

March 17, 1942.

R. MARPLE

2,276,325

LATCHING DEVICE

Filed Oct. 24, 1939

3 Sheets-Sheet 1

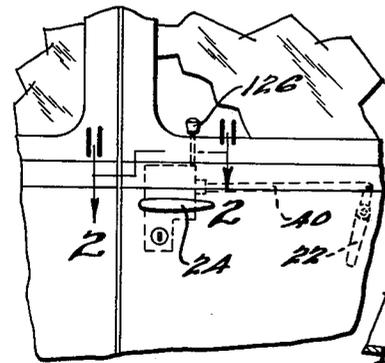


FIG. 1.

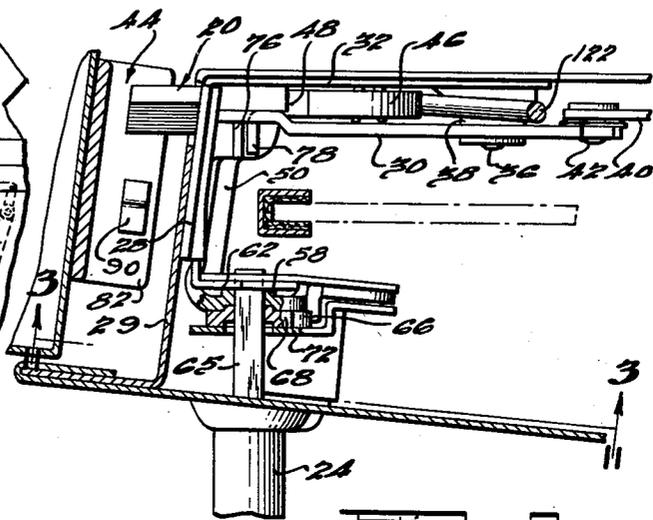


FIG. 2.

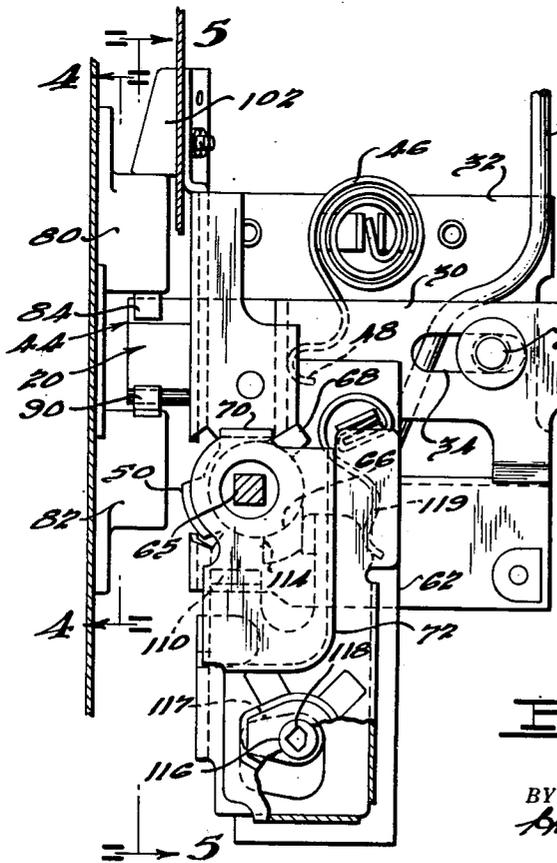


FIG. 3.

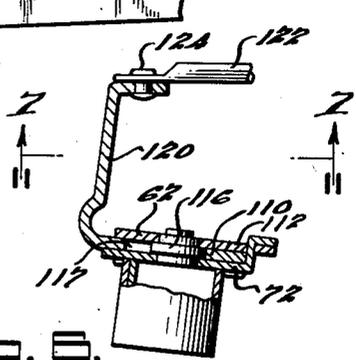


FIG. 4.

