Oct. 7, 1952 E. L. SCHLAGE 2,613,094

REVERSIBLE LATCH BOLT UNIT

Filed July 12, 1949 2 SHEETS—SHEET 1

FIG. 1.

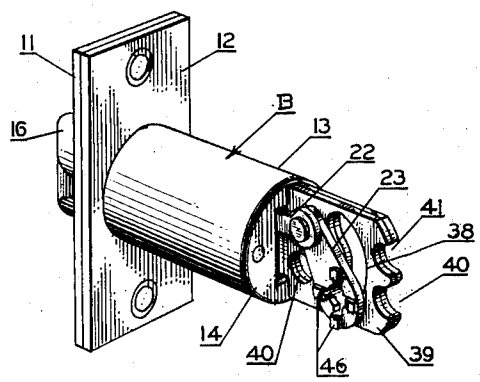


FIG. 2.

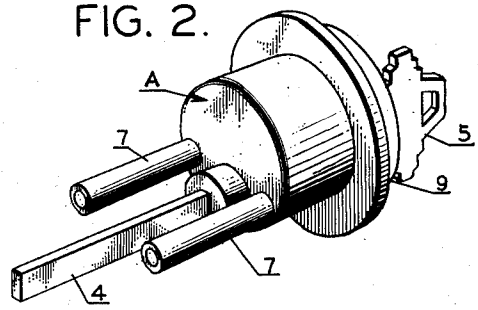


FIG. 5.

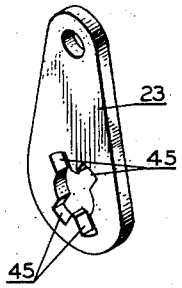


FIG. 3.

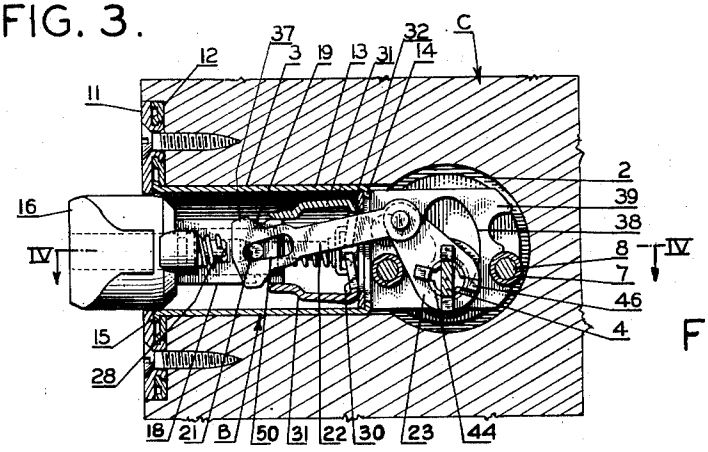


FIG. 6.

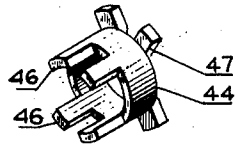
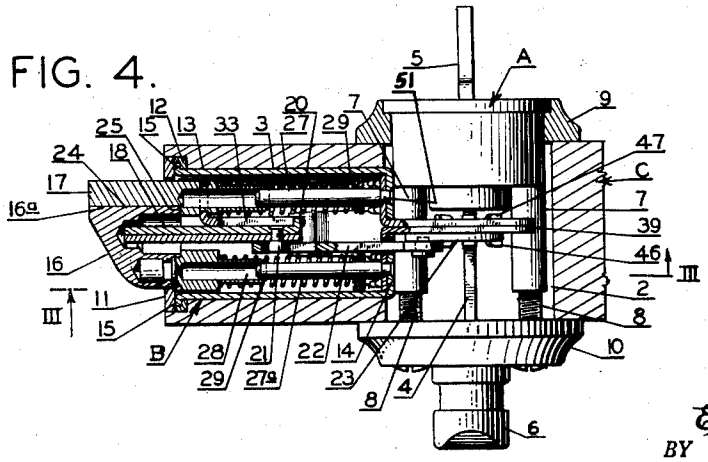


FIG. 4.



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FIG. 7.

