Oct. 14, 1958 C. C. HILLGREN 2,855,772

LOCK FOR SLIDING PANEL

Filed June 18, 1956 2 Sheets-Sheet 1

Fig. 1.

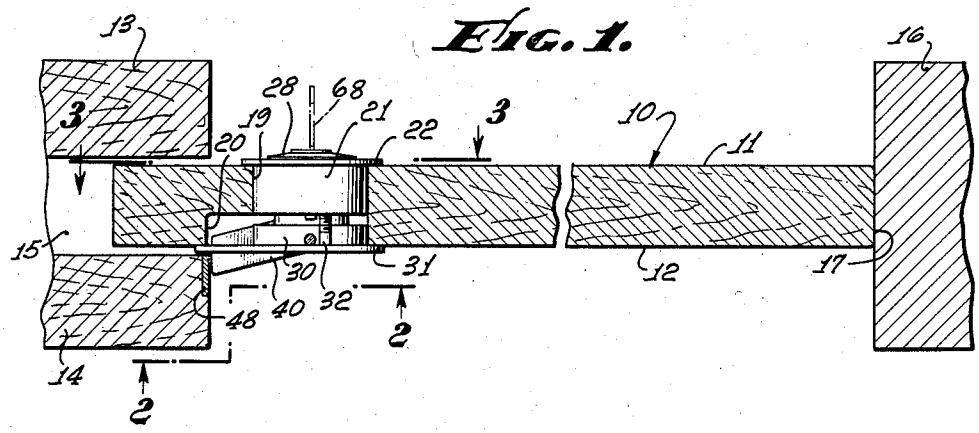

Fig. 2.

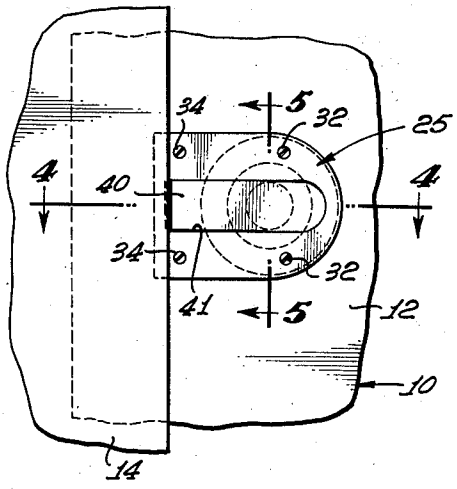

Fig. 3.

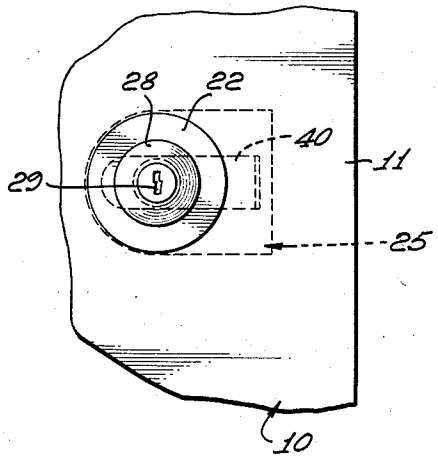

Fig. 4.

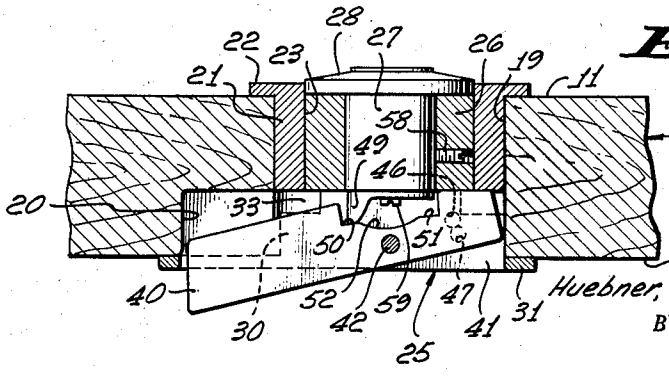

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FIG. 5.

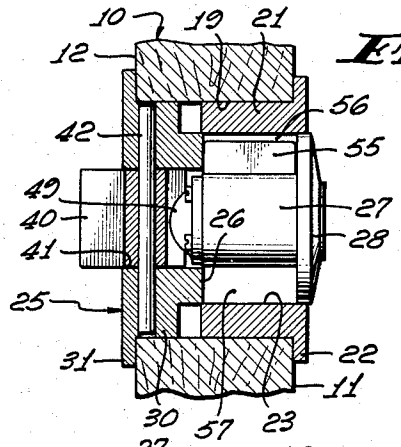


FIG. 8.

