Feb. 13, 1968 F. J. RUSSELL ETAL 3,368,375

REMOVABLE CORE WITH INDICATOR PIN

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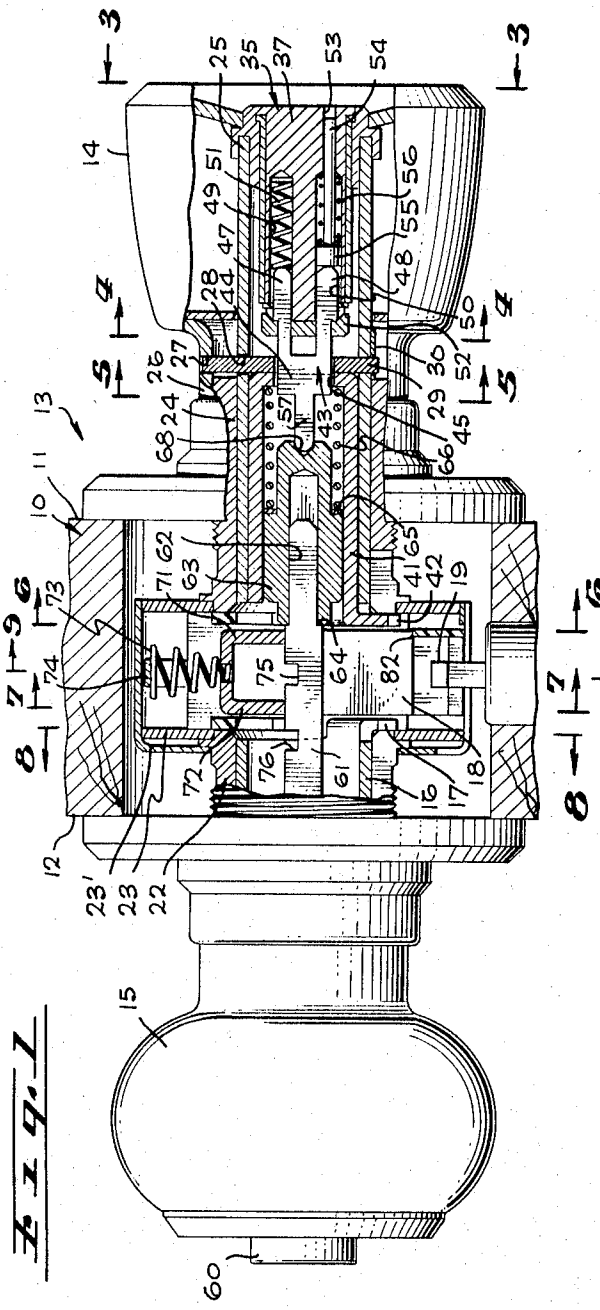


