Dec. 23, 1952 R. C. CERF, JR 2,622,431

DOORKNOB AND LOCK SET WITH INACCESSIBLE FASTENINGS

Filed Nov. 30, 1948 2 SHEETS—SHEET 1

FIG. 1.

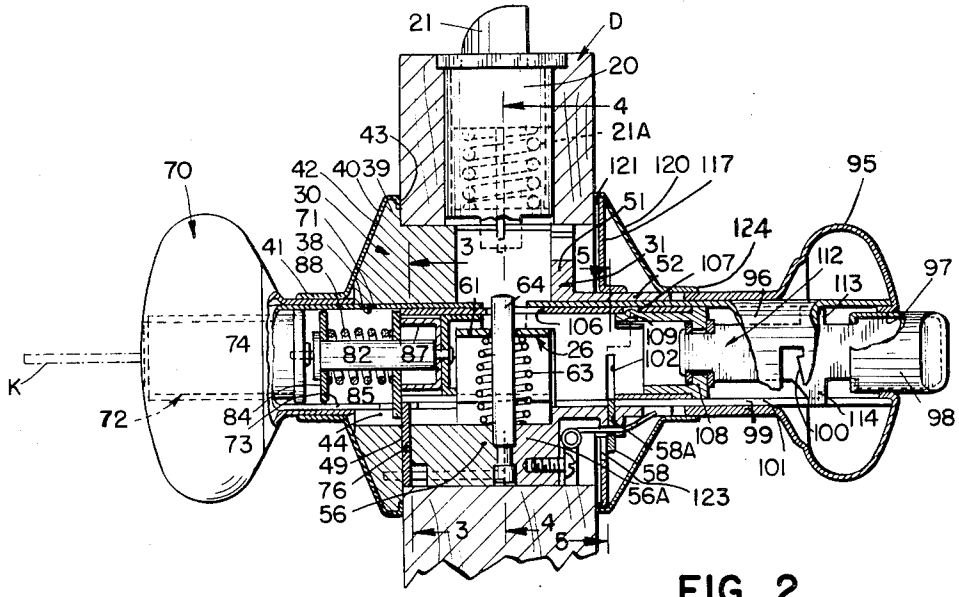


FIG. 2.

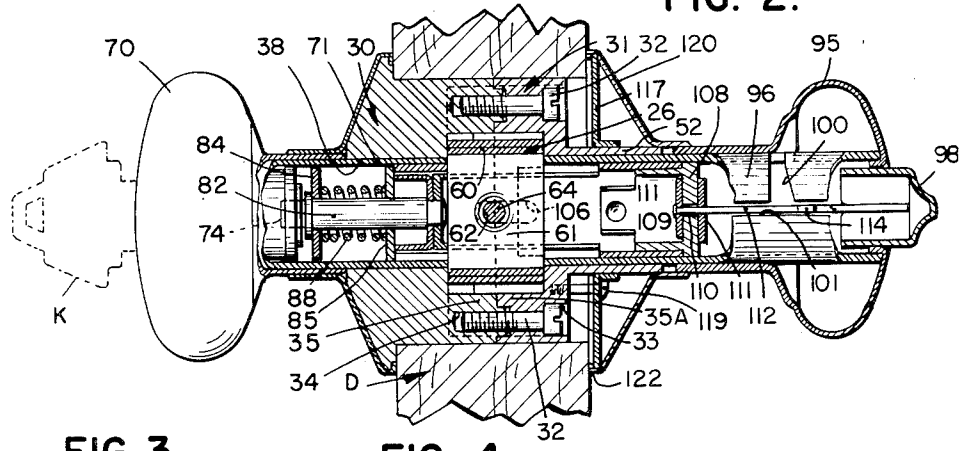


FIG. 3.

