

June 7, 1960

A. E. E. NYGREN
DOOR LOCK

2,939,737

Filed Jan. 24, 1958

2 Sheets-Sheet 1

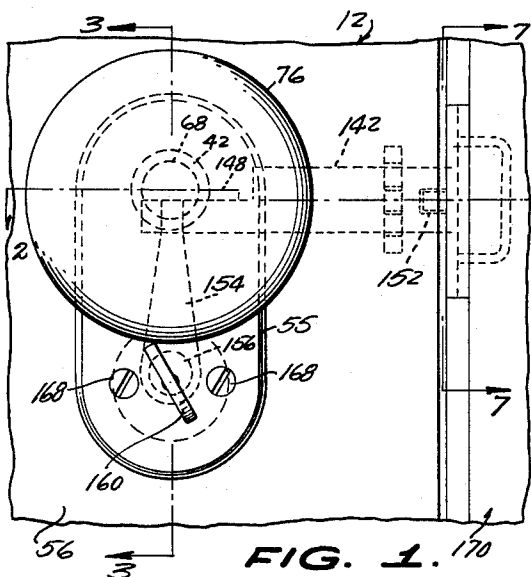


FIG. 1.

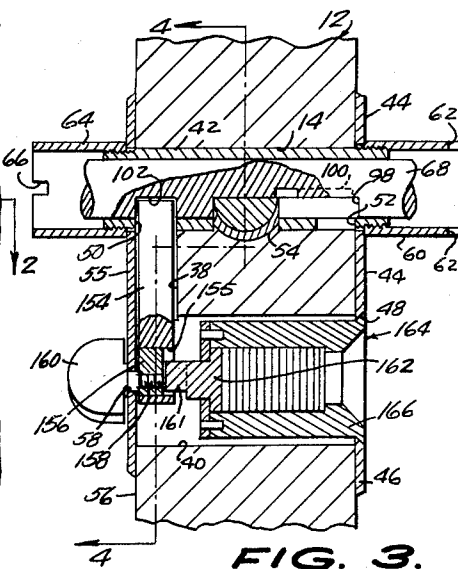


FIG. 3.