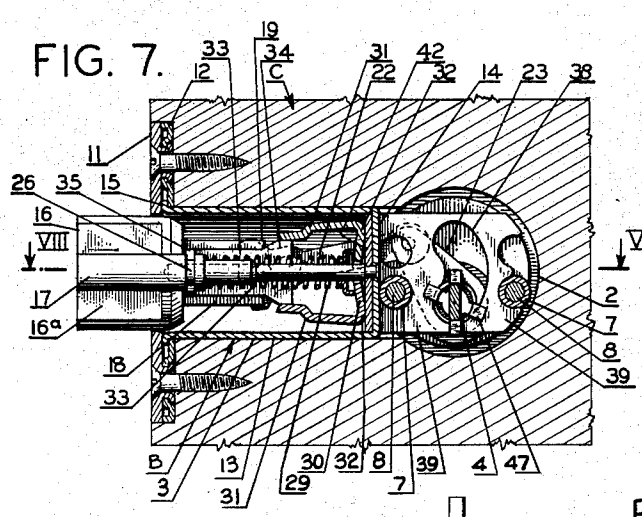


FIG. 10.

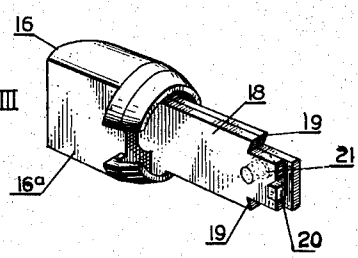


FIG. 11.

FIG. 12.

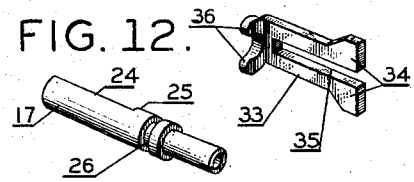


FIG. 8.

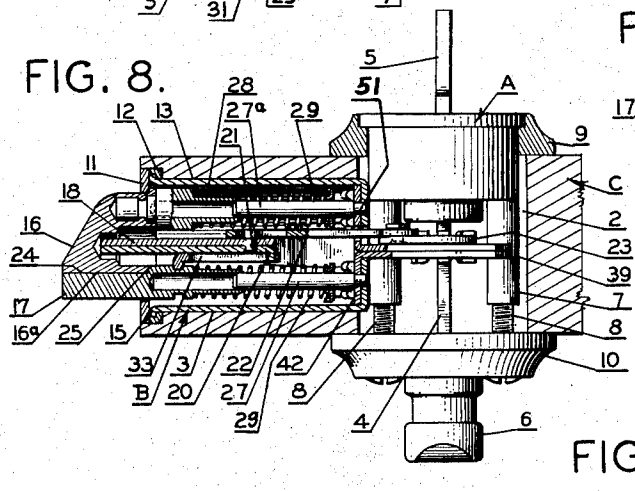


FIG. 13.

FIG. 14.

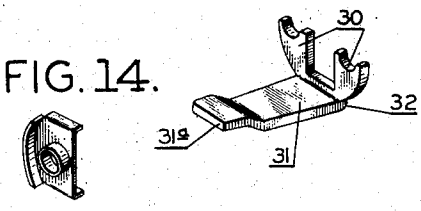


FIG. 9.

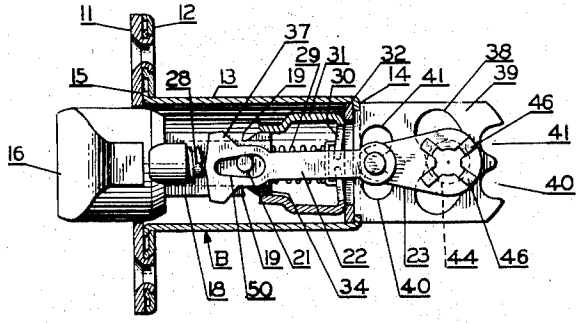
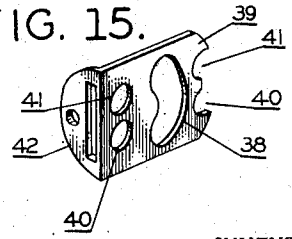


FIG. 15.



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Patented Oct. 7, 1952

2,613,094

UNITED STATES PATENT OFFICE

2,613,094

REVERSIBLE LATCH BOLT UNIT

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Application July 12, 1949, Serial No. 104,178

13 Claims. (Cl. 292—244)

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This invention relates to a door lock and especially to a reversible dead latching mechanism therefore.