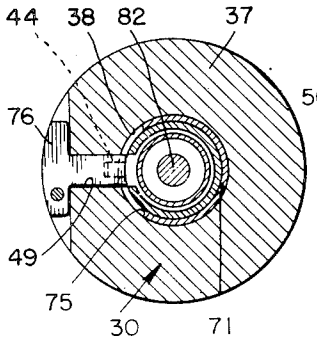
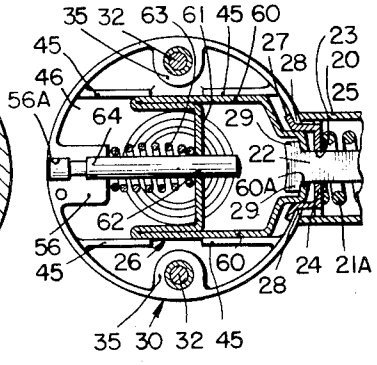


FIG. 4.



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FIG. 5.

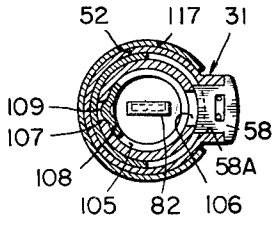


FIG. 6.

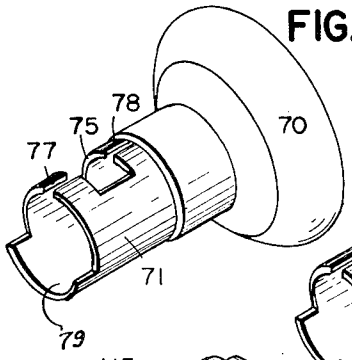


FIG. 7.

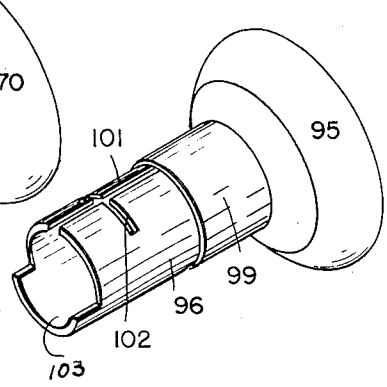


FIG. 8.

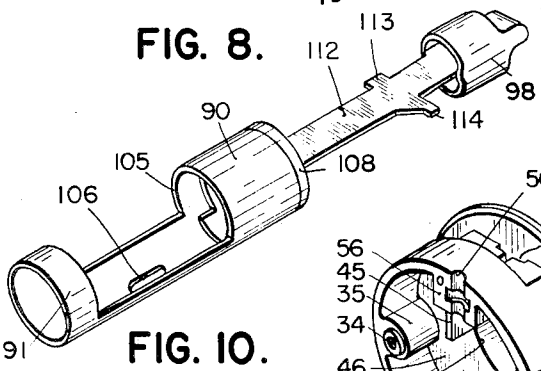


FIG. 9.

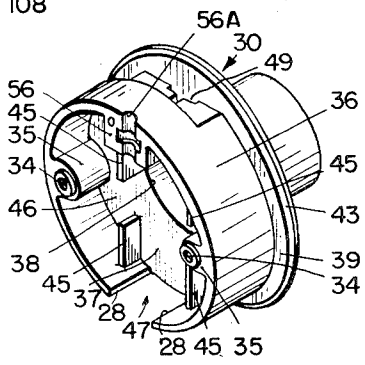


FIG. 10.

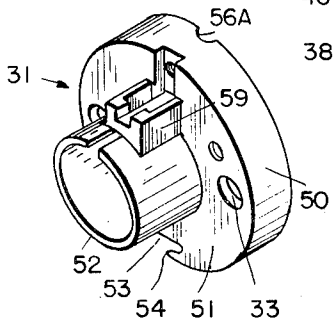
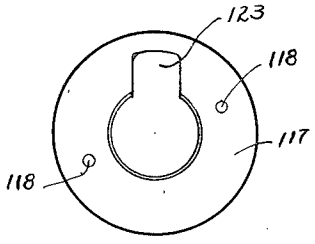


FIG. 11.



