Feb. 8, 1949. W. A. PAXTON 2,461,393

FLUSH TYPE LATCHING DEVICE

Filed Feb. 26, 1945 2 Sheets-Sheet 1

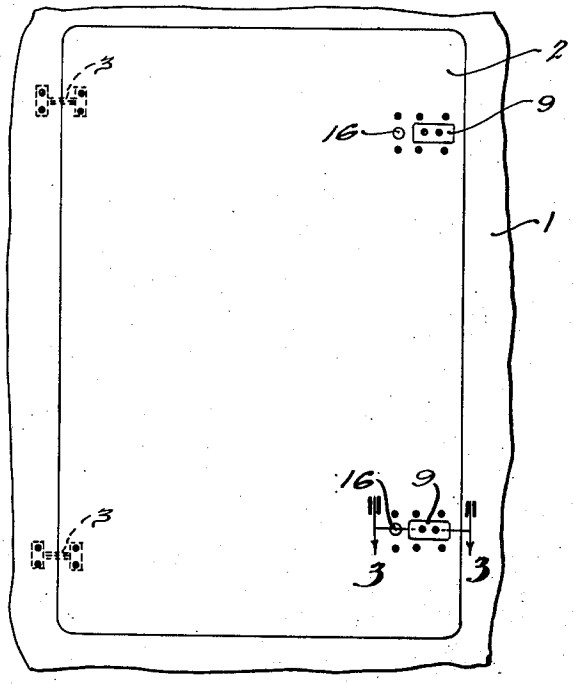

Fig. 1.

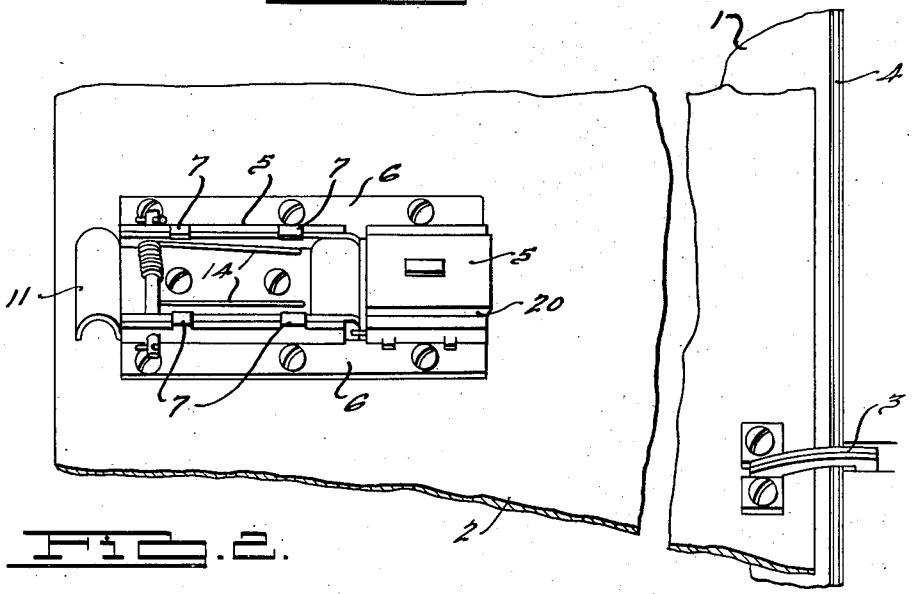

Fig. 2.

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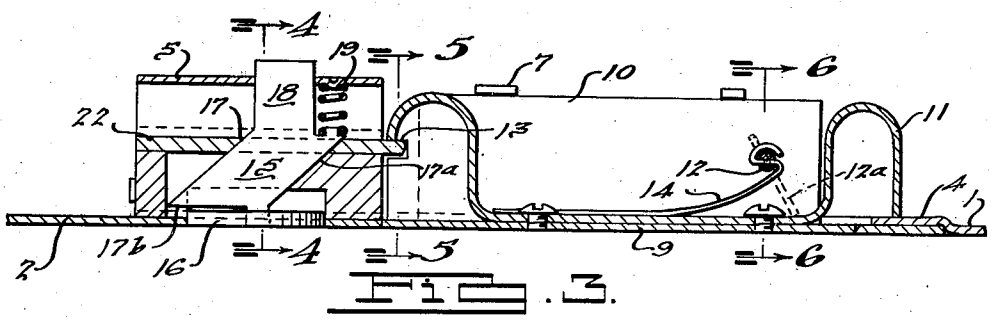

Fig. 3.

