May 9, 1961 F. J. RUSSELL ET AL 2,983,134

HOTEL LOCK WITH SPECIAL KEY SHUT-OUT FROM OUTSIDE

Filed Aug. 10, 1959 3 Sheets-Sheet 1

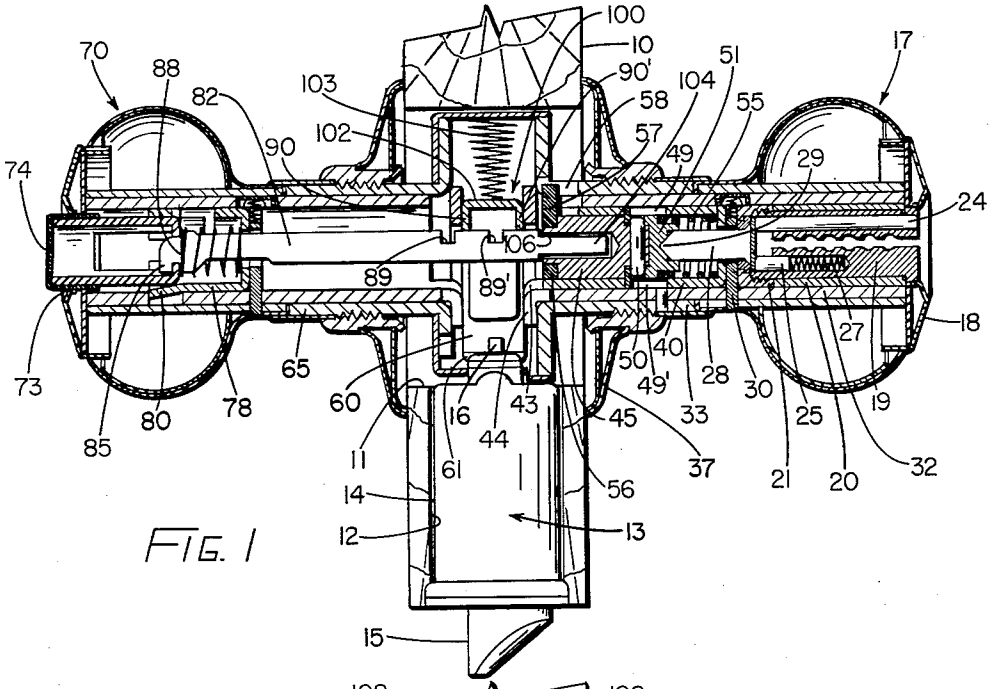


FIG. 1

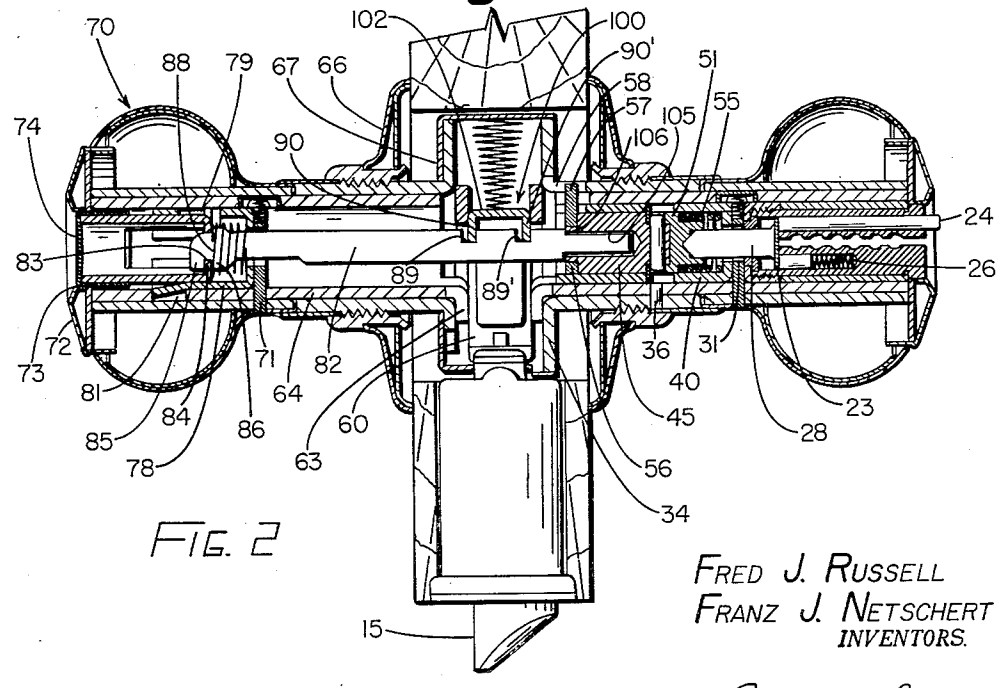


FIG. 2

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Filed Aug. 10, 1959 3 Sheets-Sheet 2