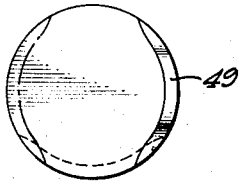


FIG. 6.

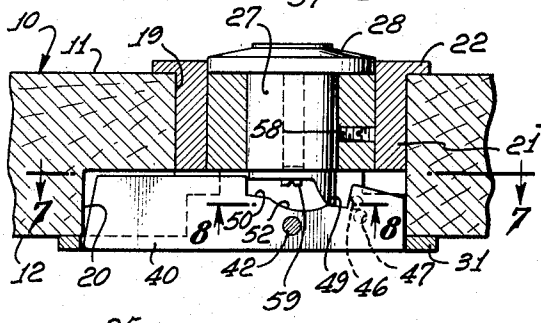


FIG. 7.

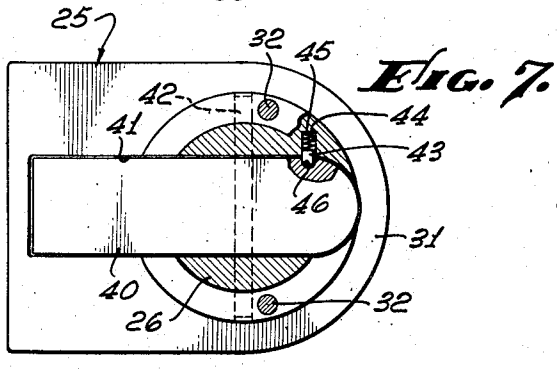


FIG. 9.

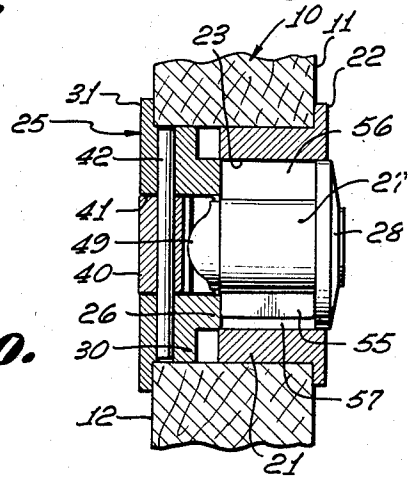
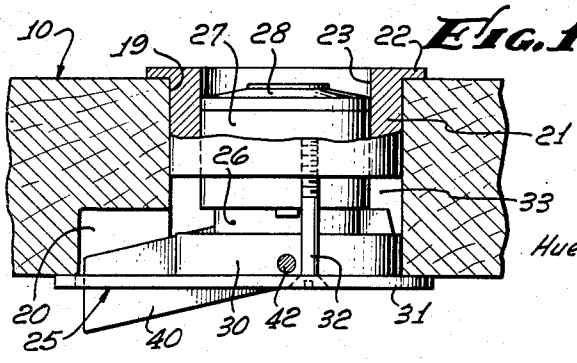


FIG. 10.



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United States Patent Office 2,855,772 Patented Oct. 14, 1958

2,855,772

LOCK FOR SLIDING PANEL

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Application June 18, 1956, Serial No. 591,897

6 Claims. (Cl. 70—100)

The invention relates to lock hardware and has particular reference to a door lock capable of use especially on a sliding door where the lock in a sense acts to block the door from sliding back into the slot which normally contains it when the door is open.

While considerable attention has been given to the design and fabrication of sliding door latches, not all of the currently designed latches are so constructed that they can incorporate a locking mechanism. In those devices especially designed to provide a key locking combination difficulty has been experienced in designing an action readily operable from both sides of the door and at the same time of such small size as to permit installation in the usual sliding door without there resulting a bulky and cumbersome structure and appearance. One of the limitations present in installations of the kind here referred to is that the sliding door must be capable of entering completely into the slot provided for it so that virtually no portion of it remains exposed except the edge. If the slot is to be kept to the desired narrow breadth, it is requisite that the lock or latch be of such size that when installed in the door it is substantially flush with the surfaces on both faces of the door. Inasmuch as sliding doors are often an inch or even less in thickness, the amount of space available for the locking equipment is virtually a minimum and accordingly presents a considerable handicap to designers.

It is therefore among the objects of the invention to provide a new and improved door lock especially adapted to a sliding door which is simple, compact and positive and therefore capable of installation in a door with both sides flush with the faces of the door.

