

[54] **PUSH BUTTON LATCH MECHANISM**

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[51] Int. Cl. .... **E05c 1/14**

[58] Field of Search..... **292/37, 41, 140, 292/165, 169, 170, 174, 336.3, DIG. 60; 70/461**

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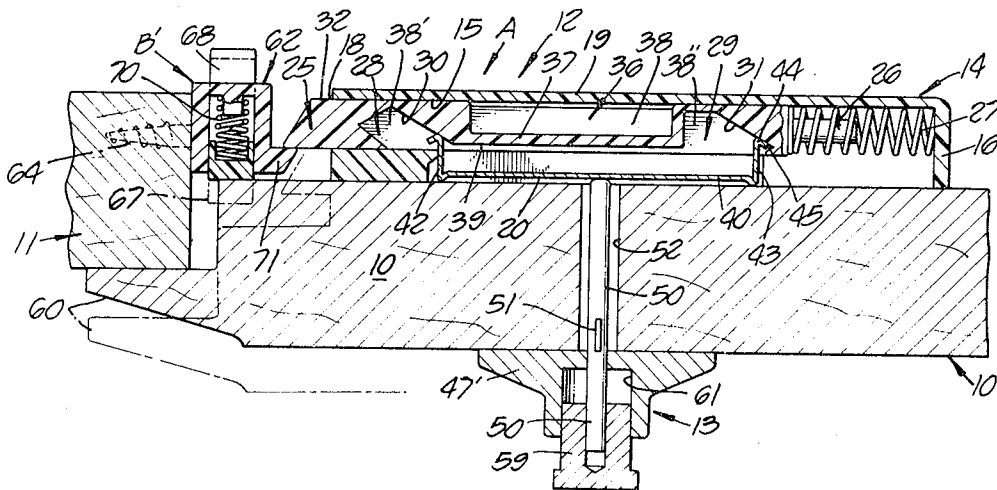
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[57] **ABSTRACT**

A latch mechanism of the push button type in which a separate associated casing contains a reciprocably mounted bolt normally spring urged to an extended latching position, and to a non-latching position by a pressure plate having its opposite ends engaged with separate cam ramps spaced apart axially of the bolt, the casing having longitudinally extending slotted side flanges permitting adjustable positioning of the casing on one surface of a door. An associated push button assembly is mounted on the opposite surface of the door and includes a mounting bracket either in the form of an escutcheon plate or alternatively a pull knob, a push button being centrally positioned in either case and guided together with a connected push rod having an end operatively bearing against the pressure plate. When a pull knob is used, the bolt is preferably operably associated with a conventional keeper, while in those arrangements where a push button only is utilized, the keeper is provided with a spring urged pusher which engages with the back surface of the closed door, whereby to automatically urge the door to a slightly ajar position, when the bolt is released.