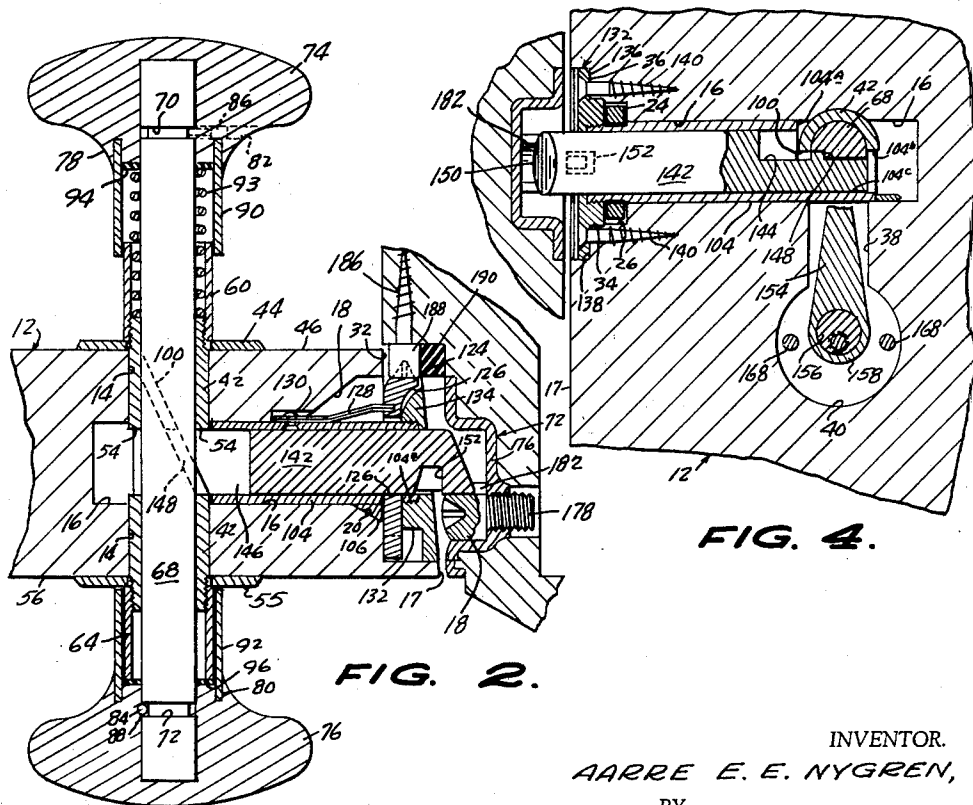


FIG. 2.

FIG. 4.

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2 Sheets-Sheet 2

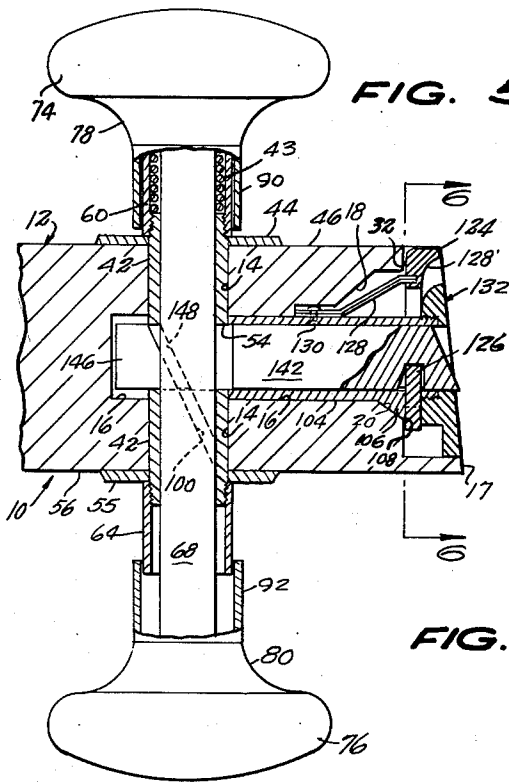


FIG. 5.

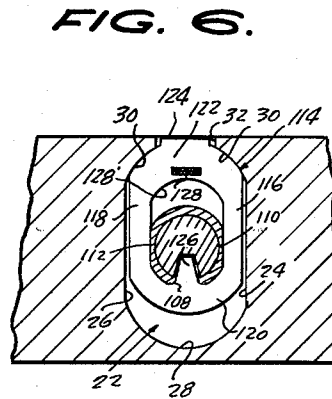


FIG. 6.

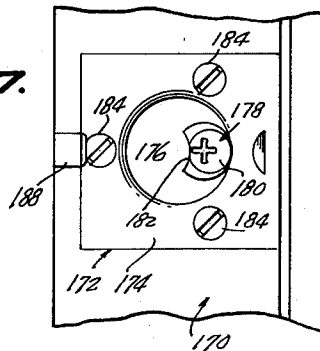


FIG. 7.

