Nov. 25, 1952 R. C. CERF, JR 2,618,955

DOORKNOB LOCK AND LATCH SET OF THE TURN-BUTTON SPINDLE LOCKING TYPE

Filed May 1, 1950 2 SHEETS--SHEET 1

FIG. 1.

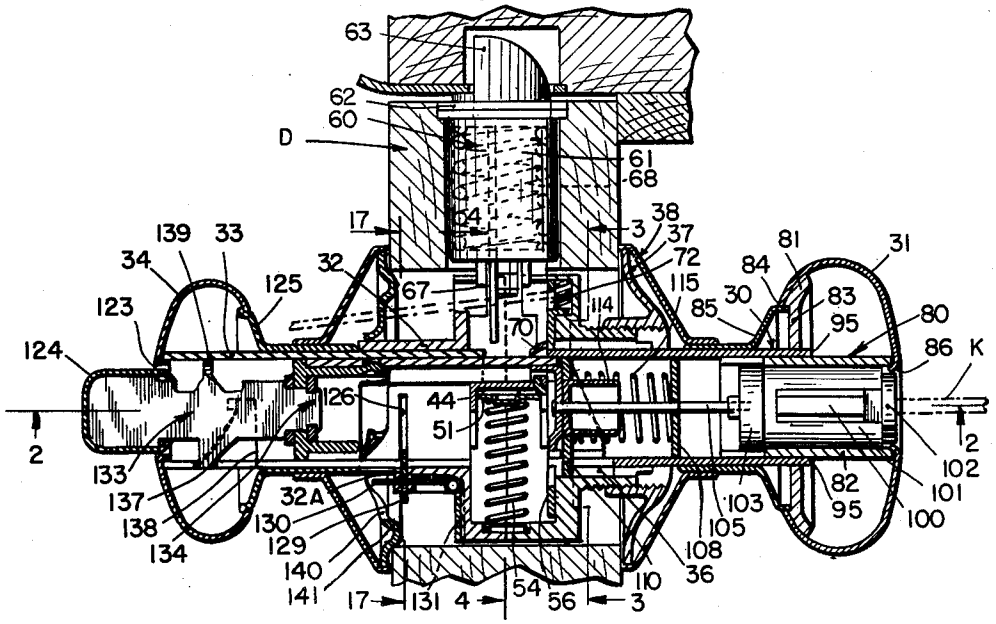


FIG. 2.

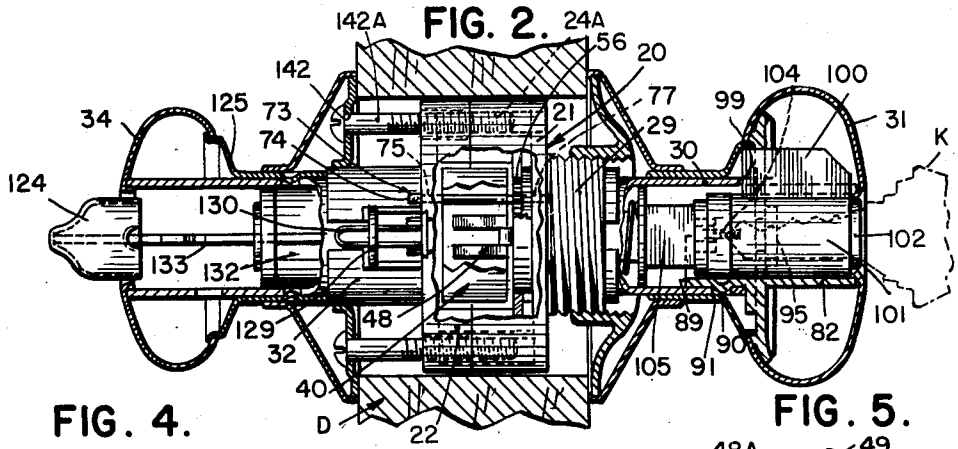


FIG. 4.

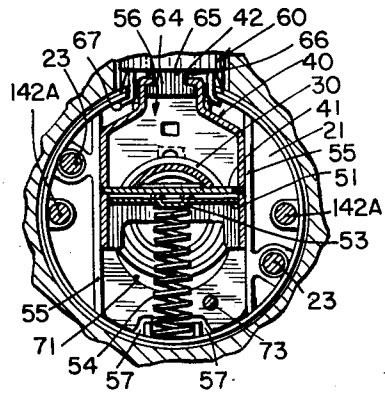


FIG. 3.

