Aug. 27, 1946. G. R. GIBSON 2,406,459

CLOSURE FASTENER

Filed Nov. 16, 1944

Fig. 1.

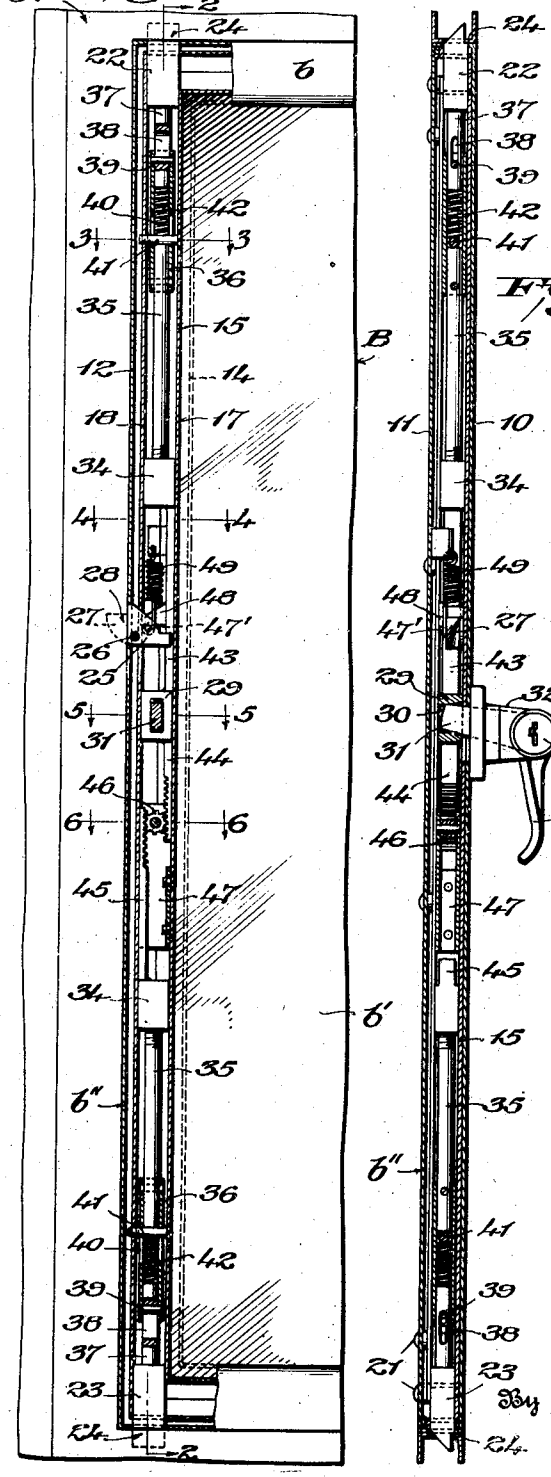


Fig. 2.

Fig. 3.

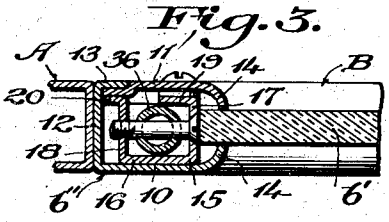


Fig. 4.

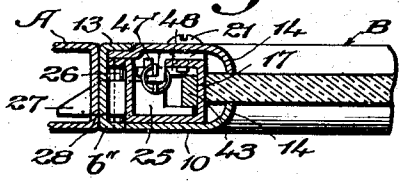


Fig. 5.

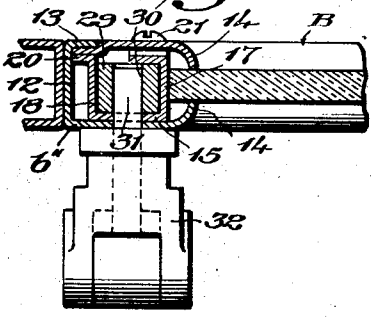
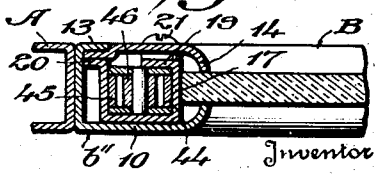


Fig. 6.



