Jan. 30, 1940. H. B. KEATS 2,188,642

AUTOMATIC LATCH WITH PUSH-BUTTON RELEASE

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Fig. 1.

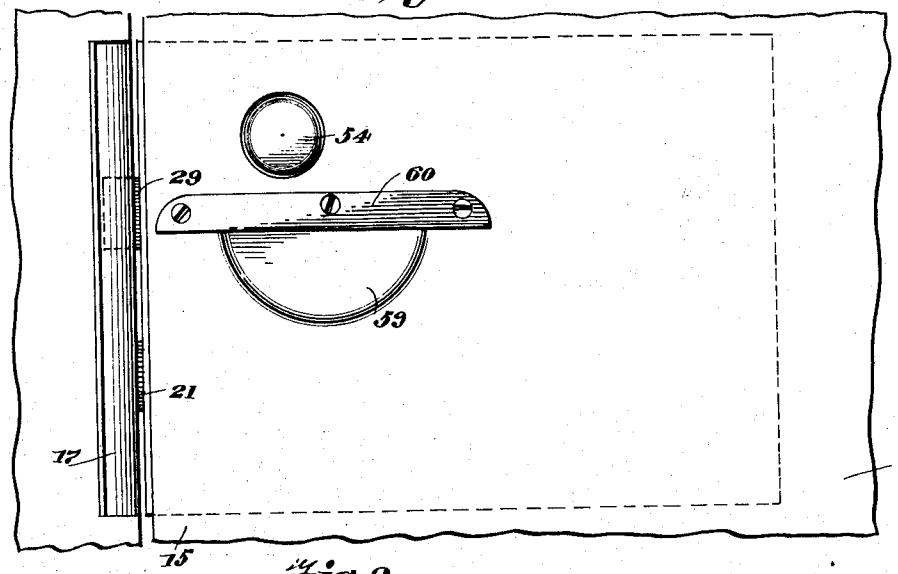


Fig. 2.

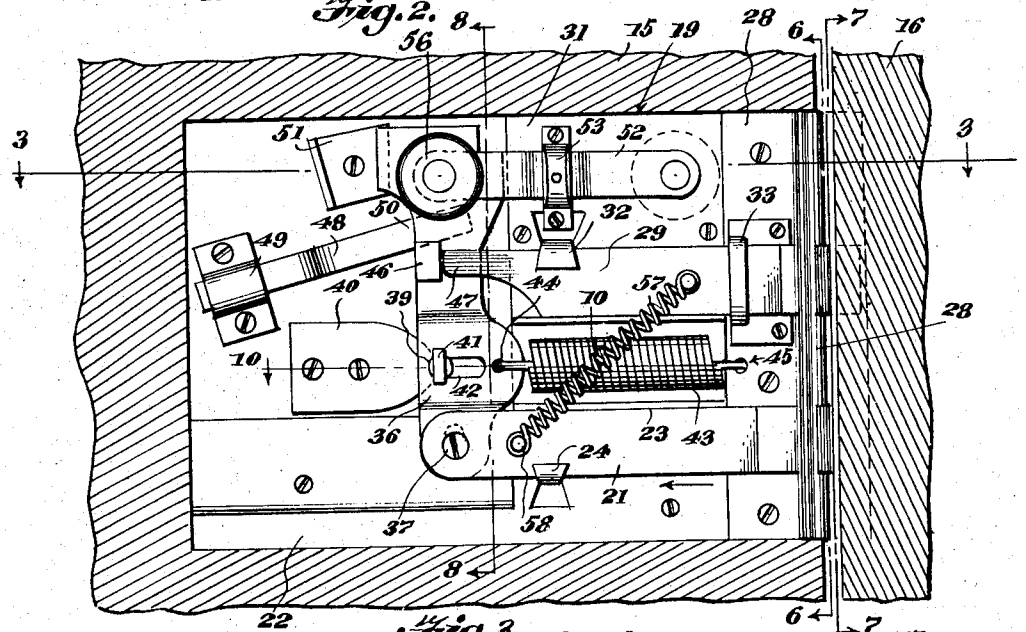


Fig. 3.

