

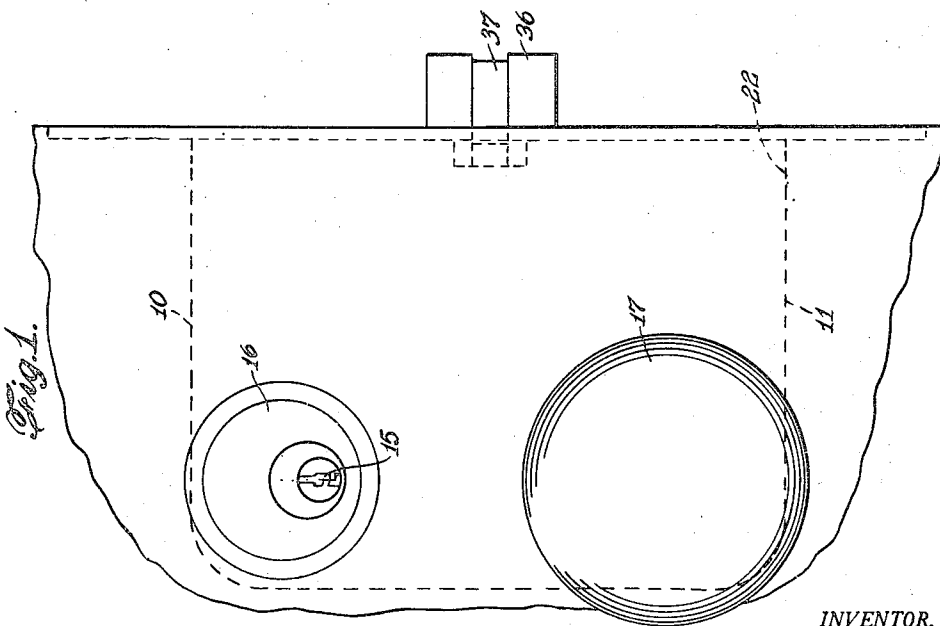
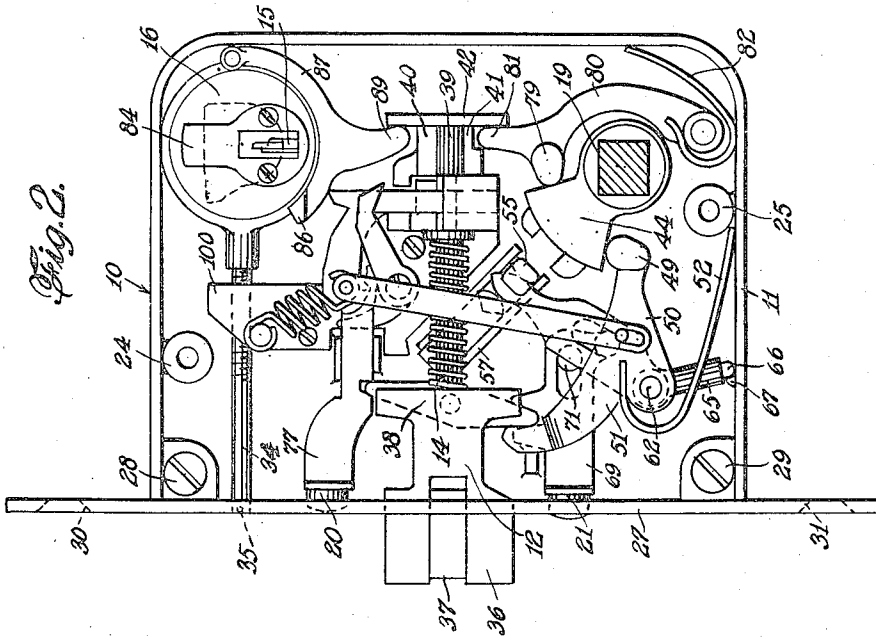
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J. KUZMA
DOOR LOCK