Another object of the invention is to provide a new and improved lock for sliding doors which is constructed and mounted so as to in effect block the door from being opened by having a portion of the lock engage the door frame, thereby making it unnecessary to provide any fixture in the side of the frame against which the door opens capable of retaining a hook-like appendage such as is usually used for locks of this kind.

Another object of the invention is to provide a new and improved sliding door lock which is inexpensive, rugged, and easy to install.

A further object of the invention is to provide a new and improved lock especially well adapted to installation in sliding doors of rather small thickness wherein the lock parts are so constructed that upon installation they can be easily adjusted to doors of different thickness without impairing readiness of operation.

A still further object of the invention is to provide a new and improved lock for sliding doors which has a simple mechanism employing relatively few parts and so combined that the bar of the lock can be easily tilted by hand to lock and unlock from the inside while at the same time remaining easily manipulatable from the outside by use of a conventional key.

Also included among the objects of the invention is to provide a new and improved lock for sliding doors which avoids the necessity of providing any endwise aperture for such portions of a lock as a latch bolt, thereby substantially minimizing the amount of opening which need provided in the door to receive the locked parts.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a horizontal sectional view of a sliding door construction showing the lock located and adjusted to a locked position.

Figure 2 is a fragmentary elevational view taken on the line 2—2 of Figure 1.

Figure 3 is a fragmentary elevational view taken on the line 3—3 of Figure 1.

Figure 4 is a horizontal sectional view of the interior of the lock taken on the line 4—4 of Figure 2.

Figure 5 is a vertical sectional view of the lock taken on the line 5—5 of Figure 2.

Figure 6 is a horizontal sectional view similar to Figure 4 but showing the lock in unlocked position.

Figure 7 is a vertical sectional view taken on the line 7—7 of Figure 6.

Figure 8 is a fragmentary transverse view taken on the line 8—8 of Figure 6.

Figure 9 is a view similar to Figure 5 but with the keying reversed.

Figure 10 is a view similar to Figure 4 but showing the lock installed in a door of greater thickness.

In the embodiment chosen for the purpose of illustration there is shown a sliding door **10** having an outside face **11** and an inside face **12**. On one edge of the door are parts **13** and **14** of a door frame housing between them a slot **15** for reception of the door. A frame **16** on the opposite side is one against which an edge **17** is adapted to abut when the door closes the doorway.

The door is provided with a circular aperture **19** extending therethrough and at the inside end of the aperture is a recess **20**.

The lock device comprises an annular or cylindrical casing **21** which has at its outer end a flange **22**. Within the annular casing is a cylindrical walled space **23**. It will be noted that the length of the casing is substantially less than the thickness of the door **10** from face to face. A housing indicated generally by the reference character **25** lies on the side of the door opposite from the side from which the casing **21** enters. The housing in the example chosen has a hollow cylindrical extension **26** which is adapted to slidably enter the space **23**. Within the cylindrical casing **21** is a cylinder lock **27** having plugs and pin tumblers of a conventional type currently in use. A face plate **28** overlies the outer end of the cylindrical casing **21** and centers a keyway **29**.

An enlargement **30** also forms part of the housing **25** and a flange **31** extends around the perimeter of the enlargement in a position adapted to overlie the inside face **12** of the door.

In mounting the lock assembly the casing **21** is inserted into the aperture **19** from the outside and the housing is applied from the inside. The flange **22** then overlies the outside face **11** of the door and the flange **31** overlies the inside face **12**. The parts, namely, the casing and housing, are anchored together by means of screws **32**. Since the cylinder **26** slides freely into the space **23** and since there is a clearance **33** between the inner end of the casing **21** and the inner face of the enlargement **30**, should the thickness of the door be smaller, the parts could be drawn more closely together. Contrarily, as illustrated

in Figure 10, when the thickness of the door is greater, the parts are permitted to separate to the extent permitted by the length of the bolts 32 and the assembly will thus be made to fit such door of greater thickness. Wood screws 34 may be employed to maintain the lock assembly in the selected position.

The locking of the door is accomplished by use of a bolt 40. The bolt lies in a slot 41 in the housing in a horizontal position. A pin 42 tiltably mounts the bolt in the slot at a tilting axis which is vertical and which is centered with respect to the axis of the key plug of the cylinder lock 27. Tiltably mounted as shown and described by means of the pin 42 the bolt can tilt from a flush position, as illustrated in Figure 6, to the tilted position, illustrated in Figures 1, 4 and 10. The bolt moreover is releasably retained in either position by use of a spring pressed detent comprising a pin 43 mounted in a hole 44 and normally urged outwardly by action of a spring 45. A recess 46 receives the pin when the bar is in unlocked position, as illustrated in Figure 6, and a similar recess 47 receives the pin when the bar is in the locked position illustrated in Figure 4, for example, to hold it in that position.