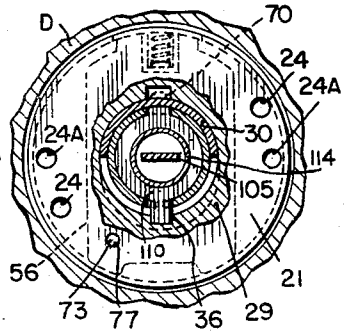
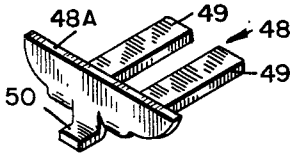


FIG. 5.



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FIG. 6.

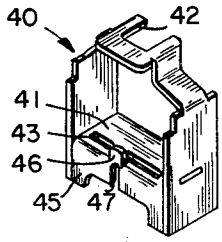


FIG. 7.



FIG. 8.

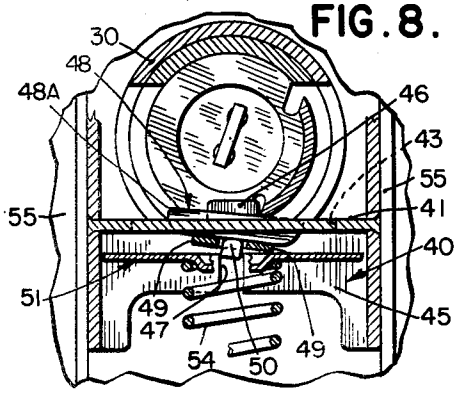


FIG. 9.

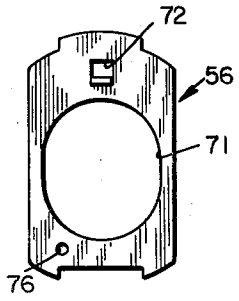


FIG. 10.

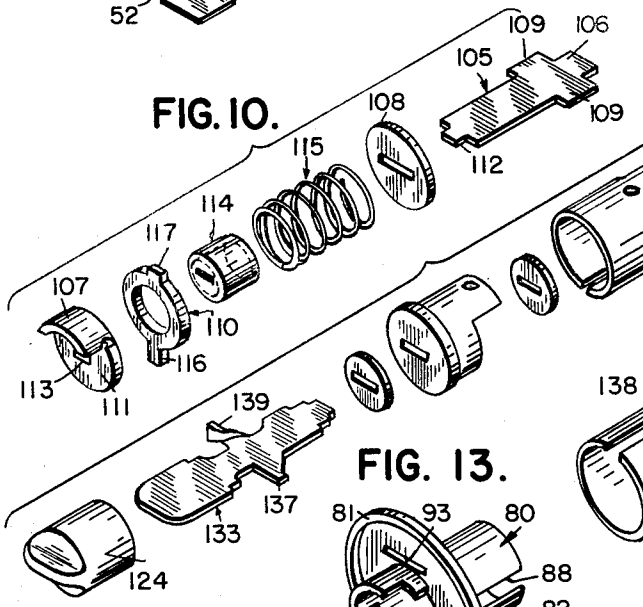


FIG. 11.

FIG. 15.



FIG. 12.

FIG. 13.

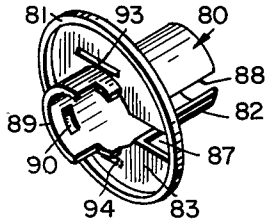


FIG. 14.

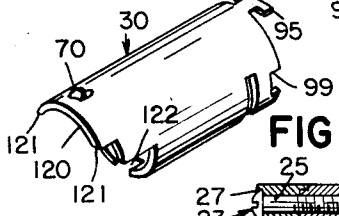


FIG. 16.

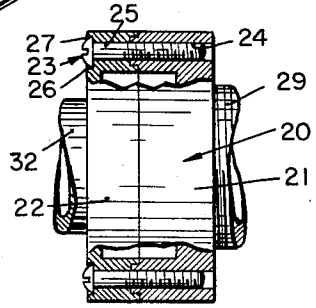
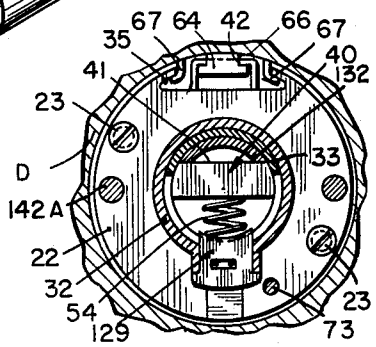


FIG. 17.