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2 Sheets-Sheet 1



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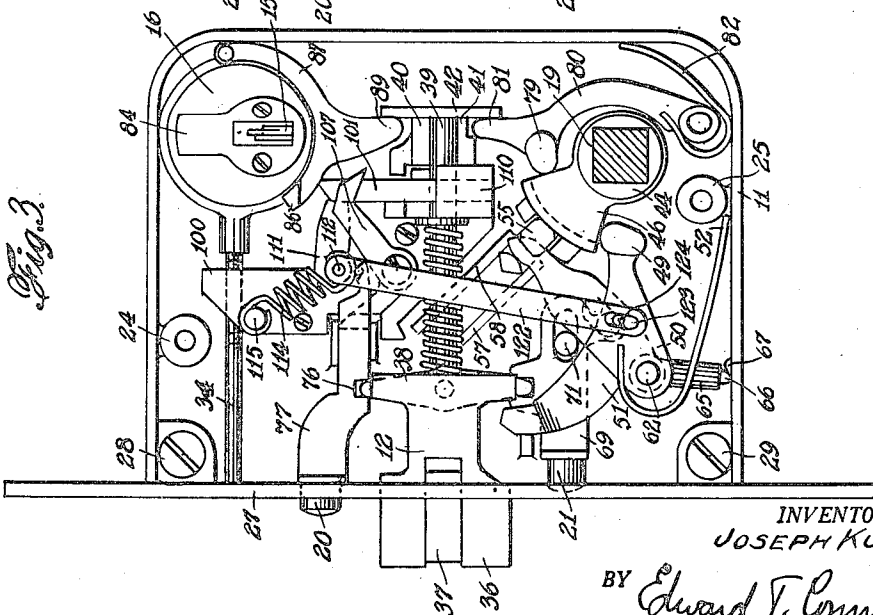
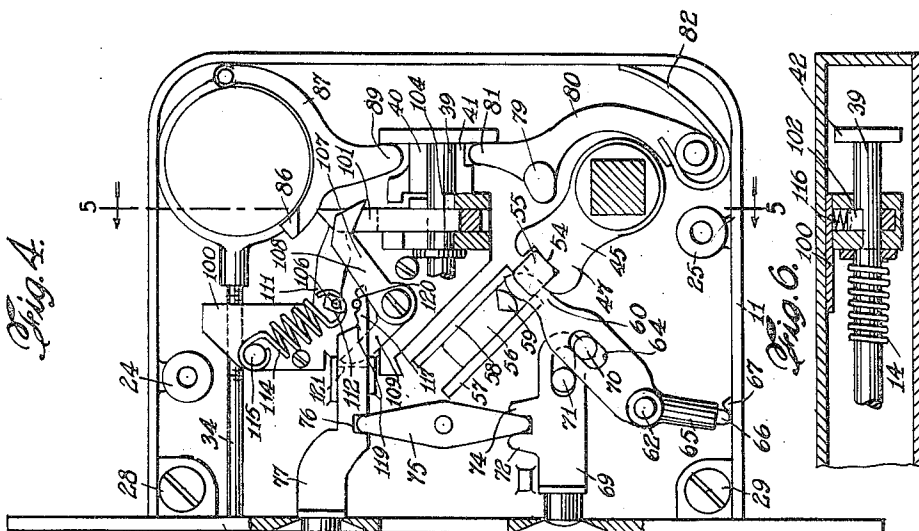
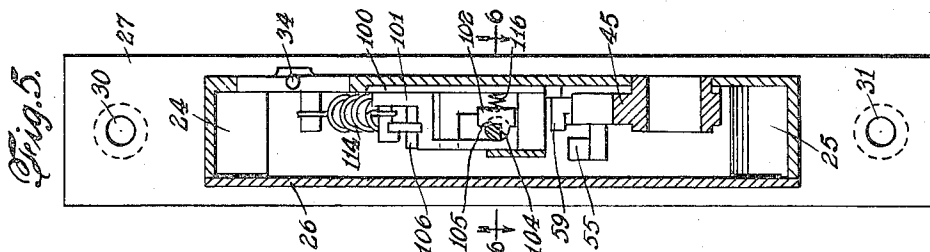
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DOOR LOCK

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11 Claims. (Cl. 292-165)

1

This invention relates to improvements in door locks.