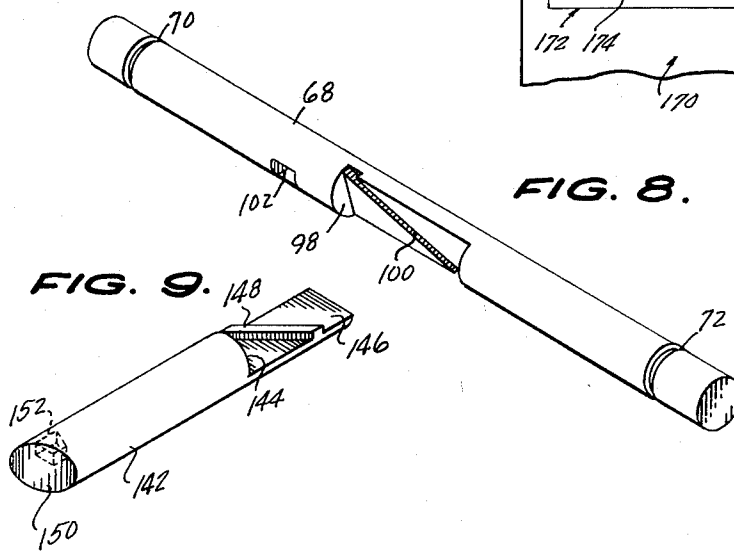


FIG. 8.

FIG. 9.

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1 Claim. (Cl. 292—170)

This invention relates to door locking or latching devices and, more specifically, to a door locking device for inside doors wherein the latch is moved to its unlocked position by a linearly directed push-pull activation of the door handle.

One of the primary objects of this invention is to provide a door locking device for use on doors having a handle or knob on opposite sides thereof whereby a push or pull movement on one or the other of the respective knobs will effect disengagement of the locking member from its keeper.

Another object of this invention is to provide a door locking device of the type generally described above together with automatically operable means for holding the latching member in its retracted inoperative position.

A further object of this invention is to provide a door locking device of the type described supra together with means mounted on the door jamb for automatically releasing the latching member from a retracted inoperative position for movement to its extended operative position when the door is closed.

A still further object of this invention is to provide a door locking device which is rapid and substantially noiseless in operation.

It is still another object of the invention to provide a door latch of the type generally described above which when moved to its retracted inoperative position has no projecting parts aside and apart from its operating knobs.

This invention contemplates, as still another object thereof, the provision of a door locking device which is non-complex in construction and assembly, inexpensive to manufacture, and durable in use.

Other and further objects and advantages of the present invention will become more evident from a consideration of the following specification when read in conjunction with the annexed drawings, in which:

Figure 1 is a front elevational view of a door locking or latching mechanism constructed in accordance with the teachings of the present invention;

Figure 2 is a detail cross-sectional view of the device illustrated in Figure 1, Figure 2 being taken substantially on the horizontal plane of line 2—2 of Figure 1, looking in the direction of the arrows and showing the latching mechanism in its extended operative position;

Figure 3 is a detail cross-sectional view taken substantially on the vertical plane of line 3—3 of Figure 1, looking in the direction of the arrows;

Figure 4 is a detail cross-sectional view taken substantially on the line 4—4 of Figure 3, looking in the direction of the arrows;

Figure 5 is a detail cross-sectional view similar to Figure 2, Figure 5, however, illustrating the component elements of the latch in their operative or retracted positions;

Figure 6 is an end elevational view of a door equipped with the locking device constructed in accordance with this invention, Figure 6 being taken on the vertical plane

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of line 6—6 of Figure 5, looking in the direction of the arrows;

Figure 7 is a side elevational view of the latch keeper secured to a door jamb;

Figure 8 is an enlarged perspective view of the door latch operating shaft; and,

Figure 9 is an enlarged perspective view of a door latch or bolt constructed in accordance with this invention.

Referring now more specifically to the drawings, reference numeral 10 designates, in general, a conventional door having a stile 12 extending vertically along a side thereof. As seen in the drawings, the stile 12 is formed with a transversely extending substantially cylindrical bore 14 which extends from side to side thereof and which is intersected at right angles intermediate its ends by a second bore 16 which projects inwardly from the outer end 17 of the stile 12. To serve a purpose to be made clear below, the outer end of the bore 16 is in open communication with the inner end of an enlarged cavity 18 having a shoulder 20 at the outer end thereof. The outer end of the cavity 18 is in open communication with a horizontally elongated substantially rectangular guide slot 22 defined by a pair of oppositely disposed laterally spaced parallel and confronting top and bottom walls 24, 26 (see Figure 6), a pair of longitudinally spaced and confronting end walls 28, 30 of which the latter is in open communication with the inner end of a passage 32 which opens at its outer end in the plane of one side of the stile 12. The outer end of the slot 22 opens into an enlarged opening 34 having a rabbeted marginal edge 36.