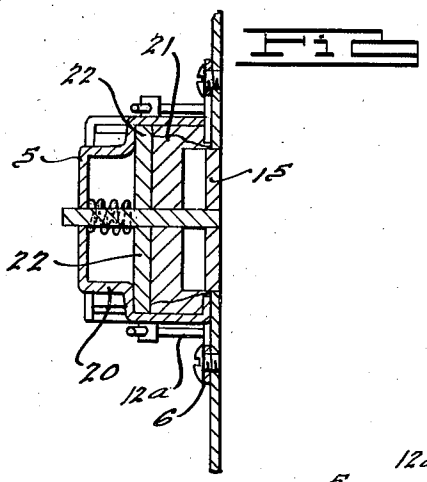

Fig. 4.

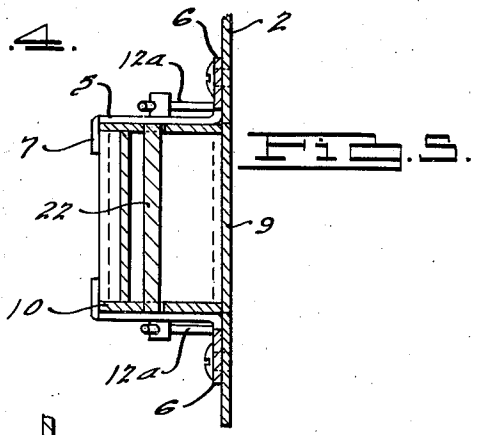

Fig. 5.

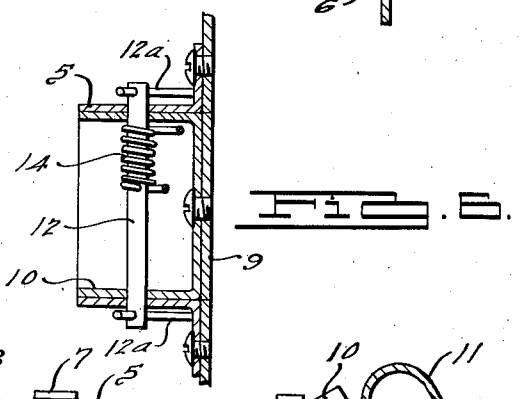

Fig. 6.

Fig. 2.

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UNITED STATES PATENT OFFICE

2,461,393

FLUSH TYPE LATCHING DEVICE

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2 Claims. (Cl. 292—229)

1

This invention relates to latching devices for hingeable or removable doors, covers, hatches or the like and particularly to that type thereof normally flush with a surface of such door, cover, hatch or the like.

Objects of the invention include the provision of a flush type latching device of new and novel construction; the provision of a flush type latching device embodying a minimum number of parts and of minimum weight; the provision of a device of the type described that will largely eliminate the possibility of rattling developing in it because of wear or the like; the provision of a device of the type described that is unlatched by the application of pressure to a member flush with the outer surface of the door or the like to which the latch is applied; the provision of a device as above described in which the releasing of the latch automatically projects a handle from the flush surface and into a position to the manually grasped for further movement of the door or the like therethrough; and the provision of the door or like structure provided with a flush type latch construction of the general type described in multiples, requiring the separate operation of each thereof to fully unlatch the door or the like, thereby to provide a safety feature against inadvertent unlatching of such door or the like.

The above being among the objects of the present invention the same consists in certain new and novel features of construction and combinations of parts to be hereinafter described with reference to the accompanying drawings, and then claimed, having the above and other objects in view.