The object of the present invention is generally to improve and simplify the construction and operation of dead latching machanisms, and especially to provide a latching mechanism including a main latch bolt and a cooperating dead bolt which are reversible as a unit prior to installation to permit either a right or left-hand positioning of the latching mechanism when installed in doors.

The invention is shown by way of illustration in the accompanying drawings, in which,

Fig. 1 is a perspective view of the latch bolt unit of the lock.

Fig. 2 is a perspective view of the latch bolt actuating unit.

Fig. 3 is a vertical side view partially in section, said view being taken on lines III—III of Fig. 4.

Fig. 4 is a horizontal view partially in section taken on line IV—IV of Fig. 3.

Fig. 5 is an enlarged perspective view of the crank.

Fig. 6 is an enlarged perspective view of the crank hub before it is applied to the crank.

Fig. 7 is a vertical side view partially in section, said view showing the latch bolt unit in a position reversed with relation to that shown in Fig. 3.

Fig. 8 is a horizontal view partially in section taken on line VIII—VIII of Fig. 7.

Fig. 9 is a vertical side elevation partially in section of the latch bolt unit showing it removed from the door, said view showing how the crank is moved from the position shown in Fig. 3 to that shown in Fig. 7.

Fig. 10 is an enlarged perspective view of the latch bolt and the retractor bar secured thereto.

Fig. 11 is an enlarged perspective view of a cam plate.

Fig. 12 is an enlarged perspective view of the dead bolt.

Fig. 13 is an enlarged perspective view of one of the dogging members.

Fig. 14 is an enlarged perspective view of one of the spring seats, and

Fig. 15 is a perspective view of one of the plate sections forming the anchor.

A door latch actuating unit A is inserted in a hole 2 drilled transversely through a door C and a latch bolt unit B is inserted in a hole 3 drilled at right angles to the hole 2 or from the edge of the door. The unit A actuates a flat spindle bar

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4 which in turn actuates a latch bolt 16 carried by the unit B. The bar 4 may be rotated by a key 5 from one side of the door C or by a knob or turnpiece 6 from the other side of the door. The unit A is also provided with a pair of anchor posts 7—7, a pair of escutcheon plates 9 and 10, and a pair of screws 8—8 insertable in the posts 7—7 which are internally threaded.

The latch bolt unit B comprises a face plate 11 and a circular cylindrical latch bolt housing 13, and these carry a latch bolt 16, a dead latching bolt or dead bolt 17, a latch bolt retracting mechanism and a dogging mechanism actuated by the dead bolt 17. The face plate is composed of an outer sheet 11 and an inner sheet 12 riveted together or otherwise secured. The face plate carries a circular cylindrical latch bolt housing 13 open at its outer end and having a closed inner end 14. The open end is provided with an outwardly extending annular flange 15 received between the face plate sheets 11 and 12, and when these are riveted together, the latch bolt housing becomes rigidly secured to the face plate.

Extending through the open end of the latch bolt housing and through the face plate are a latch bolt 16 and a dead locking bolt 17. Suitably secured to the latch bolt 16 and extending rearwardly therefrom is a bar 18 composed of two plates (see Figure 10). Both plates are cut away to form shoulders 19—19 and one plate carries a guide lug 20. Also carried by the bar 18 is a pin 21 which connects with one end of the retractor 22, the opposite end of the retractor being connected with a crank 23.

The dead bolt 17 (see Fig. 12) is substantially cylindrical throughout its length. However, the outer end has a flat 24 on one side to form a shoulder 25 and also to engage the flat face 16a of the latch bolt 16. An annular groove 26 is formed behind the shoulder 25. The inner end of the dead bolt is tubular to telescope over a guide pin 27 secured to the inner, closed end 14 of the latch bolt housing. A similar pin 27a is also provided and a tubular member 28 is secured to the latch bolt 16 so as to telescope over the pin. A compression spring 29 surrounds each pin. The springs engage shoulders formed respectively on the tubular member 28 and on the dead bolt. These springs normally function to maintain the latch bolt and the dead bolt in an extended position, and also actuate a pair of dogging members, one of which is shown in Figure 13. Each dogging member is provided with a pair of rocker arms 30 which are connected with or formed as an integral part of a dogging arm

31. The rocker arms are disposed on an angle of less than 90 degrees with relation to the dogging arm, so as to form a rocker-like support 32 for each dogging arm.