Fig. 1

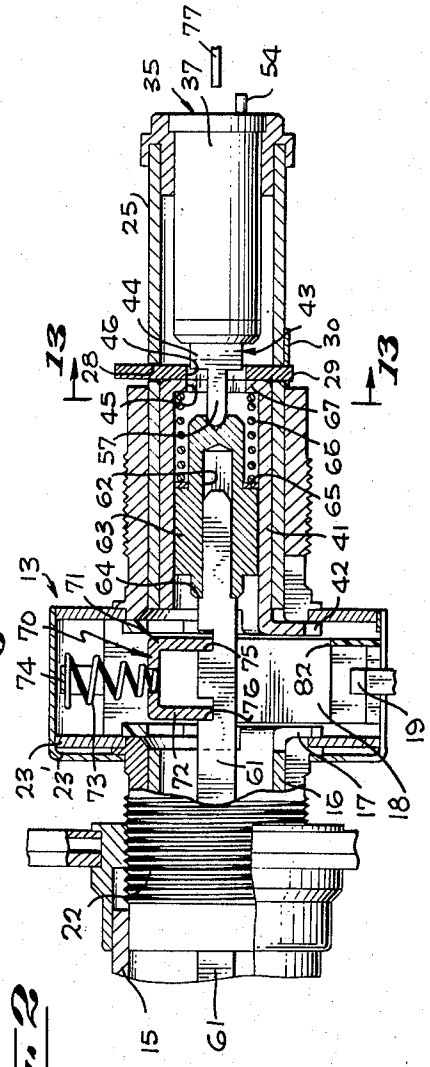


Fig. 2

INVENTORS
FRED J. RUSSELL
PAUL CIROCCO
BY
Beehler & Arant
ATTORNEYS

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Fig. 3

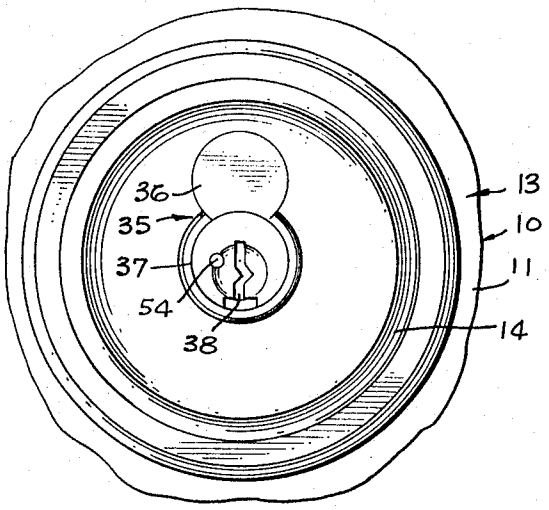


Fig. 4

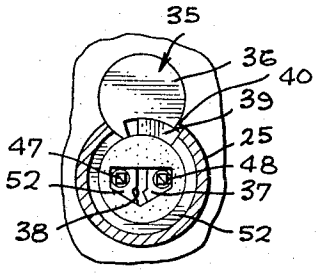


Fig. 5

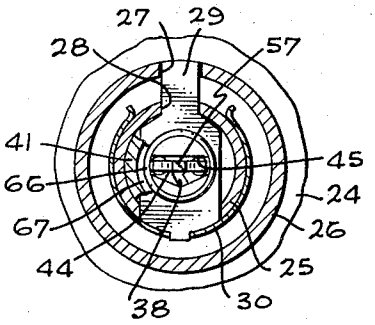


Fig. 6

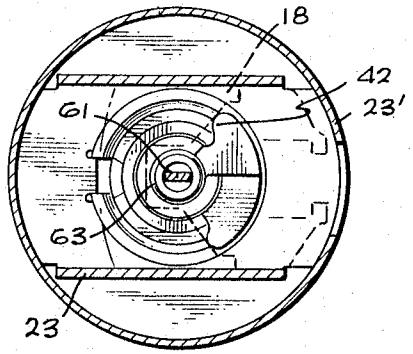
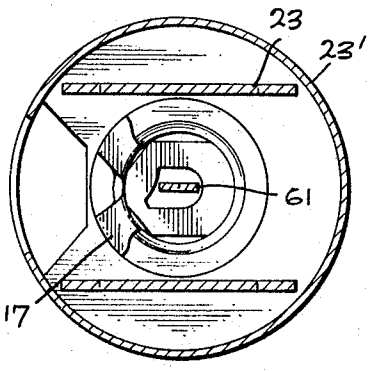