**17 Claims, 8 Drawing Figures**



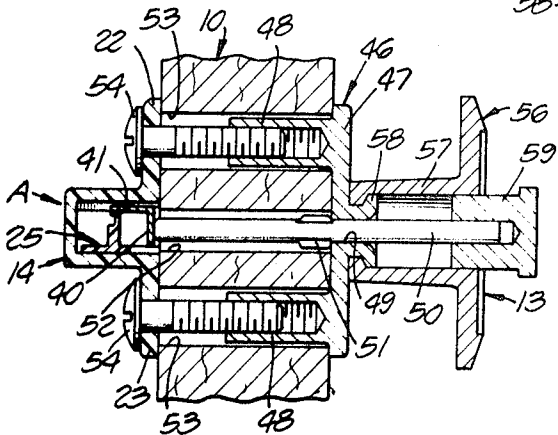
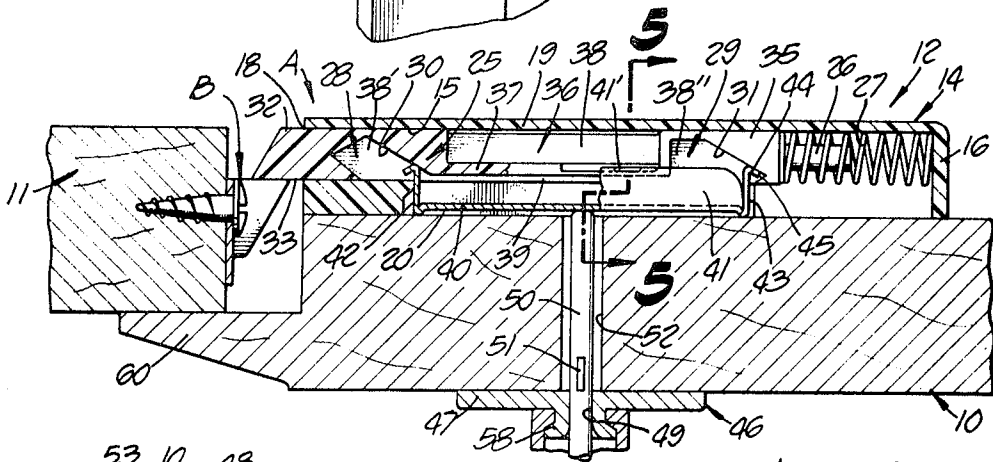
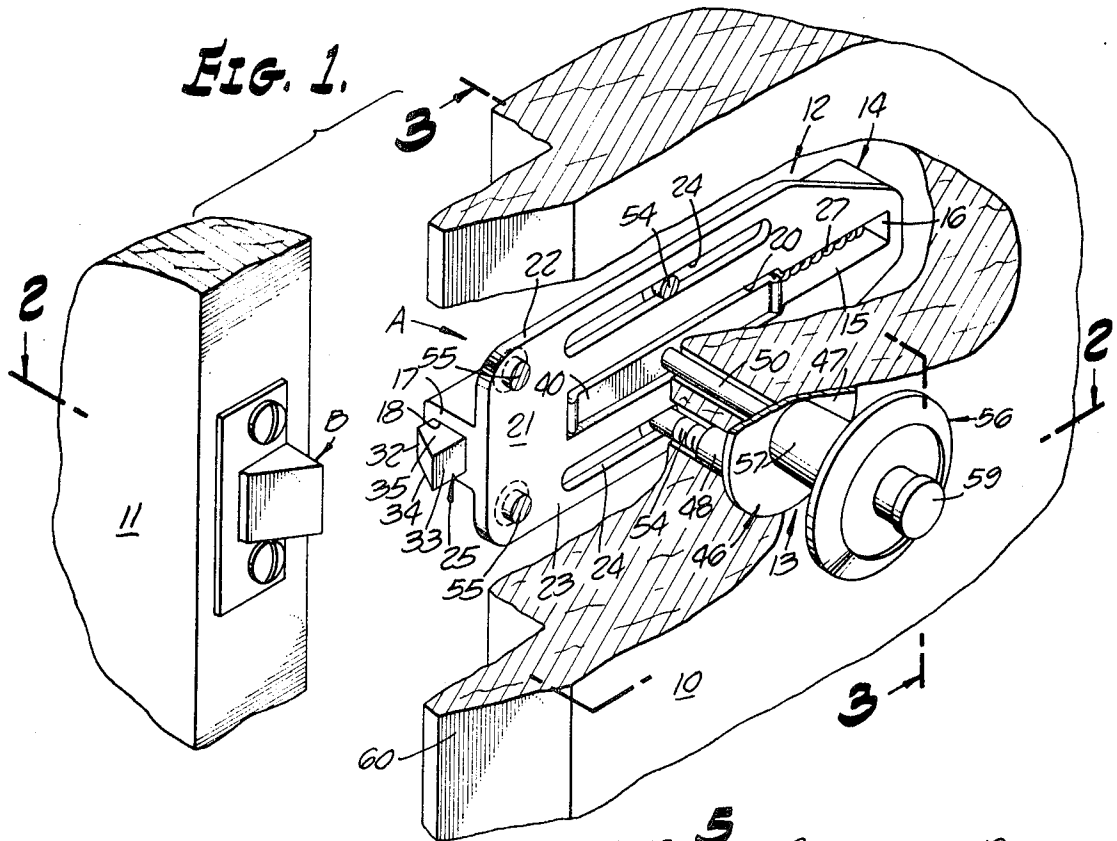