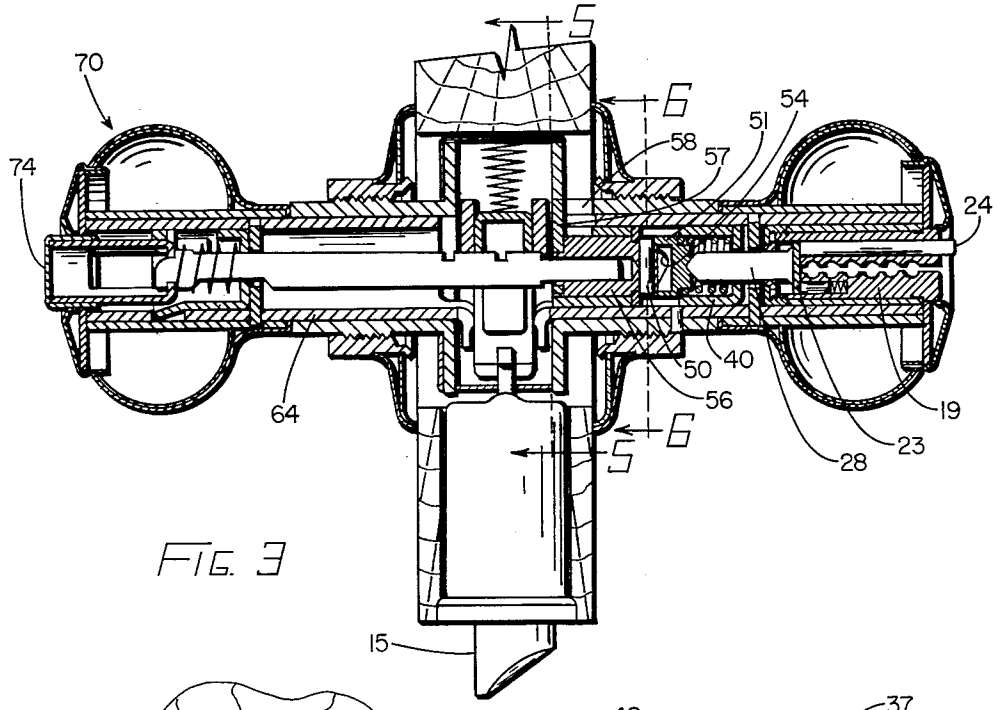


FIG. 3

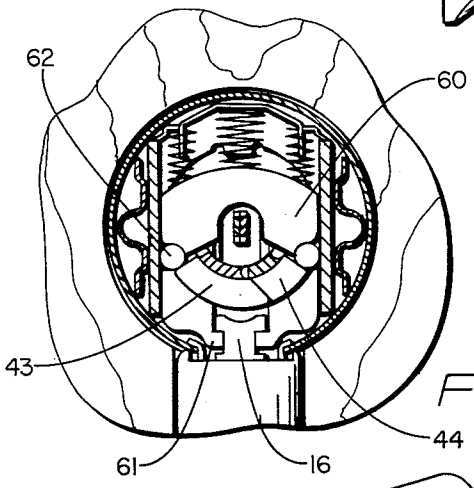


FIG. 5

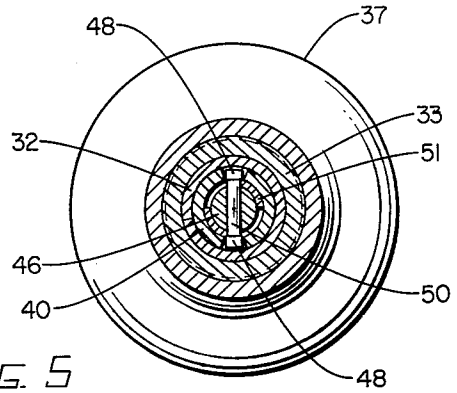


FIG. 6

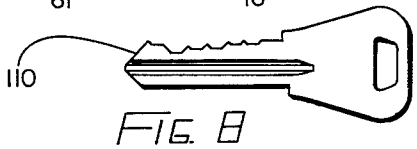


FIG. 8

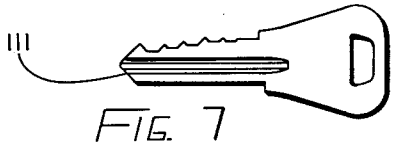


FIG. 7

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HOTEL LOCK WITH SPECIAL KEY SHUT-OUT FROM OUTSIDE

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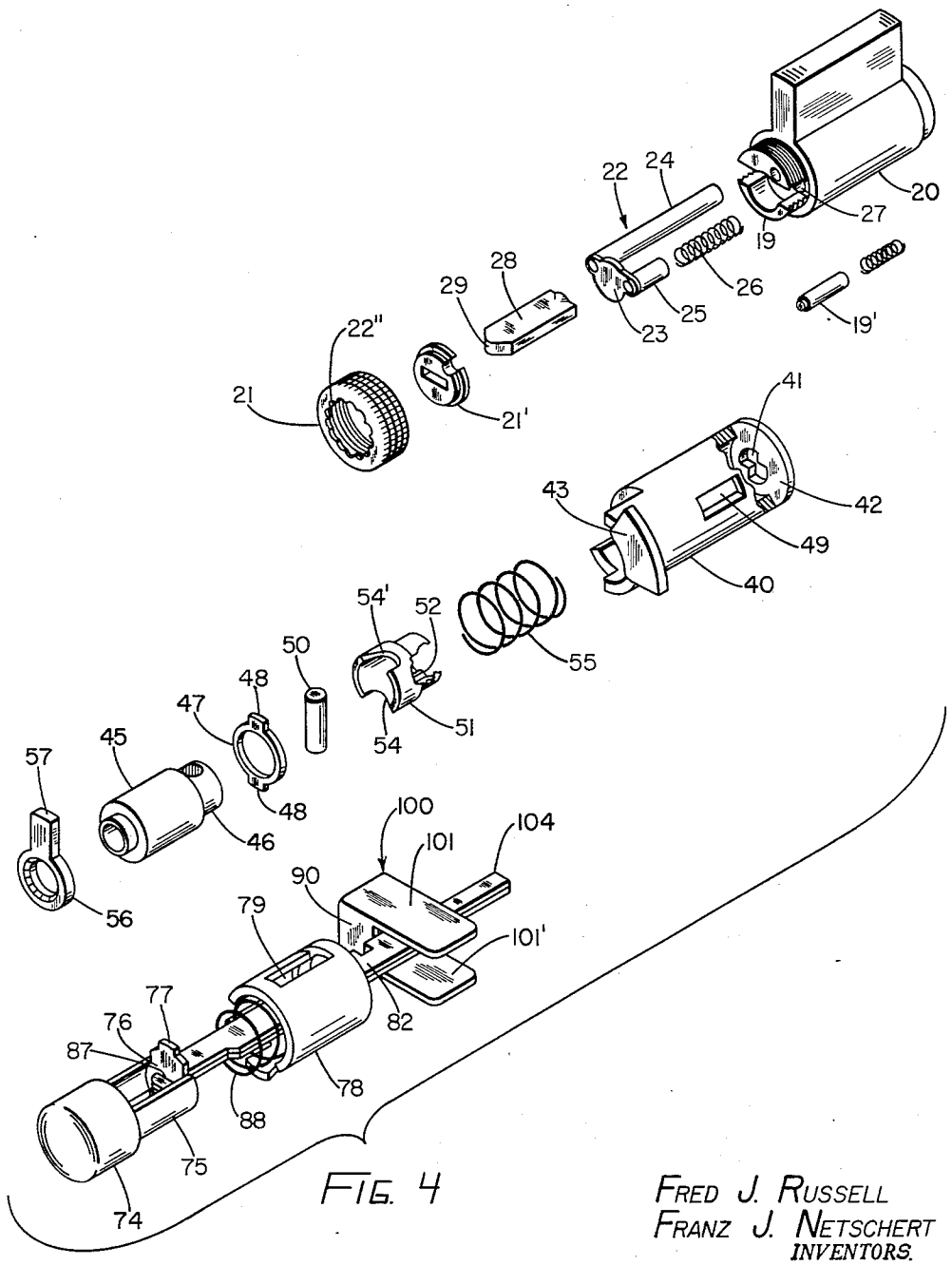


FIG. 4

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HOTEL LOCK WITH SPECIAL KEY SHUT-OUT FROM OUTSIDE

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3 Claims. (Cl. 70—146)

The invention has reference to door locks equipped with a key mechanism and equipped additionally with a manually actuated means on the inner knob by virtue of which key operation can be barred except for operation by a special authorized key.