Fig. 8



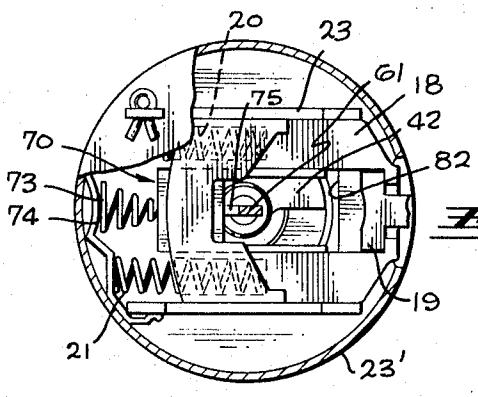


Fig. 7

INVENTORS
FRED J. RUSSELL
PAUL CIROCCO
BY
Beehler & Arant
ATTORNEYS

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Fig. 9

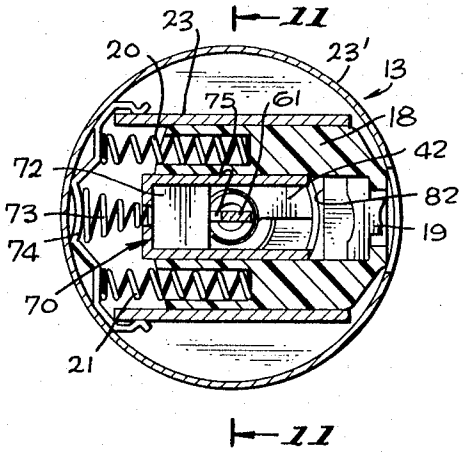


Fig. 10

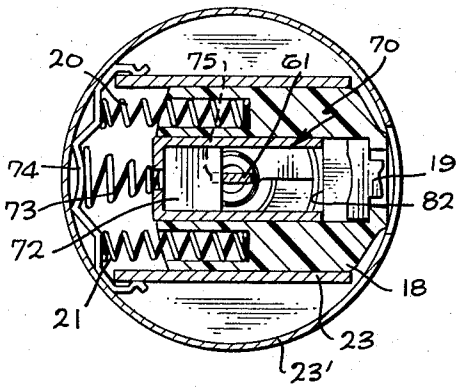


Fig. 11

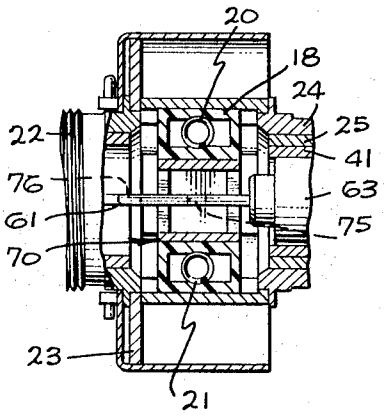


Fig. 12

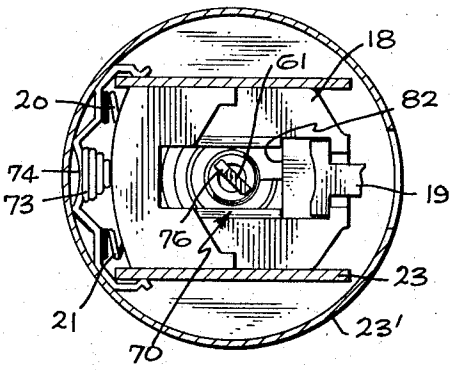


Fig. 13

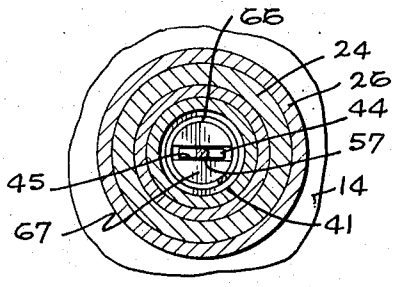
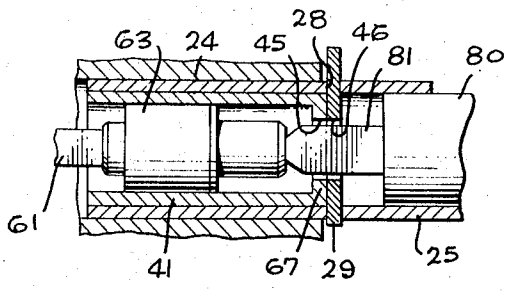


Fig. 14



INVENTORS
FRED J. RUSSELL
PAUL CIROCCO
BY
Beehler & Arant
ATTORNEYS

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REMOVABLE CORE WITH INDICATOR PIN

Fred J. Russell, 8635 Otis St., South Gate, Calif. 90280, and Paul Cirocco, Whittier, Calif., said Cirocco assignor to said Russell

Filed Oct. 21, 1966, Ser. No. 594,343
8 Claims. (Cl. 70—146)

The invention relates to door locks equipped on the outside with an indicator means to reveal to someone who might wish to open the door whether or not the lock has previously been locked on the inside and with a means to block the regular key from fully entering the keyway.

Locks of the type here under consideration are those often used in hotels or similar establishments where, when an occupant locks the door from the inside, there is some indicating means set in operation on the outside to signal some atendant, such as a maid, that the occupant is not to be disturbed, or, on the other hand, to indicate an unlocked position so that the room is free to be entered by the use of a regular key or pass key. Locks with such auxiliary means often are somewhat complicated and expensive.

It is therefore among the objects of the invention to provide a new and improved door lock equipped with an indicator means, manipulatable from the inside when the door is locked from the inside, which is physically incorporated into the outside locking mechanism.

Another object of the invention is to provide a new and improved indicator means for door locks which is located centrally with respect to the operating assembly, thereby making possible a snug, compact arrangement with attendant advantages.

Still another object of the invention is to provide a new and improved door lock capable of being locked and unlocked by a suitable push member on the inside, the lock being of such construction that, when locked from the inside, the lock is incapable of being unlocked by normal key operation from the outside.