FIG. 2.

FIG. 3.

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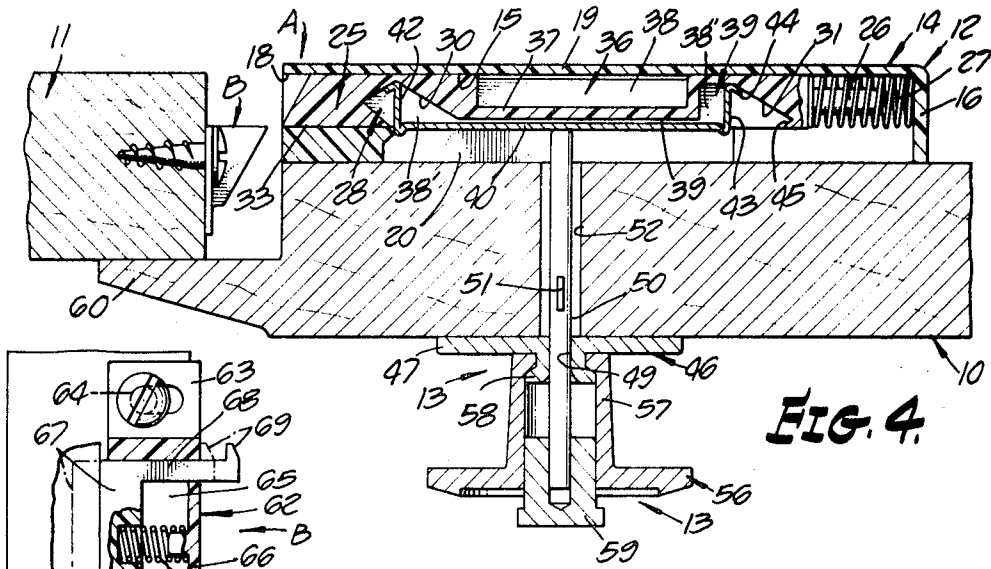


FIG. 4.

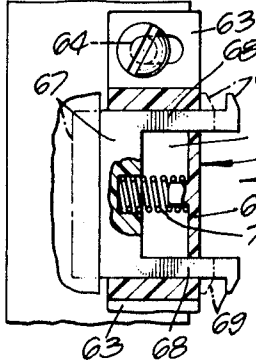


FIG. 8.

FIG. 6.

