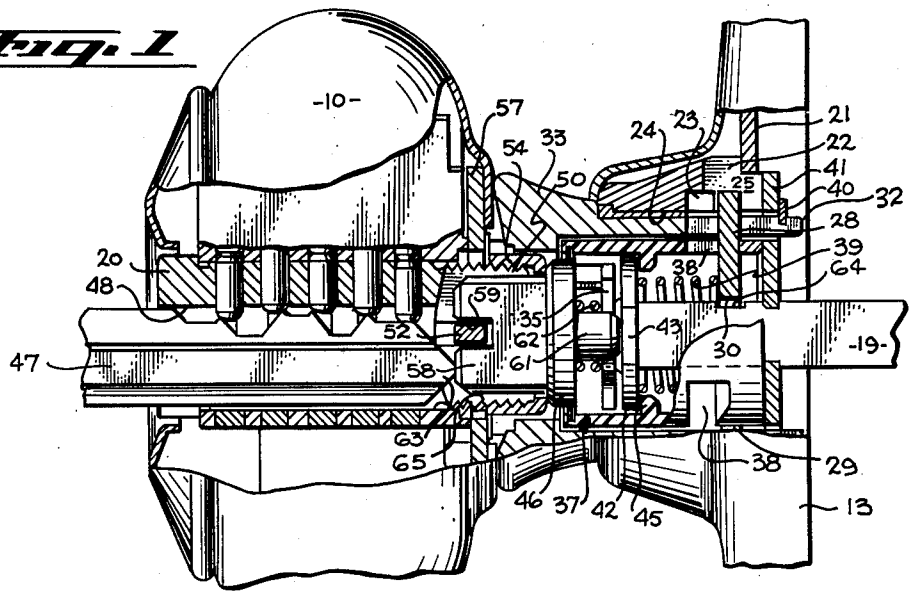
March 10, 1964 F. J. RUSSELL ETAL 3,123,995