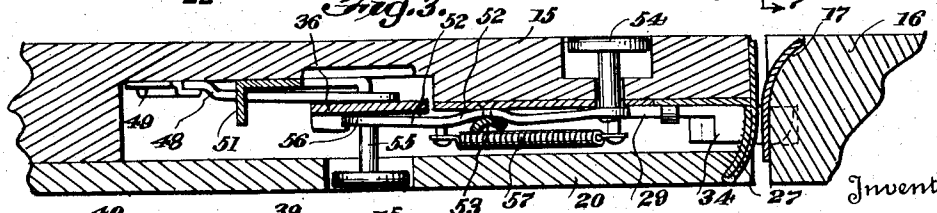
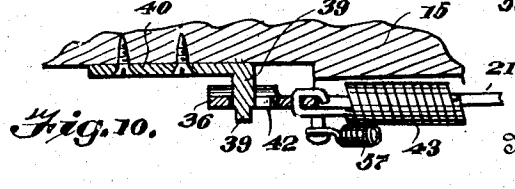


Fig. 10.



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AUTOMATIC LATCH WITH PUSH-BUTTON RELEASE

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Fig. 4.

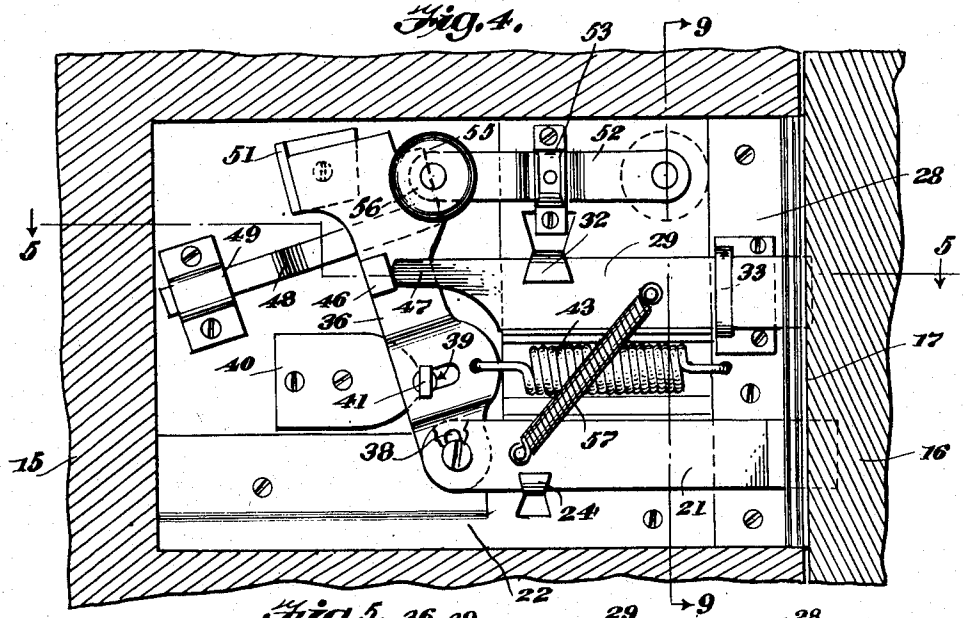


Fig. 5.

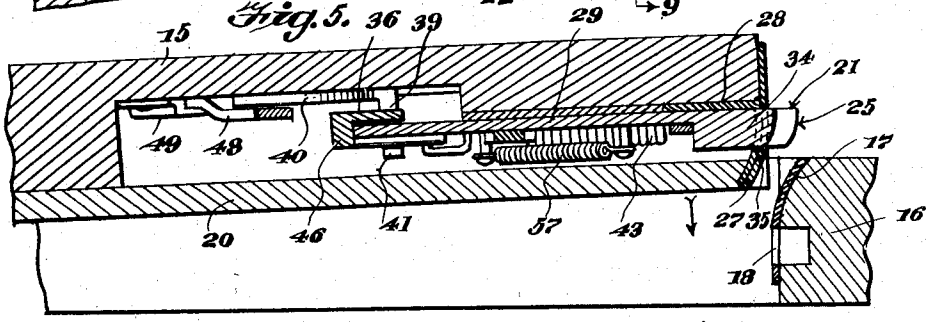


Fig. 6.

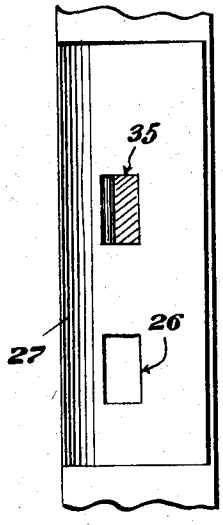


Fig. 7.