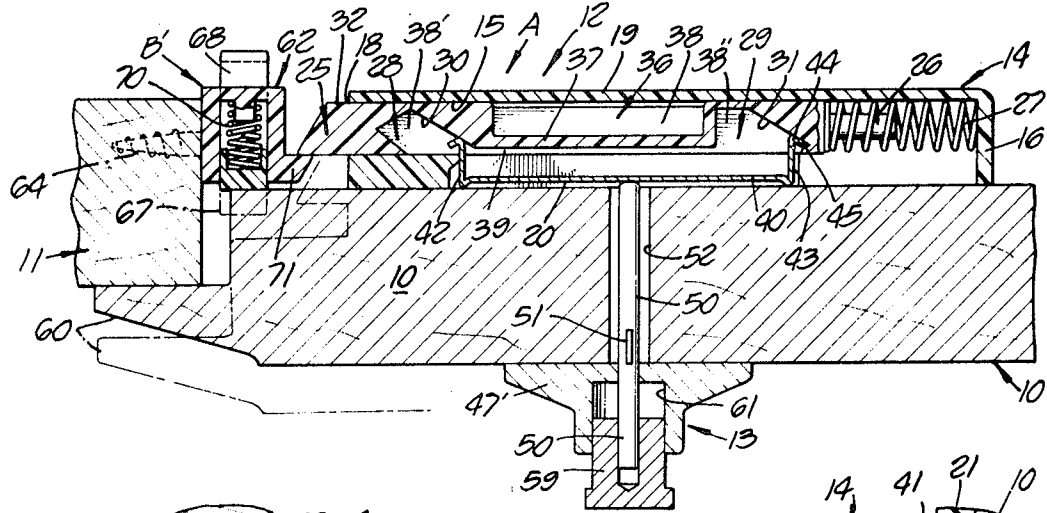


FIG. 5.

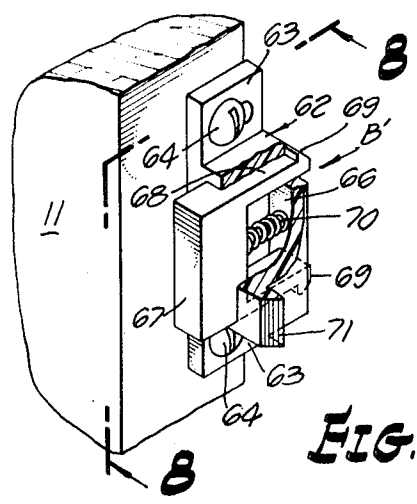
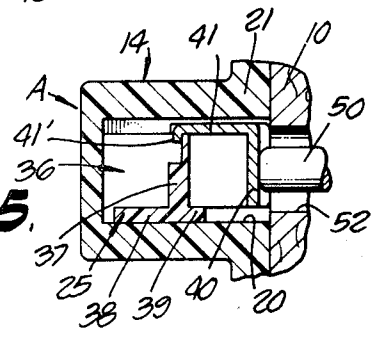


FIG. 7.



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**PUSH BUTTON LATCH MECHANISM****BACKGROUND OF THE INVENTION**

The present invention relates generally to door latches.

Heretofore, it has been known generally to provide door latching devices in which a reciprocally mounted bolt is operable from a latching position into which it is normally spring urged, to a nonlatching position by means of a depressible push button acting through a camming connection with the bolt. Latching devices of the above known type are exemplified by the structure shown in U.S. Letters Patent No. 1,287,973.

Consideration of the structure disclosed in the above noted patent, as well as other known arrangements of this general disclosed type indicates that there are a number of common characteristics in these known structures, which may be briefly noted as follows:

a. The bolt and push button elements are assembled in a fixed nonvariable relationship.

b. The ramp surfaces of the camming mechanism are provided as a fixedly connected part of the push button assembly.

c. The door frame must be cut out or mortised in order to receive the latch casing.

From the above, it is clearly evident that latches of the type exemplified by the noted U. S. patent embody structures which are obviously inflexible and unvariable in their installation possibilities.

In its broad concept, the present invention proposes to overcome the inherent disadvantages of the known arrangements and provide a unique latching mechanism wherein the bolt assembly and push button assembly are formed as separate structures which can be operatively combined along with ancillary components with a high degree of flexibility and in a manner permitting a decorator or builder, at his discretion, to vary and change the mounting in order to obtain a number of different aesthetic effects.

**SUMMARY OF THE INVENTION**

The present invention relates generally to latch mechanisms for closures, and is more particularly concerned with a unique arrangement of parts which permits fabrication of the bolt and push button components into separate assemblies which can be combined in a simple manner without having to adhere to close mounting tolerances.

It is one object of the herein described invention to provide a latching mechanism in which the bolt assembly is a separate structure from that of the actuator assembly, and wherein the actuator assembly is such that a plurality of knob styles may be utilized to provide greater design flexibility.