Still another object of the invention is to provide a new and improved door lock equipped with an indicator pin which is concentrically located with respect to the remainder of the operating mechanism, the indicator pin being directly manipulated by the inside locking member which, at the same time, disengages the spindle from the key-actuated core on the outside when the lock is locked from the inside, thereby to render key actuation inoperable.

Still another object of the invention is to provide a new and improved door lock equipped with an indicator pin integrated with the locking mechanism and equipped in such fashion that, when locked from the inside, the door cannot be opened by normal key operation from the outside, but which can be manipulated by a special tool in order to gain access to the inside area under emergency circumstances.

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 assembled lock device mounted in a door.

FIGURE 2 is a longitudinal sectional view similar to FIGURE 1, but showing the mechanism in a different position of adjustment.

FIGURE 3 is a front elevational view on the line 3—3 of FIGURE 1.

FIGURE 4 is a cross-sectional view on the line 4—4 of FIGURE 1.

FIGURE 5 is a cross-sectional view on the line 5—5 of FIGURE 1.

FIGURE 6 is a cross-sectional view on the line 6—6 of FIGURE 1.

FIGURE 7 is a cross-sectional view on the line 7—7 of FIGURE 1.

FIGURE 8 is a cross-sectional view on the line 8—8 of FIGURE 1.

FIGURE 9 is a fragmentary cross-sectional view on the line 9—9 of FIGURE 1.

FIGURE 10 is a cross-sectional view similar to FIG-9, but showing the catch member in retaining position.

FIGURE 11 is a fragmentary cross-sectional view on the line 11—11 of FIGURE 9.

FIGURE 12 is a cross-sectional view substantially similar to FIGURES 9 and 10, but showing the position of parts with the spindle rotated as it would be in retracted position for an accompanying latch bolt.

FIGURE 13 is a cross-sectional view on the line 13—13 of FIGURE 2.

FIGURE 14 is a fragmentary longitudinal sectional view, showing an emergency tool in use for opening the door from the outside.

In an embodiment of the invention which has been chosen primarily by way of illustration, there is shown a fragment of door **10** having an outside face **11** and an inside face **12**, on which has been mounted a door lock in completely assembled condition indicated generally by the reference character **13**. The door lock **13** is provided with an outside knob or handhold **14** and an inside knob or handhold **15**. The inside knob **15** has a spindle **16** nonrotatably attached to it and provided with a rollback **17** for withdrawing a retractor **18**, whereby to withdraw a latch bolt device **19** (partially shown in FIGURE 2) in a substantially conventional manner. Return springs **20** and **21**, shown in FIGURES 7, 9, 10, and 11, although not shown in FIGURES 1 and 2, serve to return the retractor **18** when the inside knob **15** and rollback **17** are released. The spindle **16**, as shown clearly in FIGURES 1 and 2, is rotatably mounted within a stationary bearing **22**. The bearing **22** is shown supported in a frame **23**, of substantially conventional construction. The frame **23** also supports an outside stationary bearing **24**. A housing **23'** surrounds the frame **23**.

The outside knob **14** is of a somewhat more complex construction than the inside knob **15** and includes a tubular support **25**, which may be considered as a secondary spindle. Both the outside knob and the tubular support **25** are nonrotatable in relation to each other and are nonrotatable in relation to the door lock **13**.

For fastening the outside knob **14** nonrotatably upon the tubular support **25**, the outside knob **14** is provided with a shank **26** in which is an opening **27** in radial alignment with a similar opening **28** in the tubular support **25**. A knob detent **29** extending through the openings **27** and **28** is resiliently urged into extended position by a spring **30**.

In the outside knob **14** is a removable key-actuated core indicated generally by the reference character **35**. (Of course, the key-actuated core **35** could be located in a threaded cylinder body or other housing on the outside of the door, rather than in an outside handhold such as outside knob **14**.) The key-actuated core **35** is provided with a customary pin tumbler housing **36** on one side, as shown to good advantage in FIGURE 3, and a cylinder plug **37** is rotatably mounted therein, the cylinder plug **37** being provided with a conventional keyway **38**. A gate **39**, capable of being manipulated by a special key insertable into the keyway **38**, can be extended to engaged position, as shown in FIGURE 4, with an appropriate shoulder **40**, as shown in FIGURE 1,

whereby to hold the key-actuated core 35 in operative position in the outside knob 14.