SLIDING KEY-ACTUATED MECHANISM CONNECTOR

Filed April 17, 1961 3 Sheets-Sheet 1

Fig. 1



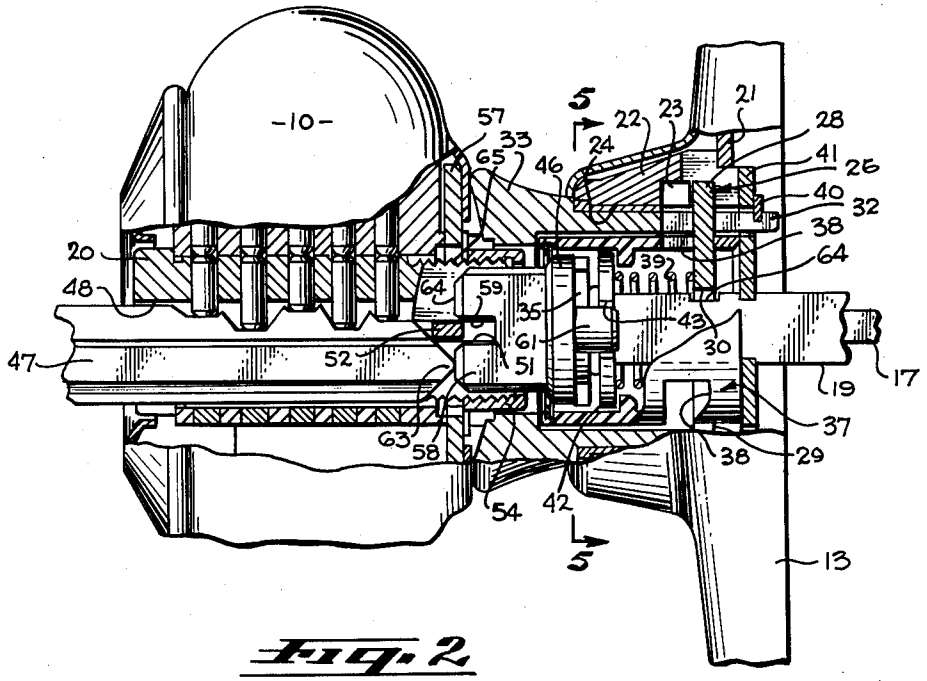


Fig. 2

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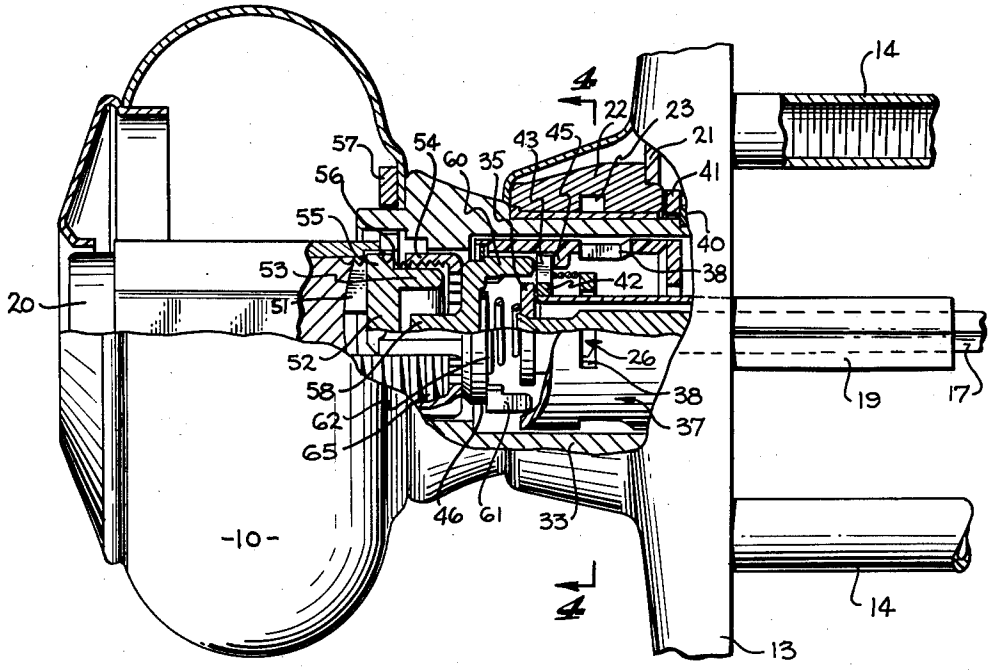