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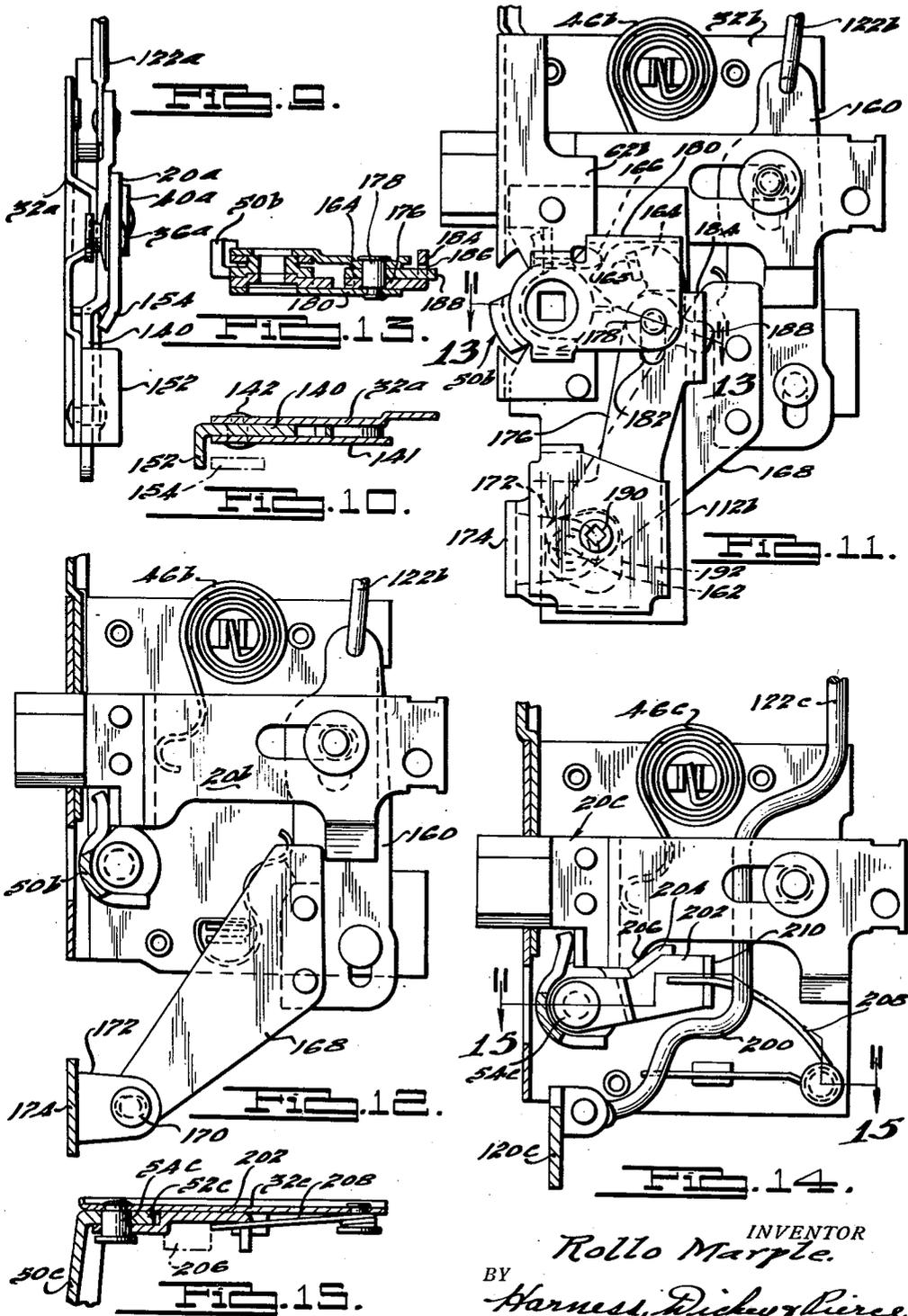
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LATCHING DEVICE

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Application October 24, 1939, Serial No. 301,025

7 Claims. (Cl. 70—146)

The present invention relates to vehicle latching devices, and is directed to the provision of improved latch constructions particularly suited for use on automotive vehicles.

The principal objects of the present invention are to provide latch constructions particularly adapted for but not limited in their use to automotive vehicles, characterized as being simple in construction, economical in manufacture, and reliable and positive in operation; to provide such lock constructions embodying an improved structural relationship between the bolt and the keeper structure; to provide such constructions wherein the keeper mechanism comprises a pair of pivotally supported elements, one whereof cooperates with the bolt member to hold the door in the fully closed position and the other whereof cooperates with the bolt to hold the door in a partially closed or safety position; to provide such an arrangement wherein the latch structure carries an abutment in spaced relation to the bolt, the keeper element being adapted to be wedgingly received between the bolt and the abutment so as to afford a dovetail action; to provide such constructions of the around-the-glass type characterized as embodying improved means operable from within the vehicle to lock the latch; to provide such constructions wherein the inside operated locking means and an externally key controlled device act upon a same locking member common thereto in locking the latch; to provide such constructions embodying means to prevent retraction of the bolt, which means is operable from within the interior of the vehicle; to provide such constructions wherein a retracting movement of the bolt restores the dogging means to the normal position thereof; and to generally improve the construction and operation of latches of the above generally indicated type.