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CLOSURE FASTENER

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5 Claims. (Cl. 292—39)

1

This invention relates to fasteners for swinging or sliding closures, such as doors, windows, drawers and the like.

In many instances it is desirable that a closure have a frame, the stiles or equivalent elements of which are of narrow width. For example, in the case of hospital windows and hospital doors having transparent panels, it is desirable that the stiles be of as narrow width as practicable in order that the windows and doors may admit the greatest possible amount of light especially in instances where the doors or windows are of narrow width. Also, it is quite desirable in many instances to provide a closure fastener embodying three latch or lock bolts, one at each end or side of the closure and the other at an intermediate point, all operable by a common mechanism, and to mount said latch or lock bolts and their operating mechanism in a door or window stile or its equivalent.

Accordingly, the general object of the present invention is to provide a closure fastener which embodies three latch or lock bolts and a common operating mechanism therefor, and which is of quite narrow width, whereby it may readily be mounted in a door or window stile or equivalent element of quite narrow width in any instance where that may be desirable.

To the end of accomplishing the aforesaid general purpose in a simple, practical manner, a special object of the invention is to provide a latch or lock bolt which is pivoted for swinging movement between projected and retracted, latching or locking and unlatching or unlocking positions, respectively, and which is of a novel form whereby it is swung to operatively engage its related keeper in response to closing movement of the closure.

Another special object of the invention is to provide a narrow-width, common operating mechanism for three latch or lock bolts which is of simple, practical construction, easy to install and thoroughly reliable and satisfactory in use.

With the foregoing and other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in a closure fastener embodying the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawing and defined in the appended claims.

In the accompanying drawing, wherein like characters of reference denote corresponding parts in the different views:

Figure 1 is a vertical section through a portion of a closure equipped with fastening means in accordance with the invention.

Figure 2 is a vertical section on the line 2—2 of Figure 1; and

2

Figures 3, 4, 5 and 6 are cross sections on the lines 3—3, 4—4, 5—5 and 6—6, respectively, of Figure 1.

Referring to the drawing in detail, A designates a portion of a closure frame and B designates a portion of an associated closure which, for present purposes, may be considered as a door hinged at one side for swinging movement between open and closed positions.

The door B includes a frame *b* and a panel *b'* which, in the present instance, is illustrated as being of transparent material, although it may be of any other material. In any event, the frame *b* includes top and bottom cross members, only portions of which are shown, and vertical side members or stiles only the one of which at the free edge of the door is shown. These members preferably are of duplicate construction. They may, however, be of unlike construction. In any event, the stile at the free edge of the door and with which the present invention particularly is concerned, is hollow and of narrow width and is closed at its outer and inner sides by walls 10 and 11, respectively, and at its outer edge by a wall 12 which constitutes the free vertical edge of the door. On the other hand, said stile which is designated as *b''* is provided at its inner edge with a slot to accommodate the related marginal portion of the panel *b'*.

While the stile *b''* may be of any suitable construction, it preferably is formed from sheet metal, its wall 10 and 12 being, for example, integral with one another, as shown, and its wall 11 being, for example, separate from its walls 10 and 12 to permit ready installation of the panel *b'*. In this connection and, according to the specific construction illustrated in the present instance, the marginal portion of the edge wall 12 at the inner side of the stile is turned inwardly to provide a covering and retaining flange 13 for the outer marginal portion of the inner side wall 11; the inner marginal portions of the side walls 10 and 11 are turned inwardly, as indicated at 14, to engage the outer and the inner faces, respectively, of the adjacent marginal portion of the panel *b'*, and a channel member 15 is disposed within the stile and is welded or otherwise fixed to the outer side wall 10 to serve as a support for the inner side wall 11 and also as a housing and guide for the latch or lock bolts and their operating means presently to be described.