Fig. 3

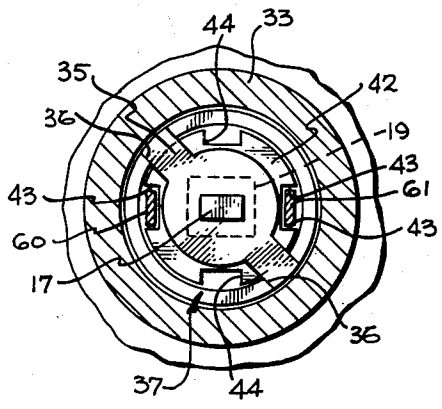

Fig. 5

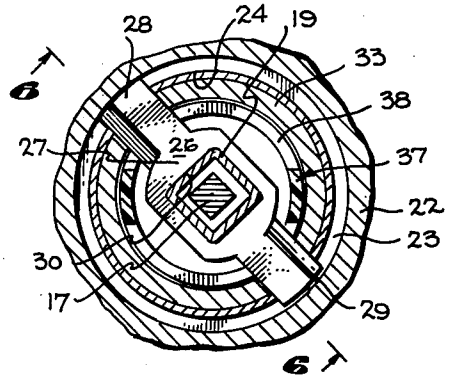

Fig. 4

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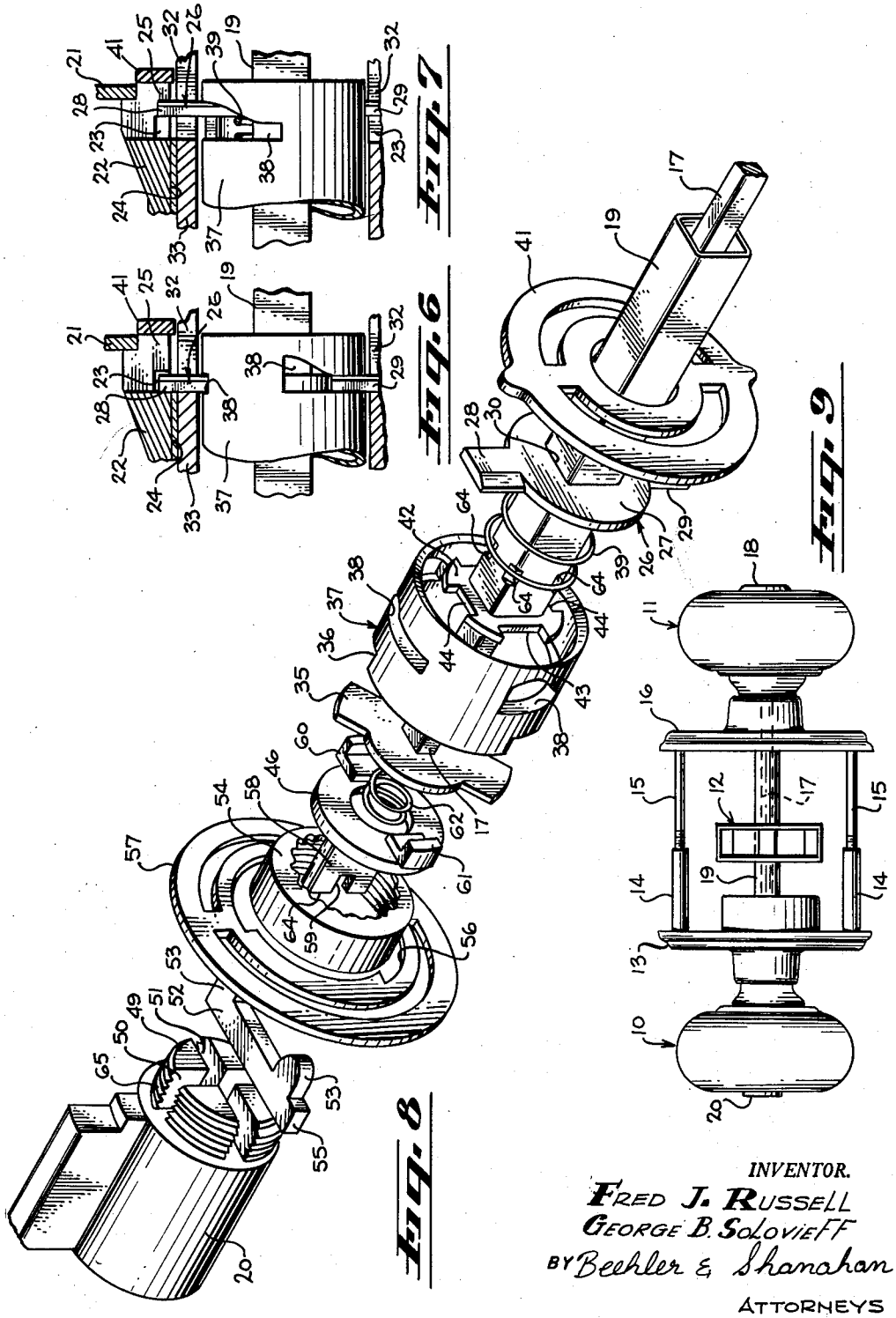

Fig. 7

Fig. 6

Fig. 9

Fig. 8

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SLIDING KEY-ACTUATED MECHANISM CONNECTOR

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3 Claims. (Cl. 70—146)

The invention relates to door locks of a currently conventional type used especially on outside doors wherein the outside knob at least sometimes is locked, thus barring manipulation of the latch bolt by rotation of said outside knob. The invention here concerned resides in a key-actuated mechanism connector which slides into engagement with the latch retracting spindle or an extension of said spindle, whereby the latch bolt may be retracted to open the door by turning the key without the necessity for unlocking the outside knob.

It is therefore among the objects of the present invention to provide a key-actuated mechanism by means of which a latch retracting spindle can be directly rotated by manipulation of the key under circumstances where the knob or other appropriate operating member on the outside which houses the key-actuated mechanism remains nonrotatable.

Still another object of the invention is to provide a new and improved connecting means for a key-actuated mechanism which is normally biased out of engagement with a latch actuated spindle, which is of such character that it can be urged into engagement merely by endwise engagement of a key therewith when the key is inserted fully into normal key operating position, thereby to permit retraction of the latch bolt in one easy normal key operation without the need for rendering the outside knob nonrotatable and without the need to overcome any lost motion which would exist between the outside knob and inside knob mechanisms, were it not for the fact that the key-actuated mechanism connecting means only is connected to the spindle when the key is fully inserted. Among other things, this makes it possible to immediately start the retraction of the latch bolt with the starting of the key rotation of the fully inserted key.

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.