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DOORKNOB AND LOCK SET WITH INACCESSIBLE FASTENINGS

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Application November 30, 1948, Serial No. 62,603

3 Claims. (Cl. 70—448)

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This invention relates to door lock sets, and in particular to a knob and lock set having no visibly accessible fastening means for the set on the door or for the knobs on the set.

One object of the invention is to provide an improved key and knob operable door lock set. Another object is to provide an outside knob for a door lock set whose fastening to the lock body is inaccessible from the outside. Another object is to provide a door lock set with invisible fastening means. A further object is to provide a door lock set in which the outer knob fastening is inaccessible prior to the removal of the inside knob and its spindle. A further object is to provide means for attaching a cylindrical door lock set to doors of varying thicknesses.

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

Figure 1 is a plan view partly in section showing my door lock set as applied to a door;

Figure 2 is a side elevational view partly in section taken at right angles to the view shown in 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 cross-sectional view taken on the line 5—5 of Figure 1;

Figure 6 is a perspective view of the outside knob and spindle;

Figure 7 is a perspective view of the inside knob and spindle;

Figure 8 is a perspective view of the turn button locking assembly;

Figure 9 is a perspective view of the outside half of the retractor housing;

Figure 10 is a perspective view of the inside half of the retractor housing; and

Figure 11 is a plan view of the retainer disk.

Referring to the drawings, particularly Figures 1 and 2, a preferred embodiment of my door lock set is shown as it is intended to be mounted in a door, the outside knob being shown to the left and the inside to the right. The latch bolt unit (shown also in Figure 11) consists generally of a cylindrically shaped housing 20 from which at the outer end extends a bolt 21. A coil spring 21A surrounds the latch bolt bar 22 and abuts the inner end of the housing 20 to maintain the bolt normally in a projecting position. The inner end of the bar 22 protrudes through the opening 23 in the end closing disk 24 and is provided with a pair of lugs 29 which are grasped by the opposed

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edges of the slot 25 in the retractor 26. The attachment ears 27 extending from the end closing disk 24 are adapted to engage the edges 28 of the peripheral opening in the assembled retractor housing.

The retractor housing consists of relatively heavy die-cast bodies including an outside half 30 and an inside half 31 which are held together by the screws 32 extending from the countersunk holes 33 in the inside half 31, into threaded holes 34 in the bosses 35 in the outside half 30. The two halves together form a hollow generally cylindrical body which is adapted to be fitted in a hole drilled in or through the door D.

The outside half 30 of the retractor housing consists of a cylindrical wall 36 and an end wall 37 which is of substantial thickness to provide a coaxially disposed bearing hole 38 for the spindle 71 attached to the outside knob 70. A longitudinal locking groove 44 is provided in the wall of the bearing hole 38 for the purpose to be described later; and a retainer slot 49 extending through from the exterior surface of the end wall 37 to the bearing hole 38 is provided for a retainer 76 to hold the spindle 71 in place in the outer half housing 30. The outer or closed end of the half housing 30 is provided with an integral outwardly extending flange 39 which is adapted to abut the outer face of the door D adjacent the edges of the mounting hole. A rosette 40 having a hub 41 extending toward the outside knob 70 is attached to or made integral with the conical outer face 42 of the half housing 30. As shown, this consists of a relatively thin sheet metal rosette spun on the conical surface 42 of the rigid end wall 37, the peripheral edges 43 of the rosette sheet metal being turned over the edge of the flange 39. In the cavity of the outside half 30 of the retractor housing, retractor guides 45 are provided, integral with and extending from the inside surface 46 of the end wall 37. Bosses 35 are provided in the cavity of the outside retractor half housing 30 for holding screws 32, and another boss 56 opposite the opening 47 for the retractor, has a semi-cylindrical seat 56A for the retractor guide pin 64. The cylindrical wall 36 is provided with an opening 47 through which in combination with the opening 53 in the half housing 31, the end of the retractor 26 and the bar 22 may move. The attachment ears 27 of the latch bolt unit are slidingly engaged under the edges 28 of the wall 36 at the peripheral opening 47, and under the corresponding edges 54 in the wall 50 at the opening 53 in the inside half housing 31, the sliding engagement permitting lateral adjustment between the latch bolt unit and the retractor housing (30 and

31) corresponding to the disposition of the mounting holes in the door D.

