June 7, 1949. D. C. SMITH 2,472,730

DOOR LATCH MECHANISM

Filed Nov. 26, 1947

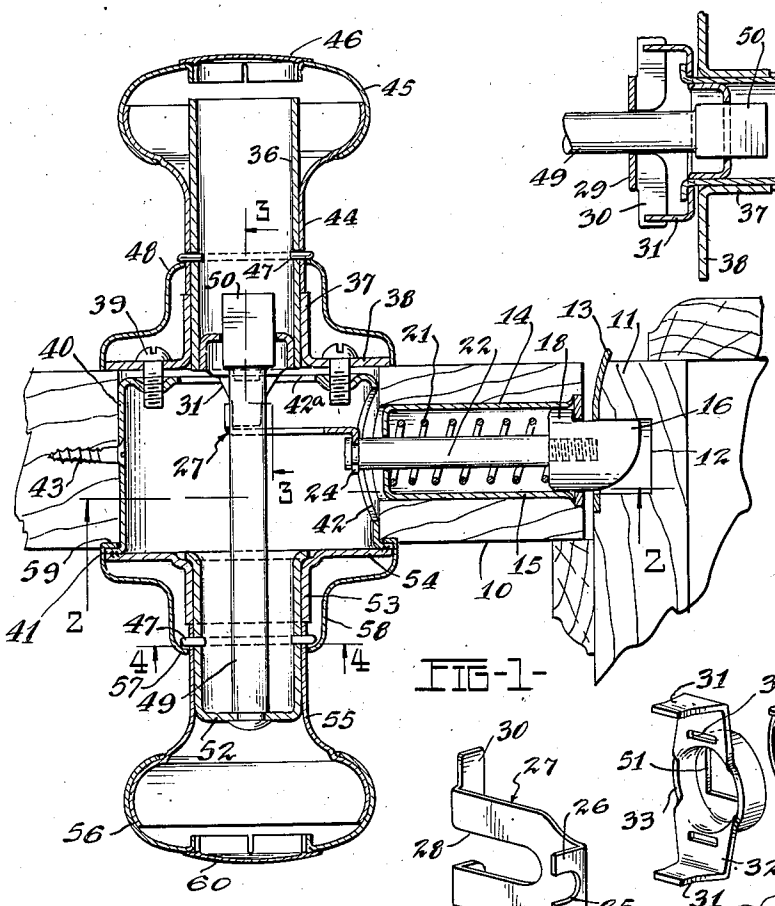


FIG-1-

FIG-3-

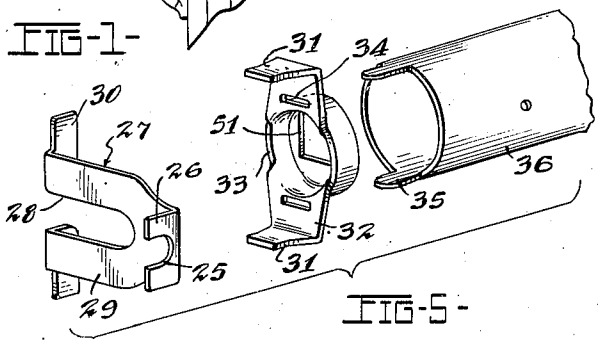


FIG-5-

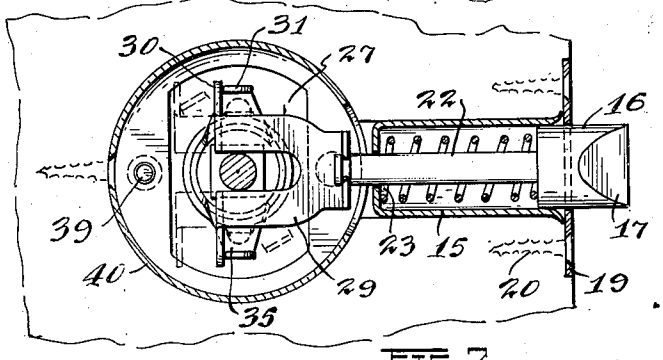


FIG-2-

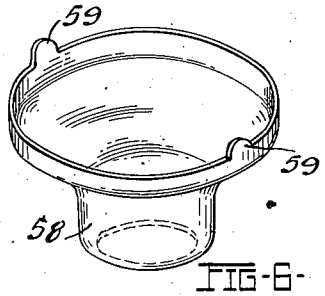


FIG-6-

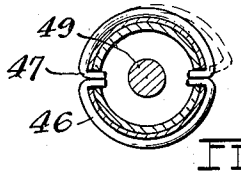


FIG-4-

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Patented June 7, 1949 2,472,730