FIGURE 1 is a longitudinal sectional view of an outside knob assembly housing the invention showing the parts in disengaged position such as they would have before the key is pushed fully into the keyway;

FIGURE 2 is a longitudinal sectional view similar to FIGURE 1 showing the position of the parts in engaged relationship such as would prevail when the key is inserted fully into operative position;

FIGURE 3 is a longitudinal sectional view taken in a direction ninety degrees removed from the position illustrated in FIGURE 1;

FIGURE 4 is a cross sectional view taken on the line 4—4 of FIGURE 3;

FIGURE 5 is a cross sectional view taken on the line 5—5 of FIGURE 2;

FIGURE 6 is a fragmentary, longitudinal sectional view taken on the line 6—6 of FIGURE 4 showing the outer knob in unblocked position;

FIGURE 7 is a fragmentary, longitudinal sectional view similar to FIGURE 6 but showing the outer knob in blocked position;

FIGURE 8 is an exploded perspective view showing

the sundry parts separated one from another in order to illustrate their proportions and relationship;

FIGURE 9 is a somewhat schematic view showing a latch bolt mechanism in relation to a set of outer and inner knobs.

In the interest of understanding the general purpose of the invention, a latch bolt assembly is shown schematically in FIGURE 9 and consists of an outside knob assembly 10, an inside knob assembly 11, and a latch bolt assembly 12. Adjacent the outside knob assembly is a rose assembly 13 having posts 14 thereon into which screws 15 from the inside rose assembly 16 are inserted in order to mount the lock on a suitable door (not shown). A mechanism not expressly shown in FIGURE 9 is provided for locking the door which for locking purposes secures the outside knob assembly in a nonrotatable adjustment by temporarily interlocking it with a part of the outside rose assembly. One manner in which this mechanism may be set in motion is to provide a locking spindle 17 manipulated by a turn button 18 on the inside knob assembly. Once locked, the outside knob assembly cannot rotate and, therefore, cannot in turn rotate a latch bolt spindle 19 for the purpose of withdrawing a latch bolt, which is part of the latch bolt assembly 12. The invention involves an appropriate mechanism which makes it possible by inserting a key into a key-operated mechanism 20 in the outside knob assembly 10 to rotate the latch bolt spindle and thus retract the latch bolt without the need for releasing the outside knob assembly from its locked or blocked position relative to the adjacent rose assembly 13.

In order that the sliding key-actuated mechanism connector may be appreciated and understood, some details of the means employed for blocking rotation of the outside knob assembly are shown in the more detailed drawings exemplified by FIGURES 1 through 7 inclusive. The device there shown includes a mounting plate 21 which is normally a stationary portion of the device when mounted upon a door, the mounting plate having a rose insert 22 anchored thereto which is also stationary. In the rose insert is an annular recess 23 in communication with a central passage 24 which extends through the rose insert and serves as a bearing surface. There is also a slot 25 which communicates with the annular recess 23 as shown in FIGURES 6 and 7, the slot 25 serving as a locking slot.

Co-operating with the annular recess 23 and the slot 25 is a blocker 26, the general form of which is readily discernible in FIGURE 8. The blocker includes a central disc 27 having arms 28 and 29 extending outwardly therefrom. The blocker has a square hole 30 in the central disc 27 which slidably and nonrotatably mounts the blocker upon the latch bolt spindle 19 which is a square hollow spindle. The arms 28 and 29 extend outwardly through cutout portions 32 in a shank 33 forming part of the outside knob assembly 10. In the position of FIGURE 6, the arms lie within the annular recess 23 and the knob assembly then is free to rotate because of travel of the arms in the annular recess even though the arms engage sides of the cutout portions 32. When by manipulation of appropriate means the arms are shifted axially to the position of FIGURE 7 the arms lie within the slot 25 and in this position the arms bar or block rotation of the shank 33, and hence the outside knob assembly because of engagement with the rose insert 22 which is a stationary portion of the device. In this position of adjustment, since the outside knob assembly cannot be rotated and the latch bolt spindle cannot be rotated, manipulation of the latch bolt assembly is prevented and the door remains locked from the outside.

For holding the knob mounted on the rose insert there is provided a snap ring 40 in engagement with the inner

end of the shank which bears against a retaining washer 41. The retaining washer in turn engages the inside end of the rose insert.