A latch bolt operating outside spindle 41, shown in FIGURES 1 and 2, is provided with a rollback 42, likewise adapted to withdraw the retractor 18 when the lock is in unlocked condition. The outside spindle 41 is rotatably mounted within the tubular support 25. A tailpiece, indicated generally by the reference character 43, has an intermediate portion 44 of rectangular cross section adapted to fit in a rectangular opening 45 in the outside end of the outside spindle 41. This rectangular relationship is shown in FIGURES 1 and 5. Incidentally, the knob detent 29 is provided with a passage 46, as shown in FIGURES 1, 2, and 5, walls of which form an obstruction which prevents manipulation of the knob detent 29 and removal of the outside knob 14 so long as the key-actuated core 35 remains in position in said outside knob 14.

The tailpiece 43 has two legs 47 and 48 which are slidably received in respective pockets 49 and 50 in the cylinder plug 37. A return spring 51 in the pocket 49 acts normally to push the tailpiece 43 inwardly in a direction from right to left, as viewed in FIGURE 1, until the leg 47 engages against a cap 52 of the key-actuated core 35.

A passageway 53 through the cylinder plug 37 communicates between the pocket 50 and the exterior. In the passageway 53 is located an indicator pin 54. A head 55 on the indicator pin 54 within the pocket 50 is pressed endwise against the leg 48 of the tailpiece 43 by a spring 56. In the chosen embodiment of the invention, the indicator pin 54 is withdrawn when the mechanism (later described) in the inside knob 15 is in unlocked position.

When the indicator pin 54 is set in an extended position, as shown in FIGURE 2, the tailpiece 43 is disengaged from the outside spindle 41, as shown in FIGURES 2 and 13. This is made possible by providing the tailpiece 43 with an inside end portion 57 which is smaller in cross section than the breadth of the rectangular opening 45.

To move the parts so that the inside end portion 57 is positioned within the rectangular opening 45, there is employed a push button member which is made up essentially of a push button 60 protruding from the interior of the inside knob 15 and a lever 61 attached thereto which projects centrally through the inside knob 15. (Of course, the push button 60 alternately could be a push-turn button or could be a turn button.) The lever 61 extends slidably into an elongated recess 62 in a positioner plug 63 which itself is slidably mounted within the interior of the outside spindle 41. A shoulder 64 on the lever 61 engages the outside end of the positioner plug 63. An oppositely facing shoulder 65 on the positioner plug 63 forms a keeper for a return spring 66, the other end of which is retained by an outside end 67 of the outside spindle 41, in which the rectangular opening 45 is located. For effectively guiding and centrally locating the tailpiece 43, the positioner plug 63 is provided with a depression 68 in its outside end large enough to receive the adjacent end of the inside end portion 57.

To hold the parts in locked position, there is provided a catch member 70 having arms 71 and 72, the catch member 70 being spring-urged by means of a spring 73 backed against a spring keeper 74. Notches 75 and 76 in the lever 61 are adapted to receive respectively the arms 71 and 72 when the lever 61 has been depressed and shifted in a direction from left to right, as viewed in FIGURE 2. This is the position assumed by the lever 61 when the push button 60 is depressed. In this position, the positioner plug 63 also is shifted from left to right, as viewed in FIGURE 2, which moves it against the tailpiece 43, thus moving the intermediate rectangular portion 44 out of engagement with the rectangular opening 45 and thus moving the inside end portion 57 into the rectangular opening 45. When this happens, the leg 48 of the tailpiece 43 is moved against the head 55 of the indicator pin 54, extending the indicator pin 54 outwardly beyond the end face of the cylinder plug 37, as shown in FIGURE 2. Moreover, when this is the relationship of the parts, a conventional key 77, when inserted into the keyway 38, is capable of being received to its full length in the keyway 38, but when it rotates the cylinder plug 37, which in turn rotates the tailpiece 43, rotation will not cause comparable rotation of the outside spindle 41, and therefore, the latch bolt device 19 cannot be withdrawn by manipulation of the key 77. The lock 13 is thereby effectively locked from the inside by manipulation of the push button 60.