The channel member 15 is approximately coextensive in length with the stile *b''* and includes an outer side wall 16 disposed against and spot welded or otherwise suitably secured to the outer side wall 10 of the stile *b''*, and inner and outer edge walls 17 and 18, respectively, extending from the wall 16 toward the inner side of the stile and having their free marginal por-

tions turned toward the outer or free edge of the stile in the form of flanges 19 and 20, respectively. The flange 20 is spaced inwardly from the flange 13 by an amount approximately equal to the thickness of the outer marginal portion of the inner side wall 11 of the stile, thus to cooperate with said flange 13 to provide a slot to neatly accommodate the said outer marginal portion of said inner side wall 11. On the other hand, the flange 19 underlies the inner side wall 11 of the stile near the inturned inner edge thereof to serve as a support for the latter and also to receive fasteners such as screws 21 by means of which said inner side wall 11 is removably secured in place.

Mounted in the upper end portion of the channel member 15 for free longitudinal sliding movement relative thereto is a latch or lock bolt 22, the upper end portion of which is projectable above and retractable to or below the top edge of the door through an opening in the top cross member of the door frame. Similarly mounted in the lower end portion of the channel member 15 is a latch or lock bolt 23 the lower end portion of which is projectable below and retractable to or above the lower edge of the door through an opening in the bottom cross member of the door frame. At their inner sides the end portions of the latch or lock bolts 22 and 23 are beveled in accordance with known practice so that if they are in their projected positions when the door is being closed they will be automatically retracted responsive to closing movement of the door due to the wedging or cam action of their beveled inner sides with their keepers which may be of any suitable form and which are designated as 24.

At a suitable point intermediate the latch or lock bolts 22 and 23, a third latch or lock bolt 25 is provided. This latch or lock bolt 25 is mounted for swinging movement in the plane of the door upon a pivot pin 26 which extends transversely of the door at right angles thereto and which is located adjacent to the edge wall 12 of the stile b'', said pin being mounted at its ends, for example, in openings in the side wall 10 and the flange 13 of said stile b''.

The latch or lock bolt 25 is pivoted intermediate its ends and adjacent to one edge thereof upon the pin 26 and includes a latching or locking portion 27 which, by rotation of said bolt in one direction through an angle of approximately ninety degrees, is projectable to a latching or locking position in which it extends beyond the stile wall 12; i. e., beyond the free edge of the door, as shown, and which, by rotation of said locking bolt in the opposite direction through an angle of approximately ninety degrees, is retractable to an unlatched or unlocked position in which it is disposed entirely within the stile b''.

The portion 27 is substantially in the form of a ninety-degree segment of a circle as viewed in side elevation and its inner face is of substantially conical form; i. e., its inner face is beveled both longitudinally and transversely away from the pivot pin 26. Consequently, should the portion 27 be in its projected position during closing of the door, the beveled inner face of said portion will, by reason of its wedging or cam action against the related keeper, designated as 28, cause said portion to swing to its retracted position so as to clear the keeper for subsequent projection behind the latter. The keeper 28 may be of any suitable form and is illustrated in the present instance as being comprised by a portion of the door frame b in front of an opening in said door frame which accommodates the latch or bolt portion 27 when the door is closed and said portion 27 is projected.

Referring now to the common operating means for the latch or lock bolts 22, 23 and 25, 29 designates a block which is longitudinally slidable in the channel member 15 and which has therein a slot 30 into which extends the free, inner end of a lever arm 31 which, at its outer end, is pivoted to a supporting bracket 32 for swinging movement to shift said block 29 longitudinally. The bracket 32 is fixed to the stile b'' at the outer side thereof and a suitable handle 33 is fixed with respect to the arm 31 for effecting swinging movements thereof.