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2,618,955

DOORKNOB LOCK AND LATCH SET OF THE TURN-BUTTON SPINDLE LOCKING TYPE

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Application May 1, 1950, Serial No. 159,339

2 Claims. (Cl. 70—146)

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This invention relates to a door knob lock and latch set with inside turn-button spindle-locking means for the outside knob and including key operable latch retraction means.

The general object of the invention is to provide an improved door knob lock and latch set particularly adapted for outside doors in which the outside knob may be locked against turning by a turn button located in the inside knob which locking remains effective after subsequent turnings of the inside knob for retracting the latch and after retraction of the latch by means of a key-operating in a cylinder lock in the outside knob. Another object is to provide in a door knob and lock set of the kind described, means for restoring the key to its initial position after using it to unlatch the latch bolt.

These and other objects are attained by my invention which will be understood from the following description, reference being made to the accompanying drawings which form a part hereof, in which:

Figure 1 is a plan view partly in section of a preferred form of my lock and latch set as mounted on a door, with portions broken away to better show the structure;

Figure 2 is a cross-sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 1;

Figure 4 is a cross-sectional view taken on the line 4—4 of Figure 1;

Figure 5 is a perspective view of the rocker for the key actuated rollback;

Figure 6 is a perspective view of the retractor;

Figure 7 is a perspective view of the spring abutment plate for the retractor;

Figure 8 is an enlarged fragmentary view similar to Figure 4 but with the key rollback turned to its maximum (about 110°) from neutral position;

Figure 9 is a plan view of the retainer key plate used to rotatably hold the outside spindle in the body;

Figure 10 is a disassembly view of the key-actuated shaft and rollback together with the outside spindle locking means, the parts being shown in perspective;

Figure 11 is a disassembly view of the turn button, the locking sleeve, and the connecting parts, shown in perspective;

Figure 12 is a perspective view of the inner knob sleeve and rollback;

Figure 13 is a perspective view of the cylinder lock housing in the outer knob;

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Figure 14 is a perspective view of the outside knob spindle;

Figure 15 is a side elevational view of the retaining key for the inside spindle;

Figure 16 is a fragmentary elevational view of the retractor housing, with parts broken away and shown in section;

Figure 17 is a cross-sectional view taken on the line 17—17 of Figure 1.

In the preferred form of my invention shown in the drawings, the lock and latch set consists of a body 20 which is generally cylindrical in shape and is assembled from die-cast metal half portions designated 21 for the outside half portion and 22 for the inside half portion, these half portions being assembled as a hollow unitary body 20 by means of the assembly screws 23 whose threaded ends engage threaded holes 24 in the outside half portion 21, the corresponding unthreaded holes 25 in the inside half portion 22 being countersunk at 26 to receive the heads 27 of the assembly screws 23. In the drawings, the right hand knob containing the key-actuated cylinder lock and the appurtenances thereto are referred to as "outside" and the left hand knob containing the turn button and the appurtenances thereto are referred to as "inside," this referring to the door mounting, for example, such as a house entrance door. The outside half portion 21 is provided with an outside threaded outwardly extending axial bearing sleeve 29 adapted for the rotatable mounting therein of the outside tubular spindle 30 upon the end of which the outside knob 31 is fastened. The inside half portion 22 is also provided with an elongated axial bearing sleeve 32 extending from the body 22, in which is mounted for rotation the inside tubular spindle 33 on the end of which is mounted the inside knob 34. A peripheral window 35 is provided to give access to the interior of the housing 20 for purposes to be explained below.

The latch bolt retractor 40 consists of a generally rectangular frame having a thrust partition wall 41, and having the opposed sides taper to an end slot 42 at the end of the frame opposite said partition wall 41, said notch being adapted to engage the latch bar by means of the end lugs on the end thereof. The thrust partition wall 41 of the retractor 40 is provided with a cross slot 43 at the inside edge, the thrust wall 41 being strengthened by a front wall 44 and a back wall 45 on the retractor, the front wall 44 facing toward the inside knob 34 and the back wall 45 facing toward the outside knob 31. The back wall 45 is provided with a stop lug

