March 3, 1942. C. PIRTZ 2,275,089

SLIDING DOOR LOCK

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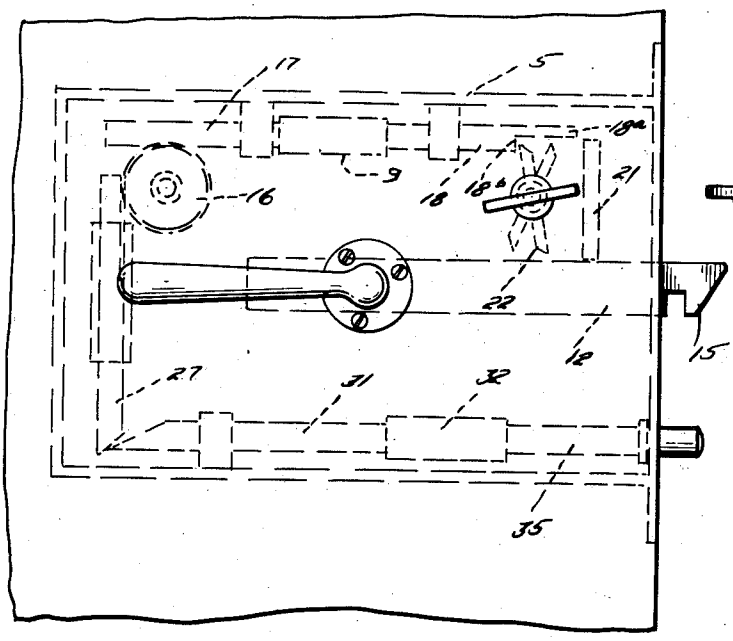



Fig. 1.

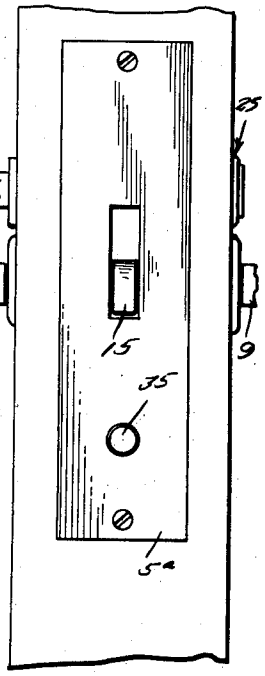



Fig. 2.

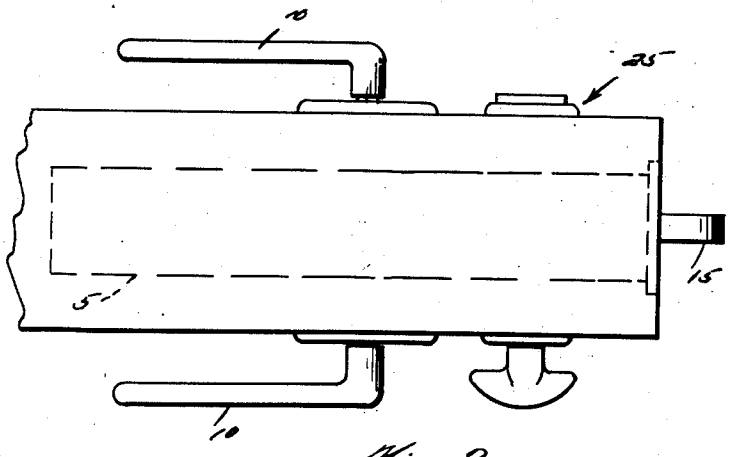
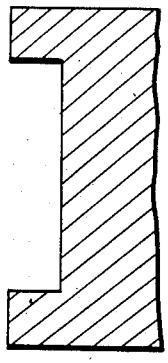



Fig. 3.