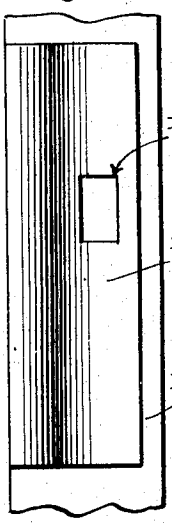


Fig. 8.

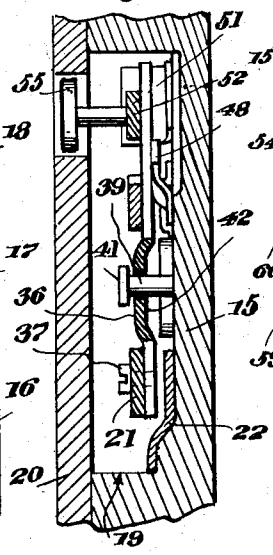
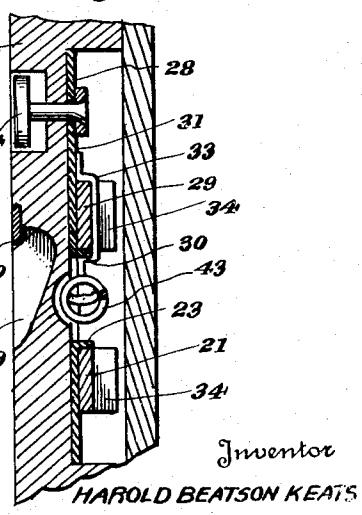


Fig. 9.



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UNITED STATES PATENT OFFICE

2,188,642

AUTOMATIC LATCH WITH PUSH-BUTTON RELEASE

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Application November 11, 1937, Serial No. 174,116

18 Claims. (Cl. 292—181)

This invention relates to automatic latches, and has for one of its objects the production of a simple and efficient latch having a push-button release, whereby the latch may be automatically unlatched by pushing upon a push-button.

A further object of this invention is the production of a simple and efficient means for automatically operating the latch as the door or support carrying the latch is moved to a closed position.

Other objects and advantages of this invention will appear throughout the following specification and claims.

In the drawings:

Figure 1 is a front elevational view of the latch support, showing one of the push-buttons and hand-grip;

Figure 2 is a side elevational view of the latch mechanism with the parts in a latched position and showing the support structure in section;

Figure 3 is a longitudinal sectional view taken on line 3—3 of Figure 2;

Figure 4 is a side elevational view of the latching mechanism with the parts in a released position and showing the supporting structure in section;

Figure 5 is a horizontal sectional view taken on line 5—5 of Figure 4;

Figure 6 is a vertical sectional view taken on line 6—6 of Figure 2;

Figure 7 is an edge elevation of the keeper plate showing the same mounted upon the door jamb and looking in the direction of the arrows, as indicated by line 7—7 in Figure 2;

Figure 8 is a vertical sectional view taken on line 8—8 of Figure 2;

Figure 9 is a vertical sectional view taken on line 9—9 of Figure 4;

Figure 10 is a horizontal sectional view taken on line 10—10 of Figure 2.

By referring to the drawings, it will be seen that 15 designates the latch support which may be in the nature of a swinging door, sliding drawer, or any other suitable support whereby the latch will be supported in a manner to be moved or swung to end from a closed position. The numeral 16 designates the door jamb or abutment, and this door jamb or abutment 16 carries a keeper plate 17 which is preferably concavo-convex in cross section, as shown in Figure 3, and is provided with a latching bolt receiving aperture 18.

The latching mechanism may be placed within a suitable case or mounted within a suitable cut-out portion or cavity 19 formed in the support 15 such as a door and the like, one side of the cavity 19 being closed by a suitable panel 20. The present invention, however, relates primarily to the latch structure and not to the structure of the support, and it is thought necessary only to illustrate and to refer to one type of mounting. The type of mounting may be varied without departing from the spirit of the invention and to accommodate the mechanism to various uses. This would only require a conventional rearrangement which would fall within the scope of anyone skilled in the art.