A further object is to provide in a latching mechanism of the push button type, a longitudinally adjustable bolt casing, which may be adjusted without affecting the operative association and operation of the bolt by means of the push button actuator. To this end, the interconnection between the bolt and push button actuator is such that the actuator assembly may be located to effect a desired appearance in styling, rather than having to adhere to a single invariable dimension from the strike of the keeper.

A further object is to provide a latching mechanism of the character described which utilizes a minimum number of component parts which are operatively asso-

ciated in a manner which assures operational reliability and low cost.

Another object is to provide a unique bolt assembly in which the parts are preassembled, ready for installation, the design of the parts being such that once assembled they will not fall out during transit.

Still another object is to provide unique mounting means for the push button which may provide an escutcheon plate, or in the alternative a pull knob, the mounting means providing for two connecting screws for retaining the bolt assembly in position on the door, thus permitting use on hollow core doors as well as doors of solid construction. To this end, the arrangement utilizes a unique three-hole mounting concept.

Yet another object is to incorporate with latching means of the present invention a conventional keeper in the case of latching mechanisms utilizing a door pull, while permitting also utilization of the latching means with a strike having a spring loaded pusher arranged to act directly against the back of a door to prevent rattle, and provide an opening force which will move the door slightly ajar when the latch actuating push button is depressed.

Further objects and advantages of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing several embodiments of the invention without placing limitations thereon.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Referring to the accompanying drawings which are for illustrative purposes only:

FIG. 1 is a fragmentary composite perspective view of a latch mechanism according to the present invention, and an associated keeper, portions being cut away to show the operative relationship between the push button assembly and associated bolt assembly;

FIG. 2 is a sectional view with the door in closed position and the bolt in latching position with respect to the keeper, taken substantially on line 2—2 of FIG. 1;

FIG. 3 is a fragmentary sectional view taken substantially on line 3—3 of FIG. 1;

FIG. 4 is a sectional view similar to that of FIG. 2, except that the bolt is shown in retracted unlatched position;

FIG. 5 is a fragmentary section taken substantially on line 5—5 of FIG. 2;

FIG. 6 is a sectional view, similar to FIG. 2, of a modified arrangement in which a spring loaded keeper operates to automatically move the door ajar, when the latch mechanism is released;

FIG. 7 is a perspective view of the keeper, as utilized with the arrangement in FIG. 6, portions being cut away to disclose internal elements; and

FIG. 8 is a sectional view through the keeper, taken substantially on line 8—8 of FIG. 7.

**DESCRIPTION OF THE SEVERAL EMBODIMENTS**

Referring more specifically to the drawings, for illustrative purposes, the invention is shown in one form in FIG. 1 as comprising a latch mechanism as generally indicated at A carried by a door or closure member 10 and an operatively associated keeper as generally indicated at B carried by a jamb or frame member 11. It is a feature of the present invention that the latch mechanism is fabricated into two separate assemblies, one of

these assemblies being a bolt assembly 12, and the other being a push button assembly 13.

The bolt assembly comprises an elongate hollow casing 14 preferably of a molded or otherwise formed suitable material such as one of the available plastics. Internally, the casing provides a bolt cavity 15 which is closed at one end by an end wall 16 and at its opposite end by wall 17 containing an opening 18. On the outer side of the casing, the bolt cavity is closed by a wall 19. The inner side of the cavity communicates with an elongate slot opening 20 which is formed in a back wall 21, this wall being laterally extended at the opposite sides of the casing to provide mounting flanges 22 and 23 respectively. Each mounting flange is formed with a longitudinally extending slot 24 which permits adjustment of the mounting position of the casing 14 on an adjacent face of the door 10 as will hereinafter be explained in detail.

