Jan. 31, 1956 P. H. GREVENGOED 2,733,089

LATCH SPINDLE SPRING DEVICE

Filed Dec. 5, 1952

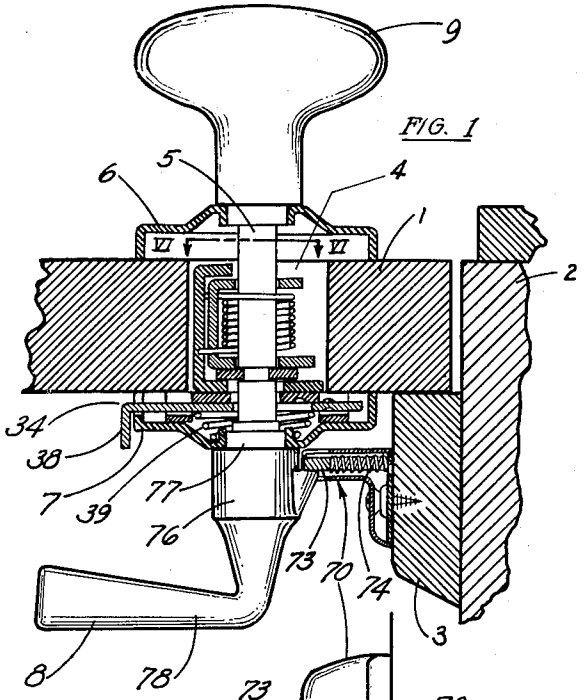


FIG. 1

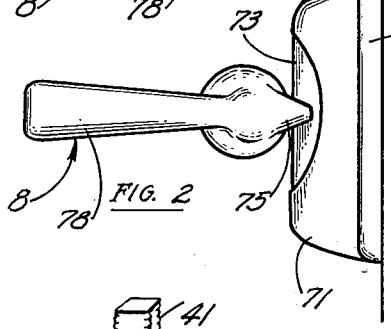


FIG. 2

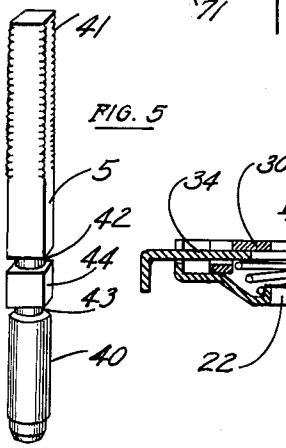


FIG. 5

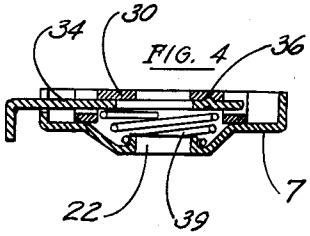


FIG. 4

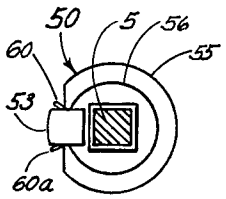


FIG. 6

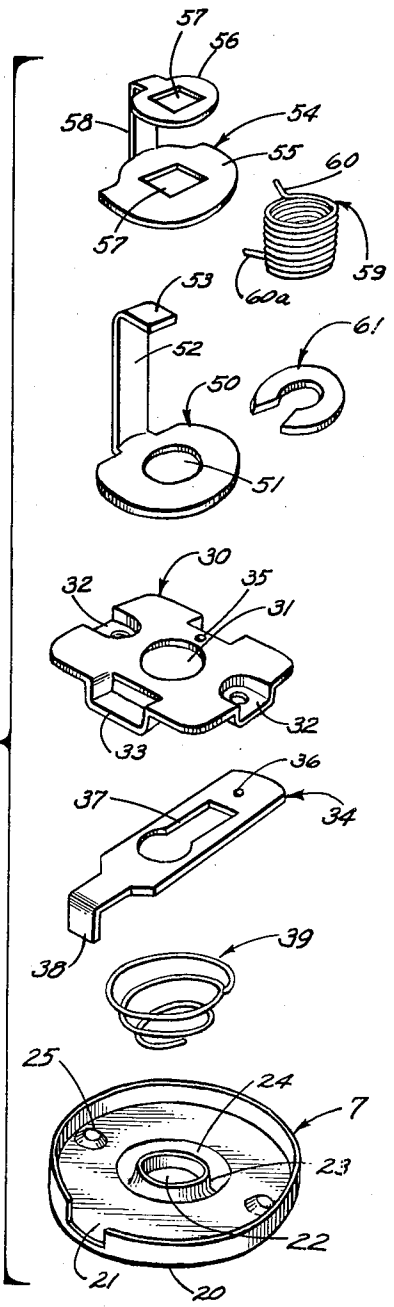


FIG. 3

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LATCH SPINDLE SPRING DEVICE

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This invention relates to door latches and more particularly to the type of door latch having an external strike engaging means such as is frequently used on screen doors.

Latch structures designed for screen doors should be both light weight and of compact design whereby their installation does not have a weakening effect upon the door. Such latch structures should be capable of actuation by rotation in either direction. Heretofore, there have been developed latch structures which could be released by rotation in either direction but which required rotation of the knob and knob spindle to effect engagement between the latch and the strike plate when the door was closed. The spring used to urge the latch spindle to assume a particular position must have sufficient strength to positively assure the proper location of the spindle after each operation. A spring of this strength necessitates closure of the door with substantial force. This force is damaging both to the door and to the door frame as well as to the latch itself.

It is my purpose to provide a latch structure in which a spring of adequate strength may be used to assure proper location of the spindle after each operation without requiring excessive force to effect a positive latching of the door. This is accomplished by eliminating the necessity for rotating the spindle against this spring when the door is closed.

It is a further object of my invention to provide a simple, compact structure requiring the removal of a minimum of material from the door.

Still another object of my invention is to provide a combined handle and strike engaging member which is of pleasing appearance, durable in operation and economical to manufacture.

These and other objects and purposes of my invention will be immediately seen by those acquainted with the design and construction of door hardware upon reading the following specification and the accompanying drawings.

In the drawings:

Figure 1 is a central sectional view of my improved latch structure mounted on a door.

Figure 2 is an inside view of my improved latch structure showing the latch and strike in engaged position.