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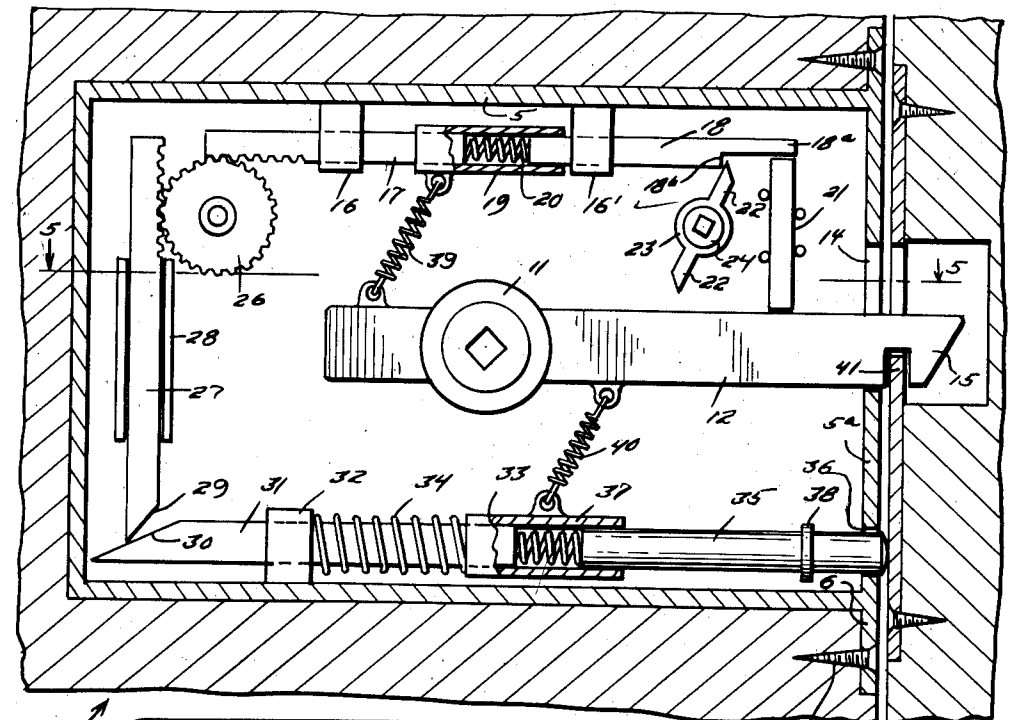



Fig. 4.

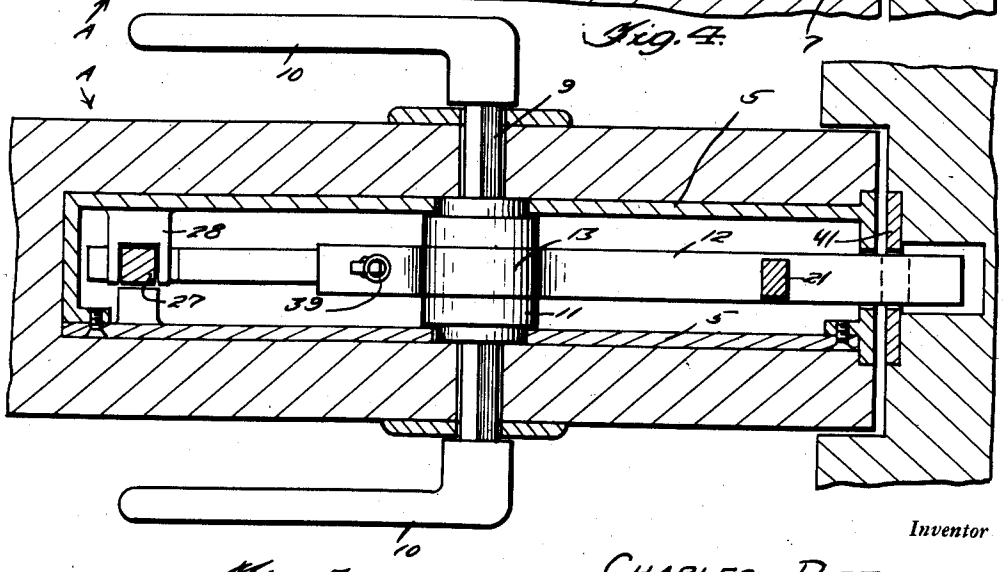



Fig. 5.

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# UNITED STATES PATENT OFFICE

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## SLIDING DOOR LOCK

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Application April 2, 1941, Serial No. 386,529

5 Claims. (Cl. 70—99)

This invention relates to closure fasteners, and more particularly to door locks.

An object of the present invention is to provide a door lock that is particularly adapted for use on a sliding door, or an analogous closure for substantially automatically locking the closure in closed position as it moves into such position.

Further, an object of the invention is to provide a lock of this character which may be either set into the body of the door, or mounted on the door at either side thereof as found desirable.

The invention, together with its objects and advantages will be best understood from a study of the following description, taken in connection with the accompanying drawings, wherein:

Figure 1 is a fragmentary side elevational view of a door showing the lock, somewhat diagrammatically, set therein.

Figure 2 is an edge elevational view of the door equipped with a lock in accordance with the present invention.

Figure 3 is a top edge elevational view of a door equipped with a lock embodying the features of the present invention, and with the door jamb shown in horizontal section.

Figure 4 is a vertical sectional view through the door with the door in fully closed and locked position, and illustrating the application of the invention.

Figure 5 is a horizontal sectional view taken substantially on the line 5—5 of Figure 4.

Referring more in detail to the drawings it will be seen that in the preferred embodiment thereof, the lock embodies a casing 5 that may be either mounted on one side of the door, or as shown, set in a suitable recess provided thereof in the door.