The type of lock here under consideration is one popular for installation on hotel room doors opening into a common hallway and arranged so that the hotel guest may so lock the door from the inside that it cannot be opened from the outside with a guest key but only by a special key. The lock is further one of a type provided with an indicator to show that the door is locked against opening by use of a guest key and furthermore arranged in such fashion that, even though not locked from the inside, the lock may be manipulated by use of the special key in such fashion that a guest key cannot be used to open the door.

Various lock mechanisms have heretofore been in use arranged in such fashion that by manipulation of a manually actuated device on the inside the door can be barred against unlocking from the outside. Locks in this type in some instances have even been further designed to permit unlocking under such circumstances but only by use of a special key. Locks of this kind have been, however, relatively expensive and have incorporated for the most part a relatively large number of parts, each in turn being such as to require careful construction and machining and painstaking assembly. The locks heretofore used, however, have not been designed and built in such fashion that barring the door against unlocking by use of the guest key could be accomplished by use of a special key operated from the outside.

It is therefore among the objects of the invention to provide a new and improved door lock which can be manipulated from the inside to bar unlocking from the outside except by a special key and which is additionally provided with means making it possible by use of a special key to bar opening by the regular key from the outside when the lock has not been manipulated from the inside to bar regular key unlocking from the outside.

Another object of the invention is to provide a door lock equipped with a signal device which operates to show the door to be barred from operation by a conventional key both when set in that position by manipulation of a manual setting device at the inside knob and also by manipulation of mechanism within the lock by means of a special key operated from the outside.

Still another object of the invention is to provide a door lock having the special features above described which is positive-acting, rugged in construction, compact in arrangement and of such design that the parts may be inexpensively manufactured and quickly and accurately assembled into a dependable locking device.

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 longitudinal sectional view of the lock set installed in a door with the latch bolt and latch mechanism in released position permitting operation by a conventional guest key.

Figure 2 is a longitudinal sectional view similar to Figure 1 but showing the mechanism in position barring manipulation by the guest key through the agency of a manually actuated button on the inside knob.

Figure 3 is a transverse sectional view similar to Figure 1 but showing a portion of the mechanism placed in a position of adjustment barring opening of the door by use of the guest key where the manually actuated device on the inside door knob has not been set.

Figure 4 is an exploded view of significant operating portions of the interior of the lock set.

Figure 5 is a cross-sectional view taken on the line 5—5 of Figure 3.

Figure 6 is a cross-sectional view taken on the line 6—6 of Figure 3.

Figure 7 is a plan view of a key shortened to form a special key.

Figure 8 is a plan view of the key lengthened to make it a guest key.

In an embodiment of the invention chosen for the purpose of illustration a lock set is shown mounted in a door 10 wherein a transverse opening 11 is provided for the spindles, housing and main portion of the device and an endwise opening 12 is provided for a latch bolt assembly 13. The latch bolt assembly is of substantially well-known construction consisting of a casing 14, a reciprocating latch bolt 15, and a tail piece 16.

In the device as illustrated an outside knob assembly, indicated generally by the reference character 17, has a knob face 18 thereon centering a substantially conventional key operated member 19. Surrounding the key operated member is a body 20 at one end of which is a cap 21 threaded into position upon the key operated member. Cylinder cap 21 confines a tail piece washer 21'; and both this washer and the cap 21 are held in non-rotatable relationship to key operated member 19 by the engagement of spring-loaded pin 19' with said washer 21' and one of the serrations 22'' in the face of cylinder cap 21. Spring-loaded pin 19' must be depressed below the surface of the face of cylinder cap 21 in order to permit the rotation of cap 21 for threading same into position or removal of same from position. A blocker assembly indicated generally at 22 consists of a plate 23 on which is an indicator shaft 24 which extends through the key operated member 19 to its outermost end. A spring keeper 25 attached to the plate 23 retains a spring 26 which fits into the bottom of an appropriate bore 27 in the key operated member.