Figure 3 is an exploded view showing all the parts of my improved latch structure except the handles and the spindle.

Figure 4 is a central sectional view of the inside escutcheon plate together with the mechanism therein showing the locking bar in locking position.

Figure 5 is an oblique view of the spindle for my improved lock structure.

Figure 6 is a sectional view taken along the plane VI—VI of Figure 1.

In executing the objects and purposes of my invention, I have provided a latch structure having, within that portion of its structure concealed within the door, a spring for retaining the spindle and therefore the knobs in a particular, selected position. One of the knobs consists of an L-shaped handle having projecting from its base a generally triangular finger acting as the strike engaging bolt. The strike is so designed that it is movable out of the path of travel of the bolt when the door is being closed.

The terms "inner" and "outer" are frequently used and are to be taken to mean "outer" towards the exterior of the door, i. e. toward the top of the latch as it appears in Figure 1 and "inner" oppositely therefrom.

Referring specifically to the drawings, the numeral 1 indicates a door mounted in a frame 2 and contacting a jamb 3. Adjacent one edge, the door has an opening 4 therethrough for receiving the hereinafter described lock structure. This lock structure includes a spindle 5, an outer escutcheon plate 6 and an inner escutcheon plate 7. Mounted to the inner end of the spindle 5 is a handle 8 and to the outer end thereof a knob 9.

The inner escutcheon plate 7 is of generally circular outline and has an outwardly directed peripheral flange 20. The flange 20 is notched at 21. The inner escutcheon plate 7 has a central aperture 22 surrounded by an outwardly directed lip 23 and a reinforcing dimple 24. The inner escutcheon plate 7 is provided with a pair of holes 25 for mounting screws.

Seated within the inner escutcheon plate 7 is a plate 30 having a central aperture 31 for the spindle 5. The plate 30 has a pair of oppositely positioned recesses 32 whereby the plate may be secured to the inner escutcheon plate 7. On opposite sides, the plate 30 is offset to form a pair of hangers 33. In the operation of forming the hangers 33 the plate is sheared whereby the locking bar 34 may pass through the plate with the main body of the plate contacting one surface and the hangers 33 contacting the other surface. Between the aperture 31 and one of the hangers 33 the plate is provided with a small depression 35, designed to cooperate with the dimple 36 on the locking bar 34.