In the accompanying drawings which illustrate a suitable embodiment of the present invention and in which like numerals refer to like parts throughout the several different views,

Fig. 1 is a fragmentary, side elevational view of a wall having a door or the like hingedly connected thereto and closing an opening therein, the door being held in latched position by a pair of latching devices constructed in accordance with the present invention;

Fig. 2 is an enlarged fragmentary, perspective view taken of one of the latching devices employed on the door shown in Fig. 1, from the rear face of the door and as appearing when the door is in open position;

Fig. 3 is an enlarged horizontal sectional view taken through the latching device of the present invention and a portion of the cooperating door and wall, as on the line 3—3 of Fig. 1, with the

2

door in closed position and the latch in a corresponding latched condition;

Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 3;

Fig. 6 is a transverse sectional view taken on the line 6—6 of Fig. 3; and

Fig. 7 is a view similar to Fig. 3 but illustrating the latch in released or unlatched position and illustrating the movement of the control element required to release it.

The present device relates to those types of latches commonly known as flush type latches and is applicable for use in connection with doors of various types and kinds, hatch covers particularly of the type employed in connection with aircraft, and generally to that class of devices known as closures for openings in walls or the like. Although from the above standpoints the latch of the present invention is applicable generally to closures of various types and description, it is particularly adaptable to those types of closures which are intended to be open from one side only. Examples of such closures are the so-called hatches leading into baggage compartments of airplanes or the like, rear deck or baggage compartment covers or doors of automobiles, cupboard doors, refrigerator doors, and to like application as in other flush type latch mechanisms. The invention is not only desirable in many cases from an appearance standpoint but is also of an advantage from a safety standpoint in that it does not include any projections beyond the surface to which it is applied to offer hazards from contact therewith by objects moving relative thereto along such surface.

As a matter of illustration only it may be assumed in the present case, by way of explanation of the application of the present invention, that it is applied to a door or so-called hatch leading to the baggage compartment of an airplane. Under such circumstances and referring now particularly to Fig. 1 it may be assumed that the numeral 1 indicates a wall of such baggage compartment having an opening therein which is adapted to be closed by the hatch, door or closure member 2 hingedly connected thereto along one side by means of concealed type hinges 3 of any suitable or conventional form. In order to illustrate an added safety feature possible in connection with the present invention the door 2 is shown as being provided with two latch devices constructed in accordance with the present invention secured to the door in vertically spaced

relation with respect to each other so that both latches must be operated in order to enable the door to be opened, this constituting a safety feature as will readily be appreciated in that it eliminates the possibility of inadvertent unlatching of the door 2 which under some circumstances might have dangerous consequences.

It will be appreciated, and as indicated in the various views, that in order to carry out the flush arrangement of surfaces of both the latch and the door the margins of the wall 1 around the door opening are inwardly offset as indicated at 4 so that the door 2 in being received against the offset portion 4 will be arranged with its outer face in flush relationship with respect to the outer face of the wall 1.

The latch device comprises a channel-shaped member indicated generally by the numeral 5 having laterally extending flanges 6 along its edges which are secured to the inner side of the door or closure member 2. As more clearly disclosed in Fig. 2, the bottom wall of the channel-shaped member is removed over the left part of its length leaving only retainer lugs 7 which extend inwardly and act as stops hereinafter explained. In the right end portion of the channel member 5, which is nearest to the hinged edge of the door as it appears in Fig. 2, the bottom of the channel member is not cut away. Between that portion of the channel member in which the bottom is retained and the portion in which the bottom is cut away except for the lugs 7, there is a slot 8 seen more clearly in Fig. 7 formed by cutting away the sides of the channel member. In the outer end of the channel member 5, that is, the end farthest from the hinged edge of the door, there is pivotally mounted a swinging latch bolt 9. As more clearly shown in Figs. 2 and 7, this latch bolt comprises a cutout section of the cover member 2, and to this is secured by screws or other suitable means a channel-shaped member 10 provided at its outer end with a hook-shaped member 11, which is adapted with its free end to engage the inner surface of the wall 1 adjacent to the opening as shown in Fig. 3. The channel-shaped member 10 is pivotally mounted upon the cross-pin 12, which is journaled in the side walls of the outer end of the channel member 5. The inner end of the channel member 10, that is, the end nearest the hinged edge of the cover is provided with slots 13 in its side walls that are adapted to engage a keeper, as will be later explained. There is mounted upon the pivot 12 a coil spring 14, one end of which is anchored to the pivot pin 12 and the other end of which is extended to bear against the bottom wall of the channel member 10. This spring is tensioned to cause the inner end of the latch bolt 9 to swing outwardly about the pivot pin 12, and to cause the outer end of the latch bolt 9 carrying the wall engaging member 11 to swing inwardly to clear the compartment wall 1. Pins 12a are secured in the ends of the pivot pin 12 and are extended so that their ends bear against the lateral flanges of the channel 5 and thereby prevent the pivot pin 12 to which the spring 14 is anchored from rotating. The lugs 7 provided upon the edges of the channel member 5 act as stops to prevent the swinging bolt 9 from swinging inwardly beyond a flush position with the outer surface of the cover 2.

