April 18, 1944. F. P. BERGHOFF 2,346,656

LATCH MECHANISM

Filed July 18, 1941 4 Sheets-Sheet 1

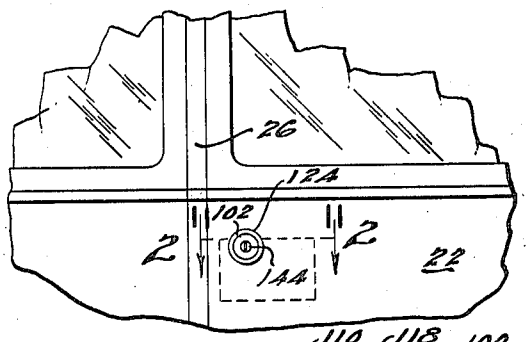


Fig. 1.

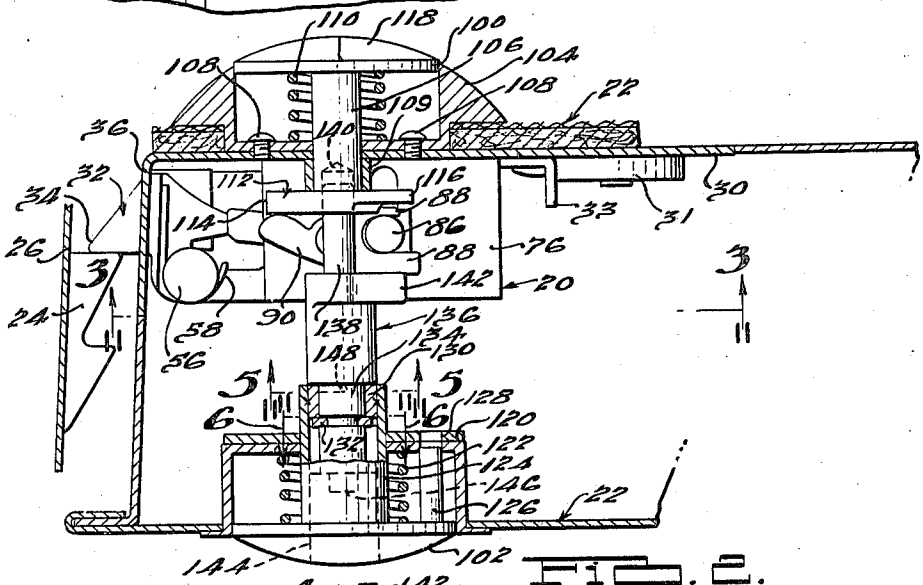


Fig. 2.

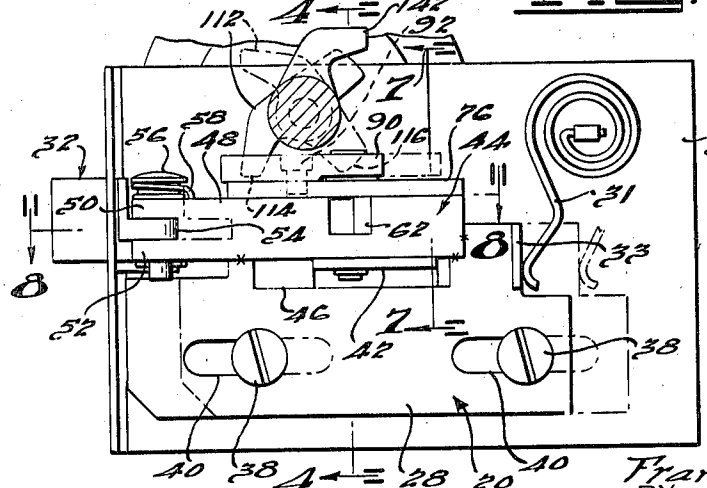


Fig. 3.

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April 18, 1944. F. P. BERGHOFF 2,346,656

LATCH MECHANISM

Filed July 18, 1941 4 Sheets-Sheet 2

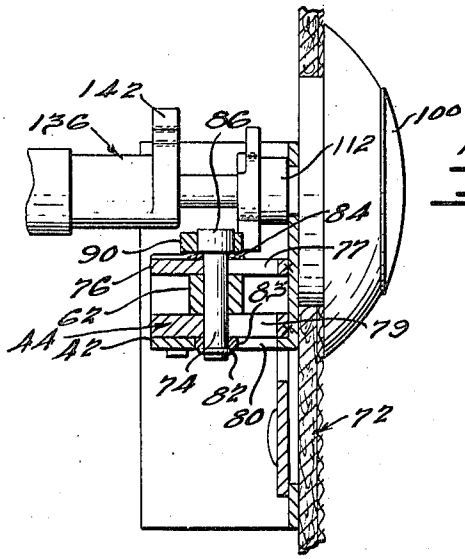


FIG. 4.

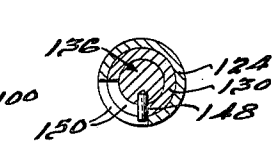


FIG. 5.

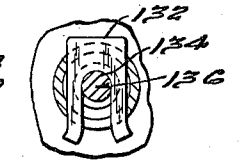


FIG. 6.

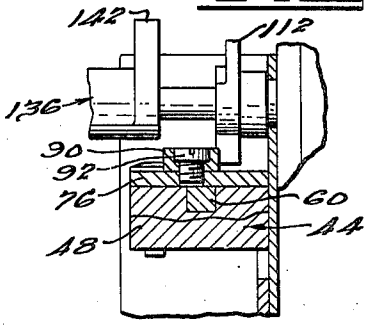


FIG. 7.

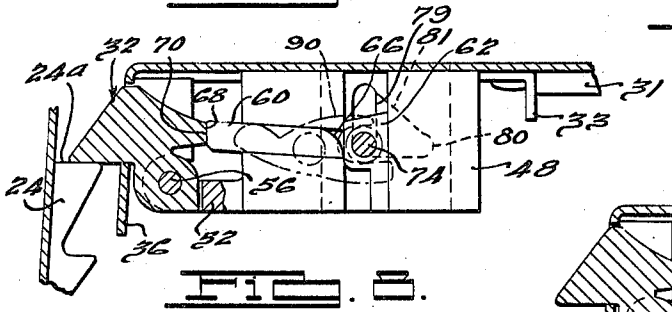


FIG. 8.