The locking bar 34 is of generally rectangular shape and has a longitudinally oriented, key-hole shaped opening 37. The reduced portion of the opening 37 is of such width that it will closely engage the spindle 5 and hold it against rotation. The enlarged, circular portion of the opening 37 is of such diameter that it will permit the spindle 5 to rotate freely therein. One end of the locking plate 34 extends through the notch 21 in the inner escutcheon plate 7 and exteriorly thereof is bent inwardly to form a grip 38. The locking bar 34 is held outwardly against the mounting plate by means of a coil spring 39, one end of which bears against the inner escutcheon plate 7 surrounding the lip 23.

The spindle 5, on its inward end, has a longitudinally serrated portion 40 to receive the inner handle 8. This prevents relative rotation between the spindle and the inner handle 8. The remainder of the spindle 5 is of square cross-section, the outer end 41 being threaded to receive the outer knob 9. The outer portion 41 is provided with a pair of spaced reliefs 42 and 43. The inner relief 43 is immediately adjacent the inner portion 40. The outer relief 42 is separated from the inner relief by a locking collar 44. At the reliefs 42 and 43 the spindle has a circular cross-section.

That portion of the latch structure seated within the opening 4 includes a stationary spring anchor 50 having a circular central aperture 51, an outwardly extending arm 52. On the end of the arm 52 is a lip 53 extending toward the center of the stationary spring anchor. The inner end of the stationary spring anchor surrounds the outer end of the spindle's locking collar 44 and seats against the plate 30, where it is preferably secured by welding.

The square outer portion of the spindle 5 mounts the movable spring anchor 54. The movable spring anchor 54 consists of an inner disk 55 and an outer disk 56 integrally joined by the arm 58. Both the inner and outer disks have a square, central aperture 57 closely engaging the spindle 5 locking the parts together for simultaneous rotation. The movable spring anchor 54 is of such length that it surrounds the spindle between the ends of the stationary spring anchor 50.

Surrounding the spindle 5 between the ends of the movable spring anchor 54 is a coil spring 59. The spring 59 has a pair of projecting ends 60 and 60*a*, one seated on each side of the arms 52 and 58. Between the inner disk 55 of the movable spring anchor 54 and the inner portion of the stationary spring anchor 50 is a substantially circular, slotted key 61. The key 61 seats within the outer relief 42 preventing the entire assembly from moving longitudinally of the spindle 5.

The strike 70 includes a housing 71 having a foot 72 for securing the strike to the jamb 3 and a movable plate 73 supported by a spring 74. The movable strike plate 73 is designed to move toward the jamb 3 against the resistance of the spring 73 under the urging of the latch when the door is closed. The strike plate 73 is more fully disclosed in my application entitled Improvement in Strike Hardware, filed concurrently herewith.

The strike plate 73 cooperates with the generally triangularly shaped bolt 75 on the inner handle 8. The inner handle 8 consists of a main circular base 76 having extending therefrom and integral therewith the bolt 75. Extending outwardly from the base 76 is the annular collar 77 for supporting and guiding the inner handle within the central aperture 22 of the inner escutcheon plate 7. The remainder of the handle consists of an arm 78 extending at a right angle to the axis of the spindle 5. It will be recognized that the use of the arm type handle is desirable in order to permit the latch structure to be placed as close as possible to the jamb 3. It will also be recognized that various other designs for this handle may be used wherever practical.

Operation

The latch is initially assembled by first securing the spindle 5 to the inner handle 8. The inner escutcheon plate 7 is then passed over the spindle together with the spring 39. The plate 30, together with the locking bar 34 assembled thereto, are seated within the inner escutcheon plate 7. The inner escutcheon plate 7, plate 30 and spring 39 may be subassembled prior to mounting on the spindle 5.