A vertically extending, substantially semi-circular recess 38 (see Figure 3) opens into the plane of the other side of the stile 12 at a point spaced inwardly from its outer end 17 and communicates at its upper end with the bore 14 with the axis of the former substantially perpendicular to the axis of the latter. As is seen in Figure 3, the lower end of the recess 38 communicates with an enlarged circular bore 40 which extends transversely through the stile 12 from side to side thereof and with the longitudinal axis of the bore 40 disposed below the longitudinal axis of the bore 14 and being substantially parallel thereto.

Reference numeral 42 designates an elongated substantially hollow tubular guide sleeve which extends through the bore 14 and is provided with a pair of opposed externally threaded ends which project beyond opposite sides of the stile 12. One end of a first vertically elongated substantially rectangular cover or face plate 44 is formed with an aperture which receives therethrough the threaded end of the guide sleeve 42 proximate the inner side 46 of the stile and rests thereagainst. To serve a function to be described, the other end of the face plate 44 is formed with a second aperture 48, the aperture 48 having substantially the same diameter as the diameter of the bore 40 and being coaxially aligned therewith.

As is seen in Figure 3 of the drawings, the guide sleeve 42 is provided with a pair of downwardly facing openings 50, 52, each being disposed adjacent one of its respective ends and a third downwardly facing opening 54 disposed intermediate the openings 50, 52 and being coaxially aligned therewith.

One end of a second vertically elongated substantially rectangular cover or face plate 55 is formed with an aperture which receives therethrough the other threaded end of the guide sleeve 42 proximate the outer side 56 of the stile 12 and rests thereagainst. The other end of the plate 55 is formed with a second aperture 58 (see Figure 3) which communicates with the bore 40 and is substantially coaxially aligned therewith.

Reference numeral 60 indicates an elongated substantially hollow cylindrical collar having a pair of opposed open ends of which one is internally threaded for threaded

engagement with the threaded end of the guide sleeve 42 proximate the side 46 of the stile 12, and is tightened against the face plate 44. To facilitate the tightening, the other end of the collar is provided with a pair of diametrically opposed inwardly extending slots 62 to receive a tool (not shown) therein. A second elongated substantially hollow cylindrical collar 64 is provided with a pair of opposed open ends of which one is internally threaded for threaded connection with the other end of the guide sleeve 42 proximate the side 56 of the stile 12, and is tightened against the face plate 55. As before, the other end of the collar 64 is provided with a pair of diametrically opposed inwardly extending slots 66 (only one being shown) to facilitate the tightening thereof against the face plate 54.

An elongated substantially cylindrical door latch or bolt operating shaft 68 (see Figure 8) is mounted for reciprocation within the guide sleeve 42 and the opposed ends thereof project beyond the remotely positioned ends of the collars 60, 64. As is seen in Figures 2 and 5, the opposed ends of the shaft 68 are positioned in coaxially spaced relation relative to the collars 60, 64.

The shaft 68, adjacent its respective ends, is provided with a pair of circumferential grooves 70, 72 and have mounted thereon a pair of identically constructed door latch operating knobs 74, 76, respectively. Each of the knobs 74, 76 are formed with reduced necks 78, 80, respectively, through which extend internally threaded bores 82, 84 which receive screws 86, 88 that tangentially engage the shaft 68 in the grooves 70, 72 to releasably secure the knobs 74, 76 thereto.