When the lock is operated from the inside, it can be locked by first moving the door 10 to close the doorway, as illustrated in Figure 1, and then depressing the right-hand end of the bar 40 with the fingers. That will tilt the bar to the position illustrated in Figures 1 and 4, for example, in which position it will be held by action of the spring pressed pin 43. Moreover, in that position the door cannot be slid open from right to left because the left end of the bar 40 will strike against a strike plate 48 on the face of the part 14 of the door frame. To unlock the door it is necessary only to press against the left end of the bar 40 with the fingers, tilting it back to flush position, as shown in Figure 6.

When the lock is to be manipulated from the outside, a key 68 is inserted into the key plug so as to rotate a cam 49. On the inside face of the bar 40 is a camway 50 on one side and a second camway 51 on the opposite side. A depression 52 separates the camway at both ends. If, for example, it be assumed that the key has been rotated to rotate the key plug of the cylinder lock 27 and cam 49 against the camway 50, the bar 40 will be tilted outwardly to locked position, as illustrated in Figure 4. The key, the key plug of the cylinder lock 27, and cam 49 can then be returned to a position wherein the cam 49 lies in the depression 52 but the bar will remain tilted outwardly at the left end to locked position, retained in that position by the spring pressed pin 43.

Obviously the bar can be tilted to unlatched position manually by a person on the inside. Where, however, it must be unlocked by use of a key from the outside, the key of the cylinder lock 27 and cam 49 are rotated so that the cam rides upon the camway 51 of the bar 40. This will tilt the bar in a clockwise direction, as viewed in Figure 4, for example, at which point the bar will be returned to a flush position, as illustrated in Figure 6. This is the unlocked position where the spring pressed detent embodied in the pin 43 will hold it. The key plug and cam 49 are then returned again to a position wherein the cam 49 falls in the depression 52 and the key removed. The bar will continue to remain held in unlocked position, thereby permitting the sliding door to be slid into its slot 15.

Should it become desirable to reverse the key position, it will be noted that a web 55 is provided on the cylinder lock 27 on one side. The cylinder 26 is provided with a recess 56 on the top side and a second recess 57 on the bottom side. To reverse the cylinder lock a set screw 58 is loosened, thereby permitting the cylinder lock 27 to be withdrawn and reversed from the position illustrated in Figure 5 to the position illustrated in Figure 9. The set screw may then be reset and the lock has been successfully reassembled with the key in reverse position.

It will be noted that the number of parts in the device are relatively few. The cam 49 is held in place by a bolt 59 fastened to the plug of a conventional cylinder lock. The cylinder lock is readily removable by loosening the set screw 58 as already described. The housing 25 is readily separatable from the casing 21 by removing two screws or bolts 32. Moreover, the bar 40 can be removed by merely dropping the pin 42 from its position. Reassembly is as readily accomplished, namely, by reinsertion of the pin 42 and by replacing the few parts in their original positions, in which positions they are anchored by joint operation of bolt 59 and the set screw 58, after which the parts of the device can be mounted on the door by use of the bolts or screws 32. If desired, a completely flush installation can be accomplished by cutting recesses, not shown, into the respective faces 11 and 12 of the door deep enough to receive the flanges 22 and 31.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

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

1. A lock for a sliding door having opposite faces and adapted to enter a slot in a door frame, said lock comprising a casing and a flange at an outside end thereof, a casing element in the casing, and a cylinder lock having a key actuated rotatable plug rotatably secured in the casing element, a separate housing, and removable means securing said housing to said casing at a location on the side opposite said flange, said housing having a horizontal slot therein lying in a position diametrical with respect to the rotatable plug, a locking bar having a barring end and securing means tiltably securing said bar to the housing in the slot, said bar having an unlocked position flush with the housing and a locking position with the barring end tilted outwardly of the housing, a camway on a portion of the bar facing said rotatable plug and a cam on an end of the plug facing said bar rotatable to positions on the camway at locations on opposite sides of said securing means whereby to tilt said bar to locked and unlocked positions.