With the above, as well as other objects in view, which appear in the following specification 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, external view of a door assembly, showing the improved latch of the present invention in place thereon;

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

Fig. 5 is a view taken along the line 5—5 of Fig. 3, showing the latch structure in end elevation;

Fig. 6 is a detailed view in horizontal section, taken along the line 6—6 of Fig. 5;

Fig. 7 is a detailed view in vertical section, taken along the line 7—7 of Fig. 6;

Fig. 8 is a view in side elevation of a modified embodiment of the invention;

Fig. 9 is a view in end elevation taken along the line 9—9 of Fig. 8;

Fig. 10 is a view in horizontal section, taken along the line 10—10 of Fig. 8;

Fig. 11 is a view in side elevation of a further modification of the invention;

Fig. 12 is an additional view of the latch structure of Fig. 11, but showing certain of the parts of Fig. 11 removed;

Fig. 13 is a view in horizontal section, taken along the line 13—13 of Fig. 11;

Fig. 14 is a view of an additional embodiment of the invention; and,

Fig. 15 is a view taken along the line 15—15 of Fig. 13.

Referring first to the embodiment of Figs. 1 through 7, the present latch is of the conventional slidable bolt type, employing a bolt 20 which is spring-biased to the projected position shown in the various figures, but may be retracted therefrom by operation of either the inside handle 22 or the outside handle 24. The bolt 20 comprises a thickened head portion which projects through and is guided within an opening 26 provided therefor in the flange 28 of the latch case plate, and also projects through an opening provided therefor in the door rail 29. The bolt 20 is provided with a plate-like body portion 30 which lies in spaced relation to the base 32 of the case plate, as most clearly appears in Fig. 2. The rear portion of the body 30 is provided with an elongated slot 34, which receives a guide pin 36, one end whereof is fixed to a bearing support 38, which is struck from the base 32 of the case plate. A link 40 is provided, one end whereof is connected to the inside handle 22 (Fig. 1), and the other end whereof is pivotally connected as by a pin 42 to the tail of the bolt body. With this relation, it will be understood that a movement to the right of the link 40, as viewed in Figs. 2 and 3, causes a corresponding rightward movement of the bolt 20, withdrawing the head thereof from cooperative relation to the keeper 44, described below, and permitting an opening

movement of the door. The bolt 20 is provided with a biasing spring 46, one end whereof is conventionally secured to the base 32 of the case plate, and the free end whereof is received between the bolt body 30 and the case plate, and bears directly against the rear edge of the bolt head. The spring 46 thus serves to return the bolt to its projected position.

The present latch construction is of the so-called around-the-glass type, and the outside retracting mechanism for the bolt comprises the U-shaped roll back 50, one laterally turned end 52 whereof is pivotally supported upon the base 32 of the case plate by means of a pin 54 (Fig. 7). The other laterally turned end 56 of the U-shaped member 50 is provided with an axially projecting boss 58, which is rotatably journaled in a correspondingly dimensioned opening provided therefor in the supplemental case plate flange 62. The supplemental case plate flange 62 is connected to the base 32 of the case plate through the previously mentioned case plate flange 28, and lies generally parallel to, but spaced on the other side of the glass 64 from the base 32 of the case plate. The roll back 50 is provided with a squared opening which receives the usual square spindle 65 to which the outside handle 24 is connected, and preferably, and as illustrated, the handle mechanism is provided with a scissor action of the type disclosed and claimed in the Moore Patent No. 1,895,893. This scissor mechanism comprises the supplemental roll-back member 66, which is also provided with a squared opening through which the spindle 64 is projected. The squared openings in the main roll-back member 50 and in the supplemental roll-back member 66 are slightly angularly offset from each other, so that when the bolt 20 is projected, the action of the bolt on the roll-back 50, described below, tends to rotate the latter in a counter-clockwise direction (Fig. 3), and correspondingly tends to rotate the supplemental roll-back member 66 in the same direction. Such rotation brings the nose 68 of the roll-back 66 into abutting relation with a bridge portion 70 associated with a deck portion 72 so that the action of the bolt on the roll back 50 causes the two roll-back members 50 and 66 to grip the spindle 65 with a scissor or wedge action. The deck portion 72 also affords a bearing for the supplemental roll-back member 66, and is conventionally secured to the case plate member 62 in spaced relation thereto.