46 extending above the thrust wall 41, and a pivot slot 47 adapted to pivot the rocker 48. The rocker 48 (see Figure 5) consists of a pressure plate 48A adapted to extend upwardly through the cross slot 43, and rocker feet 49 arranged to rest against the underside of the thrust wall 41. The pivot boss 50 extends in the opposite direction from said rocker feet 49 relative to said rocker plate 48 and at right angles thereto, being adapted to fit in the pivot slot 47 of the back wall 45 of the retractor. The spring abutment plate 51 (see Figure 7) is rectangular and adapted to slide between the front wall 44 and back wall 45 beneath the thrust wall 41, and is provided with a notch 52 to avoid interference with the rocker pivot boss 50. The spring plate 51 is also conveniently provided with a centering boss 53 adapted to position the end of the retractor coil spring 54. The retractor 40 is adapted to reciprocate within the hollow body 20, being provided with guide members 55 formed in the interior of the outside half portion 21. The retractor 40 is arranged to slide on the retainer key plate 56 which is disposed between the guide members 55, the further structure and function of which will be described below. The coil compression spring 54 is interposed between the bottom of the hole formed between the half bodies 21 and 22 in the bosses 57, and the underside of the spring abutment plate 51 below the retractor thrust wall 41, thus normally forcing the portion of the retractor having the end slot 42 toward the window 35 in the body 20 at which position the latch bar unit 60 is attached, as will be described.

The spring latch unit 60 consists generally of a cylindrical housing 61 which is adapted to fit in a hole drilled from the edge of the door at right angles to the main body mounting hole in the door, the unit being held by the flush plate 62 which is countersunk and attached to the edge of the door by screws (not shown). The latch bolt 63 normally protrudes through an opening in the flush plate, the latch bolt being connected to the latch bar 64 which extends through the other or rear end closure 65. The latch bar 64 is provided with end slot 66 which, as described above, are engaged by the slot 42 of the retractor. The attaching tabs 67 extending from the end closure 65 are formed to slide under the margins of the peripheral window 35 in the body 20, the edge of the cylindrical housing 61 of the latch unit being arranged to press on the opposite or outside surface of the margins of the window 35. The latch unit 60 is thus slidingly attached to the body 20 at the window so that its longitudinal position relative to the cylindrical main body may be adjusted by sliding it along the marginal edge of the window. The coil spring 68 is provided within the cylindrical housing 61 abutting the end closure 65 and the inside end of the latch bolt 63, thus normally tending to push the latch bolt outwardly.

The outside tubular spindle 30 is provided with an outwardly extending detent button 70 which is adapted to be engaged by the retainer key plate 56 which as previously stated is adapted to slide between the guide members 55. The plate 56 is provided with an elongated central opening 71 for the spindle 30 which permits the plate to be shifted endwise. The plate 56 is provided with a hole 72 by which the plate may be shifted by means of a tool entering through the window 35, to release the button 70, and thereby allow the outside spindle 30 to be removed without

opening the housing 20. A keying pin 73 is provided to prevent the plate 56 from shifting, this pin being provided with a head 74 positioned adjacent the outer wall of the inside half housing 22, and being inserted in coinciding holes 75, 76, and 77 respectively in the half housing 22, the retainer plate 56 and the half housing 21. When it is desired to release the outside spindle after the set is installed in the door, it may be accomplished by removing the inside rosette from the clamping plate, sliding it toward the inside knob, and releasing the inside knob by raising the inside spindle key. The keying pin is then pulled by its head to release the retainer key plate, and by means of a sharp tool inserted through the window 35, the retainer key plate is shifted to release the detent button on the outside spindle.

The outside knob 31 consists of a knob body 80 having a rim portion 81 and a coaxial hub 82 which is connected to the rim portion by the disk 83 disposed inwardly from the rear face of the knob, and is provided on its rear side with a rim 84 defining the large opening on the rear face of the knob which is closed by the closure shell member 85. The main portion of the knob body is covered by a shell spun or otherwise formed over the knob body to form the usual ellipsoidal door knob whose front face is provided with an opening 86 coinciding with the opening of the hub 82 where its abuts the front inside face of the knob shell, the margin of the shell around the hole being turned in against the inside wall of said hub. A rectangular opening 87 extending from the hub toward the periphery is provided in the disk 83, this opening continuing into the hub 82 and forming the hub slot 88, this opening and slot being arranged to admit and position the pin tumbler chamber of the key-actuated lock mechanism. The hub 82 is provided with a hub extension 89 on the rearward end thereof, said extension being only half cylindrical and being disposed diametrically opposite the rectangular opening 87. A detent boss 90 is provided on the outer surface of the hub extension 89, being adapted to engage one or the other corresponding diametrical oppositely disposed slots 91 provided in the outside knob spindle 30. Two parallel slots 93 and 94 disposed at opposite sides of the hub extension 89 are provided in the disk 83, these being arranged to engage diametrical oppositely disposed fastening tabs 95 on the spindle 30.