An actuating bolt 21 is slidably mounted within the cavity 19 and is preferably supported upon a suitable supporting plate 22 which supporting plate 22 is provided with a longitudinally extending track plate 23 along its upper edge for engaging the upper edge of the actuating bolt 21 and an upturned lip 24 overlying the lower edge of the actuating bolt 21, the track 23 and lip 24 providing means for holding and guiding the actuating bolt in proper position. The actuating bolt 21 is provided with an outer beveled end 25 and is adapted to ride over the concavo-convex keeper plate 17, as the latch and support therefor are moved to a closed position as will be hereinafter described. The outer end 25 of the actuating bolt 21 extends through a suitable aperture 26 formed in the front plate 27 of the latch-supporting mechanism, which plate 27 comprises an angular extension of the vertically extending plate 28, which plate 28 is anchored within the cavity 19, as shown.

A latching bolt 29 is located above the actuating bolt 21 and is slidably mounted on the track flange 30 formed along the lower edge of the latching bolt supporting plate 31 which plate 31 is secured within the cavity 19, as shown. The plate 31 is also provided with an overhanging lip 32 which is struck from the body of the plate 31 and overhangs the upper edge of the latching bolt 29, as shown in Figures 2 and 4. The forward end of the latching bolt 29 also passes through a guiding loop 33 carried by the vertical plate 28 and the forward beveled end 34 of the latching bolt 29 extends through the aperture 35 located above the aperture 26 in the front plate 27 of the latch supporting mechanism. The loop 33 also serves as an abutment or stop to limit the rearward movement of the latching bolt to a position where its rear end 47 will permit lug 46 to reseat itself behind the end 47 as will later more fully appear.

An actuating link or lever 36 is pivotally secured to the rear end of the actuating bolt 21 by means

of a screw 37 which works in an elongated slot 38 formed in the lower end of the actuating link or lever 36, as indicated in Figure 4. This slot 38 will allow sufficient play to prevent the binding of the actuating bolt 21, as the link or lever 36 moves. This link or lever 36 is pivotally mounted on a journal pin 39 carried by the journal plate 40, the journal plate 40 being anchored within the cavity 19, as shown, and the journal pin 39 extending at right angles to the plate 40, as shown in detail in Figure 10. This journal pin 39 is provided with an elongated head 41 which normally extends at right angles to the elongated slot 42 formed in the actuating lever or link 36, the slot 42 being elongated to permit of a slight play of the link or lever 36 upon the journal pin 34 and also to permit the elongated head 41 to slip through the aperture 42 when assembling and prior to the time when the journal plate 40 is anchored in position. A tension spring 43 is secured, as at 44, to the forward edge of the actuating link or lever 36 and the opposite end of the spring 43 is anchored, as at 45, to the plate 28. This actuating link or lever 36 is provided with an abutment lug 46 which is adapted to engage the inner end 47 of the latching bolt 29 and hold the latching bolt 29 in a projected position, shown in Figure 2, until the lug 46 is released from the end 47 of the bolt 29, as will be hereinafter described. It should be noted that the actuating link or lever 36 is shiftable longitudinally of the journal pin 39 so as to allow the link or lever 36 to be moved to and from a position to cause the lug 46 to register with or to be moved out of alignment with the end 47 of the bolt 29. A flat spring 48 is anchored, as at 49, at one end within the cavity 19 and the opposite end 50 fits behind the actuating link or lever 36 near its upper end and adjacent the lug 46 to normally urge the upper end of the actuating lever or link 36 toward the rear end 47 of the bolt 29 so as to cause the lug 46 to extend behind and in engagement with one end 47 of the bolt 29. A stop plate 51 is located in the cavity 19 to limit the swinging movement of the actuating lever or link 36 in one direction.

A push-button lever 52 is rockably journaled within a bracket 53 for rocking action and is located above the latching bolt 29 and to one side of the actuating link or lever 36. This push-button lever 52 carries a push-button 54 at one end which extends through the support 15 and normally lies flush with the outer face thereof and the opposite end of the lever carries a push-button 55 which extends through the panel 20 and normally lies flush therewith so that the push-buttons may be depressed for the purpose of unlatching the door. The inner end 56 of the push-button lever 52 overhangs the upper end of the actuating lever or link 36 and as either one of the push-buttons 54 or 55 is depressed, the upper end of the actuating lever or link 36 will be depressed moving the lug 46 out of the path of movement of the inner end 47 of the bolt 29 and allowing the tension spring 57 to automatically pull the bolt 29 to a released position as soon as the lug 46 has been moved inwardly out of the path of movement of the inner end 47 of the bolt 29. The spring 57 is secured to a pin 58 carried near the inner end of the actuating bolt 21, the spring 57 being anchored at an angle of approximately 45 degrees to the horizontal to a point near the forward end of latching bolt 29.