Under emergency conditions, it is possible by employment of a special pass key, not shown, to manipulate the gate 39, rotating it counterclockwise as viewed in FIGURE 4, thereby to withdraw it from position behind the shoulder 40. When this is done, the entire key-actuated core 35, together with the attached tailpiece 43, can be withdrawn from the outside knob 14, leaving the central portion open. It is then possible to insert a special tool 80 (see FIGURE 14), having an inside rectangular projection 81, through the open mid-portion of the tubular support 25 and into the rectangular opening 45 of the outside spindle 41 and, in this way, rotate the outside spindle 41 and its rollback 42, thereby to withdraw the retractor 18 and, in turn, to withdraw the latch bolt device 19. When the retractor 18 is withdrawn, a shoulder 82 on the retractor 18 is moved against the latch bolt device 19 which, in turn, moves against the catch member 70 (see FIGURE 10), shifting it inwardly and, at the same time, lifting the arms 71 and 72 from the respective notches 75 and 76. When this occurs, the return spring 66 acts to shift the lever 61 endwise in a direction from right to left, as viewed in FIGURES 1 and 2. The same operation occurs any time the latch bolt device 19 is withdrawn either by manipulation of the inside knob 15, manipulation of the cylinder plug 37 by normal key operation, or depression of the latch bolt device 19 when the door 10 is swung from open to closed position. When the latch bolt device 19 is released after the lever 61 resumes the position shown in FIGURE 1, action of the spring 73 against the catch member 70 merely pushes the ends of the arms 71 and 72 against the adjacent edge of the lever 61, in readiness for engagement again with notches 76 and 75 whenever the push button 60 is depressed.

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 having a tubular latch bolt operating spindle rotatably mounted therein and a key-actuated core having a cylinder plug rotatably mounted in said core, the combination of a tailpiece having an axially slidable mounting in said core and movable between a retracted position and an extended position, said tailpiece having one portion rotatable relative to said spindle and another portion engageable with said spindle, said tailpiece being movable axially between one position wherein said one portion is in position rotatable relative to said spindle and another position wherein said other portion is in a position of nonrotatable engagement with said spindle, an indicator pin having an axially slidable mounting in said core and in engagement with said tailpiece, said pin being movable between extended and retracted locations, one of said locations being indicative of rotatable disengagement of said one portion with said core and the other of said locations being indicative of nonrotatable engagement of said other portion with said core, and means engageable with said tailpiece, for moving said tailpiece and said pin between a locking position and an unlocked position relative to said spindle.

2. A door lock according to claim 1, wherein yieldable means in said core acts between said tailpiece and said core to normally move said tailpiece to one of its positions.

3. A door lock according to claim 1, wherein yieldable means in said core acts between said pin and said core to normally move said pin to one of said locations.

4. A door lock according to claim 1, wherein said lock has an inside handhold in which said means is located and an outside handhold in which said core is located.

5. A door lock according to claim 1, wherein said core is releasable by operation of a special key and removable from the lock through the face of an outside housing.

6. A door lock according to claim 1, wherein there is a reciprocatably mounted latch bolt actuating mechanism and a temporary reciprocatably mounted detent engageable with said latch bolt actuating mechanism and said means, whereby to releasably hold said means in locking position.

7. A door lock according to claim 1, wherein there is a positioner having a yieldably slidable mounting in said spindle between said means and said tailpiece, said means having an axially limited sliding engagement with said positioner, and centering means holding said tailpiece in a centered location on said positioner.

8. A door lock comprising a frame assembly, a lock operating spindle rotatably mounted in the frame assembly, an outside housing mounted in the frame assembly, and a removably key-actuated core in said outside housing, said core having a cylinder plug rotatably mounted therein, a tailpiece having an axially slidable mounting in said core and movable between a retracted position and an extended position, said tailpiece having an inner

end rotatable relative to said spindle and an intermediate portion of noncircular cross-sectional shape adapted to be moved axially between a released position relative to said spindle and a nonrotatably engaged position relative to said spindle, an indicator pin having an axially slidable mounting in said core and movable between an extended and a retracted position, one of said positions being indicative that the lock has been locked from the inside of said door and the other of said positions being indicative that the lock has been unlocked from the inside of said door, said tailpiece having an outer end in endwise engagement with said pin, return spring means between said core and said tailpiece adapted to return said tailpiece and said pin to withdrawn position, an inside push member having an axially slidable mounting on said frame assembly and movable between locked and unlocked positions, an outer end of said push member being in endwise engagement with said tailpiece, said push member being movable into locking position relative to said tailpiece, whereby to move said tailpiece out of nonrotatable engagement with said spindle and to effect movement of said pin simultaneously to one of said pin positions, and releasable means for holding said push member in said one position.

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MARVIN A. CHAMPION, *Primary Examiner.*

ROBERT L. WOLFE, *Examiner.*