The bolt assembly 12 is preassembled as a separate unit having an elongate bolt member 25 positioned in the bolt cavity 15 for reciprocable movement therein. The bolt has its outer end normally projecting through the opening 18. At its innermost end the bolt member is constructed with an axially projecting shank 26 which is adapted to extend into one end of a compression spring 27, the other end of this spring bearing against the end wall 16 of the casing. As thus arranged, the bolt member 25 is normally urged by the spring to an extended latching position, as shown in FIGS. 1 and 2.

The bolt 25 may be constructed of any suitable material, but is preferably constructed of a suitable plastic which can be molded to provide a pair of axially spaced recesses 28 and 29 respectively at the opposite ends of the bolt. These recesses are internally provided with inclined camming ramp surfaces 30 and 31, respectively.

The bolt is of substantially square section and has outer and inner wall faces 32 and 33, and right-angled opposed faces 34 and 35, as shown in FIG. 1. Intermediate the recesses 28 and 29, the bolt is constructed with an elongate recess 36, as shown in FIG. 2. This recess opens outwardly into the bolt face 32, and into the bolt face 35. The back of the recess is closed by a partition wall 37. The recess 36 on the side adjacent the bolt face 34 is closed by a thin wall 38.

As will be seen in FIG. 2, the recesses 28 and 29 are in a similar manner closed by thin wall portions 38' and 38''. These recesses also open into the bolt faces 33 and 35. As will be seen in FIG. 2, the partition wall 37 is slightly inwardly spaced from the bolt face 33 so as to provide a small longitudinally extending ridge portion 39.

The preassembled bolt assembly also includes an elongate pressure plate 40, constructed of a suitable metal, which is deformed to provide a right-angled longitudinally extending flange 41 along one side of the plate, this flange at its edge having an offset portion 41' (FIG. 5) adapted to latch over the edge of the partition wall 37 and thus retain the pressure plate in an assembled position. The pressure plate 40 is also constructed with deflected right-angled end flanges 42 and 43, respectively. The innermost end of each end flange is preferably terminated in an outwardly turned lip 44 having bearing relation with the adjacent camming ramp surface 30 or 31. As thus arranged, the lips 44, 44 act to retain the pressure plate in operative position, and with the associated end flanges 42 and 43 serving

to guide the pressure plate 40 during movements towards and away from the associated bolt 25, as well as restrain endwise movements of the pressure plate by virtue of engaging adjacent portions of the casing structure. The movement of the pressure plate 40 in a direction towards the bolt acts through the ramp surfaces to cam the bolt 25 from a latching position as shown in FIG. 2 against the force of spring 27 into an unlatched position as shown in FIG. 4. Upon release of the pressure plate, the spring 27 acts to return the bolt to its extended latching position. Outward movement of the bolt 25 is terminated and limited due to the engagement of the lip 44 of the end flange 43 against an abutment shoulder 45 at the entrance opening of the recess 29. With the component parts of the bolt assembly mounted in their operative positions, the construction of these parts is such that the parts will not tend to become dislodged and will be retained in assembled position while the units are being handled and will not become displaced or dislodged.

The push button assembly 13, as shown in the arrangement of FIG. 1, comprises a mounting bracket, as generally indicated at 46, this bracket having a disc-like body 47 with diametrically positioned spaced apart rearwardly extending internally threaded tubular-like leg portions 48—48 (FIG. 3). At its center, the body 47 has a passage 49 for guidingly supporting a push rod 50 therein for reciprocal movement. The push rod 50 is provided with abutment projections 51 which are adapted to engage the inner surface of the body 47 and limit outward movement of the push rod.