2. A lock for a sliding door having opposite faces and adapted to enter a slot in a door frame comprising a casing and a flange at an outside end thereof, a cylinder in the casing, and a cylinder lock having a key actuated rotatable plug rotatably secured in the cylinder, a separate housing, and removable means securing said housing to said casing, said housing having a horizontal slot therein, a locking bar and means tiltably securing said bar to the housing in the slot, said bar having an unlocked position flush with the housing and a locking position with a barring end tilted outwardly of the housing, a detent between the bar and the housing operable in both positions of the bar, a camway on the bar extending to both horizontal sides of the pin and a cam on the plug rotatable to positions alternatively against the camway on opposite sides of the pin whereby to tilt said bar to locked and unlocked positions and having a neutral position therebetween.

3. A lock for a sliding door having opposite faces and adapted to enter a slot in a door frame comprising an annular casing and a flange at an outside end thereof, a cylinder in the casing, and a cylinder lock having a key actuated rotatable plug rotatably secured in the cylinder, a separate housing, and removable means securing said housing to said casing, said housing having a horizontal slot therein, a locking bar and a pin tiltably securing said

bar to the housing in the slot, said bar having an unlocked position flush with the housing and a locking position with a barring end facing an adjacent edge of the door tilted outwardly of the housing and with a control end tilted inwardly of the housing, a detent between the bar and the housing operable in both positions of the bar, a camway on the inside of the bar on both horizontal sides of the pin and a cam on the plug rotatable to positions alternatively against the camways on opposite sides of the pin whereby to tilt said bar to locked and unlocked positions, said cam having a neutral position therebetween.

4. A lock for a sliding door having opposite faces and adapted to enter a slot in a door frame comprising an annular casing and a flange at an outside end thereof, a cylinder in the casing, and a cylinder lock having a key actuated rotatable plug rotatably secured in the cylinder, a separate housing, and removable means securing said housing to said casing, said housing having a horizontal slot therein, a locking bar and means tiltably securing said bar to the housing in the slot, said bar having an unlocked position flush with the housing and a locking position with a barring end tilted outwardly of the housing, a detent between the bar and the housing operable in both positions of the bar, a pair of camways of equal length and pitch extending horizontally inwardly on the inside of the bar and located one on each horizontal side of the pin and a depression between both adjacent ends of the camways, a cam on the plug rotatable to positions alternatively against the camways on opposite sides of the pin whereby to tilt said bar to locked and unlocked positions and having a neutral position therebetween, said cylinder lock having a laterally extending web, and said cylinder having two recesses spaced from each other adapted alternately to receive said web whereby to mount the plug in opposite operable positions.

5. A lock for use with a sliding door having opposite faces and an aperture therebetween, said lock comprising a casing having a hollow cylindrical interior adapted to extend into the aperture from one face and having a means extending radially outwardly at one end whereby to overlie one face of the door, a separate housing having a portion thereof adapted to extend into the aperture from the other face, said housing having a means thereon adapted to overlie said other face of the door, and fasteners extending between said housing and said casing adapted to anchor said casing and said housing

together in said aperture on the door, a hollow cylinder on said housing extending slidably into the interior of said casing to a position therein depending on the thickness of the door, a cylinder lock having a key plug therein and a bolt tiltably mounted in the housing on a vertical axis at a location substantially flush with the means thereon and subjected to tilting between locked and unlocked positions in response to movement of the key plug into engagement with the bolt on one side of said vertical axis.

6. A lock for use with a sliding door having opposite faces and an aperture therebetween, said lock comprising a hollow cylindrical casing adapted to extend into the aperture from one face and having an annular flange extending radially outwardly at one end whereby to overlie one face of the door, a separate housing having a portion thereof adapted to extend into the aperture from the other face, said housing having a flange thereon adapted to overlie said other face of the door, and threaded posts extending between said housing and said casing adapted to anchor said casing and said housing together in said aperture on the door, a hollow cylinder on said housing extending slidably into said casing to a position within the door depending on the thickness of the door, a cylindrical lock having a key plug therein and a bolt tiltably mounted on a vertical axis in the housing at a location substantially flush with the flange thereon and subjected to tilting between locked and unlocked positions in response to operative rotation of the key plug and movement of a portion of said key plug into engagement with the bolt on one side of said vertical axis, said movement being in a direction transverse with respect to the sliding door.

References Cited in the file of this patent

UNITED STATES PATENTS

149,729	Dotterer	Apr. 14, 1874
300,325	Norton	June 10, 1884
1,646,181	Babekuhl	Oct. 18, 1927
1,998,689	Ross	Apr. 23, 1935
2,448,748	Vanderveld	Sept. 7, 1948
2,717,512	Sterling et al.	Sept. 13, 1955

FOREIGN PATENTS

32,061	Sweden	Dec. 30, 1911