A lock in accordance with the invention is intended particularly for use where it is desired to lock the door against opening from the outside through the use of the outside knob, although the door may be opened from the outside by use of a key. From the inner side the door may be opened by use of the inner knob.

Difficulty has been encountered in many cases with prior locks of this type in that the door may be opened by inserting a thin member such as a knife blade or a celluloid strip between the door jamb and the edge of the door, then moving the thin member against the latch bolt of the lock so as to push the bolt inwardly to release the door.

The present invention aims to overcome the foregoing difficulty by providing a lock which may be set into the locked position in the usual manner by manipulating the locking button on the edge of the lock housing, the lock then permitting a single inward movement, such as takes place during the closing of the door, the bolt thereafter being held in an extended position so that no further inward movement may be had, excepting by turning the key or the inside knob.

Another object of the invention is to provide an improved lock, economical in construction, efficient in operation, and rugged in use.

The foregoing objectives are accomplished by providing a lock having means adapted to engage the bolt of the latch to prevent its inward movement, the engaging means restrained from so acting by a second device releasable upon a single inward movement on the latch bolt.

Other objects and advantages of the invention will be apparent from the following description and from the accompanying drawings which show, by way of example, embodiments of the invention.

In the drawings:

Figure 1 shows a fragmentary view of a door with a lock in accordance with the invention inserted in place and shown in outline by dotted lines.

Figure 2 is a side view of the lock shown in Figure 1 with the side cover removed and with the parts in the unlocked position.

Figure 3 is a view of the lock corresponding to Figure 2 with the lock shown in the locked position.

Figure 4 is a view of the lock corresponding to Figure 3 with some parts removed to reveal details of other parts thereof.

Figure 5 is a vertical sectional view taken along the line 5-5 of Figure 4.

2

Figure 6 is a horizontal view taken along the line 6-6 of Figure 5.

Referring to the drawing, there is shown a lock 10 comprising a casing or housing 11, and a latch bolt 12 positioned within the housing and resiliently urged outward by a spring 14. The latch bolt may be retracted inwardly to release the door by inserting a key into a key slot 15 of a conventional lock barrel 16 or by turning a door knob 17 having a square stem to fit in a correspondingly shaped opening 19. A pair of buttons 20 and 21 are positioned on the edge of the housing 11, so that the lock may be adjustably positioned in either a "locked" or an "unlocked" position.

The casing 11 may be of any desired shape, although it is preferably made with a rectangular outline and of a thickness so as to be inserted in a slot 22 in the edge of the door. The casing 11 is formed with a pair of apertured and threaded lugs 24 and 25 adapted to receive screws extending through corresponding apertures in a cover plate 26; used to conceal the mechanism and prevent the entry of dirt and the like. The cover 26 may also provide a bearing surface for one or more parts of the lock mechanism. The housing 11 may be formed with an end wall 27 closing the housing and secured in position by screws 28 and 29 extending through suitable apertures and threaded lugs on the inner sides of the casing 11. The end wall 27 is apertured at its ends, as indicated at 30 and 31 to receive screws to hold the lock in position in the slot 22 of the door. Additional apertures are provided in the end wall 27 for the lock and unlock buttons 20 and 21 and for the latch bolt 12. An additional aperture is provided for a lock barrel retaining screw 34 having a slotted end 35 which is used to removably retain the lock barrel 16 in position and to prevent its rotation under the action of its key.