In the type of mechanism shown, I preferably employ a hand-hold or socket 59 which is formed in the outer face of the support 15 across the top of which extends a gripping plate 60 behind which the fingers may extend for the purpose of moving the support or door 15 to an open position. The push-button 54 is preferably located above the socket 59 and the parts are preferably mounted in flush relation to the outer face of the support so as to eliminate obstructions. It should be noted that the push-buttons 54 and 55 extend through opposite sides of the support such as a door, drawer, and the like.

It should be understood that springs illustrated and described in connection with the present latch, may be replaced by any suitable or desired type of spring without departing from the spirit of the invention, and that the release in the nature of the push-buttons may be either of a push or a pull variety. It should be noted that the push-buttons merely constitute a releasing means which, when actuated, will permit the automatic operation of the latching bolt in its movement to a released position.

The operation of the device is as follows:

For the sake of the description, the operation of the latch will be described as it actuates when applied to a swinging door, although it should be clearly understood that the latch may be applied to any type of mechanism wherein the latch is moved into and out of engagement with an abutment for latching the moving support to and from a closed position with respect to the abutment. In the structure illustrated, the parts will assume the position shown in Figure 4 when the door is open wherein the actuating bolt 21 extends outwardly through the aperture 26. As the door or support 15 is moved to a closed position with respect to the door jamb or abutment 16 in the direction of the arrow as shown in Figure 5, the beveled face 25 of the actuating bolt 21 will cause the actuating bolt 21 to be moved inwardly in the direction of the arrow shown in Figure 2 against the tension of the springs 43 and 57 and also cause the latching bolt 29 to move outwardly until it is in alignment with the actuating bolt 21, when the actuating bolt 21 and the latching bolt 29 move inwardly in unison. This inward movement of the actuating bolt 21 and latching bolt 29 will slightly move the actuating lever or link 36 bodily inwardly due to the slotted aperture 42 fitting over the journal pin 39 and as the bolt 21 moves inwardly against the tension of the springs 43 and 57, the actuating lever or link 36 will be swung causing the lug 46 to push against the end 47 of the latching bolt 29 and move this latching bolt 29 forwardly, the beveled end 25 of the actuating bolt 21 riding over the face of the keeper plate 17 which is solid at this point and is not apertured, this movement pushing the latching bolt 29 forwardly and causing the forward end 34 of the latching bolt 29 to ride over the face of the keeper plate 17 and be moved into the notch or aperture 18 of the keeper plate 17, thereby firmly latching the door or support 15 in a closed position. When it is desired to open the door through the medium of the push-buttons 54 or 55, the operator will place his fingers into the socket 59 behind the plate 60 and by pushing his thumb against the push-button 54, the push-button lever 52 will depress the upper end of the actuating lever or link away from the inner end 47 of the bolt 29 moving the lug 46 out of the path of the end 47 whereupon the tension spring 57 will automatically pull the latching bolt to an unlatched position. In this position prior to swinging the

door open both of the bolts 21 and 29 will be in a retracted position, the actuating bolt 21 being held retracted against the tension of the springs 43 and 57 due to the fact that the outer end 25 bears against the keeper plate 17, the spring 57 holding the bolt 29 in a retracted position. The door may then be swung to an open position whereupon the springs 43 and 57 will cause the actuating bolt 21 to protrude to the position shown in Figure 5, where it will be ready to automatically shift the latching bolt to a latching position when the door is closed. When the latch support 15 is moved to an open position, actuating bolt 21 is moved by the tension of spring 57 to its normally projected position. Since spring 43 holds the link or lever 36 against pin 39 at this time, link or lever 36 will be rocked on 39 as a pivot thereby causing the link or lever to swing its upper end in a counter clockwise direction in Fig. 2, link or lever 36 being guided in its movement between the outer face of spring 48 and the inner face of end 47 until abutment 46 is free of inner end 47 when the tension of spring 48 urges abutment 46 into operative reseated position behind the end 47. Spring 48 is so disposed as to provide minimum resistance to the release of abutment 46 from end 47 in the latching position, and maximum tension to urge abutment 46 into reseated position behind the end 47.