A cylinder tail piece 28 which is substantially rectangular in cross-section extends within the cap 21 into endwise engagement with the plate 23 and has a blunt point 29 at the opposite end. A knob retaining pin 30 has a large opening 31 therethrough to admit passage of the cylinder tail piece.

The outside knob assembly 17 is mounted upon a spindle 32 which extends through a spindle bearing 33 which is part of a frame 34 forming the main portion of the lock and located within the opening 11 of the door. In this instance the spindle 32 is pinned to the spindle bearing by an appropriate pin 36 so that the spindle 32 and the outside knob assembly 17 cannot be rotated. An escutcheon 37 completes the trim for the exterior portion of the lock.

Located within the spindle 32 is a retractor spindle 40, the full form of which can be discerned in the perspec-

tive showing of exploded view, Figure 4. A cylinder tail piece opening 41 in a bottom 42 of the retractor spindle admits the cylinder tail piece 28, the tail piece opening being of the shape shown in Figure 4 to accommodate about 90 degrees lost motion rotation of the cylinder tail piece when manipulated in the usual fashion. A roll-back 43 is provided at the inner end of the retractor spindle which is in rotational engagement with the substantially well-known mechanism which withdraws the latch bolt 15.

Mounted slidably within the interior of the retractor spindle is a body 45 of a dogging assembly. An end 46 of reduced portion on the body extends outwardly and has rotatably mounted thereon a collar 47 having projections 48 on diametrically opposite sides slidably and non-rotatably contained in slots 49 and 49' of the retractor spindle 40. A cam pin 50 extending through the end 46 of the body assists in holding the collar upon the body.

Extending over the end 46 is a cam member 51 which has lugs 52 thereon adapted to be engaged by the inner end of the cylinder tail piece 28. Camways 54, 54' on the cam member are positioned so as to engage the cam pin 50 on opposite sides. The cam member is so located that the blunt point 29 of the cylinder tail piece centers upon it. A spring 55 acts normally to extend the cam member inwardly with respect to the device.

A dogging element 56 fixed upon the body 45 has an extension 57 thereon which extends into a dogging recess 58 in the stationary portion of the device existing in the embodiment shown of the spindle bearing 33 and frame 34, thus always preventing rotation of the body 45.

A transversely mounted retractor 60 has a sliding movement within the frame and is attached by lips 61 to the tail piece 16 so that when the retractor is moved as, for example, by the roll-back 43 acting against a roller 62, the latch bolt 15 can be withdrawn. Besides being withdrawn by the roll-back 43, the retractor can also be moved to withdrawn position by a roll-back 63 on an inside retractor spindle 64. The inside retractor spindle is rotatably mounted in a spindle bearing 65 which also is part of the frame 34. An escutcheon 66 finishes the trim on the inside of the door. It will be noted that a housing 67 surrounds the frame and cooperates with the frame to form the mid-portion of the lock set.

An inside knob assembly 70 is fastened to the retractor spindle 64 by means of a pin 71 so that the retractor spindle 64 can be rotated by rotation of the knob. A knob face 72 on the knob assembly has an opening 73 therein within which is positioned a push button 74. Within the push button 74 is a cage 75 which has a bottom 76 which has an extension 77. A sleeve 78 surrounds the cage and has a longitudinal slot 79 therein which slidably and non-rotatably retains the extension 77. A lip 80 on the sleeve 78 extends outwardly into an opening 81 in the retractor spindle 64, thereby to retain the sleeve within the spindle.

A bar 82 has a notch 83 which receives an edge 84 of the bottom 76 of the cage in such fashion that a lip 85 overlies the bottom on the inside of the cage and a shoulder 86 overlies the bottom on the outside of the cage, thereby securing the bar to the cage as a single unit for endwise motion. Inasmuch as the opening 87 through which the bar extends is rectangular, the bar cannot rotate relative to the button. A spring 88 acts normally to push the button outwardly.