The latch bolt 12 may be of the usual type having a split end 36 with a pivoted reversably faced portion 37 to contact the door jamb in aiding the inward movement of the latch bolt, or the latch bolt may be of a more simple construction having a single sloping surface for contact with the door jamb. The inner end of the latch bolt 12 has a generally T-shaped end 38 for the retraction of the bolt as will hereinafter appear. A guide stem 39 is secured to the face of the T-shaped end 38 and slides between a pair of lug members 40 and 41 affixed to one wall of the housing in order that the latch bolt 12 will be held in position against the outward urging of the spring 14. A stop member 42 is attached to the end of the guide

stem 39 in any suitable manner such as by welding or equivalent construction.

The latch bolt 12 normally slides inwardly to clear the strike plate as the door is closed and the opening of the door is accomplished by retracting the latch bolt. This may be done from the exterior of the door, when the unlock button 20 is depressed, by turning the exterior knob 17. When the lock button 21 is depressed, the latch bolt may be retracted by turning the key in the lock barrel 16, or by turning the inside door knob which has its operating stem separate from, but abutting, the stem for the outside door knob.

In order that either the inside or the outside door knobs may actuate the mechanism so as to retract the latch bolt, a pair of hub members 44 (Figures 2 and 3) and 45 (Figure 4) are provided in an abutting relationship, each having extensions respectively identified as 46 and 47, and adapted, when turned in the counterclockwise direction to contact an arm 49 of a pivoted member 50 having a second arm 51 adapted to engage the inner surface of the T-shaped end 38 of the latch bolt. A spring 52 normally urges the pivoted member 50 in a direction so as to clear the T-shaped end 38 of the latch bolt.

The hub member 45 for the outside door knob 17 has a notched end 54 (Figure 4) adapted to receive the outwardly turned end 55 of the slidable member 56 which is movable between guide members 57 and 58 formed in the casing 11. The slidable member 55 has another outwardly turned extension 59 to receive the end of a locking member 60 movable between the two outwardly turned extensions 55 and 59. The locking member 60 is pivotably mounted as indicated at 62 and is made with a slot 64. The locking member 60 also has an extension 65 carrying a spring urged detent 66 adapted to engage with a lug 67 so as to hold the locking member in either one of two positions in which it may be swung. The locking member 61 is swung by reciprocal movement of the lock button 21 which has an operating stem 69, having at its outer end the outwardly turned projection 70 adapted to engage in the slot 64. The operating stem 69 is slotted to receive a guiding lug 71 to position it during its reciprocal movement. The operating stem 69 also has a pair of projections 72 and 74 to receive an end of a pivoted member 75 having its other end extending into notch 76 in an operating stem 77 for the unlock button 20. By reason of the movement of the pivoted member 75, as button 20 is depressed, the button 21 is moved outwardly and vice versa.

As stated above, the inside door knob, through its hub member 44 is adapted to retract the latch member 12 when the inside knob is turned in a counterclockwise direction. When the inside knob is turned in a clockwise direction, the latch member 12 is retracted by contact of the extension 46 with a projection 79 extending from the side of a pivoted member 80 in turn having its tip end 81 adapted to move the stop member 42. The pivoted member 80 is normally urged in a counterclockwise direction by a spring 82 so as to keep it clear from the stop member 42.

In retracting the latch member 12 by means of a key, a conventional barrel lock plunger 84 is turned against an end 86 of a pivoted member 87 having an extension 89 engaging the stop member 42 on the opposite side from the tip end 81 of the pivoted member 80.

In accordance with the invention, means are

provided so that the latch bolt 12 may not be retracted after the mechanism has been preset by depressing the lock button 21, and after the latch bolt has been moved inwardly by a single stroke such as would occur in closing the door after the locking button has been set. The novel means may be constructed of a base member 100 carrying a locking member 101 for the guide stem 39, a restraining member 102 for the locking member 101 and a pivotable member 107 adapted to render the locking means ineffective when the unlock button 20 is in the depressed or unlocked position.

To provide for engagement of the locking member 101 with the guide stem 39 of the latch bolt 12, the guide stem is provided with a notch 104 (Figure 5) on one side, the notch having straight walled ends. The restraining member 102 is adapted to engage with another notch 105 on the back or rear side of the guide stem 39. The notch 105 is formed with one wall which may be straight, while the wall towards the T-shaped end 37 is sloping.