The inner portion of the channel member 5, that is, the part nearest the hinged edge of the closure member, has disposed therein a reciprocable cam member 15, which is more clearly shown

in elevation in Figs. 3 and 7. The outer end of this cam member 15 is provided with a circular push button 16 which normally lies flush with the outer surface of the door member 2. The inner portion of the cam member comprises a blade-like piece which is attached to the under side of the push button 16 and is provided with an inclined portion 17 which acts as a cam, and then with a straight portion 18 which acts as a pilot and guide and extends through a slot in the bottom wall of the channel member 5. A coil spring 19 is seated around a boss formed in the bottom wall of the channel 5 and has one end bearing against the shoulder 17a on the cam portion 17. This spring is tensioned to thrust the entire cam member outwardly to bring the push button portion 16 flush with the outer surface of the closure member 2 where it is stopped by engagement of another shoulder 17b on cam portion 17 with the inner surface of the cover 2. As shown in Figs. 2 and 4, the side walls of the right or inner portion of the channel 5 are offset inwardly as at 20. Disposed within this portion of the channel 5 in spaced relation to the offsets 20 is a bearing block 21 and between the surface of the block 21 and the offset shoulders 20 of the channel member there is disposed a slidable keeper plate 22 which is provided with a slot in its central portion through which the cam portion 17 of the cam member 15 extends. Thus, when the cam member 15 is reciprocated, it causes the keeper plate 22 also to reciprocate by the action of the inclined cam portion 17 sliding through the slot in the plate 22.

When the door 2 is in closed position, the parts are as shown in Fig. 3 with the hook member 11 on the outer end of the swinging bolt 9 engaging the inner surface of the compartment wall 1 and locking the cover plate securely over the opening. In this position the push button 16 of the cam member 15 is flush with the outer surface of the cover plate, and the sliding keeper plate 22 which is operated by the cam member 15 has its right end engaged in the slot 13 provided in the inner end of the swinging bolt 9, thus latching the swinging bolt 9 in the position shown in Fig. 3. When it is decided to open the compartment push button 16 of the cam member 15 is thrust inwardly. This causes the keeper plate 22 to move to the left end to disengage its right edge from the slot 13 in the swinging bolt 9, whereupon the spring 14 causes the inner end of the swinging bolt 9 to pivot outwardly and the hooked member 11 to swing inwardly, thus releasing the cover and permitting the outwardly swung portion of the bolt 9 to serve as a handle by which the door 2 can be swung open. When the opening is to be closed, the door 2 is swung inwardly against the compartment wall 1 and the swinging bolt 9 is swung inwardly bringing the free end of the hooked member 11 against the inner surface of the compartment wall 1, and acting as a lever to bring the door 2 to closed position snugly against the wall 1. When the bolt 9 is swung inwardly as far as it will go, the slidable plate 22 engages the slot 13 and retains the bolt 9 in locking position. The edges of the wall channel member 10, adjacent the slot 13, are rounded or beveled so that the thrust of this rounded or beveled portion will cam the sliding keeper plate 22 to the left and permit the latch bolt 9 to swing completely into closed position. When it is in this closed position, the slots 13 are in position to receive the edge of the keeper plate 22 which

is forced outwardly by the thrust of the spring 19 upon the cam member 15.