One end of a pair of elongated substantially hollow cylindrical collars 90, 92 are fixedly secured to the reduced necks 78, 80, respectively, and the other ends thereof are telescoped for reciprocation over the other or outer ends of the collars 60, 64, respectively. To serve a function to be described, the outer ends of the necks 78, 80 have secured thereto a pair of rubber or resilient washers 94, 96, respectively, which extend between the shaft 68 and the collars 90, 92. As is seen in Figures 2 and 5, a helicoidal spring 93 under compression surrounds one end of the shaft 68 with one of its ends abutting against the threaded end of the guide sleeve 42 adjacent the side 46 of the stile 12, and the other end of the spring engages against the washer 94, whereby the shaft 68 is constantly biased for movement in a traction away from the side 46.

To serve a purpose to be set forth below, the shaft 68, intermediate its ends, is formed with an undercut or axially extending recess 98 (see Figures 3 and 8) which is in open communication with a downwardly opening groove 100 that extends transversely through the shaft 68 at an acute angle with respect to its longitudinal axis. The shaft 68 is also formed with a downwardly facing socket 102 which serves a function to be defined, the socket 102 being located intermediate the recess 98 and the groove 70.

Reference numeral 104 indicates an elongated substantially hollow cylindrical guide member having a cutout extending between the points 104A, 104B at one end thereof (see Figure 4) leaving an upwardly open end section 104C. The other end of the guide member is externally threaded at 104D and adjacent to the threaded end is provided an arcuately shaped laterally projecting brace element 106. At one side and intermediate the stop element 106 and the threaded end 104D the guide member 104 has formed therein a slot 108 (see Figures 2, 5 and 6). As is seen in the drawings, the guide member 104 has a pair of diametrically opposed parallel top and bottom keyways 110, 112 formed therein which are aligned with the lateral slot 108.

An elongated open substantially rectangular yoke is indicated at 114 and is seen to comprise a pair of longitudinally extending substantially rectangular arms 116, 118 having one pair of adjacent ends thereof integrally

connected by an arcuate end member 120, and their respective other pair of adjacent ends integrally connected by an arcuate end member 122 which terminates in a centrally located abutment element 124 having an outwardly facing concave face 125. The end member 120 carries an inwardly projecting latch 126, the function of which will be explained below. The arms 116, 118 and end members 120, 122 define an elongated substantially rectangular opening 128 having a longitudinal length greater than the diameter of the guide 104 to serve a function to be described below. As is seen in Figures 2, 5 and 6, the yoke 114 is slidably mounted on the guide 104 with the arms 116, 118 engaging the keyways 110, 112 and with the latch 126 slidably engaging within the slot 108.

One end of a leaf spring 128 is riveted to the guide 104 at 130 and the other end thereof is fixedly connected to the end member 122 of the yoke 114, the arrangement being such that the yoke 114 is constantly biased for movement in the direction for effecting entry of the latch 126 into the opening 108.

A cover plate 132 having an internally threaded opening is threaded on the threaded end 104D of the guide 104 and is formed with an inwardly projecting convex boss 134 disposed in confronting relation with respect to the concave face 126 of the latch 124. As is seen in the drawings, the cover plate 132 includes upper and lower flanges 136, 138 (see Figure 4) which are seated in the rabbeted marginal edge 36. The flanges 136, 138 are secured to the stile 12 by means of screws 140.

A door latch or bolt 142 (see Figure 9) having a substantially cylindrical configuration is mounted for reciprocation within the guide 104. The door latch or bolt 142 at one end thereof is formed with an upwardly facing cutout 144 which includes a tongue extension 146, across which extends, at an acute angle with respect to its longitudinal axis, a raised rib 148. It will be noted that the angle of inclination of the rib 148 is the same as the angle of inclination of the groove 100. The other end of the bolt 142 terminates in an inclined face 150 and immediately adjacent thereto the bolt 142 is provided with a socket 152.