The base member 100 is used to support the locking member 101 and its associated parts in a unit for ease in assembling as well as to provide a ready conversion unit for the modification of existing locks. The base member is made of thin material and may have any desired outline so as to permit its positioning within the casing without interfering with other parts of the mechanism. The base member 100 carries a guide pin 106 and a pivoted member 107 having a downwardly extending arm 108 and an upwardly extending arm 109. At the lower end of the base member 100, and positioned about the guide stem 39 is a locking member guide 110 which has a hollowed out portion to receive the locking member 101 and the restraining member 102.

The locking member 101 has a generally U shaped portion, the right hand leg thereof adapted to engage in the locking notch 104 to prevent the reciprocation of the latch bolt 12. The other leg of the locking member 101 has an upwardly extending portion 111 carrying a stud 112 for engagement by one end of the spring 114. The other end of the spring 114 is secured by another stud 115, extending outwardly from the base member 100. The locking member guide 110 has a recess on the back side thereof under the guide stem 39 to receive the restraining member 102 which is urged upwardly against the surface of the guide stem 39 by a spring 116. The restraining member 102 has a slight recess on its back surface to receive one end of the spring 116 while its upper surface is generally U-shaped so that it is retained in position by receiving the guide stem 39 between the legs of its U-shaped portion. As the latch bolt is reciprocated, the restraining member 102 is alternately depressed and released as the notch 105 passes underneath it. When the restraining member 102 is in the depressed position clearance is provided for lateral movement of the locking member 101.

The locking member 101 is held in the unlocked position by an extension 117 secured to the inner end of the operating stem 77 of the button 20, the extension 117 having its inner end formed with a pair of adjacent notches 119 and 120 adapted to be interposed between the stud 106 and the side of the hub of the pivoted member 107. The upwardly extending arm 109 of the pivoted member 107 contacts a shoulder 121 on the bottom

5

of the extension 117. The inward movement of the button 20 swings the pivoted member 107 so that its downwardly extending arm 108 contacts the exposed leg of the U-shaped locking member 101 holding it against the action of the spring 114, thus the other leg of the U-shaped locking member 101 clears the locking notch 104 in the guide stem 39. A bar 122 has an aperture to receive the top of the stud 112 while its other end is slotted as indicated at 123 to receive a pin 124 carried by the upper surface of the arm 49. The bar 122 is used to assure the proper alignment of the locking member 101 under the action of its spring 114 and also to retract the locking member under the action of the inner door knob as will later appear.

In the operation of the lock, the lock button 21 is pressed to preset the mechanism so that the latch bolt 12 cannot be moved inwardly from the locking side of the door without the use of the key. The restraining member holds the locking member from acting until a single inward movement of the latch bolt is made, such as takes place during the closing of the door. In pushing the lock button 21 inwardly, the slidable member 55 is moved inwardly to engage the extension 47 of the hub member thereby locking the outer door knob against rotation. At the same time, through the movement of the pivoted member 75, the unlock button 20 is moved outwardly so that the shoulder 121 of its extension 117 releases the upwardly extending arm 109 relieving the pressure of the arm 107 against the member 101 which under the urging of its spring 114 tends to move over against the guide stem 39. This movement is opposed by the restraining member 102. Upon the first inward movement of the latch member 12, the restraining member 102 is depressed by the sloping upper end of the notch 105 thereby allowing the locking member 101 to move into the locking notch 104. Further inward movement of the latch bolt is prevented until the locking member 101 is rendered inoperative, either by turning the key in the lock or by turning the inside door knob. In the event that the inner door knob is turned in the counterclockwise direction, the extension 46 of the hub member 44 turns the pivoted member 50 exerting a pull on the guide bar 122 which moves the locking member 101 transversely away from the locking notch 104. Further movement of the door knob turns the pivoted member 50 clockwise and causes the second arm 51 to contact the upper side of the T-shaped end 38 of the latch bolt withdrawing the latch so that the door may be opened.