When set in the door as shown, the casing 5 at one end thereof is provided with integral attaching flanges 6 through the medium of which and screws 7, or other fastening elements, the casing 5 is properly secured in position on the door as is somewhat conventional.

Provided in opposite sides of the door are suitable apertures to accommodate the respective opposite ends of a knob spindle 9 equipped at said ends with handles 10—10.

The knob spindle 9 extends transversely through the casing 5 and intermediate its ends is provided with a bushing 11, the opposite ends of which are journaled in suitable openings provided therefor in the opposed walls of the casing 5, and said bushing 11 is fitted upon the knob spindle and shrunk or otherwise secured thereto so as to turn with the spindle.

A bolt or locking element 12, adjacent one end thereof, is provided with an integral annular collar 13 that is sleeved on the bushing 11 so that rotative movement of the spindle 9 is transmitted to the bolt or locking element 12 for raising and lowering the latter; the collar 13 of the bolt or locking element 12 being shrunk or otherwise secured to the bushing 11.

At the outer end thereof the casing 5 is provided with a vertically elongated slot 14 that accommodates the hook end 15 of the bolt 12 as shown.

Mounted in the top portion of the casing 5 are guide elements 16 and 16' through which a rack bar 17 and a locking bar 18, respectively, have a sliding working fit.

At the confronting ends thereof the bar members 17 and 18 are accommodated within the opposite ends of a tubular member 19 that houses a spring 20 bearing on the inner end of the bar member 17 that is fixedly secured within the tubular member 19 and also on the inner end of the bar member 18 accommodated by the tubular member and normally urging said members in reverse directions relative to one another.

For the locking bolt or element 12 there is slidably mounted in the casing 5 a hold-down element 21 and the free end of the lock rod 18 is notched as shown to provide an extension 18a that is movable into and out of position within the path of the hold-down element 21, and a shoulder 18b with which is engageable cranks 22 formed integrally with an annulus 23 which is fitted upon and shrunk or otherwise secured to the rotating barrel 24 of a lock indicated generally by the reference numeral 25 and hereinafter more fully referred to.

The teeth of the rack bar 17 are in constant mesh with a rack wheel 26 rotatably mounted in the casing 5, and a vertically shiftable rack bar 27 has the teeth thereof also in mesh with this wheel 26.

The rack bar 27 works in a suitable guide 28 provided therefor in the casing and has a cam end 29 that coacts with a cam end 30 on a cam rod 31.

The cam rod 31 works in a suitable guide 32 provided therefor and has an end secured within a sleeve 33. Interposed between the guide 32 and one end of the sleeve 33, and convoluted about the cam rod 31, is a spring 34 that acts to normally urge the rod 31 and the cam end 30

thereof away from the cam end 29 of the rack bar 27.

A pressure-responsive, elongated push button 35 has one end working through an opening 36 provided in the end wall 5a of casing 5 and a second end slidably accommodated within the sleeve 33. Interposed between the inner ends of the push button 35 and the cam rod 31, and housed within the sleeve 33, is a coil spring 37 that normally acts to urge the rod 31 and the button 35 in reverse directions relative to one another.

The push button 35 inwardly from the free end thereof is provided with a collar 38 that acts as a stop to limit the outward movement of the button 35 relative to the casing 5.

At one side of the spindle 9 the locking bolt or element 12 is connected with the aforementioned sleeve 19 through the medium of a coil spring 39, while at the opposite side of the spindle 9 the locking bolt or element 12 is connected with the sleeve 33 through the medium of a coil spring 40.

When the door A is in closed position, the bolt or locking element 12 is engaged with the keeper 41, as best shown in Figure 4.

When the door is in its closed position, it is held locked in such position by reason of the end 18a of the bar 18 disposed over the upper end of the hold-down element 21, which in turn is in the path of the vertical swinging movement of the locking bolt or element 12, as shown in Figure 4.

To unlock the door from one side thereof, a key is inserted in the lock 25 to turn the barrel or spindle 24 thereof. This causes the crank 22 to move into engagement with shoulder 18b of bar 18 forcing the bar inwardly against the action of spring 20 and moving the end 18a of the bar out of the path of the hold-down 21. At the same time this movement of the bar 18 is transmitted to the rack bar 17 causing the wheel 26 to turn. The turning movement of the wheel 26 causes the bar 27 to move downwardly so that the cam end 29 thereof coacts with the cam end 30 of the cam bar 31 to move the latter together with the sleeve 33 against the action of spring 37. This consequently results in an outward pressure being exerted by the spring on the push button 35 to project the latter through the opening 36.

As the key in the lock 25 is being turned, the operator, by grasping the handle 10 on the corresponding side of the door, rotates the spindle 9 to raise the locking bolt or element 12 out of engagement with the keeper 41, thus completing the unlocking of the door so that the same is then free to slide to an open position.