The roll-back member 50 (Fig. 2) is provided with an upwardly struck lug portion 76, which normally is abutted by an ear 78 struck inwardly from the body 30 of the bolt. With this relationship, it will be appreciated that a clockwise rotation of spindle 65, as shown in Fig. 3, causes a corresponding clockwise rotation of the roll-back member 50, and causes the ear 76, as viewed in Fig. 2, to move to the right, which action, in turn, causes the bolt 20 to move to the right. Upon release of the handle 24, the spring 46 associated with the bolt again becomes effective to force the bolt 20 to the left to the projected position, as previously described.

Referring now particularly to Figs. 2, 3, and 4, the improved keeper 44 comprises generally a plate-like member adapted to be secured to the edge of the associated door pillar, and which is provided with an upper housing member 80 and a lower housing member 82, both whereof project from the said edge of the pillar toward the rail 29 of the door, leaving between them a recessed

area in which the bolt 20 may move. The upper housing part 80 accommodates a pivotally mounted keeper element 84, which is provided with a biasing spring 86, which continuously acts between it and the housing 80 to urge it in a clockwise direction of rotation, as viewed in Fig. 4. A limit to such rotation is afforded by providing the keeper element 84 with a tail piece 86, which is adapted, in the limiting position thereof to bear against a rubber buffer 88 or the like. The lower housing member 82 accommodates a pivotally supported safety catch 90, the nose whereof is adapted to project into the recess between the housing members 80 and 82, for engagement by the bolt 20 during closing movement of the door. The safety catch 90 is provided with a biasing spring 92, which continuously acts against the same to urge it in a counterclockwise direction of rotation. A limit to such rotation is afforded by providing the safety catch 92 with a tail piece 94, which abuts a rubber buffer 96, or the like, in the limiting position of the latter.

In accordance with the present arrangement, the door latch and the keeper cooperate not only to hold the door in the closed position, but to produce a dovetail action, and for this purpose, the case plate is provided with an upwardly projecting bracket portion 100, which carries a dovetail member 102, as most clearly appears in Figs. 3 and 5. The upper housing member 80 and the keeper element 84, associated with the keeper 44, are adapted to be received in wedging relation between the bolt 20 and the dovetail member 102, and for this reason the upper surface 104 of the housing 80 is adapted to have sliding contact with the under surface of the dovetail member 102.

The bolt and keeper elements are shown in Fig. 4 in the fully closed position of the door, in which the nose of the keeper element 84 bears against the inner and downwardly sloped base portion 85 of the bolt, and positively prevents a leftward or door opening movement of the bolt. The camming relation between the keeper element 84 and the bolt 20 also produces a vertical reaction between these two members, which action tightly wedges the upper surface of the keeper housing 80 against the under surface of the dovetail member 102, which latter wedging action effectively prevents vertical vibrating movements of the door.

It will be understood from the foregoing description that in order to open the door, either the outside handle 24 or the inside handle 22 may be operated to retract the bolt 20. The operation of the inside handle effects the retraction of the bolt directly through the link 40, whereas the operation of the outside handle effects the retraction of the bolt by producing the previously described rotation of the roll-back member 50, the nose 76 whereof bears against the ear 78 of the bolt. The retracting movements, as produced by either the inside or the outside handles, withdraw the bolt to the right, as viewed in Fig. 6, sufficiently far so that the end thereof clears both the keeper 84 and the safety catch 90.

During a closing movement of the door, during which the bolt 20 may be expected to occupy a projected position under the influence of the biasing spring 46, the back of the bolt engages the rear edge of the safety catch 90 when the door reaches a partially closed position. Continued door closing movement enables the bolt 20 to cam the safety catch 90 in a clockwise di-

rection against the force of its biasing springs 92, so that the bolt 20 ultimately passes beyond beyond the safety catch 90, enabling the latter to resume its active position (Fig. 4). As soon as this occurs, the safety catch 90 becomes effective to prevent a reopening movement of the door except in response to a retracting movement of the bolt, and it will be understood that the safety catch 90 is positioned relative to the keeper 84, so that it becomes effective when the door reaches the usual partially closed or safety position.