UNITED STATES PATENT OFFICE

2,472,730

DOOR LATCH MECHANISM

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Application November 26, 1947, Serial No. 788,138

6 Claims. (Cl. 292—169)

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This invention relates to door latching mechanisms but more particularly to doors which do not require key locks or the like, such, for example, as closet doors, and an object is to produce a new and improved door latching mechanism which has a relatively small number of parts thereby reducing the cost of manufacture and assembly, is easy to assemble, is sturdy in construction, is simple to install in a door, and has the novel features of construction, assembly and operation hereinafter described.

Other objects and advantages of the invention will hereinafter appear, but for purposes of illustration but not of limitation, an embodiment of the invention is shown on the accompanying drawings, in which

Figure 1 is a longitudinal sectional elevation of the door latch mounted in a door and showing in section the door frame and keeper for the bolt nose;

Figure 2 is a transverse sectional view substantially on the line 2—2 of Figure 1;

Figure 3 is a fragmentary sectional view on the line 3—3 of Figure 1;

Figure 4 is a transverse sectional view on the line 4—4 of Figure 1 showing the snap rings for operatively connecting the knob sleeve to the actuating tube;

Figure 5 is a perspective view of the latch bolt retractor, actuator and actuating tube showing the operative relationship of these parts; and

Figure 6 is a perspective view of the escutcheon associated with one of the knob assemblies.

The illustrated embodiment of the invention comprises a door 10 hingedly mounted in the usual manner to a door frame 11, one edge of which is formed with a bolt-receiving recess or socket 12 over which is mounted a metal plate 13 having the usual inclined or cam surface and apertured to register with the mouth of the recess 12 thereby to provide the keeper. The door in this instance is indicated as being wooden and extending from the free edge of the door is a hole 14 into which is pressed a metal cup 15 to receive the latch bolt. The latch bolt has a bolt head or nose 16 formed with an inclined surface 17 to engage the corresponding surface on the keeper plate 13 in closing of the door. The rear end portion of the bolt nose is enlarged at 18 slidably to fit within the cup 15. At the edge of the door is a plate 19 which is apertured for slidably receiving the bolt nose, the shoulder provided by the enlarged end 18 abutting against the inside face of the plate 19. Screws 20 secure the plate to the edge of the door. A helical coil spring 21 bears at one

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end against the enlarged end portion 18 of the bolt nose and at the other end against the bottom of the cup 15. Disposed concentrically of the spring 21 and suitably secured, as by screw-threaded engagement, at its forward end to the bolt nose is a rod 22, the inner end extending through an aperture 23 in the bottom of the cup 15.

Adjacent the outer end of the bolt rod 22 is an annular groove 24 into which fits the notched portion 25 of a flanged end portion 26 of a bolt retractor 27. The bolt retractor 27 is a sheet metal part having a body portion formed with an elongate slot 28 open at the outer end and providing a pair of legs 29. Integral with the inner ends of the legs 29 are wings 30 respectively which extend at right angles to the legs 29 in a direction opposite to that of the flanged end 26. To afford increased bearing surface, the wings 30 project laterally beyond the side edges of the legs 29.