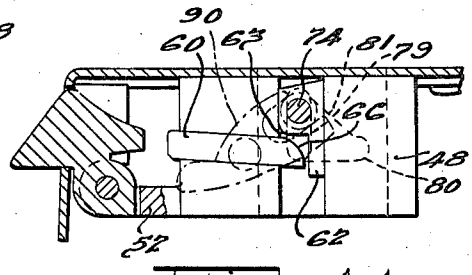


FIG. 11.

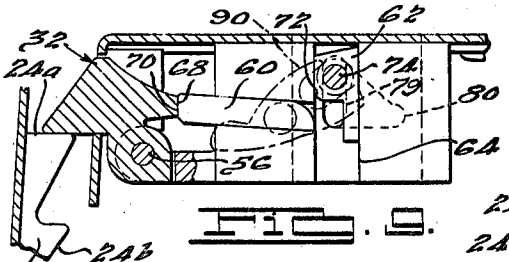


FIG. 9.

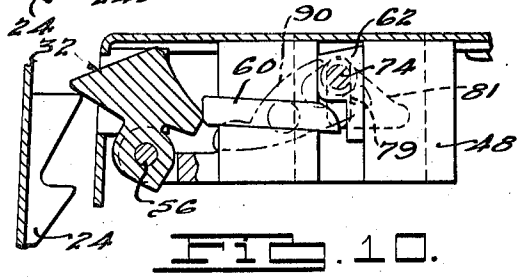


FIG. 10.

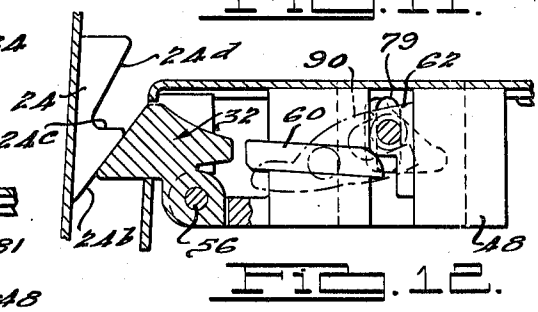


FIG. 12.

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LATCH MECHANISM

Filed July 18, 1941 4 Sheets-Sheet 3

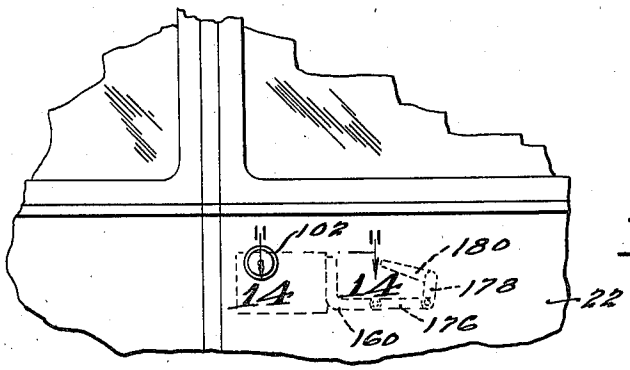


Fig. 13.

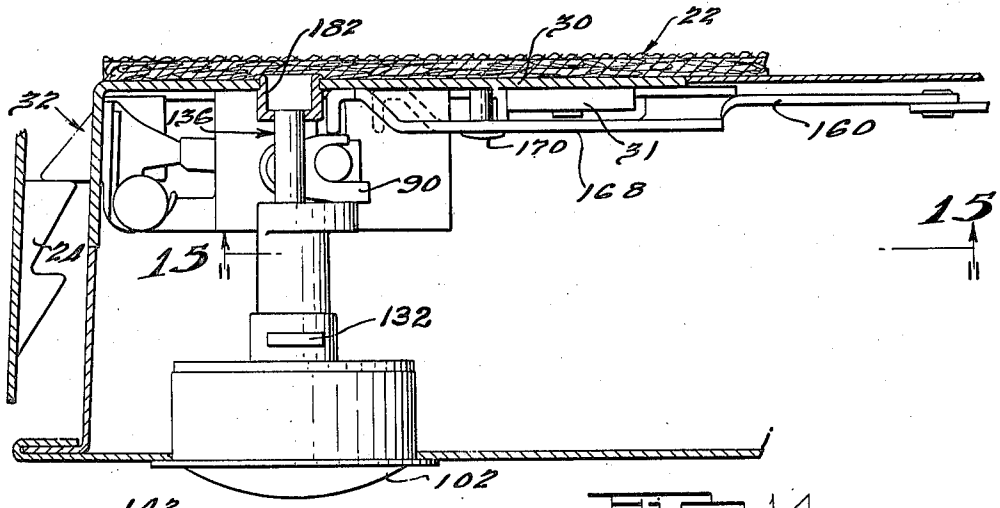


Fig. 14.

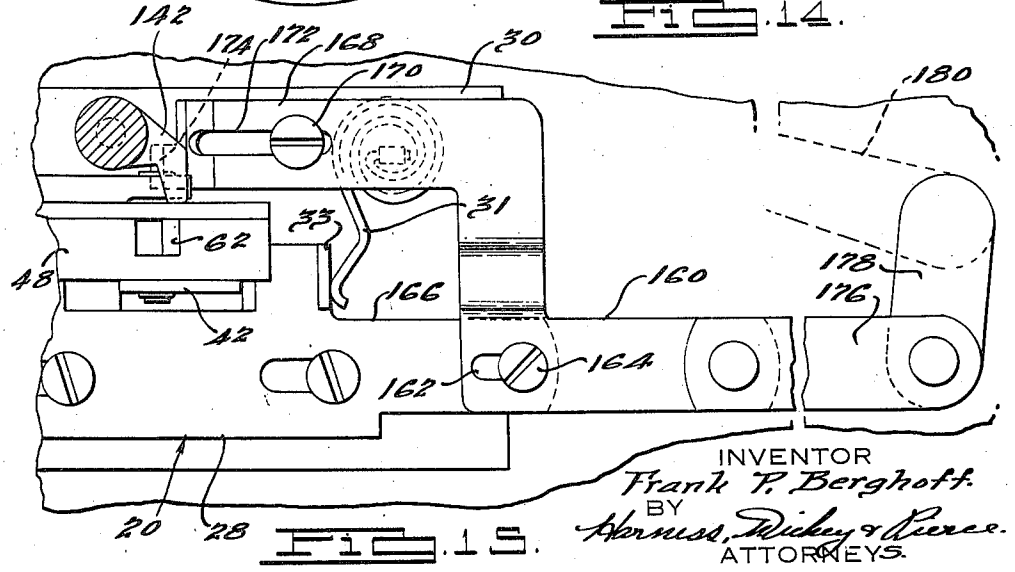


Fig. 15.