To further understand the manipulation of the blocker, attention is again directed to the locking spindle 17 to which is attached a tailpiece washer 35. The tailpiece washer in turn has a nonrotatable engagement in pockets 36 of a cam sleeve 37. In the cam sleeve are camways 38 through which the arms 28 and 29 extend as shown effectively in FIGURES 6 and 7 and in FIGURES 1 and 2. When the arms of the blocker 26 occupy positions at the small ends of the camways, as shown in FIGURE 6, the arms lie as previously described within the annular recess 23. When, however, the locking spindle 17 is rotated, rotation causes rotation of the cam sleeve 37 through the tailpiece washer 35 an angular distance sufficient to move the large ends of the camways into position adjacent the arms 28 and 29. When this happens, a spring 39 slides the blocker a short distance axially from left to right, as viewed in FIGURE 7, until the arms 28 and 29 fall within the slots 25. This is the operation which accomplishes the blocking of rotation of the outside knob assembly and previously described in a general way. Conversely, the blocking can be relieved by rotating the locking spindle in the opposite direction thereby rotating the cam sleeve 37 causing the camways 38 to shift relative to the arms 28 and 29, moving the arms from the large end of the camways to the small end of the camways against the pressure of the spring 39. The shift is sufficient to return the arms to locations within the annular recess 23. It is, however, the locked or blocked position of FIGURE 7 which the sliding key-actuated mechanism connector is designed to circumvent, thereby to make it possible to rotate the latch bolt spindle 19 without the necessity of shifting the arms 28 and 29 from their position of engagement with the slots 25.

As shown in FIGURES 1, 2, and 3 a spindle washer 42 is nonrotatably secured to the latch bolt spindle 19. The form of the spindle washer is shown in the exploded view of FIGURE 8. In the spindle washer are opposite pairs of cutouts 43 and 44, only one pair of which is employed at any one selected time. The spindle washer also serves as one keeper for the spring 39 previously described. A shoulder 45 within the cam sleeve 37 prevents the latch bolt spindle from being shifted from left to right as viewed in FIGURES 1, 2, and 3.

The mechanism employed to make possible rotation of the latch bolt spindle 19 during blocked condition of the outside knob assembly includes a connector 46 which serves as a means for reaching the spindle washer 42 when the connector is manipulated by a key 47, inserted in an appropriate keyway 48 of a conventional pin tumbler lock. The lock is provided with a conventional cylinder plug 49 having a first slot 50 therein opening inwardly and a second slot 51 therein likewise opening inwardly and at substantially right angles to the slot 50. A cylinder plug stop 52 is received in the slot 51 and is possessed of tabs 53 which serve to center the stop within the interior of a cap 54. A projection 55 extending laterally from the cylinder plug serves to travel in a cutout 56 in a knob washer 57 thereby to limit rotation of the cylinder plug to a desired conventional extent. As shown, the cap 54 has a threaded engagement upon threads 65 of the cylinder plug and serves to hold the cylinder plug stop in assembled position.

The connector 46 includes a portion 58 which extends into and is slidably received within the slot 50. A notch 59 in the portion 58 clears the cylinder plug stop 52 as shown in FIGURE 1. On the opposite side, the connector is provided with tabs 60 and 61 adjacent the outer perimeter. These tabs extend around the central portion of the tailpiece washer 35 at a location within the cam sleeve 37 as clearly shown in FIGURES 1 and 2. A spring 62 bottomed upon the tailpiece washer serves normally to urge the connector in a direction from right to left as viewed in FIGURE 1.

Assuming the positions shown in FIGURES 1 and 2, namely, a position wherein the outside knob assembly is blocked against rotation by engagement of the blocker 26 with the slots 25, it then becomes desirable to unlatch the door by use of the key 47. The key thereupon is pushed inwardly from the position of FIGURE 1 to the position of FIGURE 2 where the key matches the conventional pin tumblers permitting the cylinder plug to be rotated. As the key is moved from the position of FIGURE 1 to the position of FIGURE 2, an end 63 of the key is pressed against an outermost edge 64 of the portion 58 of the connector 46. This moves the connector against the tension of the spring 62 and extends the tabs 60 and 61 into engagement with the cutouts 43 of the spindle washer 42. By this movement the connector is engaged with the spindle washer and hence is engaged with the latch bolt spindle 19 without, however, moving the portion 58 of the connector out of its engagement with the slot 50 in the cylinder plug.