At the end opposite from the button, the bar is provided with a pair of notches 89, 89' so spaced and positioned that they receive side walls 90 and 90' of a latching slide 100. Guide walls 101, 101' complete the side wall arrangement of the latching slide, the walls springing from a bottom 102. A spring 103 acts between the bottom 102 and the housing 67 in a fashion normally urging the latching slide in a direction toward the bar 82.

A projecting end 104 on the bar extends through a bore 105 within the body 45 of the dogging assembly and is freely slidable within the body. A shoulder 106 on the bar bears endwise against the dogging element 56 in certain positions of adjustment.

In operation let it be assumed that the parts are initially in the relative positions shown in Figure 1. It will be noted that the button 74 is extended and that the notches 89, 89' are displaced laterally toward the left of the side walls 90, 90' and hence the latching slide 100 is urged laterally against tension of the spring 103. In this position when a long key 110 is inserted into the key operated member 19, the key operated member can be rotated, in turn rotating the cylinder tail piece 28 which rotates the outside retractor spindle 40, and as this spindle is rotated the roll-back 43 acting against the retractor 60 moves the retractor in a direction away from the latch bolt assembly, thereby withdrawing the latch bolt 15. Hence the door can be opened by the long key, which is the guest key, from the outside.

When it becomes desirable to bar the door from being opened by the guest key, the button 74 is depressed into the position of Figure 2. Depression of the button shifts the bar 82 to the position of Figure 2 wherein the notches 89, 89' fall in alignment with the side walls 90, 90' of the latching slide 100 and the side walls thus lock the bar in this position.

Movement of the bar 82 from the position of Figure 1 to the position of Figure 2 moves the shoulder 106 against the dogging element 56 and hence the extension 57 of the dogging element is moved into the dogging recess 58. When this condition prevails, the outside retractor spindle 40 cannot be rotated. It should also be noted that when the body 45 has been shifted from the position of Figure 1 to the position of Figure 2, it moves endwise against the cam member 51, depressing the spring 55 and also moves the cylinder tail piece a short distance toward the right sufficient to shift the plate 23 and hence the shaft 24 to an extended position as shown in Figure 2. This is a signal that the guest key cannot be used to open the door. Therefore, although the guest key 110 can be inserted into the key operated member, the key operated member cannot be rotated because the key is prevented by the plate 23 from entering fully into key operated member.

During this adjustment, however, the latch bolt can be retracted by rotation of the inside knob assembly 70 operating through the inside retractor spindle 64 to withdraw the retractor. When the inside knob assembly is thus rotated and the retractor withdrawn, the latching slide 100 is disengaged by movement of the retractor 60 and the bar 82 is returned to initial position by the agency of the spring 55. The button may also be returned in this fashion merely by depressing the latch bolt 15 either by hand or by the act of closing the door if the door should be in open position when the button 74 is depressed because the retractor 60 in this case pushes the latching slide 100 out of engagement with the bar 82.

It is possible, however, to bar the operation of the guest key even though the button 74 is extended in the position illustrated in Figure 3. This is accomplished by inserting a short key 111 into the key operated member 19. When this is done, the key is rotated in a counterclockwise direction. Rotation in this direction causes rotation of the cylinder tail piece 28 in the same direction, effecting rotation of the cam member 51 while the body 45 and the cam pin 50 remain non-rotatable by reason of retention of the extension 57 in the dogging recess 58. As the cam member is rotated, it moves the camways 54, 54' against the cam pin 50 thereby shifting the cam member 51 in a direction from left to right, as viewed in Figure 3. Movement of the cam member 51 to the new position shown in Figure 3 moves the cylinder tail piece 28 outwardly toward the outside knob assembly and against the plate 23, simultaneously shifting the shaft 24,

which is the indicator, outwardly to extended position, as shown in Figure 3. This then is a signal that the guest key cannot be used to open the door even though the button **74** may not have been manipulated from the inside.

The reason for this condition prevailing is that should the long key or guest key **110** now be inserted into the key operated member, it must press against the plate **23** inasmuch as the plate overlies the inside end of the key operated member. Since the key **110** is slightly too long, the extra length will prevent the key from registering properly to turn the lock. It will furthermore not be possible to force the long key against the cam member **51** sufficient to press it inwardly toward the left because even though it might be moved slightly by force, sufficient to initiate the possibility of rotation of the key in the key operated member as rotation proceeds, the cam pin and camways **54, 54'** immediately proceed to act in a fashion forcing the cam member **51** outwardly to a position throwing register of the long key out of adjustment with the key operated member.