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LATCH MECHANISM

Filed July 18, 1941 4 Sheets-Sheet 4

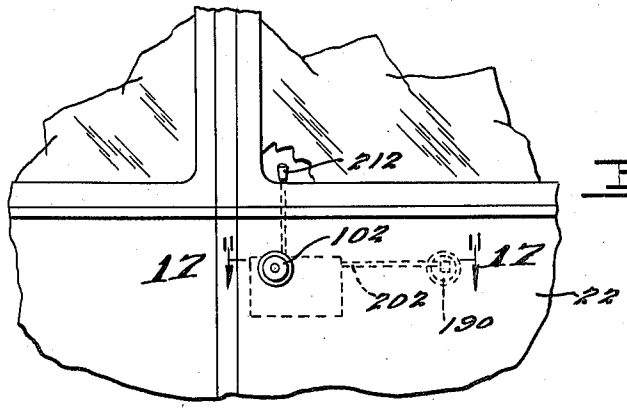


Fig. 16.

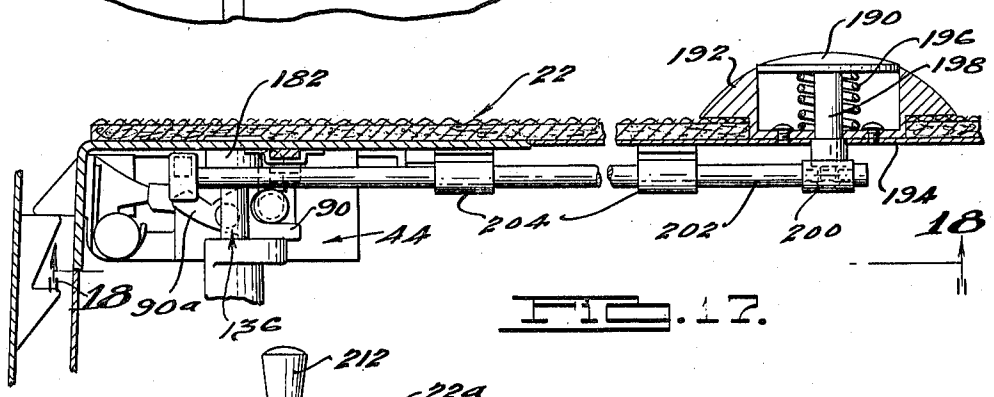


Fig. 17.

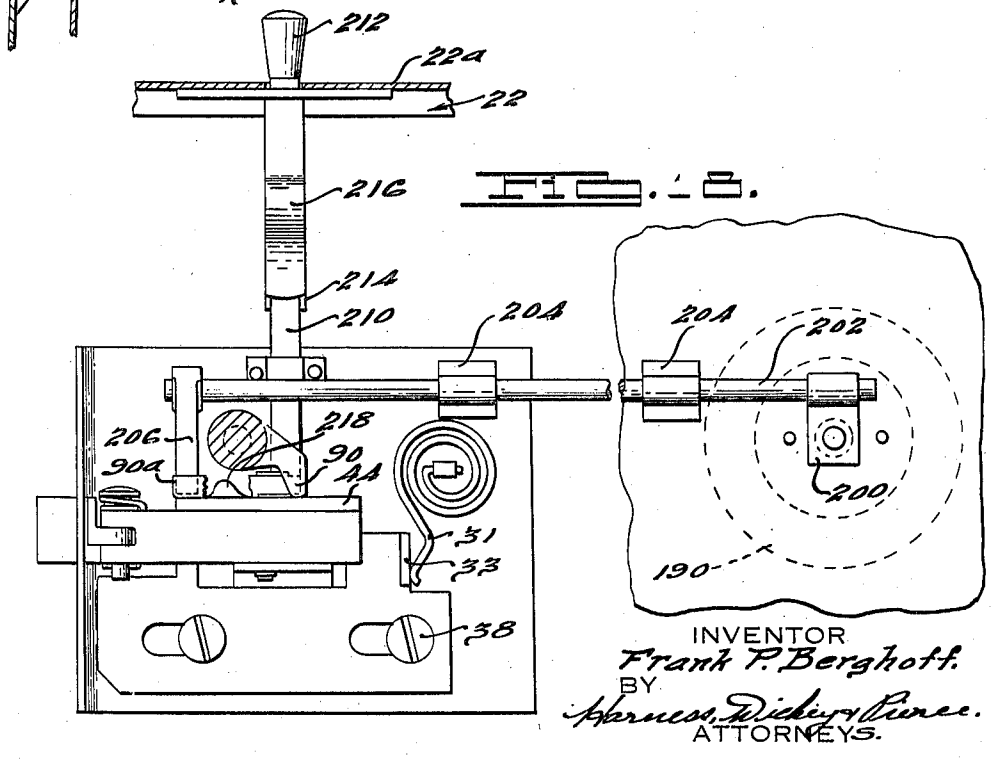


Fig. 18.

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UNITED STATES PATENT OFFICE

2,346,656

LATCH MECHANISM

Frank P. Berghoff, La Fayette, Ind.

Application July 18, 1941, Serial No. 403,031

21 Claims. (Cl. 292—192)

The present invention relates to latching devices, and in particular provides improved constructions which are well suited, but are not limited in their application, to automobile doors, refrigerator doors, and the like.

The principal objects of the present invention are to provide latch structures which are simple in construction, economical of manufacture and assembly, and which, while being efficient and reliable in operation, are extremely easy to operate; to provide such constructions which embody a keeper engaging bolt having relatively movable portions and which further embody holding means which normally act to prevent relative movement between such portions, to thereby cause the bolt to cooperate with the keeper in positively holding the associated closure members in predetermined position; to provide such structures, including means to release the holding means so as to enable relative movement between the bolt portions, thereby enabling an opening movement of the associated closure members; to provide such constructions wherein the bolt comprises a slidable body having a swingable head carried thereby and wherein the aforesaid holding means normally acts to block swinging movement between the swingable head and the bolt body; to provide such constructions wherein inside and outside operators associated with the latch may be operated to move the holding means out of holding relation to the swingable bolt head; and to provide such constructions wherein during a closing movement of the door the head engages the keeper and causes the bolt to be slidably retracted, and wherein, further, such retracting movement of the bolt restores the holding means to operative condition.