The above described guide 104, yoke 114 assembly and bolt 142 are inserted into the bore 116 until the stop element 106 engages and seats against the shoulder 20. In this position the cutout section 104C extends through the recess 98 with the longitudinal axis of the guide 104 disposed at right angles with respect to the longitudinal axis of the shaft 68. The tongue extension 146 extends below the cutout section 104C with the rib 148 entering the groove 100 at one end thereof. The leaf spring 128 is positioned in the cavity 18, the yoke 114 is reciprocable within the slot 22 and passage 32, and the socket 152 of the bolt 142 is adapted for movement into and out of registry with the slot 108.

An elongated latch lever 154 is mounted for reciprocation within the semi-circular recess 38. The upper end of the lever 154, as will be explained below, is adapted for reciprocation through the opening 50 and for extension into the socket 102 to hold the shaft 68 against reciprocable movement within the guide sleeve 42. The lower end of the lever 154 is apertured at 155 to receive therein a cylindrical insert 156 which is eccentrically threaded on a stem 158 of a manually operable key 160, the stem 158 extending transversely through the face plate 55. As is seen in Figure 3, the insert 156 does not occupy the entire aperture 155 whereby room is provided therein to receive the cylindrical end 161 of a tumbler bolt 162 comprising a part of a tumbler lock 164, the end 161 being offset with respect to the longitudinal axis of the bolt 162. The lock 164 is conventional in all other respects and includes the barrel 166 which is disposed within the bore 40 and has its outer end fixedly secured to the face plate 44. Assembly bolts 168 (see

Figure 1) also serve to maintain the barrel 166 in its respective position.

A door jamb is indicated by reference numeral 170 and has set therein a door latch or bolt keeper 172 which comprises a substantially rectangular face plate 174 (see Figure 7) having a circular expressed portion 176 through which extends a Phillips bolt 178 in off-center relation with respect to the center point of the expressed portion 176. As is seen in Figure 7, the head 180 of the bolt 178 is formed with an arcuate recess 182 which cooperates with the outer end of the bolt 142 to hold the door 10 in its closed position (see Figure 2). The plate 174 is secured to the jamb 170 by means of conventional screws 184. A second Phillips screw 186 is inserted into the jamb 170 and the longitudinal axis thereof is substantially perpendicular to the longitudinal axis of the screw 78. The screw 86 is so positioned that its enlarged head 188 is in the swinging path of movement of the abutment element 124 (see Figure 2). A rubber cushion 190 is inserted between the jamb 170 and the screw head 188 to prevent clothes from being caught thereon.

Having described the component elements of this invention in detail its operation becomes manifest from an inspection of Figures 1 to 4, inclusive, which illustrate the latching member or bolt 142 in its operative, extended, or locked position. With the several elements in their respective illustrated positions and assuming that it is now desired to open the door 10, the operator first turns the key 160 to effect rotation of the insert 156 which, in turn, causes the downward movement of the lever 154 to effect the withdrawal of its upper end from the socket 102. The same downward movement of the lever 154 may be achieved by insertion of a key (not shown) into the tumbler lock 164 to effect a turning movement of the offset cylindrical end 161 of the tumbler bolt 162.

With the lever 154 withdrawn from the socket 102, the operator now presses inwardly on the knob 74 or pulls outwardly on the knob 76, both movements taking place against the force of the spring 93. This produces a sliding movement of the shaft 168 downwardly (as viewed in Figure 2) and assumes the position illustrated in Figure 5. In so moving, the rib 148 slides within the groove 100 from its position of Figure 2 to its position shown in Figure 5. The rib 148, as it shifts between its positions shown in Figures 2 and 5 causes the bolt 142 to move laterally to the left from its position shown in Figure 2 to its retracted unlocked position illustrated in Figure 5. This frees the outer end of the bolt 142 from behind the head 180 of the bolt or screw 178 and effects alignment of the socket 152 with the slot 108. Now, as the door 10 is swinging to its open position, the abutment element 124 escapes from the bolt head 188 and, under the influence of the leaf spring 128, the yoke 114 is forced to move in such direction as to pass the latch 126 into the socket 152. Under these conditions the bolt 142 is retracted and is held against further movement (see Figure 5).