In the description as thus far given it is, of course, assumed that under the circumstances the only requirement is that the latch be capable of being operated from the outside of the door or closure member 2 and that there is no occasion for operating the latching device from the inside of the same. However, it will be appreciated that where operation from the inside of the door or other closure member is desired or required any suitable means may be provided for withdrawing the cam member 15 inwardly from the inner side of the door. Any suitable type of mechanism may be provided for this purpose and the type of mechanism provided may, of course, vary, depending upon whether a single control is desired for a plurality of latches, and where one or more latches are provided whether such control is to be operated at the latch itself or from a point remote therefrom. As a matter of illustration only such means is illustrated in Fig. 7 and as comprising a ring 23 suitably fixed to the cam member 15 on the inside of the door or closure member 2 and which may be manually grasped and pulled to move the cam member 15 towards unlatching position.

This latch device is composed of relatively few parts, is simple and cheap to make, as all of it, except the pivot pin 12 and the springs 14 and 19, may be made from sheet metal, or may be made of castings or forgings for heavy duty use. The hooked engaging member 11 is, by reason of its shape, somewhat resilient and is dimensioned so that it will be under tension when the swinging bolt 9 is pressed inward to engagement with the keeper plate 22. This prevents the cover member from rattling. The spring 14 thrusting outwardly against the swinging bolt 9 also aids to keep it snugly engaged with the keeper plate 22, and thus prevents rattle. The cam member 15 is resiliently held against rattle by the spring 19.

A further advantage is that this latching device is self-contained and does not require any special fittings or keeper means on the compartment wall.

Having thus described my invention, what I claim by Letters Patent is:

1. A latching device for a closure member for an opening in a wall or the like comprising, in combination, a latch bolt pivotally mounted on the inside of said closure member and having a projection thereon adjacent said pivotal mounting for engaging the inner surface of said wall and thereby securing said closure member in closed position, said latch bolt being adapted on pivotal movement to swing its wall engaging projection inwardly and away from the adjacent margin of said wall and its opposite end outwardly away from the outer surface of said closure member, keeper means for retaining said latch bolt in engaged position with said wall mounted inwardly of the outer face of said closure member including a reciprocable tongue

adapted to releasably engage the outwardly swingable end of said latch bolt, a cam for engaging said tongue and adapted to cause reciprocation of the tongue upon movement transversely thereof and manual means for moving said cam accessible at the exterior face of said closure member and flush therewith.

2. A latching device for a closure member for an opening in a wall or the like comprising, in combination, a channel member adapted to be mounted on the inner side of the closure member with its open side opening toward the outside of the closure member and over an opening therein and having the bottom thereof cut away from one portion of its length except for inwardly extending lugs, a second channel member positioned within the walls of said first channel member with its open side facing away from the outer face of said closure member and its closed side facing outwardly, said second channel member being pivotally mounted at one end within said first channel member and having its inward pivotal movement limited by the said lugs on said first channel member, said second channel member having the bottom portion thereof extended beyond said first channel member at one end thereof and reversely bent to provide an engaging tongue for the inner surface of the adjacent margin of said wall and having notches formed in the edges of its side members at its opposite end and its bottom portion filling an opening in said closure member and flush with the exterior surface of said closure member, the portion of said first channel member with its bottom portion unremoved having its side walls offset inwardly to provide interior shoulders along its sides, a bearing member mounted therein in spaced relation to said interior shoulders, a keeper plate slidably mounted between said bearing member and said shoulders, a camming device mounted therein comprising a blade extending through a slot in said keeper plate, said cam blade having generally parallel inclined edges adapted upon movement normal to said keeper plate to cause the same to slide on said bearing member and having a pilot extension slidable in a pilot opening in the bottom of said first channel member, spring means engaging said cam blade and adapted to thrust same toward the exterior of said closure member, and a manually operating member secured to the end of said cam blade and flush fitting in an opening in said closure member.

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