As the door is being closed the outer beveled end 25, being projected (see Fig. 5) will engage the keeper plate 17 and be forced inwardly. Since spring 43 holds link or lever 36 against pin 39 at this time, link or lever 36 will be rocked on 39 as a pivot thereby causing the link or lever to swing its upper end in a clockwise direction in Fig. 4. This causes abutment 46 to push latching bolt 29 forward until its beveled end engages the keeper plate. From this time on both the actuating bolt and the latching bolt move inwardly in unison carrying link or lever 36 with them against the tension of spring 43 (slot 42 permits this) until the beveled end 34 of latching bolt 29 reaches the recess 18, whereupon the spring 43 swings the link or lever on screw 37 as a pivot and lug 46 pushes latching bolt 29 forward so its beveled end 34 will enter recess 18 and latch the door.

From the foregoing description, it will be seen that a very simple and efficient device has been provided for automatically latching a door, drawer, or the like, and it should be further understood that certain detail changes in the mechanical construction may be employed without departing from the spirit of the invention so long as such changes fall within the scope of the appended claims.

It should be understood that springs illustrated and described in connection with the present latch, may be replaced by any suitable or desired type of spring without departing from the spirit of the invention, and that the release in the nature of the push-buttons may be either of a push or a pull variety. It should be noted that the push-buttons merely constitute a releasing means which, when actuated, will permit the automatic operation of the latching bolt in its movement to a released position.

Having described the invention, what I claim as new is:

1. A latch of the class described comprising a spring-projected actuating bolt adapted to be pushed back, a latching bolt, means actuated by said actuating bolt and operatively engaging said latching bolt for moving said latching bolt to a latched position, means for releasing said last mentioned means, spring means for automatically moving said latching bolt from a latched position to an unlatched position when released, and tracks for supporting said bolts in parallel relation, the outer edges of the tracks lying within the plane of the outer side faces of the adjacent bolts, said spring means engaging said bolts and holding said bolts firmly upon said tracks.

2. A latch of the class described comprising an actuating bolt mounted for slidable movement, an actuating lever, a journal pin, said lever being mounted for pivotal and laterally slidable movement on and shiftable longitudinally of said journal pin and pivotally connected to said actuating bolt, spring means for normally holding said actuating bolt in an extended yieldable position, a latching bolt, means carried by said actuating lever and adapted to contact with said latching bolt for simultaneously moving said latching bolt to a latching position when said actuating bolt is moved to a retracted position, retracting means for automatically moving said latching bolt from a latched position to a retracted position when released from said actuating lever, and means for shifting said actuating lever out of engagement with said latching bolt.

3. A latch of the class described comprising an actuating bolt mounted for slidable movement, an actuating lever mounted for pivotal and laterally slidable movement and pivotally connected to said actuating bolt, spring means for normally holding said actuating bolt in an extended yieldable position, a latching bolt, means carried by said actuating lever and adapted to contact with said latching bolt for simultaneously moving said latching bolt to a latching position when said actuating bolt is moved to a retracted position, means for automatically moving said latching bolt from a latched position to a retracted position when released from said actuating lever, and push-button means for moving said actuating lever out of engagement with said latching bolt.

4. A latch of the class described comprising an actuating bolt mounted for slidable movement, an actuating lever mounted for pivotal movement and pivotally connected to said actuating bolt, spring means for normally holding said actuating bolt in an extended yieldable position, a latching bolt, means carried by said actuating lever and adapted to contact with said latching bolt for simultaneously moving said latching bolt to a latching position when said actuating bolt is moved to a retracted position, means for automatically moving said latching bolt to a retracted position when released from said actuating lever, push-button means for moving said actuating lever out of engagement with said latching bolt, and said latching bolt contacting means comprising a lug adapted to engage the rear end of said latching bolt to releasably hold said latching bolt in an extended position.

5. A latch of the class described comprising an actuating bolt mounted for slidable movement, an actuating lever, a journal pin, said lever being mounted on said pin for pivotal and laterally slidable movement and shiftable longitudinally of said journal pin and pivotally connected to said actuating bolt, spring means for normally holding said actuating bolt in an extended yieldable position, a latching bolt, means carried by said actuating lever and adapted to contact with said latching bolt for simultaneously moving said latching bolt to a latching position when said

actuating bolt is moved to a retracted position, spring means for automatically moving said latching bolt from a protracted position to a retracted position when released from said actuating lever, and means for shifting said actuating lever out of engagement with said latching bolt.