Further objects of the present invention are to provide latch constructions which embody one or more push buttons, which may be depressed to release the bolt from holding engagement with the associated keeper; to provide such constructions wherein the push buttons may be positioned immediately adjacent or remotely from the bolt mechanism; to provide such constructions in which, in accordance with certain embodiments, inside and outside push buttons are coaxially mounted, and wherein either thereof may be depressed to retract the aforesaid holding means out of cooperative relation to the aforesaid swingable bolt head; to provide such constructions, wherein, in accordance with certain other embodiments, the inside push button may be located remotely from the latch structure; to provide such constructions wherein, in accordance with certain other embodiments, the aforesaid holding means may be retracted by depressing a push button located, for example, on the outside of the associated closure, and wherein the bolt assembly as a whole may be retracted by a remote operator provided at the inside of the door; to provide such constructions wherein one or both of the push buttons associated with the bolt assembly may be rotated to render one or both of such push buttons ineffective; and to provide such constructions embodying key controlled means for effecting the locking rotation of one or both of the push buttons.

Further objects of the present invention are to provide latch constructions of the above generally indicated type, embodying an improved separable connection between the inside and outside operators, which facilitates the assembly of the latch structure; and to provide such constructions embodying a depressible push button, a bolt releasing operator associated therewith, and an improved releasable connection between the push button and the operator.

With the above, as well as other and more detailed objects in view, which appear in the following description and in the appended claims, preferred but illustrative embodiments of the invention are shown in the accompanying drawings, throughout the several views of which corresponding reference characters are used to designate corresponding parts and in which:

Figure 1 is a fragmentary view in elevation, illustrating the application of one form of the invention to an automobile door;

Fig. 2 is a view in horizontal section, taken along the line 2—2 of Fig. 1;

Fig. 3 is a view in vertical section, taken along the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary view in vertical section, taken along the line 4—4 of Fig. 3;

Fig. 5 is a view in vertical section, taken along the line 5—5 of Fig. 2;

Fig. 6 is a view in vertical section, taken along the line 6—6 of Fig. 2;

Fig. 7 is a fragmentary view in vertical section, taken along the line 7—7 of Fig. 3;

Figs. 8, 9, 10, 11 and 12 are comparative views, showing various operating positions of the latch structure;

Fig. 13 is a view corresponding to Fig. 1, but illustrating a modification of the invention;

Fig. 14 is a view in horizontal section, taken along the line 14—14 of Fig. 13;

Fig. 15 is a fragmentary view, taken along the line 15—15 of Fig. 14;

Fig. 16 is a view corresponding generally to Figs. 1 and 13, but illustrating a further modification of the invention;

Fig. 17 is a view in horizontal section, taken along the line 17—17 of Fig. 16; and

Fig. 18 is a view, taken along the line 18—18 of Fig. 17.

It will be appreciated from a complete understanding of the present invention that, in a generic sense, the improvements thereof may be embodied in latch constructions intended for widely differing applications, and employing widely differing specific structural arrangements. In the forms which are at present preferred, the invention is embodied in automobile door latches, it being understood that the disclosure herein of such specific forms is by way of illustration and not of limitation.

Referring first to Figs. 1 through 12, the improved latch structure comprises generally a bolt 20, which is supported within the associated door 22 and a conventional stepped keeper 24, which is suitably secured to the jamb face of a pillar 26, which is associated with the door 22.

The bolt 20 comprises a plate-like body portion 28, which is rectilinearly slidable relative to the base 30 of the associated case plate, and a swingable head 32, the nose 34 whereof projects outwardly through the flange 36 of the case plate for cooperation with the keeper 24, in the relation shown in Fig. 2.

The bolt body 28 is supported on the base 30 of the case plate by means of a plurality of studs 38, which are secured to the case plate and which ride in elongated slots 40, formed in the bolt body. The pins 38 and the slots 40 also guide the sliding movements of the bolt, as will be understood, and further support for the bolt is afforded by a shelf 42, which is struck inwardly from the base 30 of the case plate and underlies a laterally offset bolt portion 44, which is rigidly secured to the bolt body 28. The body 28 is provided with a slot-like opening 46, through which the shelf 42 projects, and which opening accommodates the sliding movements of the bolt.

The laterally offset portion 44 comprises a body 48, having forwardly projecting vertically spaced bearing arms 50 and 52. The bolt head 32 is provided with a rearwardly projecting leg 54, which is received between the bearing arms 50 and 52. A pin 56 is passed through the arms 50 and 52 and the leg 54 and forms a pivotal connection between the bolt head 32 and the laterally offset bolt portion 44. A coil spring 58 is wound around the pin 56, and the respectively opposite ends thereof are connected, respectively, to the member 44 and to the bolt head 32 in such relation as to continuously urge the bolt head 32 in a counterclockwise direction, as viewed in Fig. 2 and in Figs. 8 through 12.

When the associated door 22 is in the fully closed position, shown in Figs. 2 and 8, the nose 34 of the bolt head 32 bears against the face 24a of the keeper 24, and in order to positively prevent a clockwise or releasing movement of the bolt head 32 under the just-mentioned conditions, the holding means of the present invention is provided. This holding means takes the form of a bar 60 and a cooperating slide 62. The bar 60 is slidable within a channel provided therefor in the member 48 between the projected position of Figs. 2 and 8, and the retracted position of Fig. 11. The slide 62, in turn, is slidably guided in a transverse slot 64 formed in the member 48 and is movable across the path of movement of the bar 60. In the holding position of Fig. 8, the slide 62 lies in blocking relation to the rounded rear end 66 of the bar 60, and thus holds the bar 60 in a position in which the squared front end 68 thereof lies in blocking relation to the shoulder 70 formed on the bolt head 32. In the released position of Figs. 9, 10, and 11, the holding face 72 of the slide 62 lies out of the path of movement of the bar 60 and enables the latter to be freely moved from the projected position of Figs. 2 and 8 to the retracted position of Fig. 11. This retracting movement of the bar 60 is caused by the rotative force applied to the bolt head 32.

The slide 62 is provided with an operating pin 74, the upper end of which projects upwardly through a slot 77 provided therefor in the cover plate 76 associated with the previously mentioned member 44. The lower end of the pin 74 projects downwardly through a slot 79 in the member 44 and through an opening 80 provided therefor in the previously mentioned supporting shelf 42.