If the door closing movement is continued past the just mentioned safety position, the back of the bolt engages the keeper 84 and cams the latter in a counterclockwise direction. Just before the door reaches the fully closed position, the bolt 20 passes beyond the nose of the keeper 84, enabling the latter to swing in a clockwise direction under the influence of its biasing spring to the holding position shown in Fig. 4, in which, in cooperation with the dovetail member 102, it also affords the dovetail action described above.

To the extent described above, the latch and keeper are, of course, applicable to any of the doors of a vehicle. The structure specifically shown in Figs. 1 through 7, however, is particularly designed for use in connection with the right hand front door of a vehicle, to which the outside key controlled lock is usually applied.

In order to enable the locking of the door from the outside, the latch structure is provided with a key operated slide 110, which is vertically reciprocable between the previously mentioned deck 72 and the downwardly extended portion 112 of the case plate. When the door is unlocked, the slide 110 normally occupies the lower position thereof shown in Figs. 3 and 5, in which the upper end is out of the path of movement of the foot 114 carried by the roll-back member 50. The key operated mechanism comprises a cam 116, which may be rotated under the influence of the usual key mechanism which may be inserted, for example, in the squared spindle opening 118, so as to lift the slide 110 into a position in blocking relation to the foot 114. The cam 116 fits into an opening 117 in the slide 110, which is so proportioned that the slide 110 may be raised to locking position without moving the cam 116, but also so that a clockwise rotation of the cam 116 is effective to raise the slide 110 to locking position. When in raised position, the slide 110 prevents a clockwise or bolt retracting movement of the roll-back member 50 and thus prevents the door from being opened by operation of the outside handle 24. The slide 110 is yieldingly retained in either the raised or lowered position by means of a detent spring 119.

A feature of the present invention resides in arranging the slide 110 so that it may also be raised and lowered between the locked and unlocked positions from within the vehicle and for this purpose, the slide 110 is provided with a bracket portion 120 (Fig. 6) which extends transversely of the lock structure to a point spaced from the base 32 of the case plate. A control rod 122 is pivotally connected to the bracket portion 120 as by means of a pin 124, and it will be understood that the control rod extends upwardly through the garnish mold of the associated door, and terminates in a button 126, or the like. It will be appreciated that the button 126 normally occupies its lower position, but that upon being grasped and lifted, it lifts the slide 110 in the same manner that the same is lifted

in response to operation of the cam 116. Also, a lifting movement of the slide 110 under the influence of the cam 116 lifts the button 126, so that the raised and lowered position of the latter always indicates whether the associated latch is in a locked or an unlocked condition.

In accordance with conventional practice, it is preferred to arrange the key operated mechanism associated with the spindle opening 118 so that the key can be inserted or withdrawn only when the cam 116 is in the normal or horizontal position shown in full lines in Fig. 3. With this relation, it will be understood that in locking the door by means of a key, the key is actuated to rotate the cam 116 in a clockwise direction through an angle of 90°, which angle lifts the slide 110 and then restores the key to its original position, thus restoring the cam 116 to its original position. The return movement of the cam does not affect the position of the slide, since it is held in its raised position by the detent spring 119. Similarly, when it is desired to unlock the door by means of a key, the latter is actuated to rotate the cam 116 in a counterclockwise direction through a 90° angle, thus lowering the slide after which the cam 116 is restored to its normal position. Under all normal conditions, accordingly, the cam 116 occupies the horizontal position, in which it does not interfere with the upper or downward movements of the slide 110. With this relation, the locking slide may be actuated between either its unlocked or its locked position at any time by operating either the key or the inside button.

If desired, all of the vehicle doors may be provided with an outside key controlled locking mechanism of the type just described, but it is preferred to so provide only one of the doors, such as the previously mentioned right front door. The latches for the other doors are preferably so arranged that all locking actions are controlled from the interior of the vehicle. With this arrangement in view, the structure of Figs. 8, 9 and 10 may be employed in connection with all such other doors.