6. A latch of the class described comprising an actuating bolt mounted for slidable movement, an actuating lever mounted for pivotal and laterally slidable movement and pivotally connected to said actuating bolt, spring means for normally holding said actuating bolt in an extended yieldable position, a latching bolt, means carried by said actuating lever and adapted to contact with said latching bolt for simultaneously moving said latching bolt to a latching position when said actuating bolt is moved to a retracted position, means for automatically moving said latching bolt from a latched position to a retracted position when released from said actuating lever, push-button means for moving said actuating lever out of engagement with said latching bolt, and guiding tracks for said actuating bolt and latching bolt, said guiding tracks having their outer edges substantially flush with the outer side face of said latching bolt.

7. A latch of the class described comprising an actuating bolt mounted for slidable movement, an actuating lever mounted for pivotal movement and pivotally connected to said actuating bolt, spring means for normally holding said actuating bolt in an extended yieldable position, a latching bolt, means carried by said actuating lever and adapted to contact with said latching bolt for simultaneously moving said latching bolt to a latching position when said actuating bolt is moved to a retracted position, means for automatically moving said latching bolt to a retracted position when released from said actuating lever, means for shifting said actuating lever out of engagement with said latching bolt comprising a push-button lever rockably mounted adjacent said actuating lever and having one end overhanging one end of said actuating lever, and oppositely arranged push-buttons carried by the opposite ends of said push-button lever.

8. A latch of the class described comprising an actuating bolt mounted for slidable movement, an actuating lever mounted for pivotal movement and pivotally connected to said actuating bolt, spring means for normally holding said actuating bolt in an extended yieldable position, a latching bolt, abutment means carried by said actuating lever and adapted to contact with said latching bolt for simultaneously moving said latching bolt to a latching position when said actuating bolt is moved to a retracted position, means for automatically moving said latching bolt to a retracted position when released from said actuating lever, manually operated means for moving said actuating lever out of engagement with said latching bolt.

9. A latch of the class described comprising a support having an opening edge, a spring-projected inarticulate normally projected actuating bolt adapted to be repressed adjacent the opening edge of the support, an inarticulate latching bolt, the latching face of said latching bolt extending substantially in a plane parallel to the longitudinal axis of said latching bolt, laterally slidable means actuated by said actuating bolt and operatively connected with said latching bolt for moving said latching bolt to a firmly latched position, means for releasing said last mentioned means, spring means for automatically moving said latching bolt from a latched position to an unlatched position when released, and tracks for supporting said bolts in parallel relation, the outer edges of the tracks lying within the plane of the outer side faces of the adjacent bolts, said spring means engaging said bolts and holding said bolts firmly upon said tracks.

10. A latch of the class described comprising a support having an opening edge, an inarticulate normally projected actuating bolt adapted to be repressed adjacent the opening edge of the support mounted for slidable movement, an actuating lever, a journal pin, said lever being mounted for pivotal and laterally slidable movement and by radial movement shiftable longitudinally of said journal pin and pivotally connected to said actuating bolt, spring means for normally holding said actuating bolt in an extended yieldable position, an inarticulate latching bolt, the latching face of said latching bolt extending substantially in a plane parallel to the longitudinal axis of said latching bolt, means carried by said actuating lever and adapted to contact with said latching bolt for simultaneously moving said latching bolt to a latching position when said actuating bolt is moved to a retracted position, retracting means for automatically moving said latching bolt from a latched position to a retracted position when released from said means carried by said actuating lever, and means for shifting said means carried by said actuating lever out of engagement with said latching bolt.

11. A latch of the class described comprising an inarticulate normally projected actuating bolt mounted for slidable movement, an actuating lever mounted for pivotal and laterally slidable movement and pivotally connected to said actuating bolt, spring means for normally holding said actuating bolt in an extended yieldable position, an inarticulate latching bolt, the latching face of said latching bolt extending substantially in a plane parallel to the longitudinal axis of said latching bolt, means carried by said actuating lever and adapted to contact with said latching bolt for simultaneously moving said latching bolt to a latching position when said actuating bolt is moved to a retracted position, means for automatically moving said latching bolt from a latched position to a retracted position when released from said means carried by said actuating lever, and push-button means for moving said means carried by said actuating lever out of engagement with said latching bolt.