As described below, the opening 80 is triangular in shape and has an angularly extending surface 81, which operates to cam the slide 62 from its retracted to its holding position; and to reduce the friction between the parts, it is preferred to provide the pin 74 with a roller 83, which has rolling engagement with the bounding surface of the opening 80. Roller 83 is held in place between the pin 82 (which is passed through the lower end of pin 74) and the underside of member 44, it being noted that the diameter of roller 83 is greater than the width of slot 79. Preferably and as illustrated, a leaf spring 84 surrounds the upper end of the pin 74, and bears against the upper surface of plate 76. As will be understood, spring 84 acts to hold the roller 83 in firm but slidable relation to the underside of member 44.

The enlarged head 86 of the pin 74 is freely received in the bifurcated end 88 of a lever 90. Lever 90 is pivotally secured to the aforesaid cover plate 76 by means of a stud 92, and may be rocked between the normal position of Figs. 2 and 8 and the released position of Figs. 9, 10 and 11, it being understood that when the lever 90 is in the holding position of Figs. 2 and 8, it retains the slide 62 in blocking relation to the holding bar 60. When the lever 90 is rocked to the released position of Figs. 9, 10, and 11, on the other hand, it carries the slide 62 out of blocking relation to the bar 60 and enables the bolt head 32 to be swung from the holding position of Fig. 8 to the released position.

In accordance with the embodiment now being described, the lever 90 may be rocked from the holding position of Figs. 2 and 8 to the released position by depressing either an inside push button 100, or an outside push button 102, which push buttons are coaxially mounted, and which are positioned, respectively, at the inside and at the outside of the door 22. The push button 100 is depressibly mounted in an escutcheon 104, and the shank 106 thereof is slidably guided in a bearing sleeve 109, which is rigidly secured to or is formed integrally with the base 30 of the case plate and projects inwardly therefrom. The escutcheon 104 is secured to the base 30 of the case plate by a plurality of studs, such as 108. The push button 100 is normally maintained in its projected position in which its outer surface lies substantially flush with and constitutes a continuation of the escutcheon surface by means of a compression spring 110, which is seated between

the head of the push button and the base of the escutcheon.

The inner end of the shank 106 carries an operating and dogging arm 112, which is rigidly secured thereto. In the normal position of the push button 100, the arm 112 occupies the position shown in full lines in Fig. 3, in which the nose 114 thereof lies behind and in operating relation to the previously mentioned lever 90. In the dogging position of the push button 100, the arm 112 occupies the position shown in dotted lines in Fig. 3, in which the nose 116 thereof lies behind and in blocking relation to the bifurcated end of the lever 90, and positively prevents the latter from being moved out of the holding position of Figs. 2 and 8. As will be appreciated, the push button 100 is rotatably mounted within the escutcheon 104 and may be freely turned between the just-mentioned normal and dogging positions. Preferably, the face of the push button 100 is provided with an indicator 118, illustrated as being a slight depression in the surface thereof, and the position whereof indicates whether the push button 100 is in the normal or the dogging position.

The outside push button 102 is non-rotatably but depressibly received in an escutcheon 120, which is suitably received in the outer panel of the door 22. A compression spring 122, which surrounds the shank 124 of the push button 102 normally urges the latter to the normal position shown in Fig. 2, and a pin 126, which projects inwardly from the head of the push button, cooperates with an opening 128 in the escutcheon to prevent rotation of the push button.

The shank 124, which is rigid with the push button 102, is of sleeve-like form and is connected by means of an insert 130 and a removable fork 132 to the outer and reduced end 134 of a rod 136. The inner reduced end 138 of the rod 136 is slidably received in a counterbore 140 provided therefor at the inner end of the shank 106 associated with the inside push button 100. The fork 132 serves to couple the shank 124 and the rod 136 together so that these two members move as a unit. Also, the fork 132, the back whereof bears against the inner wall of the escutcheon 120, limits the degree to which the spring 122 is enabled to project the button 102.

The rod 136 carries an offset arm 142, which in the unlocked position of the parts lies in front of the bifurcated end 88 of the lever 90. It will be understood, therefore, that if the push button 102 is depressed when the rod 136 is in its unlocked position, the arm 142 rocks the lever 90 and releases the holding members 60 and 62 in the same manner that these members are released by a depressing movement of the inside push button 100.

In order to render a depressing movement of the outside push button ineffective to so rock the lever 90, the push button 102 may be and preferably is provided with a recessed lock cylinder 144, which may be of usual construction, and consequently is shown only in outline. It will be understood that the cylinder 144 may be provided at its inner end with a suitable notch to receive the diametrically extending tab 146 provided at the inner end of the rod 136 and that, consequently, by rotating the cylinder 144, the rod 136 may be rocked between the locking position shown in Figs. 3, 4 and 7 and the aforesaid unlocked position. A limit to the rotative movements of the rod 136 is afforded by a pin 148, which is carried thereby and which rides in registering slots 150 formed in the previously mentioned shank 124 and insert 130.

It will be noticed from Figs. 2 and 6 that the downwardly extending legs of the fork 132 are received in an annular recess formed in the reduced portion 134 of the rod 136. Such legs are also received in diametrically opposite slots provided in the shank 124 and insert 130. It will be understood, therefore, that by withdrawing the fork 132, the assembly comprising the push button 102, the shank 124 and the insert 130 may freely be withdrawn from the escutcheon 120. As soon as this has been done, the rod 136 may be moved outwardly, as viewed in Fig. 2, carrying the reduced inner end 138 thereof out of the counterbore 140 and enabling the bodily removal of the rod 136 from the assembly. The aforesaid connection comprising the fork 132 will be recognized, therefore, as affording an extremely simple separable connection between the push button 102 and the rod 136, which connection also serves to retain the latter two members in assembled relation to the door. It will be understood that the legs of the fork 132 may be crimped or spread, after insertion, to normally prevent the fork from being removed.

Considering now the operation of the embodiment shown in Figs. 1 through 12, the parts are shown with the inside push button 100 in the normal position, in which the arm 112 occupies the full line position of Fig. 3. The push button 100 may, therefore, be depressed to release the door and also the arm 112 does not interfere with rocking movements of the lever 90 under the influence of the outside push button 102. In the position shown, however, the operating rod 136 is in its locking position, in which the arm 142 carried thereby is elevated out of range of the lever 90. Under these conditions, the outside push button 102 may freely be depressed, but such depressing movements are without effect upon the lever 90.

In the position of the parts as shown, also, the lever 90 is in its normal or holding position, in which the slide 62 lies behind and holds the bar 60 in blocking relation to the bolt head 32, rendering the latter effective to cooperate with the keeper and hold the door 22 in the fully closed position.

