said journal lugs, and adapted to occupy coplanular closed positions and angular open positions; pins journalling said levers extending between said lugs and coacting with said web to space said side flanges; the first of said levers pivoted at one end by its pin and including a lip engageable with said web when said lever is in its closed position; the second of said levers pivoted intermediate its ends to form opposed arms, one arm terminating in a lip adapted to fit under the journalled end of the first lever when said second lever is in its closed position, the other arm of said second lever forming a latching element; and spring means attached at its extremities to said levers and positioned to retain said first lever in its closed position and urge said second lever to its open position.

3. A flush latch structure, comprising: a mounting plate including coplanular side flanges connected at one end by an end web and defining a longitudinal slot, and journal lugs bordering said slot; tandem disposed levers each of channel cross-section, fitting within said slot between said journal lugs, and adapted to occupy coplanular closed positions and angular open positions; and pins journalling said levers extending between said lugs and coacting with said web to space said side flanges; the first of said levers pivoted at one end by its pin and including a lip engageable with said web when said lever is in its closed position; the second of said levers including an offset lip fitting under the fulcrumed end of the first lever when said levers are in a closed position; and a cam face at the under side of said end engageable with said first lever to move it into its open position clear of said second lever whereby said second lever may be pressed into position, the pin for said first lever being so positioned as to constitute a stop limiting inward travel of said cam face, the other end of said second lever forming a latching element.

4. A flush latch structure, comprising: a mounting plate including coplanular side flanges connected at one end by an end web and defining a longitudinal slot, and journal lugs bordering said slot; tandem disposed levers each of channel cross-section, fitting within said slot between said journal lugs, and adapted to occupy coplanular closed positions and angular open positions; and pins journalling said levers extending between said lugs and coacting with said web to space said side flanges; the first of said levers pivoted at one end by its pin and including a lip engageable with said web when said lever is in its closed position; the second of said levers including an offset lip fitting under the fulcrumed end of the first lever when said levers are in a closed position; a cam face at the under side of said end engageable with said first lever to move it into its open position clear of said second lever whereby said second lever may be pressed into position, the pin for said first lever being so positioned as to constitute a stop limiting inward travel of said cam face, the other end of said second lever forming a latching element; and spring means attached at its extremities to said levers and positioned to retain said first lever in its closed position and urge said second lever to its open position.

5. A flush latch structure, comprising: a mounting plate including side flanges connected at one end by an end web and defining a longitudinal slot extending from said web to the other

extremity of said plate, and journal lugs bordering said slot; journal pins carried by said lugs and bridging said slot; a keeper journalled by one end on one of said pins, and having a lip at its other end fitting under said web, when in its closed position; a latching lever journalled by the other of said pins, one end of said latching lever being folded upon itself to form a cam face at the extremity of its inner side occupying substantially the width of the latching lever, the outer side of said end adapted to fit under the fulcrumed end of said keeper lever when said latching lever is in its closed position, said cam face being engageable with said keeper lever to move said keeper lever clear as said latch is forced to its closed position, the remaining end of said latching lever adapted in its closed position to project laterally from said mounting plate for

engagement with a surrounding structure; said flanges and said levers when closed being substantially flush with each other.

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