The latch of Figs. 8, 9 and 10 corresponds in all respects, to the previously described latch of Figs. 1 through 7, in so far as concerns the arrangement of the bolt and the operation and arrangement of the inside and outside retracting mechanisms, and this relationship is indicated by the use of corresponding reference characters with the postscript "a." In the arrangement of Figs. 8, 9 and 10, however, in order to provide for the locking of the corresponding latch from the inside of the car, the push rod 122a is connected to a slide 140, which slide is vertically reciprocable relative to the latch case plate 32a, and in its reciprocating movement is guided by the bolt supporting pin 36a and a companion pin 142. To accommodate the pins 36a and 142, the slide 140 is provided with elongated slots 144 and 146 and it will be noted that the upper part of the slide 140 is positioned between the base of the case plate 32a and the body 30a of the bolt. The lower part thereof is guided between the case plate 32a and a deck 141. A detent spring 148 is secured to the base of the case plate 32a, and the free end thereof bears against a dwell portion 150 formed at the edge of the slide 140. The spring 148 is thus effective to yieldingly hold the slide 140 in either the lower unlocking position, shown in Fig. 8, or in a raised position or locking position.

In order to adapt it for locking the latch, the

slide 140 is provided adjacent its lower end with a laterally turned flange 152, which, when the slide is elevated, lies in blocking relation to a projection 154 extending downwardly from the body 30a of the bolt. With the slide 140 in raised position, accordingly, it will be appreciated that the flange 152 blocks movement of the bolt 20a to the left, and so prevents a retracting movement of the bolt in response to either the inside or the outside handle associated with the latch.

Figs. 11, 12 and 13 disclose an embodiment of the invention characterized as employing the key controlled arrangement described with reference to Fig. 7, but arranged also to embody the inside controlled locking slide described with reference to Figs. 8, 9 and 10. In the embodiment of Figs. 11, 12 and 13, the mounting and arrangement of the bolt, and the arrangement thereof whereby the same may be normally retracted by operation of either the inside or the outside handle is the same as described with reference to Figs. 1 through 7, which relationship is indicated by the use of corresponding reference characters with the addition of the subscript "b." A locking slide, designated 160, is slidably guided in a case plate in a manner similar to that described with reference to slide 140. In this instance, however, the slide 160, instead of being arranged to block retracting movement of the bolt, is arranged, in conjunction with the key controlled mechanism comprising the cam 162, to rotate a dogging member 164 into blocking relation to a tail piece 166 formed on the outside roll-back member 50b. More particularly, the lower end of the slide 160 is connected to a downwardly extending member 168, which is pivotally connected at its lower end, by means of a pin 170, to one arm 172 of a U-shaped connecting member 174. The other arm 176 of the U-shaped connecting member 174 extends upwardly and at its upper end is guided by a pin 178, which is supported by a deck portion 180, which extends from the case plate portion 62b. The pin 178 rides in an elongated slot 182 formed in the arm 176. Adjacent its upper end, the arm 176 is provided with a laterally turned flange 184, which is provided with a notch 186, to receive one arm 188 of the previously mentioned bell crank shaped dogging member 164. The dogging member 164 is pivotally mounted between the deck 180 and the base 32b of the case plate by means of the previously mentioned pin 178. With this relationship, it will be understood that an upward movement of the arm 176, rotates the dogging member 164 in a counter-clockwise direction from the unlocking position, shown in Fig. 11, to a locked position in which the nose 165 lies in blocking relation to the tail piece 166 of the roll-back member 50b.

The upward movement of the arm 176 may be caused, as will be evident, by means of the push rod 122b, through the previously mentioned connecting member 168, and it may also be caused by the external key controlling cam 162. The cam 162 is suitably journaled for rotative movement between the deck 12b and the downwardly projecting portion 112b of the case plate, and may be rotated by means of a suitable handle or the like (not shown) inserted in the squared opening 190 provided in the body thereof. The cam 162 rides in an opening 192 provided therefor at the lower end of the arm 176, and, as described with reference to Figs. 1 through 7, a clockwise rotation of the cam 162 causes a lifting movement of the arm 176 and a consequent rotation of the dog