In order to mount the bolt assembly 12 and the push button assembly 13 on the door 10, it is only necessary to predrill three aligned holes, a central hole 52 to receive the inner end of the push rod 50, and diametrically outwardly spaced holes 53—53 to respectively receive the leg portions 48—48. The location of these three holes is not critical and may be varied within the limits of travel as dictated by the slots 24—24 on the mounting flanges 22 and 23 of the casing 14. The manner of mounting the bracket 46 and bolt assembly 12 is clearly indicated in FIG. 3. With the bracket legs 48—48 positioned in the openings 53—53, it is only necessary to secure the bolt assembly by means of mounting screws 54—54 positioned in the slots 24—24. These slots permit longitudinal adjustment of the casing 14 to bring the projecting end of the bolt member 25 into a proper position for engaging with the keeper B, when the door is in closed position. In order to minimize stresses on the bolt 25, the end of the casing 14 adjacent the keeper B may be secured further by suitable wood screws 55—55 mounted in appropriate openings in the mounting flanges 22 and 23.

The mounting bracket 46 as thus far described basically embodies a structure which is readily incorporated, by slight modification, to provide a multiplicity of pull knobs having different design features or escutcheon plates. As shown in FIG. 1, a pull knob 56 is fabricated on the basic mounting bracket structure by interengaging the inner end of a tubular shank 57 of the knob over a protruding central neck portion 58 (FIG. 3) formed on the mounting bracket. As thus arranged, the outer end of the push rod 50 extends through the tubular shank 57 and is connected to a push button 59 having sliding engagement with the inner wall of the tubular shank. Conveniently operable means are thus provided for actuating the bolt 25 to its unlatched posi-

tion simply by depressing the push button 59, and with the fingers of the same hand engaging the pull knob 56, the unlatched door may be readily swung to an open position. Swinging movement of the door is terminated at a proper closed position for latching by means of a ledge 60 adapted to overlie and abut the frame 11 in the closed position of the door.

In FIG. 6 there is shown a modified mounting bracket in which the body is contoured to provide an escutcheon plate 47' having a central recess 61 which operably mounts the push button 59 in a manner similar to that of the pull knob structure previously described. In the absence of a pull knob, however, it is desirable to provide other means for at least initially moving the door to a slightly open position when the latch bolt is released. This may be accomplished by providing a modified keeper construction as shown generally at B'.

As shown in FIGS. 7 and 8, the modified keeper comprises a hollow housing 62 which is arranged with mounting side lugs 63—63 having appropriate openings for receiving fastening screws 64—64 by means of which the housing may be secured to the adjacent edge of the frame 11. The housing 62 defines an open sided cavity 65 which extends forwardly of a back wall 66 and is adapted to receive therein a pusher bar 67. The bar 67 is fabricated with end legs 68—68 which extend through appropriate openings in the back wall 66 and are provided with deflected end lips 69—69 respectively which serve to limit outward movement of the pusher bar 67 under the force of a compression spring 70 interposed between the bar and the back wall 66.

Referring to FIG. 6, it will be seen that in the closed position of the door, the inner face of the door will engage and depress the pusher bar 67 against the force of spring 70, and that in the fully closed position of the door the bolt 25 will latchingly engage a strike 71 projecting from the adjacent side of the housing 62. It will now be apparent that when the push button 59 is depressed, the bolt 25 will be motivated to its unlatched position, wherein it will be released with respect to the strike 71. The spring 70 then urges the door to a slightly ajar position as shown in phantom lines in FIG. 6 so that the ledge 60 may be engaged by the fingers to pull the door to a more fully open position.

From the foregoing description and drawings, it will be clearly evident that the delineated objects and features of the invention will be accomplished.

Various modifications may suggest themselves to those skilled in the art without departing from the spirit of the disclosed invention and, hence, it is not wished to restrict it to the specific forms shown or uses mentioned, except to the extent indicated in the appended claims.

I claim:

1. A latching mechanism, comprising:

- a. a hollow casing,
- b. a latch bolt reciprocally mounted in said casing for movement to an extended latching position and a retracted nonlatching position with respect to an associated keeper;
- c. means normally urging said bolt towards the latching position;
- d. laterally extending manually operable actuating means including a reciprocable member; and
- e. camming means interposed between said bolt and said member operable to move the bolt towards the nonlatching position against the action of said

urging means, when said member is depressed, said camming means including two inclined ramp surfaces spaced apart longitudinally of said bolt, and a pressure applying member engaged by said reciprocable member, said pressure applying member having spaced parts positioned on opposite sides of said reciprocable member respectively bearing against said ramp surfaces.