A spring seating plate, as shown in Figure 14, is on each of the guide pins 27 and 27a. The springs 29 seat on the respective plates and as the plates engage or rest on the rocker arms 30, a force is exerted which tends to maintain the offset tips 31a of the dogging arms 31 in engagement with the shoulders 19—19 formed on the bar 18.

A slide 33 (see Figure 11) has two cams 34 formed thereon to engage the dogging arms 31 and normally maintains the dogging arms out of engagement with the shoulders 19—19, as shown in Figure 7. The slide 33 is movable alongside the bar 18 and is actuated by the dead locking bolt 17. The slide and its cams 34 may be moved to a position rearwardly of the tips 31a formed on the dogging arms. When this position is assumed, the dogging arms swing toward the bar 18 and engage the shoulders 19—19 thereby deadlocking the latch bolt 16. The slide 33 has a longitudinal slot 35 to receive the guide lug 20 formed on the bar 18. Also, a pair of lugs 36 are formed on the slide 33 and extend into the annular groove 26 formed on the dead bolt. Thus, when the dead bolt is depressed, the slide 33 moves inwardly in unison therewith and the cams 34 formed thereon assume a position rearwardly of the tips 31a thereby permitting the dogging arms to assume a dogging position. Conversely, when the dead bolt is projected, the slide 33 moves outwardly with it and the cams 34 engage and lift the dogging arms 31 out of engagement with the shoulders 19—19.

In actual operation, when a door containing the lock here shown is closed, the latch bolt 16 will be depressed when it engages the striker plate (not shown) which is mounted in the door frame. The bolt 17 will also be depressed in unison with the latch bolt because the latch bolt engages the shoulder 25 formed on the dead bolt. The dead bolt will remain depressed when the door is fully closed while the latch bolt will only be momentarily depressed as an opening is formed in the striker plate into which the latch bolt is automatically projected by its spring 29. As the dead bolt remains depressed, the slide 33 with its cam 34 remains in its inner position and the dogging arms therefore engage the shoulders 19—19 and maintain the latch bolt in a dead locked position.

The door may be opened either by the key 5 or the knob or turn piece 6. In either instance, the spindle bar 4 is rotated and the crank arm 23 swings rearwardly, thus pulling the retractor 22 in the same direction. The forward end of the retractor has a longitudinal slot 50 to permit it to be moved a predetermined distance before engaging the pin 21 on the bar 18. A pair of cams 37 are formed on the retractor 22 on opposite sides of the slot 50. These cams engage the tips 31a of the dogging arms 31 during the predetermined movement and lift the dogging arms out of engagement with the shoulders 19—19 just before the pin 21 is engaged, thereby permitting full retraction of the latch bolt by the key or the turn piece.

One of the important features of the present invention is that the latch bolt unit B may be reversed to fit either a right or left-hand door. The latch bolt unit B as a whole is positioned to fit either a right or left-hand door, this being accomplished prior to installation by merely rotating the unit as a whole about its longitudinal axis 180 degrees so as to make the flat face 16a of the latch bolt face toward one side or the other depending upon whether a right or left-hand door is to be fitted. In view of the fact that the actuating unit A is not reversible, provision is made to permit changing of the position of the crank 23. If the latch bolt unit is inserted in a right-hand door in the position shown in Figure 3, the flat face of the latch bolt faces away and the hub end of the crank is in a position near the bottom of the hole 2. Now, if the latch bolt unit is removed and rotated about its longitudinal axis 180 degrees, as shown in Figure 7, then the hub of the crank is in a position near the top of the hole 2. But the spindle bar 4 is not reversible, and always is in a fixed position near the bottom of the hole 2. Consequently, the hub end of the crank is swung toward the lower part of the hole 2 for either a right or left-hand door installation.

The structure that permits this comprises an anchor 39 in which is formed an arcuate slot 38 and two pairs of openings 40 and 41 to receive the anchor posts 7—7. The anchor may be made of a single plate but, in this instance, is made of two plates with a lug 42 on the end of each (see Figure 15). A slot is formed in the inner end 14 of the latch bolt housing. The anchor projects through this slot and so does the retractor 22, while the lugs 42 are fastened to the inner end 14 by riveted extensions 51 formed on the guide pins 27, thus reenforcing the inner end of the latch bolt housing and at the same time rigidly securing the anchor.