164. A reverse rotation of the cam 162, in turn, restores the arm 176 to the unlocked position.

In the embodiment of the invention described with reference to Figs. 1 through 7, it will be appreciated that the key controlled door may be locked either by operation of the inside controlled push rod, or by operation of the key mechanism, while the door is in a closed condition, and thereafter, without disturbing the lock condition, the bolt may be retracted as by operation of the inside handle. This operating arrangement is in line with certain commercial preferences, but in meeting other commercial preferences, it is found that provision should be made so that a retracting movement of the bolt restores the locking mechanism to unlocked condition. Such an arrangement is illustrated in Figs. 14 and 15, wherein the latch structure may correspond in all respects to the arrangement described with reference to Figs. 1 through 7, which relationship is indicated by the use of corresponding reference characters with the subscript "c." In this arrangement, the locking rod 122c is provided with an offset or shouldered portion 200, which in the unlocked position thereof, lies below and beyond the range of movement of a kick-off lever 202, which is pivotally supported on the latch by means of the previously mentioned pin 54c associated with the roll-back 50c. The kick-off lever 202 is provided with an offset seat 204, which lies in the path of movement of a downwardly extending part 206 of the bolt 20c. With this relation, it will be understood that a retracting movement of the bolt causes the portion 206 to bear against the seat 204 and rotate the latter in a clockwise direction against the force of the biasing spring 208. With the locking rod 122c in the raised position shown in Figs. 14 and 15, this clockwise rotation of the kick-off lever brings a flange 210 formed at the end thereof downwardly into engagement with the shoulder 200 formed in the rod 122c, and enables the lever 202 to move the rod 122c downwardly from the locked position to the unlocked position. With this arrangement, it will be appreciated that a retracting movement of the bolt while the parts are in locked condition restores the locking elements to the unlocked condition thereof.

Although only several specific embodiments of the invention have been described in detail, it will be appreciated that various modifications 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, the combination of a case plate, a bolt member slidably guided upon said case plate and means for retracting the same, a slide member interposed between the base of the case plate and the bolt, means for operating the slide, and means carried by the slide and movable into blocking relation to the bolt so as to prevent retraction thereof.

2. In a latch of the around-the-glass type having a case plate, the base whereof is disposed at one side of the glass and a flange portion whereof is disposed at the other side of the glass, a bolt, a retracting member operative to retract the bolt, a slide movably guided upon the base of the case plate, key operated means carried by the flange portion, and means common to said slide and said key operated means and supported on said flange portion for rendering said retracting member ineffective to retract the bolt.

3. In a latch of the around-the-glass type hav-

ing a case plate, the base whereof is disposed at one side of the glass and a flange portion whereof is disposed at the other side of the glass, a bolt, a retracting member operative to retract the bolt, a slide movably guided upon the base of the case plate, key operated means carried by the flange portion, means inter-connecting said slide and said key operated means, and a pivotally mounted locking member actuatable by said interconnecting means into blocking relation to said retracting means.

4. In a latch mechanism, a movably mounted bolt arranged to operatively engage an associated keeper to hold associated closure members in predetermined position, retracting means operatively coupled to said bolt and movable to render said bolt ineffective to so hold said members, a locking member movable between a retracted position and a locking position in which it blocks said movement of said retracting means, key controlled means operable to move said locking member from either of said positions to the other said position, and an additional manually operable control effective to move said locking member from at least one of said positions to the other position.

5. In a latch mechanism for a door, a movably mounted bolt carried by the door and arranged to operatively engage an associated keeper to hold the door in the closed position, retracting means operatively coupled to said bolt and movable to render said bolt ineffective to so hold said door, a locking member movable between a retracted position and a locking position in which it blocks said movement of said retracting means, key controlled means operable from one side of said door to move said locking member from either of said positions to the other said position, and an addi-

tional manually operable control operable from the inside of said door to move said locking member from at least one of said positions to the other position.

6. In a latch mechanism for a door, a movably mounted bolt carried by the door and arranged to operatively engage an associated keeper to hold the door in the closed position, retracting means operatively coupled to said bolt and movable to render said bolt ineffective to so hold said door, a locking member movable between a retracted position and a locking position in which it blocks said movement of said retracting means, key controlled means operable from one side of said door to move said locking member from either of said positions to the other said position, an additional manually operable control operable from the inside of said door to move said locking member from at least one of said positions to the other position, and means operated by movement of said bolt for restoring said locking member to the retracted position.

7. In a latch mechanism for a door, a movably mounted bolt carried by the door and arranged to operatively engage an associated keeper to hold the door in the closed position, retracting means operatively coupled to said bolt and movable to render said bolt ineffective to so hold said door, a locking member movable between a retracted position and a locking position in which it blocks said movement of said retracting means, key controlled means operable from one side of said door to move said locking member from either of said positions to the other said position, and means operated by movement of said bolt for restoring said locking member to the retracted position.

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