Assuming it is desired to render the outside push button effective for operation, the key cylinder 144 may be rotated, rocking the rod 136 from the position shown in Figs. 3, 4 and 7 to a position in which the arm 142 lies in operating relation to the lever 90. If the push button 102 is depressed under these circumstances, the inward movement of the rod 136, as viewed in Fig. 2, rocks the lever 90 from the holding position of Figs. 2 and 8 to the released position of Figs. 9, 10 and 11. A similar rocking movement of the lever 90 may also be produced by depressing the inside push button 100, as will be understood By virtue of its connection to the pin 86, the above-mentioned rocking movement of the lever 90 carries the slide 62 out of blocking relation to the rounded inner end 66 of the bar 60 (Fig. 9), thereby enabling the latter to be freely moved to the retracted position shown, for example, in Fig. 11.

As will be understood, it is to be expected that the door 22 will be provided with compressible bumpers, and the opening force normally exerted by these bumpers becomes effective upon release of the bar 60 to force the door in an

opening direction. During this door movement, the head 32 of the bolt rocks around its pivot pin 56 sufficiently far to clear the keeper 24. During its rocking movement, the head 32 of the bolt forces the bar 60 to the retracted position of Fig. 10, and as soon as the bolt clears the keeper 24, the return spring 58 returns the head 32 to the normal position, (Fig. 11).

Upon release of the inside push button 100 or the outside push button 102, as the case may be, the associated return spring becomes effective to restore the same to the projected position. Such return movement of the operated push button is, however, without immediate effect upon the position of the lever 90, the slide 62 and the bar 60, which latter parts remain in the retracted positions of Fig. 11.

If the door is now moved towards the closed position, the tapered face of the bolt head 32 rides up along the tapered face 24b of the keeper 24. This engagement urges the bolt head 32 in a counterclockwise direction, as viewed in Figs. 2 and 8, which direction of rotation is, however, prevented by the flange 36 of the case plate, and by a resisting action between the bolt head 32 and the base of the slot between the legs 50 and 52. The engagement between the bolt head 32 and the keeper 24 consequently forces the entire bolt assembly 20 to move to the right, as viewed in Fig. 12, against the force of the continuously acting projecting spring 31. Spring 31, as will be understood, is connected between the case plate 30 and a laterally turned flange 33 on the bolt body 28.

The just-mentioned retracting movement of the entire bolt assembly enables the bolt head 32 to pass behind the leading face 24c of the keeper 24, at which time the spring 31 is enabled to project the bolt 20 to the normal position. If the door closing movement is continued, the bolt head 32 rides along the second surface 24d of the keeper, again retracting the bolt, and when the door reaches the fully closed position, the head 32 moves behind the keeper face 24a, as aforesaid.

The retracting movement of the bolt assembly causes the pin 74, associated with slide 62, to move to the right relative to the previously mentioned supporting shelf 42, and this rightward movement is utilized to restore the slide 62 and the bar 60 to the holding position of Figs. 2 and 8. More particularly, the previously mentioned opening 80 in the shelf 42 is generally triangular in form, and is provided with the angled surface 81. The initial rocking movement of lever 90 carries slide 62 to the unlocked position of Fig. 9, in which the pin 74 is positioned adjacent one corner of the triangular opening 80. The rightward movement of the entire bolt assembly 20 causes pin 74 to travel to the right, as viewed in Figs. 9 and 12, during which movement pin 74 engages the angled surface 81 of the opening, which angled surface is consequently effective to cam the pin 74 and slide 62 outwardly, as viewed in Figs. 8 through 12. During this outward camming movement of slide 62, the shoulder 63 formed thereon cammingly engages the rounded end 66 of the bar 60 and forces the latter from the retracted position of Fig. 11 to the normal or projected position of Figs. 2 and 8.

It will be appreciated, therefore, that the closing movement of the door restores all of the locking parts to the positions occupied thereby prior to the just-mentioned door opening operation.

Assuming it is desired to render the outside push button 102 ineffective, the key cylinder 144 may be rotated, as aforesaid, to carry the arm 142 to a position in which it is ineffective to rock the lever 90. Both push buttons 100 and 102 may also be rendered ineffective by rotating the inner push button 100 to thereby swing the arm 112 carried thereby from the normal position shown in full lines in Fig. 3 to the dogging position shown in dotted lines in the same figure. This rotation, as will be understood, brings the nose 116 of the arm 112 behind and in blocking relation to the lever 90, thereby positively preventing the same from being rocked by either the inside push button 100 or the outside push button 102.

In the modified embodiment of the invention shown in Figs. 13, 14, and 15, the previously described inside push button 100 is replaced by a retracting slide 160. The slide 160 is provided with an elongated slot 162, which receives a pin 164 carried by a rearwardly extending projection 166 on the body 28 of the bolt 20, thus forming a lost motion connection between the slide 160 and the bolt.

The slide 160 is also provided with an upwardly and forwardly extending arm 168, which is guided relative to the case plate 30 by means of a pin 170, which rides in an elongated slot 172 in the arm 168. The forward end of the arm 168 is formed as a laterally extending foot 174, which in the illustrated dogging position of the slide 160 lies behind and in blocking relation to the previously described lever 90.

The righthand end of the slide 160 may be connected in any suitable way, as by means of articulated links 176 and 178, to the usual swingable inside handle 180, associated with the door 22. The last-mentioned connections preferably incorporate means (not shown) such as are disclosed in Grund et al. Patent No. 1,760,491, granted May 27, 1930, which function to yieldably hold the slide 160 in either of the full line or dotted line positions of Fig. 14, and which also enable the slide 160 to be moved in a retracting direction to a position to the right of the dotted line position of Fig. 14.

In the embodiment now being described, the inner end of the operating rod 136, instead of being slidably received in a counterbore associated with the inside push button, as was the case in the embodiment of Figs. 1 through 12, is slidably received in a bearing sleeve 182, which is suitably secured to and projects inwardly from the base 30 of the case plate. Also, in this case, since the inside push button and the mechanism immediately associated therewith are replaced by the slide 160, the lever 90 is provided with a rounded back, instead of having the previously described tailpiece. In all other respects, the construction and arrangement of the embodiment shown in Figs. 13, 14 and 15 may and preferably does duplicate the construction and arrangement of the embodiment of Figs. 1 through 12.