The inside half 31 of the retractor housing consists of a cylindrical wall 50 with an end closure disk 51 having an axial bearing hub 52 extending toward the inside knob 95 from the disk 51, said hub being adapted to serve as a bearing and centering means for the spindle 96 of the inside knob 95. A peripheral opening 53 coinciding with the opening 47 in the outerhalf housing 30 is provided, the edges 54, coinciding with the edges 28 in the outside housing 30 being adapted for engagement by the lugs 27 on the disk 24. Inside bosses 35A are provided for the countersunk holes 33 for the holding screws 32. Another boss 56 is provided opposite the opening 53 in which is provided a semi-cylindrical recess 56A for the retractor guide pin 64. Threaded holes 66 are provided on the face for the attachment of the rosette retainer 117.

The retractor 26 consists of two parallel side walls 60 and a cross-partition member 61 at right angles therebetween, this partition member being provided with a center hole 62 through which the retractor guide pin 64 extends. The coil compression spring 63, mounted on the pin 64, is adapted to normally hold the retractor 26 extended toward the combined opening 53 and 47, and the rollbacks 83, 79, and 103. The latch bar lug engaging edges 60A of the retractor 26 are formed by bending in the ends of the side walls 60 to form the slot 25 in which the lugs 29 on the latch bar 22 are engaged.

The outer knob 70 is non-rotatably attached to an outer spindle 71, provided with a rollback 79, and a key-actuated lock cylinder 72 (see Figure 1) is operatively disposed inside an axial hole 73 in the outer face of the knob 70, said cylinder 72 protruding into the spindle 71. The end of the lock cylinder 72 is provided with a rectangular socket 74 which is adapted to make operative connection with the end of a coaxial shaft 82 having a key-actuated semi-circular rollback 83 attached at the inner end thereof, arranged to reciprocate the retractor 26 by contact with the top surface of the partition 61, this reciprocation being independent of other means of reciprocating said retractor. The shaft 82 is spaced axially within the spindle 71 by the spacer disk 84 and by the locking spacer disk 85, both slidably and rotatably mounted on the shaft 82 between the outer end stop 86 and the end spacer 87 attached to the opposite or inner end of the shaft 82, a compression coil spring 88 being arranged between the two spacer disks to normally hold them apart and to provide spring pressure against the movement of the locking spacer 85. The locking spacer disk 85 is provided with a peripherally extending locking tab 89 which is adapted to be normally engaged in the longitudinal locking groove 44 extending from the cavity face 46 for a portion of the length of the bearing hole 38. The spindle 71 is free to be turned in either direction for about one-quarter of a turn by the provision therein of the peripheral slot 75. This slot 75 is also adapted to receive the retainer 76 in the retainer slot 49, to secure the spindle 71 in the housing 30. The tubular spindle 71 is also provided with a longitudinal slot 77 leading from the inner end to the peripheral slot 75, allowing the entrance thereto of the locking tab 89 from the cavity side of the half housing 30 (during assembly or disassembly). The extension of the longitudinal slot 77 opposite the peripheral slot 75 forms the locking notch 78 into which the tab 89 may be longitudinally pressed against the spring 88 by the turn button sleeve 90, the end 91 of which slides over the key-operated rollback 83 and the end spacer 87, as will be more particularly described later.