A bushing 44 (see Figure 6) extends through the crank 23 forming a hub and also extends freely through the arcuate slot 38 to permit the hub to be swung from one end of the slot to the other. The crank is punched out and has four notches 45 formed therein. The bushing is provided with prongs 46 and 47 at opposite ends. The prongs 47 are bent at right angles to engage one face of the anchor while the prongs 46 are bent into the notches 45 and against the crank so as to secure the bushing to the crank and against endwise removal from the anchor. The notches 45 are considerably deeper than the thickness of the metal forming the prongs, so that after they have been bent into place, enough space still remains to form splines to receive the spindle bar 4. The notches are disposed in pairs diametrically opposite each other, so that one pair receives the spindle bar in one position of the crank and the other pair receives the spindle bar in its other position. In changing the latch bolt unit from a right to a left-hand position or vice versa, the hub end of the crank is swung to the lower end of the arcuate slot 38, the slot 50 in the front end of the retractor being sufficiently long to provide the play required. Figure 9 shows the crank arm as it is being swung from one position in the arcuate slot into the other. The slot 50 in the front end of the retractor permits two functions, first, that of allowing a predetermined preliminary movement of the crank and retractor when opening a door, so that the dogging arms 31 may be released before the latch bolt 16 is retracted and second, that of providing the play or free movement required to swing the hub end of the crank from one end of the arcuate slot 38 to the other.

The anchor posts 7—7 are positioned slightly below the center of the actuating unit A. Due

to this fact, two sets or pairs of openings 40 and 41 are formed in the anchor. The posts project through one pair of openings when a right-hand door is fitted and through the other pair of openings when the latch bolt unit is placed in a left-hand door. If the anchor posts are placed on the center line of the actuating unit, only one pair of openings will be required.

While the invention has been described as applied to a dead locking latch bolt unit, I also contemplate making units of this character which do not require dead locking, that is, the dead locking bolt and the dogging mechanism actuated thereby is eliminated; the invention being applicable to a latch bolt unit of this character whether it contains a dead locking mechanism or not, and while this and other features of the invention have been more or less specifically illustrated and described, I wish it understood that changes may be resorted to within the scope of the claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A door lock with a reversible latch bolt unit comprising a housing having a longitudinal axis, a latch bolt projecting from said housing, an anchor secured to the housing, there being a slot formed in said anchor extending transversely across said axis, a crank, a hub engaging the crank and projecting through the slot and movable therein from one side of the axis to the other, and a retractor connecting the crank with the latch bolt.

2. A door lock with a reversible latch bolt unit comprising a housing having a longitudinal axis, a latch bolt projecting from said housing, an anchor secured to the housing, there being a slot formed in said anchor extending transversely across said axis, a crank, a hub engaging the crank and projecting through the slot and movable therein from one side of the axis to the other, a retractor connecting the crank with the latch bolt, and a spindle engaging said hub to impart movement to said crank.

3. A door lock with a reversible latch bolt unit comprising a housing having a longitudinal axis, a latch bolt projecting from said housing, an anchor secured to the end of the housing, there being an arcuate slot formed in said anchor extending transversely across said axis, a crank, a hub engaging the crank and projecting through the slot and movable therein from one side of the axis to the other, a retractor connecting the crank with the latch bolt, and a spindle member projecting through the hub to impart movement thereto.

4. A door lock with a reversible latch bolt unit comprising a housing having a longitudinal axis, a latch bolt projecting from said housing, a dead bolt also projecting from said housing, dogging arms actuated by the dead bolt for dogging said latch bolt against depression, an anchor secured to the end of the housing, there being an arcuate slot formed in said anchor extending transversely across said axis, a crank, a hub engaging the crank and projecting through the slot and movable in said slot from one side of the axis to the other, a retractor connecting the crank with the latch bolt, said crank and said retractor moving across said axis with said hub, and cams on said retractor for engaging said dogging arms in either position of said retractor with respect to said axis.