As to operation, it will be appreciated that the parts are shown in Figs. 13 and 14 with the door 22 in the fully closed position and with the slide 160 in its lefthand or dogging position, in which the foot 174 thereof lies behind and in blocking relation to the lever 90, thereby preventing the same from being rocked by means of the outside push button 102. As before, the outside push button may also be rendered ineffective by oper-

ating the key cylinder associated therewith, so as to elevate the arm 142 out of cooperative relation to the lever 90, but such arm is shown in Figs. 14 and 15 in its lower or operative position.

If the inside handle 180 is rocked, in a counterclockwise direction, as viewed in Fig. 15, the slide 160 moves to the right as viewed in Fig. 14. This movement of the slide, which carries it from the lefthand limit or dogging position, to the normal or dotted line position, brings the lefthand end of the slot 162 in slide 160 into abutting relation to the pin 164, and moves the foot 174 out of blocking relation to the lever 90. The latter movement renders the outside push button 102 effective to rock the lever 90 and open the door in the previously described manner.

As aforesaid, the handle 180 is preferably provided with spring mechanism to yieldably hold it in either the dogging position or the normal position, and consequently the handle 180 may be released as soon as the slide 160 has reached either of such positions.

If the swinging movement of the handle 180 is continued past the just-mentioned normal position, the engagement between the slot 162 and the pin 164 causes the entire bolt assembly 20 to be retracted sufficiently far to bring the head 32 of the bolt out of cooperative relation to the keeper 24, thereby enabling the door to be freely opened. Upon release of the handle 180, the previously described spring 31 becomes effective to restore the bolt 20 to the projected position. The latter movement also returns the handle 180 to the normal position, which return movement is also aided by the above-mentioned spring mechanism (not shown), which is preferably associated therewith.

It will be observed from the above description that an opening movement of the door, when accomplished by operating the inside handle 180, does not involve any rocking movement of the lever 90. During a closing movement of the door, following an opening action in response to operation of the inside handle 180, the bolt is forced rearwardly by the keeper 24 in the manner previously described and is finally restored to the keeper engaging position by the spring 31. These retracting movements of the bolt, under the conditions stated, do not serve to reset the lever 90, since the latter has not been moved out of its normal or holding position.

If the slide 160 is moved to the dogging position while the door is open, and such door is thereafter closed, the retracting movement of the bolt enables the pin 164 to act against the righthand end of the slot 162, thereby restoring the slide 160 to the normal position. It is believed to be evident that opening and closing movements following actuation of the outside push button 102 produces the operations described in connection with Figs. 1 through 12.

In the further embodiment of the invention shown in Figs. 16, 17 and 18, the previously described inside handle 180 is replaced by a remotely located push button 190, which is supported in an escutcheon 192, which may be suitably secured to the inner panel 194 of the door 22. As before, the button 190 is provided with a return spring 196. The inner end of the shank 198, associated with the push button 190, is loosely and pivotally connected to one end of a crank 200. The other end of the crank 200 is rigidly connected to a rock shaft 202. The rock shaft 202 is rotatably journalled in bearings 204, which are stationarily supported by the door, and at its inner end is provided with a radially extending foot 206, which lies behind and in operating relation to the tailpiece 90a of the lever 90 in the same manner as was described in connection with the arm 112 of Figs. 1 through 12. With this arrangement, it will be appreciated that a depressing movement of the push button 190 rocks the rock shaft 202 in such a direction as to enable the arm 206 to rock the lever 90 in a counterclockwise or door releasing direction, as viewed in Fig. 17.

As in the case of Figs. 13, 14 and 15, the inner end of the push rod 136 is slidably received in a bearing sleeve 182, which is suitably secured to the case plate, and it will be understood that rod 136 is associated with the outside push button 102 in the previously described manner.

In the embodiment now being described, the dogging of the lever 90 is accomplished by a vertically movable slide 210, which may extend upwardly through the garnish molding 22a of the door 22 and may be provided at its upper end with an operating push button 212. Preferably and as illustrated, the guiding sleeve 214, associated with the slide 210, is provided with a detent spring 216, which is operative to hold the slide 210 in either its upper or normal position, or in its lower or dogging position. In the upper position, the lower end of the slide 210 lies above and out of the path of movement of the lever 90. In its lower position, on the other hand, the end of the slide 210 lies behind and in blocking relation to the lever 90, and is consequently effective to prevent release of the door by means of either the inside push button 190 or the outside push button 102.

It will be noticed that in the embodiment of Figs. 1 through 12 and 16 through 18, each opening movement of the door, resulting from an operation of either the inside or outside push button, swings the lever 90 to the retracted position shown, for example, in Fig. 9. When so retracted, the bifurcated end of the lever 90 prevents rotation of the dogging arm 112 (Figs. 1 through 12) into dogging position, and prevents downward movement of the slide 210 (Figs. 16 through 18) into dogging position. It is not necessary, therefore, to provide the so-called resetting or "kickoff" feature described with reference to Figs. 13, 14 and 15, whereby a closing movement of the door restores the dogging mechanism to the normal position thereof. It is possible, however, to manually force the bolt 20 in a retracting direction while the door is open, which retracting movement, as aforesaid, restores the lever 90 to the normal position, shown in Figs. 2 and 8, after which the locking arm 112 or the slide 210, as the case may be, could be moved to dogging position. To take care of an operating contingency of this sort, a cam 218 may be provided on the bolt portion 44 in such position that a retracting movement of the bolt is effective to elevate the slide 210 out of its dogging position, and it will be understood that a corresponding cam structure may be utilized in the embodiment of Figs. 1 through 12 for the purpose of swinging the arm 112 far enough out of its dogging position to enable free operation of the lever 90 in response to the outside push button.

Although only specific embodiments of the invention have been described in detail, it will be appreciated that various changes in the form, number and arrangement of parts may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. In a latch structure for association with relatively movable members, a bolt having relatively movable portions, holding means for controlling said last-mentioned relative movement, an operator for moving said holding means from holding position to a position in which it is ineffective to so control said relative movement, and means movable by and as an incident to a closing movement of said members for positively moving said holding means into said holding position.

2. In a latch structure for association with relatively movable members, a bolt having a body portion and a swingable head carried thereby, holding means operatively associated between said head and said body for controlling said swinging movement, an operator for moving said holding means from holding position to a position in which it is ineffective to so control said movement, and means movable by and as an incident to a closing movement of said members for positively moving said holding means into said holding position.

3. In a latch structure for association with relatively movable members, a bolt having a body portion and a swingable head carried thereby, holding means operatively associated between said head and said body for normally blocking said swinging movement, an operator for retracting said holding means so as to permit said swinging movement, and means movable by and as an incident to a closing movement of said members for positively moving said holding means to blocking position.