The tubular spindle 30 consists of a metal tube large enough to fit over the hub extension 89, provided at its end with diametrically opposite fastening tabs 95 by which the spindle is rigidly, but removably, fastened to the face of the disk member 83 around said half cylindrical hub extension, as described in greater detail in my copending application Serial No. 76,314 filed February 14, 1949, now Patent No. 2,542,117. The knob attachment end of the spindle 30 is further provided with diametrically opposite notches 99 disposed intermediate the tabs 95, one or the other of which notches engages the pin tumbler extension 100 of the cylindrical casing 101, enclosing the key plug 102. The key plug 102 which is adapted to be turned by the key K is retained in the cylindrical casing 101 by the turning bar connection 103 held to the plug 102 by screws 104.

The turning bar 105 makes operative connection to the key plug 102 through the tongue 106, the said bar being centered axially within the

outside tubular spindle 30 by the washer 108, stop arms 109 adjacent the tongue 106, and by the locking tab disk 110 rotatably mounted upon the bar 105 adjacent the rollback 107, said rollback extending from the rollback disk 111 which is non-rotatably attached to the end of the bar 105, for example, by a tongue 112, which is held rigidly in the corresponding hole 113 in the rollback disk 111. A spacer member 114 is non-rotatably mounted on the bar 105 between the disk 110 and the washer 108, and a compression coil spring 115 is disposed around the bar between said washer 108 and disk 110. The locking tab disk 110 is provided with a peripherally extending locking tab 116, and is conveniently provided with an aligning tab 117 for the purposes described below.

The outside spindle 30 is provided at its unattached end with a rollback 120 which is a segmental end of the tubular spindle, the longitudinal edges 121 being adapted to press alternatively when the outside knob is turned, upon the thrust partition wall 41 of the retractor 40 to thereby move the retractor and the latch bolt which is operatively attached thereto. In order to permit the necessary rotation of the outside knob 31, a portion of the spindle 30 between the rollback 120 and the locking notch 122, approximately one-half the circumference, is cut away to avoid interference with the locking tab 116 when this tab is not being depressed by the turn button and its associated parts, that is, when the outside knob 31 is free to be turned to operate the latch.

The inside knob 34 is attached to the inside tubular spindle 33, the spindle extending through the knob to the front face thereof to define an opening 123 in which the turn button 124 is mounted. The knob 34 is provided with a finish hub 125 extending toward the body 20 and telescoping over a portion of the spindle 33, the end abutting the end of the inside bearing sleeve 32. The spindle 33 is provided with a circumferential retainer key slot 126 which extends approximately one-half the circumference of the spindle to permit the turning of the spindle for a sufficient amount to fully move the retractor 40 by means of the rollback 127 at the end of the spindle 33. This rollback 127 at the end of the spindle 33 consists of a short segment of the tubular spindle with longitudinal edges 128 arranged to alternatively press upon the thrust partition wall 41 of the retractor 40, one edge being effective when the knob 34 is turned in one direction and the other edge when the knob is turned in the opposite direction, in either case to move the retractor and withdraw the latch bolt 63. The retainer key 129 fits in the retainer key slot 126 of the spindle 33 and in the retainer key slot 32A in the sleeve 32. The retainer key 129 is normally held down in place by a hairpin spring 130 which is attached at one end to the end of the cylindrical body 20 in the groove 131.

The turn button 124 is connected to the spindle locking sleeve 132 by the bayonet bar 133 whose other end is swivel connected at 134 to the spindle locking sleeve 132. The spindle locking sleeve 132, in its mid-portion, is cut away leaving a segment 135 of about one-third of the cylinder to avoid interference with the reciprocatory movement of the retractor 40. The other end of the locking sleeve 132 is provided with a circumferential opening 136 on one side for the locking tab 116, being cut away on the opposite side for the aligning tab 117.