The inside knob 95 is provided with a fixed tubular spindle 96, and has a central opening 97 in the front face of the knob adapted to receive a thumb turn button 98. The side of the knob opposite said opening 97 is provided with a hub 99 which covers a portion of the spindle 96. The tubular spindle 96, inside the knob, is provided with a bayonet type slot 100, which is connected to the free end of the spindle by the longitudinal solt 101, by which a bayonet slot follower tab 114 is assembled in the bayonet slot 100. A peripheral keying slot 102 is also provided near the free end of the inside spindle 96 which is adapted to receive the spring retainer key 58 insertable in the slot 58A in the side boss 59 on the hub 52 of the inner half housing 31. A rollback 103 is provided on the end of the spindle 96, adapted to engage the partition member 61 of the retractor to reciprocate it and the operatively connected latch bolt.

The means shown for at times locking the outside knob 70 against rotation consists of the turn button sleeve 90, whose inside end 91 is adapted to slip over the key-operated rollback 83 with its end spacer 87, the end 91 making contact with the face of the locking tab 89 to press the tab into the locking notch 78 of the spindle 71, thus fastening the outside knob spindle 71 to the half housing 30. The turn button sleeve 90 is cut away at the opening 105 to avoid interference with the reciprocating movement of the retractor 26. The elongated hole 106 is provided through the wall of the sleeve 90 at the opening 105, through which the retractor guide pin 64 passes, this pin allowing only limited turning but the necessary functional longitudinal movement of the sleeve 90. The turn button sleeve 90 is swivel-connected at the end opposite 91 to the bayonet bar 112, which terminates in the thumb turn button 98 which is positioned in the central opening 97 in the face of the inside knob 95. The swivel connection as shown consists of the swivel cup 108 which removably fits inside the sleeve 90, being held against removal by normal pulling by the dimple 109 of the cup 108 in the hole 107 in the sleeve 90. The hole 110 in the end of the cup 108 is adapted to receive the narrowed end of the bayonet bar 112, with washers 111 on either side of the end wall, and with the end of the bar enlarged to retain the washers.

The bayonet bar 112 is provided at its intermediate position with a centering tab 113 adapted to turn inside the spindle 96 and with an opposite slot follower tab 114 adapted to follow the bayonet slot 100 in the spindle 96, this follower tab 114 being introduced into the bayonet slot 110 through the longitudinal slot 101 in the spindle 96.

When the thumb turn button 98 is pushed in and turned so that the tab 114 engages the bayonet slot notch, it locks the outside knob 70 and its spindle 71 to the half housing 30 and thereby prevents the operation of the latch mechanism by the outside knob 70, while not interfering with the retraction of the latch bolt by use of the key K, and also not preventing the use of the inside knob 95 for retraction of the latch bolt. The thumb turn button 98 remains in locking position until manually released, irrespective of the use of the key or the inside knob.

The housing for the lock mechanism is positioned between the faces of a door, in the circular mounting hole provided therethrough, by the flange 39 abutting the hole edges on one side of the door, and by the inner rosette retainer disk 117. The rosette retainer disk 117 is provided with screw holes 118 by which screws 119 hold the flange 39 to the wall of the inside half housing 31 in the threaded holes 66, the outer margin of the rosette disk 117 engaging the edge of the hole in the door. By means of the screws 119, the door may be securely clamped between the flange 39 and the disk 117.

The retainer disk 117 is provided with a window 123 which permits access to the hair pin spring of the spring retainer key 58, which rotatably holds the spindle 96 in the housing irrespective of the longitudinal position of the disk 117 on the sleeve 52.