The wings 30 are engageable by a pair of lugs 31 respectively which are integral with and project at right angles from arms 32 integral with a cup body 33. This part is also made of a metal stamping and constitutes the actuator so that upon rotation thereof in one direction or the other, one of the lugs 31 bearing against its respective wing 30 will impart retracting movement to the bolt nose 16 against the tension of the coil spring 21 to enable opening of the door. Manifestly the retractor 27 may move relatively to the actuator as, for example, when the door is slammed to closed position. The arms 32 of the actuator are each formed with slots 34 to receive ears 35 which are integral with an elongate actuating tube 36. After the ears 35 are unseated into the respective slots 34, they are bent outwardly as indicated on Figure 2 against the under side of the arms 35 thereby to provide a simple and inexpensive connection between these parts. The cup body 33 of the actuator fits nicely into the inside of the tube 36 thereby to militate against looseness or rattles between parts. The actuating tube 36 rotates within a sleeve 37 which is integral with a plate 38 which in turn is secured by screws 39 to a cup-shaped housing 40.

The housing 40 fits snugly within an opening which extends through the door and which in turn connects to the hole 14 which receives the bolt assembly. As shown, the housing has an outturned flange 41 at its free edge so that in the assembly, the housing is inserted from one side of the door until the flange 41 abuts against the adjacent side of the door. The housing has a lateral aperture 42 which registers with the hole 14 in the

door. Thus before the bolt assembly is installed, a screw 43 may be applied through an opening in a wall of the cup 40 for securing the cup in position, access to the screw head being had through the hole 14. The cup housing 40 also has an opening 42a through which extends the lugs 31 on the actuator.

Fitting the actuating tube 36 is a knob sleeve 44, the outer end of which flares outwardly and spun thereover is a knob 45 forming virtually a one-piece structure. The sleeve 44 is secured to the actuating tube 36 for rotation therewith and for this purpose, apertures are formed in the sleeve 44 and tube 36 and arranged to register with each other. Embracing the sleeve 44 is a pair of semi-circular snap rings 46 having inturned ends 47 to extend respectively through the registering apertures. Manifestly by snapping the rings 46 in place, the parts are secured together in an extremely simple and inexpensive manner. Not only do the snap rings 46 secure these parts together but also hold an escutcheon 48 in position against the adjacent face of the door 10 to cover the plate 38 and adjacent parts.

It will be noted that the actuating tube 36 projects well inside of the knob 45 and that the knob 45 has an aperture which is closed by a cap or plug 46. This is for the purpose of enabling the parts of this latch to interchange with other latch mechanism carrying push button controls and the like, such, for example, as shown in the co-pending application of David C. Smith and Leroy Oblinger, Serial No. 656,920.

For retracting the door latch from the other side of the door, a spindle 49 extends through the door and is provided at its end portion with a head 50 which is square in cross section to fit slidably into a square hole 51 formed in the bottom of the cup 33 of the latch bolt actuator. It will be clear that rotation of the spindle 49 in one direction or the other will effect withdrawal or retraction of the latch bolt through the connections above described. The spindle 49 extends freely through the slot 28 in the retractor plate 27. The opposite end of the spindle 49 is spaced away from the adjacent face of the door and is fixed to a cup member 52. In this instance, the end of the spindle is reduced, extended through an aperture in the bottom of the cup 52 and upset to effect a rigid connection. The ends of the cup are flanged outwardly against the inner portion of a bearing sleeve 53, the bearing sleeve 53 being integral with a plate 54. Thus it will be apparent that the actuating cup 52 rotates within the sleeve 53 which provides a support therefor.

The cup 52 slightly above the outer end of the sleeve 53 is secured to a knob sleeve 55 with which a knob 56 is rigid. The sleeve 55 and cup 52 are connected by semi-circular snap rings 57 similar to the snap rings 46 above described. The snap rings 57 are covered by an escutcheon 58 which is similar to the escutcheon 48 except the escutcheon 58 is formed with a pair of ears 59 at the inner end, these ears being bent inwardly to engage the under side of the flange 41 on the housing 40. The flange 41 is spot welded to the bearing plate 54. The knob 56 similarly has a central opening which is closed by a plug 60 similar to the plug 46.

From the above description, it will be manifest that I have produced an exceedingly simple latch mechanism which, in the main, can be produced from sheet metal stampings and the parts can be readily and conveniently assembled

on the job without requiring the use of special tools. The number of parts has been substantially reduced so that the entire assembly can be manufactured inexpensively in large scale production.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claims.