The lock can, however, be manipulated during this adjustment by rotation of the inside knob assembly **70** which continues to be free to rotate so that the inside retractor spindle **64** can retract the latch bolt **15**. This operation, however, will not change the setting of the lock which bars use of the guest key **110** from opening the door from the outside. The only way to reset the lock to the position of Figure 1 is to again insert key **111**, which is the short key or special key, into the key operated member **19** and rotate it clockwise, thereby to rotate the outside retractor spindle **40** in a similar direction accompanied by rotation of the cam member **51** so that the cam pin **50** slides down the camways **54, 54'**, thereby causing the cam member **51** to shift toward the left as viewed in Figures 3 and 1. This change in position thereafter permits the long key or guest key **110** to be pushed far enough into the key operated member to register and permit it to operate.

It is, of course, not possible to use the long key to extend the plate **23** outwardly as shown in Figure 3 because if the long key is rotated in a counterclockwise direction, it will tend to rotate the cam member **51** in the same direction which will tend to move the plate **23** against the end of the long key, throwing it out of register. Hence the long key also cannot be rotated a distance far enough to move the plate **23** and shaft **24** outwardly as is the case when the short key is used.

From the foregoing description it will be apparent that the parts necessary to accomplish the singular result hereinabove described are relatively simple as readily appears in the drawings and particularly Figure 4.

While the invention has herein been shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the 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 the invention, what is claimed as new in support of Letters Patent is:

1. In a door lock a stationary portion comprising a housing, an outside knob assembly, an inside knob assembly, a reciprocating latch bolt, a retractor cooperable with said latch bolt and inside and outside retractor spindles operatively associated with the retractor, the combination of a key operated means in the outside knob including a key operated member having a keyway therein and having a long key and a short key therefor receivable in said keyway, said means including a cylinder tail piece in axially slidable engagement with said outside retractor spindle and movable to a first position near said keyway and a second position removed from said keyway, a cam means having an operative engagement with said cylinder tail piece and said cylinder tail piece having an operative engagement with said key operated member whereby said cam is rotated by rotation of said key operated means, said cylinder tail piece being subject to outward movement by said cam means upon rotation of said short key when in said key-way whereby to push said cylinder tail piece to said first position barring admission of said long key to operative position and clearing the end of the short key when located therein.

2. In a door lock a stationary portion comprising a housing, an outside knob, an inside knob, a reciprocating latch bolt, a retractor cooperable with said latch bolt and inside and outside retractor spindles operatively associated with the retractor, the combination of a key operated means in the outside knob including a key operated member having a keyway therein and having a long key and a short key therefor receivable in said keyway, said means including a cylinder tail piece in operative engagement with said key operated member, said tail piece being in axially slidable engagement with said outside retractor spindle and movable to a first position near said keyway and to a second position removed from said keyway, an axially movable plate in said key operated means in endwise engagement with said cylinder tail piece, a cam means within said outer retractor spindle having an operative engagement with said cylinder tail piece, said cylinder tail piece being movable outwardly by said cam means upon rotation of said cam means and said tail piece by said short key when said short key is in the keyway whereby said tail piece moves with the plate to said first position whereby said plate in said first position bars admission of said long key to operative position.

3. In a door lock a stationary portion comprising a housing, an outside knob assembly, an inside knob assembly, a reciprocating latch bolt, a retractor cooperable with said latch bolt and inside and outside retractor spindles operatively associated with the retractor, the combination of a key operated means in the outside knob including a key operated member having a keyway therein and having a long key and a short key therefor receivable in said keyway, said means including a cylinder tail piece in operative engagement with said key operated member, said cylinder tail piece being in axially slidable engagement with said outside retractor spindle and movable to a first position adjacent said keyway and to a second position removed from said keyway a distance sufficient to admit said long key therein, an axially movable plate including an axially slidable visual indicator in said outside knob assembly, said plate being in endwise engagement with said cylinder tail piece, a cam means in said outer retractor spindle having an operative engagement with said cylinder tail piece, said plate and the indicator being movable outwardly by said cam means upon rotation of said cam means by operation of said short key when in said keyway, said cam means during said outward movement being movable against the cylinder tail piece and plate until said plate reaches an extended position barring admission of said long key to operative position and said indicator moves to a corresponding position indicative of barring position of said plate.

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