12. A latch of the class described comprising an inarticulate actuating bolt mounted for slidable movement, an actuating lever, a journal pin, said lever being mounted for pivotal and laterally slidable movement and by radial movement shiftable longitudinally of said journal pin and pivotally connected to said actuating bolt, spring means for normally holding said actuating bolt in an extended yieldable position, an inarticulate latching bolt, the latching face of said latching bolt extending substantially in a plane parallel to the longitudinal axis of said latching bolt, means carried by said actuating lever and adapted to contact with said latching bolt for simultaneously moving said latching bolt to a latching position when said actuating bolt is moved to a retracted position, spring means for automatically moving said latching bolt from a protracted position to a retracted position when released from said means carried by said actuating lever, and means for shifting said means

carried by said actuating lever out of engagement with said latching bolt.

13. A latch of the class described comprising an inarticulate actuating bolt mounted for slidable movement, an actuating lever mounted for pivotal and laterally slidable movement and pivotally connected to said actuating bolt, spring means for normally holding said actuating bolt in an extended yieldable position, an inarticulate latching bolt, the latching face of said latching bolt extending substantially in a plane parallel to the longitudinal axis of said latching bolt, means carried by said actuating lever and adapted to contact with said latching bolt for simultaneously moving said latching bolt to a latching position when said actuating bolt is moved to a retracted position, means for automatically moving said latching bolt from a latched position to a retracted position when released from said means carried by said actuating lever, push-button means for moving said means carried by said actuating lever out of engagement with said latching bolt, and guiding tracks for said actuating bolt and latching bolt, said guiding tracks having their outer edges substantially flush with the outer face of said latching bolt and actuating bolt.

14. In combination with a keeper plate having a single latching bolt receiving aperture, an inarticulate latching bolt, the latching face of said latching bolt extending substantially in a plane parallel to the longitudinal axis of said latching bolt, said latching bolt having a projectable end with a wiping face to wipe over the face of said keeper plate prior to entering the aperture therein, an inarticulate actuating bolt, said actuating bolt adapted to be repressed adjacent the opening edge of the support and having a retractable projecting end adapted to wipe over the face of said keeper plate, laterally slidable means for simultaneously moving said latching bolt into said latching bolt receiving aperture as the outer end of said actuating bolt moves across said keeper plate, means for releasing said last mentioned means, and means for automatically retracting said latching bolt from a latching to an unlatched position when said latching bolt is released, said latching bolt and said actuating bolt having their wiping faces arranged to wipe over the keeper plate in the same direction.

15. In a latch mechanism of the class described, a support, an actuating bolt and a latching bolt mounted on said support, means operatively connecting said bolts together by virtue of which means, as said actuating bolt is pushed back, said latching bolt will be projected, means to mount said connecting means for movement bodily in the same direction as said bolts move when said bolts are moved inwardly in unison and means to effect a release of said latching bolt at will, means to retract said latching bolt when released, and means to project said actuating bolt.

16. In a latch mechanism of the class described, a support, an actuating bolt and a latching bolt projectable from the same face of and mounted on said support, means continuously tending to project said actuating bolt and to retract said latching bolt, means mounted on said support for operatively connecting said bolts together by virtue of which, as said actuating bolt is pushed back said latching bolt will be projected, said last named means having provision for its movement laterally when said latching bolt meets resistance before said actuating bolt completes its backward movement and means for operatively disconnecting said latching bolt from said last named means to permit said continuously tending means to effect automatic retraction of said latching bolt.

17. A latch of the class described comprising a support, having an opening edge, an inarticulate normally projected actuating bolt having a beveled face and adapted to be repressed near the opening edge of the support, an inarticulate latching bolt having a beveled face, the beveled faces of the said bolts facing the same way, bodily laterally slidable means actuated by the actuating bolt and operatively engaging said latching bolt for moving said latching bolt to a latching position, means for releasably holding said latching bolt in a latching position, and means automatically to retract said latching bolt when released.

18. A latch of the class described comprising a support having an opening edge, an inarticulate normally projected actuating bolt having a beveled face and adapted to be repressed near the opening edge of the support, an inarticulate latching bolt having a beveled face, the beveled faces of the said bolts facing the same way, means actuated by the actuating bolt and operatively engaging said latching bolt for moving said latching bolt to a latching position, means for releasably holding said latching bolt in a latching position, and means continuously tending to project said actuating bolt and to retract said latching bolt by virtue of which said latching bolt when released will automatically return to a retracted position and said actuating bolt when released will automatically return to a protracted position.

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