2. A latching mechanism according to claim 1, wherein said pressure applying member comprises an elongate pressure plate extending at right angles to and being engaged by the inner end of said reciprocable member, said spaced parts comprising end flanges formed at the opposite ends of said pressure plate.

3. A latching mechanism according to claim 2, wherein the casing has a back wall with an elongate slot opening into the casing interior, and in which said end flanges are in guiding relation during movements of the pressure plate towards and away from said bolt.

4. A latching mechanism according to claim 3, wherein said end flanges further operate to restrain said pressure plate against relative axial movement in said casing.

5. A latching mechanism according to claim 3, wherein said pressure plate and said bolt have overlapping side portions.

6. A latching mechanism according to claim 5, wherein said overlapping side portions include a side flange on said pressure plate and a side wall of said bolt.

7. A latching mechanism according to claim 2, wherein said casing is provided with side flanges respectively having a slot extending longitudinally of the casing, said slots each being adapted to receive a mounting screw, whereby the mounted portion of the casing on a door surface is longitudinally adjustable, along with the relative position of the inner end of said reciprocable member on said pressure plate.

8. A latching mechanism according to claim 1, wherein the reciprocable member is operatively connected with a push button.

9. A latching mechanism according to claim 1, wherein the casing, latch bolt and camming means comprise an assembly adapted to be mounted on one face of a closure member, and the actuating means comprises a separate assembly adapted to be mounted on an opposite face of the closure member, and including means interconnecting said assemblies having parts relatively adjustable to vary the mounted position of the first mentioned assembly.

10. A latching mechanism according to claim 9, wherein said casing has slotted side flanges, and the actuating means assembly includes a mounting bracket having a pair of spaced internally threaded leg portions for receiving threaded screws respectively positioned in the slots of said side flanges.

11. A latching mechanism according to claim 10, wherein said mounting bracket includes a body formed as an escutcheon plate having a recess therein, and a push button operably mounted in said recess, said push button being connected to said reciprocable member.

12. A latching mechanism according to claim 10, wherein said mounting bracket includes a body member, a pull knob connected with said body member and having a recess therein, and a push button operably mounted in said recess, said push button being connected to said reciprocable member.

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13. A latching mechanism according to claim 11, wherein the associated keeper includes a spring urged member operable to automatically move the closure member to an initial open position, when the push button is depressed to release said latch bolt.

14. As an article of manufacture, a latch bolt assembly, comprising:

a. an elongate hollow casing having a back wall laterally extended to provide mounting flanges, said flanges respectively having a longitudinally extending slot;

b. an elongate latch bolt reciprocably mounted in said casing with an end normally projecting through an end opening in said casing to a latching position;

c. spring means normally urging the bolt towards said latching position;

d. an elongate pressure plate positioned in an elongate slot opening in the back wall of said casing, said plate being supported for lateral movements towards and away from said latch bolt; and

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e. camming means interposed between said pressure plate and said bolt operative to move said bolt from said latching position against the action of said spring to a retracted nonlatching position, when said pressure plate is moved in a direction towards said latch bolt.

15. A latching mechanism according to claim 1, including a latch operating push button assembly, comprising: a body structure having a central recess; a pair of legs projecting from one side of said body structure in spaced apart parallel relation, said legs being tubular and having internal threads for engaging threads of a mounting screw; and wherein said reciprocable member includes a push button positioned in said recess.

16. A latching mechanism according to claim 15, wherein said body structure comprises an escutcheon plate.

17. A latching mechanism according to claim 15, wherein said body structure comprises a pull knob.

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