In the event the door is to be opened by a key, the rotation of the barrel against the end 86 of the pivoted member 87, causes the pivoted member 87 to swing against the locking member extension 111 moving the locking member 101 laterally out of the locking notch 104. Further movement of the barrel member 84 causes the extension 89 to contact the stop member 42 withdrawing the latch bolt so that the door may be opened. In either case, if the door is allowed to close, the sliding surface of the latch bolt pushes it inwardly and resets the mechanism so as to prevent further reciprocation of the latch bolt unless the locking mechanism is released as described above.

From the preceding description it will be seen that the present invention provides an improved lock which may not be opened by inserting a narrow strip between the door jamb and the

6

edge of the door in which it is installed. The lock is readily actuated into the locked or unlocked position by moving the usual buttons on the edge of the lock, the lock permitting one closing of the door before its restraining mechanism releases the locking mechanism to prevent further reciprocation of the latch bolt.

While the invention has been described and illustrated with reference to a specific embodiment thereof, it will be understood that other embodiments may be resorted to without departing from the invention. The locking mechanism may be incorporated in locks of other designs than the basic construction shown herein; it being understood that practically all spring urged bolt locks may have features of applicant's construction incorporated therein. Alternative constructions may be made within the scope of the doctrine of equivalents, for example, while the locking and restraining member have been described as engaging in a notch in the latch bolt, an equivalent construction might provide extensions or raised portions for engagement by these members. Therefore, the form of the invention set out above should be considered as illustrative and not as limiting the scope of the following claims.

I claim:

1. A lock comprising a housing, a single latch bolt reciprocable within the housing and having an outer end extending therefrom, means normally urging the outer end of the latch bolt outwardly from the housing, means restraining the inward movement of the latch bolt, and means positioned wholly within the housing rendering said last mentioned means ineffective for a single inward movement for the latch bolt.

2. A lock comprising a housing, a single latch bolt reciprocable within the housing and having an outer end extending therefrom, a spring normally urging the outer end of the latch bolt outwardly from the housing, a locking member engaging with the latch bolt to restrain the inward movement of the latch bolt, a restraining member rendering the locking member ineffective to restrain the inward movement of the bolt, and means positioned wholly within the housing rendering the restraining member ineffective, said means operative upon a single inner movement of the bolt.

3. A lock comprising a housing, a single latch bolt reciprocable within the housing and having an outer end extending therefrom, a spring normally urging the outer end of the latch bolt outwardly from the housing, the latch bolt having a notched portion, means adapted to engage with the notched portion to restrain the inward movement of the latch bolt, and means positioned wholly within the housing rendering said last mentioned means ineffective for a single inward movement of the latch bolt.

4. A lock comprising a housing, a latch bolt reciprocable within the housing and having an outer end extending therefrom, a spring normally urging the outer end of the latch bolt outwardly from the housing, the latch bolt having a pair of notched portions, a locking member adapted to engage with one of the notched portions of the latch bolt to restrain the inward movement of the latch bolt, and a restraining member adapted to releasably engage the locking member to restrain its engagement with the latch bolt while the restraining member is engaged in the second of the notched portions, the restraining member adapted to be moved out of

engagement with the locking member by the wall of the second notched portion upon an inner movement of the bolt to release the locking member so that it engages in the first notch to restrain another inward movement of the latch bolt.

5. A lock comprising a housing, a latch bolt reciprocable within the housing and having an outer end extending therefrom, a spring normally urging the outer end of the latch bolt outwardly from the housing, the latch bolt having a pair of notched portions, a U-shaped locking member adapted to engage the wall of one of the latched portions of the latch bolt to restrain its inward movement, and a spring urged restraining member adapted to engage with one of the legs of the U-shaped locking member to releasably restrain it from engaging in the notched portion of the latch bolt, the restraining member normally engaged in the second notch and adapted to be moved out of the notch by an inner movement of the bolt.