The inside rosette 120 having a central extended sleeve 124 adapted to telescope over the hub 99 of the inside knob 95, is fastened to the edge of the rosette retainer 117 by frictional engagement on the rosette flange 121, and the rosette may be released by prying means applied at the notch 122, and access made to the spring key 58 by moving the rosette toward the inside knob 95 on its hub 99. When the spring retainer key 58 is released, the inside spindle and knob are released, and full access to the lock mechanism is attained from the inner side of the door. The screws may be removed to release the retainer disk 117, following which the body (30 and 31) with the outside knob 70 may be removed from the hole in the door. The outside spindle 71 may then be released by removal of the retainer 76. The removal of the body (30 and 31) from the hole in the door also disengages the tabs 76 from the edges 28, and releases the edges 60A from the lugs 29 on the latch bar 22.

The advantages of my invention will be apparent. The outer knob and its spindle are fastened to the heavy die-cast housing by key means which is wholly inaccessible while the lock body is in the mounting hole. The lock body is removable from the hole only after the inside knob and its spindle have been released from the housing, and after the retainer disk has been released from the body. The inside spindle with its knob is releasable only by displacing the inside rosette to gain access to the keying means holding the spindle to the housing. No mounting screws or other fastening means for the housing, or for the knobs on the spindles are visible when the set is assembled and mounted on the door and the outside knob cannot be removed except through removal of the entire lock body from the door.

I claim:

1. In a combined knob and lock set for use on a door, a body comprising a key-end portion and a turnbutton-end portion, said two portions together forming a hollow cylindrical housing with integral closure pieces, said closure piece of said key-end portion being conical shaped and having a peripheral flange adapted to engage the edge of the hole in the door in which said body is mounted, and also having an axial aperture forming a bearing for an outer knob sleeve; and said closure piece of said turnbutton-end portion having a tubular bearing sleeve extending oppositely from said key-end bearing aperture; a retainer disk larger in diameter than said cylindrical housing and having an axial aperture adapted to slide over said tubular bearing sleeve, said retainer disk being adapted to abut the face of the door opposite said peripheral flange; fastening means accessible from the side of said disk opposite the key end of said housing adapted to hold said retainer disk to said body in clamping relation on the door in which said housing is mounted.

2. In a combined knob and lock set for use on a door, a body comprising a key-end portion and a turnbutton-end portion, said two portions together forming a hollow cylindrical housing with integral closure pieces, said closure piece of said key-end portion being conical shaped and having a peripheral flange adapted to engage the edge of the hole in the door in which said body is mounted, and also having an axial aperture forming a bearing for an outer knob sleeve; and said closure piece of said turnbutton-end portion having a tubular bearing sleeve extending oppositely from said key-end bearing aperture; a retainer disk larger in diameter than said cylindrical housing and having an axial aperture adapted to slide over said tubular bearing sleeve, said retainer disk being adapted to abut the face of the door opposite said peripheral flange; fastening means accessible from the side of said disk opposite the key end of said housing adapted to hold said retainer disk to said body in clamping relation on the door in which said housing is mounted; a free rosette adapted to be removably attached to the outer rim of said retainer disk to conceal said fastening means, said rosette having a concentric hub adapted to telescope over the hub of an adjacent knob.

3. In a combined knob and lock set for use on a door, a body comprising a key-end portion and a turnbutton-end portion, said two portions together forming a hollow cylindrical housing with integral closure pieces, said closure piece of said key-end portion being conical shaped and having a peripheral flange adapted to engage the edge of the hole in the door in which said body is mounted, and also having an axial aperture forming a bearing for an outer knob sleeve; and said closure piece of said turnbutton-end portion having a tubular bearing sleeve extending oppositely from said key-end bearing aperture; a retainer disk larger in diameter than said cylindrical housing and having an axial aperture adapted to slide over said tubular bearing sleeve, said retainer disk being adapted to abut the face of the door opposite said peripheral flange; fastening means accessible from the side of said disk opposite the key-end of said housing adapted to hold said retainer disk to said body in clamping relation on the door in which said housing is mounted; and a fixed rosette affixed to said conical shaped part of said key-end portion of said housing, said fixed rosette having a hub adapted to telescope over the hub of an adjacent knob.

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