Now let it be assumed that it is desired to close the door 10. As the operator swings the stile 12 into the door jamb 170 the abutment element 124 engages against the head 188 of the screw 186 forcing the yoke 144 to move in the opposite direction and to effect the withdrawal of the latch 126 from the socket 152 against the tension of the leaf spring 128. Substantially simultaneously therewith, the tension of the helicoidal spring 93 acts against the knob 74 causing it to move from its position shown in Figure 5 to its position illustrated in Figure 2. This, in turn, causes the rib 148 to shift from its Figure 5 position to its Figure 2 position and effects movement of the bolt 68 from its retracted inoperable position to its extended operative position with the outer end thereof disposed in locked position in the recess 182.

The key 160 is now rotated in the reverse direction to elevate the lever 164 to project the upper end thereof into engagement with the socket 102, or the same may be accomplished by rotating the tumbler bolt 162 by means of a key (not shown).

By providing the opening 52 in the guide sleeve 42, the entire latching mechanism may be reversed from left to right as viewed in Figure 3.

Having described and illustrated in detail one embodiment of this invention, it will be understood that the same is offered merely by way of example, and that the present invention is to be limited only by the scope of the appended claim.

What is claimed is:

- 15 A door locking device comprising a cylindrical guide sleeve extending transversely through a door stile adjacent an end thereof and having its opposed ends projecting on opposite sides of said stile, said guide sleeve having a downwardly facing opening formed therein intermediate the ends thereof, a hollow cylindrical collar for each end of said guide sleeve, said collars having one of their respective ends fixedly connected to their respective associated ends of said sleeve and said collars projecting away therefrom in coaxial alignment therewith, an elongated substantially cylindrical door latching bolt mounted for reciprocation through said end of said door stile and being reciprocable transversely through said opening formed in said guide sleeve, said bolt having an axially extending upwardly facing cutout adjacent an end thereof, a substantially straight angled rib integral with said bolt and disposed within said cutout, said rib extending transversely across said bolt and at an acute angle with respect to the longitudinal axis thereof, a reciprocable latching bolt actuating shaft slidably mounted in said guide sleeve and having the ends thereof projecting beyond the remotely disposed ends of said collars, said shaft having a downwardly facing recess formed therein intermediate its ends and disposed in confronting relation relative to said cutout with the axis of said shaft being perpendicular to the axis of said bolt, said shaft having a substantially straight angled groove formed therein opening into said recess to receive said rib, said rib and said groove extending transversely across said bolt and said shaft at substantially identical acute angles with respect to the longitudinally extending axes of said bolt and shaft whereby actuation of said shaft in one direction effects retraction of said bolt into said stile and actuation of said shaft in the opposite direction effects extension of said bolt out of said stile, said rib slidably engaging opposed confronting sides of said groove as said bolt and shaft are reciprocated, a collar mounted for reciprocation on each one, respectively, of said first collars, a door knob fixedly secured to the remotely disposed ends of said reciprocable collars, and a helicoidal spring surrounding one end of said shaft and having an end thereof engaging one of said knobs and its other end engaging the adjacent one of said first collars whereby said shaft is constantly biased for movement in a direction to force extension of said bolt out of said stile.

References Cited in the file of this patent

UNITED STATES PATENTS

144,931	Stowe	Nov. 25, 1873
228,323	Crandal	June 1, 1880
361,247	Winchester	Apr. 12, 1887
618,708	Merwin	Jan. 31, 1899
659,887	Crouch	Oct. 16, 1900
1,565,212	Sillick	Dec. 8, 1925
1,956,098	Jacobson	Apr. 24, 1934
2,186,666	Cereda	Jan. 9, 1940
2,521,111	Ylinen	Sept. 5, 1950
2,726,889	Lawson	Dec. 13, 1955

FOREIGN PATENTS

75	225,523	Switzerland	May 1, 1943
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