6. A lock comprising a housing, a latch bolt reciprocable within the housing and having an outer end extending therefrom, a spring normally urging the outer end of the latch bolt outwardly from the housing, the latch bolt having a pair of notched portions, the first of said notched portions having a straight wall on its inner side towards the outer end of the latch bolt, the second of said notched portions having a sloping wall on its inner side, a locking member movable transversely of the latch bolt and adapted to engage with the straight wall of the first of said notched portions of the latch bolt to restrain its inward movement, resilient means adapted to urge the locking member against the latch bolt, a restraining member movable transversely of the latch bolt and generally perpendicularly to the movement of the locking member and adapted to engage with the locking member to restrain its transverse movement, and resilient means adapted to urge the restraining member against the latch bolt, the restraining member adapted to engage with the sloping wall of the second notched portion to cause reciprocation of the restraining member with reciprocation of the latch bolt, whereby the restraining member is adapted to hold the locking member from engaging the latch bolt for a single inward movement of the latch bolt.

7. A lock comprising a housing, lock and unlock buttons projecting from the side of the housing, a latch bolt reciprocable within the housing and having an outer end extending therefrom, a spring normally urging the outer end of the latch bolt outwardly from the housing, the latch bolt having a pair of notched portions, the first of said notched portions having a straight wall on its inner side towards the outer end of the latch bolt, the second of said notched portions having a sloping wall on its inner side, a locking member movable transversely of the latch bolt and adapted to engage with the straight wall of the first of said notched portions of the latch bolt to restrain its inward movement, resilient means adapted to urge the locking member against the latch bolt, means operatively engaging the locking member to render the locking member ineffective when the unlock button is depressed and effective when the lock button is depressed, a restraining member movable transversely of the latch bolt and generally perpendicularly to the movement of the locking member and adapted to engage with the locking member

to restrain its transverse movement, and resilient means adapted to urge the restraining member against the latch bolt, the restraining member adapted to engage with the sloping wall of the second notched portion to cause reciprocation of the restraining member with reciprocation of the latch bolt, whereby the restraining member is adapted to hold the locking member from engaging the latch for a single inward movement of the latch bolt.

8. A subcombination for use with a lock including a single latch bolt reciprocable within its housing and having an outer end extending therefrom comprising a locking member engaging with the latch bolt to restrain the inward movement of the latch bolt, a restraining member rendering the locking member ineffective to restrain the inward movement of the bolt, and means positioned wholly within the housing rendering the restraining member ineffective, said means operative upon an inner movement of the bolt.

9. A subcombination for use with a lock including a single latch bolt reciprocable within its housing and having an outer end extending therefrom and having a notched portion comprising means adapted to engage with the notched portion to restrain the inward movement of the latch bolt, and means positioned wholly within the housing rendering said last mentioned means ineffective for a single inward movement of the latch bolt.

10. A subcombination for use with a lock including a latch bolt reciprocable within its housing and having an outer end extending therefrom, and having a pair of notched portions comprising a locking member adapted to engage with one of the notched portions of the latch bolt to restrain the inward movement of the latch bolt, and a restraining member adapted to releasably engage the locking member to restrain its engagement with the latch bolt while the restraining member is engaged in the second of the notched portions, the restraining member adapted to be moved out of engagement with the locking member by the wall of the second notched portion upon an inner movement of the bolt to release the locking member so that it engages in the first notch to restrain another inward movement of the latch bolt.

11. A subcombination for use with a lock including a latch bolt reciprocable within its housing and having an outer end extending therefrom, the latch bolt having a pair of notched portions, a U-shaped locking member adapted to engage the wall of one of the latched portions of the latch bolt to restrain its inward movement, and a spring urged restraining member adapted to engage with one of the legs of the U-shaped locking member to releasably restrain it from engaging in the notched portion of the latch bolt, the restraining member normally engaged in the second notch and adapted to be moved out of the notch by an inner movement of the bolt.

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