The movable spring anchor 54, together with the spring 59, is placed between the ends of the stationary spring anchor 50 and the resulting assembly is slid into place over the end of the spindle. The key 61 is then seated in the relief 42 to lock the entire assembly together.

With the latch structure so assembled, the latch may be mounted to a door by securing the inner escutcheon plate 7 to the door. The outer escutcheon plate 5 and the outer knob 9 may then be put in place. The strike assembly 70 is mounted to the door jamb 3 in a suitably aligned position. When the latch structure is mounted the bolt 75 extends beyond the vertical edge of the door toward the jamb.

To open the door, the spindle 5 is rotated by either the inner handle 8 or the outer knob 9 causing the bolt 75 to rotate out of engagement with the movable plate 73. This rotation must be done against the resistance of the spring 59. It is immaterial in which direction the spindle 5 is rotated since both ends 60 and 60*a* of the spring 59 are held against rotation in one direction by their engagement with the arm 52 of the stationary spring anchor 50. Rotation of the spindle 5 causes the arm 58 of the movable spring anchor 54 to carry one end of the spring 59 with it. This tensions the spring 59. Upon release of the handle, the spring 59 automatically returns the spindle to its stationary position. This is determined by that point at which both the ends 60 and 60*a* of the spring contact the arm 52. When the door is being closed, the bolt 75, upon contacting the strike plate 73, forces the strike plate inwardly against the spring 74, until the bolt 75 may pass the strike plate whereupon the spring 74 snaps the strike plate out to engage the outward surface of the bolt 75. Thus, the door may close and the bolt and strike plate may be brought into secure engagement without rotation of the spindle. A door equipped with my invention will be positively latched even though the momentum of the door would have been insufficient to have rotated the spindle against the spring 59. This permits the door to be closed quietly and with a minimum of shock and wear upon the operating parts.

If it is desired to lock the door, the locking bar 34 is moved away from the jamb 3 causing the small end of the opening 37 to surround the locking collar 44 of the spindle 5. The spindle then may not be rotated and the entire assembly is held stationary.

Various modifications of my invention may be made, each without departing from the principle thereof. Each of these modifications is to be considered as included in the hereinafter appended claims unless these claims by their language specifically state otherwise.

I claim:

1. In a latch for a door having a bore perpendicular to the plane of said door, said latch having an escutcheon plate assembly secured to the surface of said door, the combination comprising: a spindle rotatably mounted through said escutcheon plate assembly for disposition within said bore; handle means on each end of said spindle; a first spring anchor formed of sheet material disposed within said bore fixed against rotation with respect to said spindle and rotatable therewith, said anchor having a spaced pair of heads embracing said spindle and an integral arm portion interconnecting said heads and extending parallel to said spindle; a second spring anchor fixed with respect to said escutcheon plate assembly and positioned to extend into said bore, and having an arm portion extending opposite said first spring arm portion and disposed radially outward therefrom with respect to said spindle; and a helical spring surrounding said spindle interposed between said heads and having each of its ends angularly displaced from the other, said first and second spring arm portions being disposed in the axially-projected sector defined by said spring ends.

2. A latch as defined in claim 1, wherein a relief is provided in said spindle, and said first spring anchor is received between axially spaced portions of said second spring anchor and is slidably mounted on said spindle; and a slotted laterally insertable key engages said relief to limit withdrawal of said spindle.

3. In combination with a door having front and rear surfaces lying in parallel planes and containing a bore perpendicular to said planes, a latch mechanism having an escutcheon plate assembly secured to one of said surfaces, a spindle extending rotatably through said escutcheon plate assembly and through said bore, a handle provided at each end of said spindle, a first spring anchor disposed entirely within said bore rotatable with said spindle but secured against rotation with respect thereto, said anchor having spaced head portions embracing said spindle, an arm portion spaced from said spindle interconnecting said head portions and extending parallel to said spindle; a second spring anchor secured against rotation with respect to said escutcheon plate assembly extending into said bore and having an arm portion extending opposite said first arm portion and disposed radially outwardly therefrom with respect to said spindle; and a helical spring surrounding said spindle and interposed between said spaced head portions, said spring having ends angularly displaced from one another, said first and second arm portions being disposed in an axially-projected sector defined by said spring ends.

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