When the door is in an open position and then moved to a closed position, the projected end of the button 35 will engage the keeper plate 41, causing the button 35 to move inwardly of the casing 5. This inward movement of the button 35 will be transmitted to the cam bar 31 so that the cam ends 30 and 29 of the bars 31 and 27 coact to move the bar 27 upwardly for rotating the wheel 26 in a clockwise direction. Rotation of the wheel 26 in this direction will cause the rack bar 17 to move inwardly of the sleeve 19 and this movement of the bar 17 is transmitted to the lock bar 18. Consequently, as the door reaches closed position and the hook end 15 of the locking bolt or element 12 snaps into engagement with the keeper 41, the hold-down bar 21 will move downwardly and the end 18a of the bar 18 return to position in the path of the hold-down 21, or, in other words, the parts, upon complete closing of the door, return to the position shown in Figure 4, and in which position of the parts the door, as is obvious, is locked, the locking bolt or element 12 being thus prevented from swinging upwardly for disengagement from the keeper 41 until the locking bar 18 is retracted in the manner hereinbefore described.

It is thought that the manner in which the lock operates, together with its many advantages, will be clear to those skilled in the art without further detailed description.

While I have herein illustrated and described the preferred embodiment of the invention, it is to be understood that I do not wish to limit myself to the specific embodiment herein illustrated, since those skilled in the art may make changes therein without departing from the spirit of the invention.

Having thus described the invention what is claimed as new is:

1. A lock mechanism for sliding doors including a locking element mounted for rotative movement, a hold-down bar mounted for sliding movement above said locking element, a lock bar mounted for sliding movement above said locking element and having an end normally projected in the path of said hold-down element above the upper end of said hold-down element, and an actuating mechanism for and connected with said lock bar and operable incidental to the opening and closing of the door for projecting and retracting said end of the lock bar into and out of the path of said hold-down element.

2. In a locking mechanism for doors, a locking bolt mounted for vertical swinging movement, spring devices connected with said bolt normally urging the same to swing downwardly into a locking position, a hold-down element slidably mounted for vertical movement above said locking bolt and arranged in the path thereof for releasably holding the bolt in the downward locking position, a lock bar slidably mounted for movement laterally with respect to said hold-down element and projectible into and out of position in the path of the hold-down element above said locking bolt, a rack bar operatively connected with said lock bar for shifting the latter into projected position across the path of said hold-down element, a driven rack wheel having the teeth thereof in mesh with said rack bar for shifting the latter in either of two directions, and operating means for said rack bar for rotating the latter incidental to the opening and closing of said door; and the connection between said rack bar and said lock bar being such as to permit limited movement of the one relative to the other, and a key-operated lock mechanism embodying means engageable with said lock bar for retracting the same to a position out of the path of said hold-down element.

3. In a lock of the character described, a locking bolt mounted for vertical swinging movement, a hold-down element mounted for sliding movement above said locking bolt and in a plane perpendicular thereto, a lock bar mounted for sliding movement at right angles to said hold-down element and adapted to be projected into the path of said hold-down element for coaction with the latter in securing the locking bolt in locking position, actuating mechanism connected with said lock bar for moving the latter into effective position in the path of said hold-down element incidental to the movement of the door to a closed position, and a key-operated lock

mechanism embodying a part engageable with said lock bar for retracting the same to a position out of the path of said hold-down element.

4. In a lock of the character described, a locking bolt mounted for vertical swinging movement, a hold-down element slidably mounted above said locking bolt for movement in a plane perpendicular thereto and arranged within the path of said locking bolt, a lock bar mounted for sliding movement in a plane at right angles to said hold-down element and adapted to be projected into the path of said hold-down element above said locking bolt for coaction with the hold-down element to secure the locking bolt in locking position, a key-operated lock mechanism mounted in operative position to said lock bar and embodying a part engageable therewith for retracting said lock bar, and mechanism for projecting said lock bar into the path of said hold-down element including a rack mechanism operatively connected with the lock bar.

5. In a lock of the character described, a locking bolt mounted for vertical swinging movement, a hold-down element slidably mounted above said locking bolt for movement in a plane perpendicular thereto and arranged within the path of said locking bolt, a lock bar mounted for sliding movement in a plane at right angles to said hold-down element and adapted to be projected into the path of said hold-down element above said locking bolt for coaction with the hold-down element to secure the locking bolt in locking position, a key-operated lock mechanism mounted in operative position to said lock bar and embodying a part engageable therewith for retracting said lock bar, and mechanism for projecting said lock bar into the path of said hold-down element including a rack mechanism operatively connected with the lock bar, a push-button assembly mounted below the locking bolt for sliding movement, and coacting cam means on said push-button assembly and said rack mechanism for actuating the latter to cause a projecting of the lock bar incidental to the closing of the door, and a projecting of the push-button mechanism incidental to the opening of the door.

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