According to the specific arrangement illustrated in the drawing, a pair of blocks 34, 34 are slidably mounted in the channel member 15 above and below the block 29, respectively, and have fixed thereto and extending upwardly and downwardly therefrom, respectively, rods 35, 35. To the upper and lower ends, respectively, of these rods are fixed tubes 36, 36, and in the upper and lower ends, respectively, of said tubes are slidably mounted stems 37, 37, which are fixed to and extend inwardly from the inner ends of the latch or lock bolts 22 and 23, respectively.

Fixed in the side walls of each tube 36 and extending through a longitudinally elongated slot 38 in the related stem 37 is a pin 39, while fixed in the walls 17 and 18 of the channel member 15 and extending through longitudinally elongated slots 40 in each tube 36 is a related screw or pin 41. The screws or pins 41, 41 are spaced inwardly from the inner ends of the stems 37, 37, respectively, and between each screw or pin 41 and the inner end of the related stem 37 is interposed an expansion spring 42. Accordingly, said springs 42, 42 tend constantly to urge the tubes 36, 36 outwardly to their limits of outward movement, as determined by engagement of the tube walls at the inner ends of the slots 40 with the screws or pins 41, and also to urge the latch or lock bolts 22 and 23 constantly outward to their limits of outward movement as determined by engagement of the walls at the inner ends of the slots 38 in the stems 37 with the pins 39. In this connection, the construction obviously is such that if the latch or lock bolts 22 and 23 are projected as shown in Figure 1, they will be retracted by inward movement of the rods 35, 35 and the tubes 36, 36. At the same time, the construction is such that even though the rods 35, 35 and the tubes 36, 36 are not moved inwardly, the latch or lock bolts 22 and 23 are free to be moved inwardly against the springs 42, 42. In short, the described construction provides for positively retracting the latch or lock bolts 22, 23 when it is desired to open the door and, at the same time, provides for automatic retraction of said bolts by engagement of their beveled inner faces with their related keepers to permit the door to be closed, as well as for subsequent spring projection of said bolts to their door latching or locking positions when the door is closed.

The block 29 is rigidly connected with the block 34 thereabove by a bar 43. On the other hand, the block 29 is connected with the block 34 therebelow through the instrumentality of a rack bar 44 extending downwardly from said block 29, a rack bar 45 extending upwardly from the lower block 34, and a pinion 46 having a fixed axis of rotation and interposed between said rack bars 44 and 45. The pinion 46 may appropriately be

mounted in a suitable frame 47 suitably fastened in the channel member 15. In any event, it is apparent that the springs 42 tend constantly to project both latch or lock bolts 22 and 23 and to shift the block 29 upwardly, and that by downward movement of said block 29, both latch or lock bolts 22 and 23 will be retracted. The block 29 is, of course, shiftable downwardly to retract the bolts 22 and 23 by means of the handle 33 operating through the lever arm 31.

The lock or latch bolt 25 is located between the block 29 and the upper block 36 and, inwardly of its pivot pin 26, has projecting laterally therefrom a pin 47' over which extends a finger 48 which projects laterally from the bar 43. Accordingly, when the bar 43 is shifted downwardly, the finger 48 acts upon the pin 47' to rotate the latch or lock bolt 25 to its retracted position. On the other hand, a suitable spring 49 is provided to rotate said bolt 25 to its projected position when the bar 43 and the finger 48 are moved upwardly. Obviously, the finger 48 acts as a stop engageable by the pin 47' to limit rotation of the bolt 25 beyond its projected position.