It should be noted particularly that when the blocker 26 has been moved to the position illustrated in FIGURES 1 and 2, the hole 30 in the blocker coincides with notches 64 at the corners of the latch bolt spindle 19. This being true, the latch bolt spindle is free to rotate despite the fact that the blocker blocks rotation of the shank 33 and the outside knob assembly 10. Accordingly, when the key 47 is then rotated while in the fully inserted position of FIGURE 2, the connector 46 is rotated, which in turn rotates the latch bolt spindle, making it possible to unlatch the latch bolt assembly 12 without disturbing the blocked relationship of the outside knob assembly. After the unlatching has been completed by the withdrawal of the key 47, the spring 62 returns the connector to its initial position (as shown in FIGURE 1) which disengages the tabs 60 and 61 from engagement with the spindle washer 42. Conventional means incorporated in the latch bolt assembly or in an auxiliary torsion spring device serve to return the latch bolt spindle 19 rotationally to normal position and, consequently, the blocker can at that time be returned to unblocking position, if desired, by manipulation of the locking spindle 17 through the agency, for example, of the button 18.

From the foregoing description it will be noted that when it is desired to retract the latch bolt by use of the key 47 while the outside knob assembly remains in blocked position, only a limited number of parts need be manipulated and rotated. Accordingly, the key can be turned with appreciable ease due to the minimum resistance provided by internal parts and hence withdrawal of the latch bolt mechanism is made possible with a substantially minimum amount of effort, and also without need for assisting the unlatching operation by manipulation of the outside knob assembly. Hence, the unlatching can be easily accomplished by one hand only which is used to insert and turn the key.

Also, no provisions need be made for any lost motion between the pin tumbler cylinder assembly and the locking spindle 17 or turn button 18 in the inside knob assembly because the connector 46 remains disconnected from the latch bolt spindle 19 at all times except when the key 47 pushes the connector 46 into engagement with latch bolt spindle 19. Thus, the rotating of the fully inserted key 47 results in correspondingly immediate retracting of the latch bolt.

Having described the invention, what is claimed as new in support of Letters Patent is:

1. In a lock a relatively stationary portion, an operating assembly including a hand-hold and means for securing said hand-hold non-rotatably to said stationary portion, a latch bolt actuating spindle rotatably mounted in said operating assembly, a key-operated mechanism including a key plug rotatably mounted in the assembly and having a keyway therein adapted to receive a key, a

connector having a non-rotatable position relative to said key plug and having an axially slidable position in said key-operated mechanism relative to said key plug, said connector being movable in response to key pressure from a position wherein said connector and said spindle are disengaged to a position wherein said connector is non-rotationally interconnected with said spindle whereby to rotate said spindle independently of said hand-hold.

2. In a lock a relatively stationary portion, an operating assembly including a hand-hold and means for securing said hand-hold non-rotatably to said stationary portion, a latch bolt actuating spindle rotatably mounted in said operating assembly, a key-operated mechanism in said operating assembly, a cylinder plug rotatably mounted in the key-operated assembly, said cylinder plug having a keyway adapted to receive a key and having an inwardly facing slot, a connector in said slot in non-rotatable engagement with said cylinder plug and having an axially slidable position relative to said keyway, said connector being movable in response to key pressure from a position wherein said connector and said spindle are disengaged to a position wherein said cylinder plug and said connector are non-rotationally interconnected with said spindle whereby to rotate said spindle independently of said hand-hold.

3. In a lock a relatively stationary portion, an operating assembly comprising a latch bolt actuating hand-hold having a shank rotatably mounted in said stationary portion and a latch bolt actuating spindle mounted in said operating assembly, a blocker in said assembly having a non-rotatable engagement with said hand-hold and movable alternately between positions of engagement and disengagement with said stationary portion whereby respectively to set said hand-hold in blocked and unblocked adjustments, said spindle being rotatably mounted in said hand-hold when said hand-hold is in a position of engagement with said stationary portion, a key-operated mechanism in the assembly having a key plug rotatably mounted in the assembly, said key plug having a keyway therein adapted to receive a key, a connector non-rotatably attached to said key plug and having an axially slidable position in said assembly relative to said keyway, said connector being movable axially in response to key pressure from a position wherein said connector and said spindle are disengaged to a position wherein said connector is non-rotationally interconnected with said spindle whereby to effect rotation of said spindle in response to rotation of said key plug independently of said hand-hold.

References Cited in the file of this patent

UNITED STATES PATENTS

1,776,945	Georgison	Sept. 30, 1930
2,618,955	Cerf	Nov. 25, 1952
2,627,436	Cerf	Feb. 3, 1953