4. In a latch structure for association with relatively movable members, a bolt having a body portion and a swingable head carried thereby, said bolt being bodily movable, holding means operatively associated between said head and said body for controlling said swinging movement of said head, an operator for rendering said holding means ineffective to so control said swinging movement, and means responsive to a said bodily movement of said bolt for again rendering said holding means effective.

5. In a latch structure for association with relatively movable members, a bolt having relatively movable portions, said bolt being bodily movable, holding means for controlling said relative movement between said portions, an operator for rendering said holding means ineffective to so control said relative movement, and means operable by a said bodily movement of said bolt for again rendering said holding means effective.

6. In a latch structure for association with relatively movable members, a bolt having relatively movable portions, holding means for controlling said relative movement between said portions, a pivotally mounted lever operatively associated with said holding means for rendering the same ineffective, and inside and outside operators actuable to swing said lever.

7. In a latch structure for association with relatively movable members, a bolt having relatively movable portions, holding means for controlling said relative movement between said portions, a pivotally mounted lever operatively associated with said holding means for rendering the same ineffective, and inside and outside operators actuable to swing said lever, each said operator comprising a depressible push button structure.

8. In a latch structure for association with relatively movable members, a bolt having relatively movable portions, holding means for controlling said relative movement between said portions, a pivotally mounted lever operatively associated with said holding means for rendering the same ineffective, and oppositely disposed coaxially mounted depressible push button means individually depressible to swing said lever.

9. In a latch structure for association with relatively movable members, a bolt having relatively movable portions, holding means for controlling said relative movement between said portions, a pivotally mounted lever operatively associated with said holding means for rendering the same ineffective, a manually depressible push button member having a push rod mounted coaxially therewith and operable upon depressing movement of said button to swing said lever, a second depressible push button remotely located with respect to said lever, and means comprising articulated connections extending between said last-mentioned push button and said lever and operable by depressing movement of said last-mentioned push button to swing said lever.

10. In a latch structure for association between relatively movable members, a bolt having a body and a swingable head carried thereby and releasably engageable with a keeper, said bolt being bodily movable between retracted and projected positions, a said bodily retracting movement of the bolt and a said swinging movement of the head each being effective to release said head from said keeper, holding means associated with said head for preventing said swinging movement thereof, a first operator operable to release said holding means so as to enable said swinging movement, and a second operator actuable to bodily retract said bolt, and means operable as an incident to a closing movement of said members for again enabling said holding means to prevent said swinging movement.

11. In a latch structure for association between relatively movable members, a bolt having a body and a swingable head carried thereby, said bolt being bodily movable between retracted and projected positions, holding means associated with said head for preventing said swinging movement thereof, a first operator operable to release said holding means so as to enable said swinging movement, a second operator actuable to bodily retract said bolt, and means rendering said second-mentioned operator effective to render said first operator ineffective.

12. In a latch structure for association between relatively movable members, a bolt having a body and a swingable head carried thereby, said bolt being bodily movable between retracted and projected positions, holding means associated with said head for preventing said swinging movement thereof, a first operator operable to release said holding means so as to enable said swinging movement, a second operator actuable to bodily retract said bolt, means rendering said second-mentioned operator effective to render said first operator ineffective, and means operably responsive to a retracting movement of said bolt for restoring said first operator to effective condition.

13. In a latch structure for association between relatively movable members, a bolt having relatively movable portions, holding means for controlling said relative movement, a first operator for rendering said holding means ineffective to so control said relative movement, a second operator comprising a bodily depressible and

rotatable element, means responsive to bodily movement of said element for rendering said holding means ineffective to so control said relative movement, and means responsive to rotation of said element for rendering said first operator ineffective.

14. In a latch structure for association between relatively movable members, a bolt having a body and a swingable head carried thereby, said bolt being bodily movable, means comprising a holding member for normally preventing said swinging movement of said head but being ineffective to prevent said bodily movement, an operator for moving said holding member to a retracted poistion, a said bodily movement of said bolt being effective to restore said holding member to holding position, and dogging means normally operable to render said operator ineffective, said first-mentioned means being effective when said holding member is in its retracted position to prevent operation of said dogging means.

15. In a latch structure, a bolt having relatively movable portions, means supporting said bolt for movement between retracted and projected positions, a member movable between a first position in which it is effective to control relative movement between said portions and a second position in which it is ineffective to effect such control, and means moved by movement of said bolt for positively moving said member between said positions.

16. In a latch structure for association with relatively movable members, a bolt having a body portion and a swingable head carried thereby, said bolt being bodily movable, holding means operatively associated between said head and said body for controlling said swinging movement of said head, an operator for rendering said holding means ineffective to so control said swinging movement, and means moved by a said bodily movement of said bolt for positively moving said holding means to a position in which it is again effective.

17. In a latch structure for association with relatively movable members, a bolt having relatively movable portions, said bolt being bodily movable, holding means for controlling said relative movement between said portions, an operator for rendering said holding means ineffective to so control said relative movement, and means moved by a said bodily movement of said bolt for positively moving said holding means to a position in which it is again effective.

18. In a latch structure, a bolt having relatively movable portions, means supporting said bolt for bodily movement between retracted and projected positions, holding means for controlling relative movement between said portions, a first operator operable to render said holding means ineffective, a second operator actuable to effect a said bodily movement of said bolt, and means rendering said second mentioned operator effective to render said first mentioned operator ineffective.

19. In a latch structure, a bolt having relatively movable portions, means supporting said bolt for bodily movement between retracted and projected positions, holding means for controlling relative movement between said portions, a first operator operable to render said holding means ineffective, a second operator actuable to effect a bodily movement of said bolt, means rendering said second mentioned operator effective to render said first mentioned operator ineffective, and means operably responsive to movement of said bolt for restoring said first mentioned operator to effective condition.

20. In a latch structure, a bolt having relatively movable portions, means supporting said bolt for movement between retracted and projected positions, a member movable between a first position in which it is effective to contro. relative movement between said portions and a second position in which it is ineffective to effec such control, and means rendered effective by movement of said bolt for moving said member between said positions.

21. In a latch structure for association with relatively movable members, a bolt having relatively movable portions, means supporting said bolt for bodily movement between retracted and projected positions, holding means for controlling relative movement between said portions, a first operator operable to render said holding means ineffective, a second operator actuable to effect a said bodily movement of said bolt, and means operable as an incident to a closing movement of said members for again rendering said holding means effective to control said relative movement.

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