Summarizing, it will be apparent that normally the three latch or lock bolts 22, 23 and 25 are projected; that they will be urged inwardly automatically during and in response to closing movement of the door to permit the door to close and to permit them to subsequently be projected behind their keepers; that they will be projected behind their keepers when the door is closed; that all of them will be retracted to permit the door to be opened by the mere act of swinging the handle 33 in a direction to swing the lever arm 31 downwardly, and that upon release of said handle they will be projected by the springs 42 and 49. In this connection, it will be noted that the handle 33 extends downwardly relative to the lever arm 31 so that it is adapted to be pulled to retract the bolts 22, 23 and 25 and also to open the door. Further in this connection it is pointed out that a lock 50 may be associated with the lever arm 31, the handle 33 and the bracket as shown so that said lever arm and handle may be locked against swinging movement to thus lock the door in its closed position.

From the foregoing description considered in connection with the accompanying drawing, it is believed that the construction and mode of operation of the present closure fastening means will be readily understood and its advantages appreciated. It is desired to point out, however, that while only a single, specific structural embodiment of the invention has been illustrated and described, the same is readily capable of embodiment in specifically different structures within its spirit and scope as defined in the appended claims.

I claim:

1. Closure fastening means comprising a latch bolt carried by the closure for linear projection and retraction relative thereto and having its rear face beveled so that by engagement thereof with a keeper during closing of the door the bolt is retracted, a stem extending inwardly from said bolt and having therein a slot extending longitudinally thereof, a tube in the outer end portion of which said stem is slidably mounted a pin fixed with respect to said tube and extending through said slot, said tube having therein a slot extending longitudinally thereof, a pin extending through the slot in said tube and fixed with respect to the closure, an expansion spring disposed within said tube and interposed between said second-

mentioned pin and the adjacent end of said stem and constantly urging said tube outwardly and said bolt outwardly relative to said tube, and means for manual actuation to move said tube inwardly and thereby retract said bolt.

2. Closure fastening means comprising a pair of latch bolts carried by the closure for linear projection and retraction relative thereto in opposite directions, respectively, a block carried by the closure and shiftable relative thereto in the same directions as said bolts, connections between said block and said bolts whereby shifting of said block in one direction retracts both bolts and whereby said bolts are retractable relative to said block without shifting the latter, means for manual actuation to shift said block in said direction, and springs means for projecting said bolts and for shifting said block in the opposite direction.

3. Closure fastening means comprising a pair of latch bolts carried by the closure for linear projection and retraction relative thereto in opposite directions, respectively, a block carried by the closure and shiftable relative thereto in the same directions as said bolts, lost-motion connections between said block and said bolts whereby shifting of said block in one direction retracts said bolts and whereby said bolts are retractable independently of any shifting movement of said block, means for manual actuation to shift said block in a direction to retract said bolts, and spring means for projecting said bolts and for shifting said block in the opposite direction.

4. Closure fastening means comprising a pair of latch bolts carried by the closure for linear projection and retraction relative thereto in opposite directions, respectively, a block carried by the closure and shiftable relative thereto in the same directions as said bolts, a connection between said block and one of said bolts whereby shifting of said block in one direction shifts said bolt in the same direction to a retracted position, a rack and pinion connection between said block and the other bolt whereby shifting of said block in said direction shifts said other bolt in an opposite direction to its retracted position, and spring means for projecting said bolts and for shifting said block in the opposite direction.

5. Closure fastening means comprising a pair of latch bolts carried by the closure for linear projection and retraction relative thereto in opposite directions, respectively, a stem extending inwardly from each bolt and having therein a slot elongated longitudinally thereof, a pair of tubes in the outer end portions of which said stems are slidably engaged, respectively, a pin fixed with respect to each tube and extending through the slot in the related stem, each tube having therein a slot elongated longitudinally thereof, a pin extending through each tube slot and fixed with respect to the closure, an expansion spring in each tube interposed between each second-mentioned pin and the adjacent end of the related stem whereby both tubes and both bolts are urged constantly outwardly and whereby said bolts are retractable independently of inward movement of said tubes, the rear faces of said bolts being beveled so that by their engagement with related keepers during closing of the door said bolts are retracted to clear the keepers, and means connecting said tubes and manually operable to move them simultaneously inwardly to retract said bolts.

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