The bayonet bar 133 connecting the turn button 124 and the locking sleeve is provided with a bayonet pin 137 extending outwardly from the bar and adapted to follow the bayonet groove 138, which is provided in the end of the inside tubular spindle 33 adjacent the turn button 124. An aligning tab 139 is provided opposite the bayonet pin tab 137 in order to hold the latter in the bayonet groove 138 when the turn button is pressed inwardly and turned to lock the button in its inward position. The longitudinal or inward movement of the button 124 moves the locking sleeve 132 so that the end of the opening 136 presses the locking tab 116 into the locking notch 122 in the outside spindle 30, this locking notch being on the side of the cylinder opposite the rollback 120. The locking tab 116 also engages the groove 36 in the outside bearing sleeve 29, thus preventing rotation of the spindle 30 relative to the bearing sleeve 29. The turn button 124 is thus pressed inwardly and rotated in order to engage the bayonet pin tab 137 in the bayonet groove 138 and thereby hold the locking sleeve 132 against the locking tab 116, locking the outside knob against rotation. The inside knob, because of the swivel connection at 134, may be rotated without releasing the turn button 124, thus the retractor and the latch bolt may be operated from the inside knob without effecting the locked condition of the outside knob.

The latch may also be retracted by the use of the removable pocket key K which operates the plug 102, which in turn is operatively connected through the turning bar 105 to the rollback 107. This rollback 107 actuates the retractor 40 independently of the rollbacks 120 and 127 on the outside spindle 30 and the inside spindle 33 respectively, and irrespective of the position of the turn button 124, thus permitting the retraction of the latch bolt at any time by means of the key K.

The body 20 is arranged to be positioned centrally in the mounting hole in the door D by means of the threaded clamping disk 37, which is permanently attached to the outside rosette 38, and the removable clamping disk 140 disposed respectively on the outside and inside of the door. Screw holes 142 for screws 142A are provided in the disk 140 which engage the threaded holes 24A in the body 20 to clamp the body to the door. A window 141 is provided in the clamping disk 140 for the inside bearing sleeve 32 to give better access to the hairpin spring 130 holding the retainer key 129. After removal of the inside knob and spindle, and clamping plate, the keying pin 73 may be pulled out to release the retainer key plate 56, which when shifted laterally by the use of a long sharp tool, releases the outside knob 31 and its spindle 30, following which the cylinder lock may be changed or rotated through 180° if desired.

The advantages of my invention will be apparent. The rigid die-cast body and the integral elongated bearing sleeves for the knob spindles provide a durable lock set in which the knobs and spindles do not become loose and wobbly after long use. The set is adapted to be used upon doors of slightly varying thicknesses, with the protrusion of the knobs being equalized on the two sides of the door. The latch bolt is independently retracted through a common retractor by the turning of either knob in either direction and also by means of a removable key turned in either direction. The outside knob may be fixed against rotation through the inside turn button

so that entry may not be effected without the use of a proper key. This outside knob locking is unaffected by the subsequent use of the inside knob for retracting the bolt, and is also unaffected by the use of the removable key, the outside knob continuing to be locked against rotation after the key is removed. The outside knob is not released by pushing in the latch bolt, as in closing the door. The key slot for the removable key is easily reversible in position so that the lock may be properly positioned on either right or left hand doors and under the same circumstances the latch bolt unit may be reversed in position through its tongue and groove connection with the retractor. The outside knob and its attached spindle may be easily disconnected and removed for changing the key combination or for reversing the position of the key slot, by shifting the retainer key plate by access with a pointed rod or tool through the provided window in the body after pulling out the keying pin **73**. The labor required for installation adjustment and resetting of my lock and latch set is reduced to a minimum by the provision of the described cylindrical body mounted in a bored hole through the door, with the latch bolt unit being mounted in another hole drilled from the edge of the door at right angles to the main mounting hole. Because of the provision of the spring pressed rocker plate in the retractor, the key-actuated rollback cannot jam, and the key is spring-actuated to return to its original position before turning to unlatch the door.

I claim:

1. In a door knob lock and latch set of the kind described, a retractor adapted to be reciprocated, a roll-back for actuating said retractor, said rollback being operatively connected to a key operable lock cylinder, a thrust plate on said retractor having a slot adapted to receive a contact edge piece, a rockably mounted contact edge piece mounted in said slot for making operative contact with said rollback, said contact edge piece being spring pressured so that upon the release of applied pressure through said rollback, said contact edge initiates the return of said rollback to its neutral position.

2. In a door knob lock and latch set of the kind described having a spring pressed retractor adapted to be reciprocated, a rollback for actuating said retractor, said rollback being operatively connected to a key operable lock cylinder, a thrust plate on said retractor having operatively associated therewith a rockably mounted contact edge piece for making operative contact with said rollback, an abutment plate disposed below said thrust plate and pressed against said contact edge piece by the spring for said retractor, so that upon the release of applied pressure through said rollback, said contact edge initiates the return of said rollback to its neutral position.

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