5. A door lock with a reversible latch bolt unit comprising a housing having a longitudinal axis, a face plate secured at the outer end of said housing, a latch bolt projecting from said housing through the face plate, a dead bolt also projecting through the face plate, dogging arms actuated by the dead bolt for dogging the latch bolt against depression, an anchor secured to the end of the housing, there being an arcuate slot formed in said anchor extending transversely across said axis, a crank, a hub engaging the crank and projecting through the slot and movable in said slot from one side of the axis to the other, a retractor connected at one end with the crank, means at the other end of the retractor for retracting the latch bolt, said crank and said retractor moving across said axis with said hub, and means on the retractor for releasing the dogging arms in either position of said retractor with respect to said axis.

6. A reversible latch bolt unit comprising an elongated housing having a longitudinal axis, a latch bolt projecting from one end of said housing, an anchor secured to the other end of the housing, said anchor having an elongated slot therein extending transversely across said axis, a crank, a hub for said crank disposed in said slot, said hub being movable in said slot between two extreme positions at opposite ends of said slot, and a retractor connecting the crank with the latch bolt in all positions of said hub.

7. A door lock with a reversible latch bolt unit comprising an elongated housing having a longitudinal axis, a latch bolt projecting from one end of said housing, an anchor secured to the other end of said housing, said anchor having an elongated slot therein extending across said axis, a crank, a hub for said crank disposed in said slot, said hub being movable in said slot between two extreme positions at opposite ends of said slot, a retractor connecting said crank with the latch bolt, and a spindle projecting through said hub and said crank to impart movement thereto.

8. A door lock with a reversible latch bolt unit comprising an elongated housing having a longitudinal axis, a latch bolt projecting from one end of said housing, an anchor secured to the other end of the housing, said anchor having an elongated slot therein extending across said axis, a crank, a hub for said crank disposed in said slot, said hub being movable in said slot between two extreme positions at opposite ends of the slot, a retractor connected to said crank, a slotted connection between said retractor and said latch bolt, and a spindle projecting through said hub and said crank to impart movement thereto.

9. A door lock with a reversible latch bolt unit comprising a housing, a latch bolt slidable within said housing, a pin on said latch bolt and movable along a line, an actuating spindle disposable in either of two positions on opposite sides of said line, a crank connected to said spindle and extending across said line when said spindle is in either one of said positions, and a retractor at one end connected to said pin and at the other end connected to said crank on the opposite side of said line from said spindle.

10. A door lock with a reversible latch bolt unit comprising a housing, a latch bolt slidable within said housing along a longitudinal axis, a crank rotatable with respect to said housing about either one of two transverse axes on opposite sides of said longitudinal axis, a retractor pivotally connected to said crank, and a longitudinal lost-motion connection between said retractor and said latch bolt.

11. A door lock with a reversible latch bolt unit

comprising a housing, a latch bolt slidable within said housing along a longitudinal axis, a crank rotatable with respect to said housing about either one of two axes extending in a transverse direction and disposed on opposite sides of said longitudinal axis, said crank being shiftable across said longitudinal axis between said two axes, a retractor, and connections between said retractor and said crank and between said retractor and said latch bolt, one of said connections being a lost-motion connection affording rotation of said crank toward said latch bolt as said crank is shifted across said longitudinal axis while said latch bolt is stationary.

12. A door lock with a reversible latch bolt unit comprising a circular cylindrical housing having a longitudinal axis, an anchor extending from said housing along said axis, said anchor having a slot therein extending across said axis, a hub movable in said slot across said axis, means for holding said hub on either side of said axis, a latch bolt slidable within said housing, and operating connections between said hub and said latch bolt.

13. A door lock with a reversible latch bolt unit comprising a circular cylindrical housing having a longitudinal axis; an anchor extending from said housing along said axis, said anchor having a slot therein extending across said axis; a latch bolt slidable within said housing; a retractor connected to said latch bolt; a crank connected to said retractor; and a hub on said crank movable in said slot across said axis while said crank, said retractor and said latch bolt are connected.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,739,654	Schlage	Dec. 17, 1929
1,876,080	Schlage	Sept. 6, 1932
1,876,081	Schlage	Sept. 6, 1932
2,307,038	Gutman	Jan. 5, 1943
2,516,991	Heyer	Aug. 1, 1950