What I claim is:

1. Door latch mechanism having a spring-tensioned latch bolt comprising a pair of knob assemblies adapted to be disposed on opposite sides of the door, one knob assembly including an oscillatable tube, an actuator having a pair of actuating lugs, a connection between said actuator and tube so that oscillating movements of the latter are transmitted to the former, a retractor shiftable at right angles to the axis of said tube and having parts engageable respectively by said lugs for effecting shifting movement thereof, said retractor being adapted operatively to engage the latch bolt, the other knob assembly having an oscillatable tubular member, a spindle fixed at one end to and concentric with said tubular member, and a driver on the opposite end of said spindle and coupled to said actuator so that oscillation of said spindle imparts corresponding movement to said actuator, said driver being separable from said actuator by longitudinal shifting movement.

2. Door latch mechanism as claimed in claim 1, in which the driver is polygonal in cross section and slidably engages by axial movement a portion of the actuator, said actuator portion being shaped to receive said driver whereby turning of the latter imparts corresponding movement to the actuator.

3. Door latch mechanism as claimed in claim 2, comprising an actuator engaging portion on the driver polygonal in cross section, and the actuator having a polygonal opening into which said engaging portion fits.

4. Door latch mechanism having a spring-tensioned latch bolt comprising a pair of knob assemblies adapted to be disposed on opposite sides of the door, one knob assembly including an oscillatable tube, a knob having a sleeve fitting over said tube, said sleeve and tube having registering apertures, snap rings embracing said sleeve and having inturned ends extending into said registering apertures, an actuator having a pair of actuating lugs, a connection between said actuator and tube so that oscillating movements of the latter are transmitted to the former, a retractor shiftable at right angles to the axis of said tube and having parts engageable respectively by said lugs for effecting shifting movement thereof, said retractor being adapted operatively to engage the latch bolt, the other knob assembly having an oscillatable tubular member, a spindle fixed at one end to and concentric with said tubular member, and a driver on the opposite end of said spindle and coupled to said actuator so that oscillation of said spindle imparts corresponding movement to said actuator, said driver being separable from said actuator by longitudinal shifting movement.

5. Door latch mechanism having a spring-tensioned latch bolt comprising a pair of knob assemblies adapted to be disposed on opposite sides of the door, one knob assembly including an oscillatable tube, an actuator having a pair of actuating lugs, a connection between said actu-

ator and tube so that oscillating movements of the latter are transmitted to the former, a retractor shiftable at right angles to the axis of said tube and having parts engageable respectively by said lugs for effecting shifting movement thereof, said retractor being adapted operatively to engage the latch bolt, the other knob assembly having an oscillatable tubular member, a bearing sleeve supporting said tubular member and having base portion, a housing adapted to fit into an opening extending through the door and having an outturned edge portion abutting said base portion, an escutcheon covering said bearing sleeve and base portion, ears on an end of said escutcheon bent over and engaging the inner side of said outturned edge, a spindle fixed at one end to and concentric with said tubular member, said spindle extending through said housing, and a driver on the opposite end of said spindle and coupled to said actuator so that oscillation of said spindle imparts corresponding movement to said actuator, said driver being separable from said actuator by longitudinal shifting movement.

6. Door latch mechanism having a spring-tensioned latch bolt, comprising a handle knob assembly having a sleeve, an actuating tube within said sleeve, a connection between said tube and sleeve causing same to turn together, a stationary bearing element supporting said tube, an actuator having a cup-shaped body fitting within said actuating tube and provided with integral actuating lugs, a retractor plate having wings engageable respectively by said lugs, means providing a connection between said retractor and the latch bolt, a spindle having an end portion polygonal in cross section, said cup-shaped body of the actuator having a polygonal hole to receive said spindle end portion, and another handle knob assembly fixed to the opposite end of said spindle so that turning of the knob imparts turning movement to the actuator.

DAVID C. SMITH.

REFERENCES CITED

The following references are of record in the file of this patent:

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