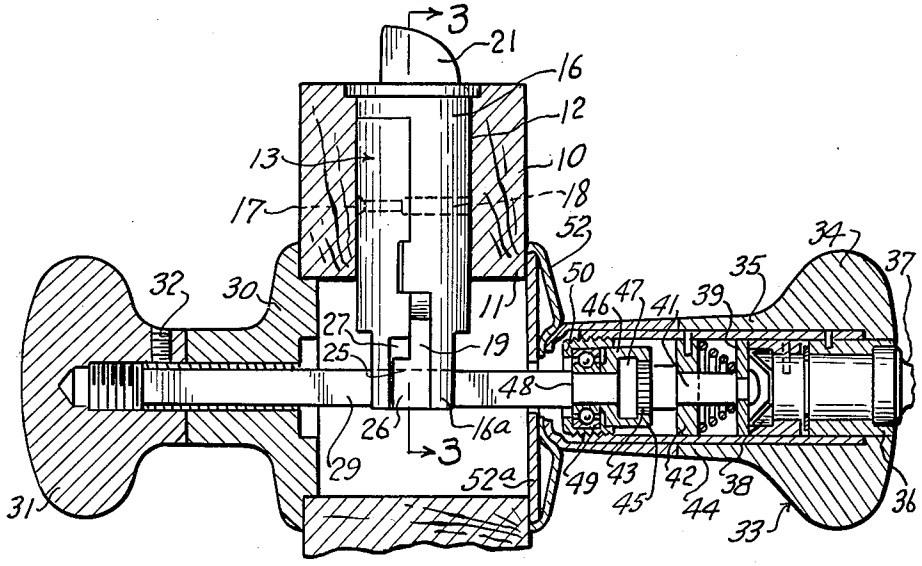
May 4, 1954 D. C. SMITH 2,677,263

DOOR LATCH MECHANISM

Filed Dec. 7, 1948

FIG. 1.



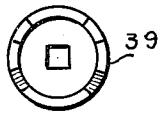


FIG. 4.



FIG. 5.

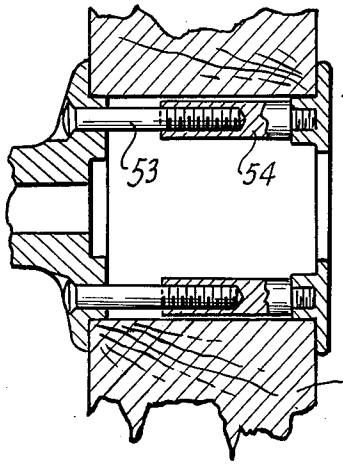
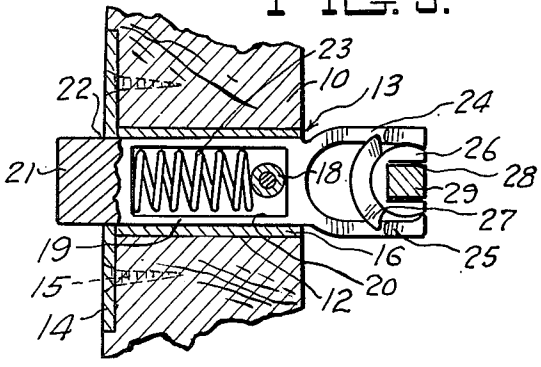


FIG. 2.

FIG. 3.



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DOOR LATCH MECHANISM

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1 Claim. (Cl. 70—149)

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This invention relates to closure operators, but more particularly to latch mechanisms particularly adapted for house, apartment and hotel doors.

An object is to produce a new and improved door latch mechanism in which the spring-tensioned latch bolt and its retracting roll back can be readily and conveniently mounted in the edge portion of the door separately and independently of the knob operated actuated spindle which is preferably mounted in the door before the latch bolt assembly is installed, thereby not only simplifying the construction of the mechanism but expediting and facilitating the assembly.

Another object is to produce a door latch mechanism equipped with a separate spring-tensioned latch bolt assembly and a knob operating spindle which can be simple and conveniently connected operatively to such assembly and which includes a key lock carrying knob provided with mechanism to clutch and declutch it from the operating spindle in response to turning movement of the key.

A further object is to produce a spindle and operating knob assembly which can be installed in existing door latches to replace the whole knob and spindle assembly, the assembly constituting a knob permanently connected to the spindle and the knob containing key controlled mechanism for causing the knob and spindle to rotate together or to enable the knob to rotate independently of the spindle.

A still further object is to produce a door latch knob and operating spindle assembly, the parts having clutch elements respectively and key controlled means on the knob for selectively connecting and disconnecting the knob from the spindle.

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

Figure 1 is a fragmentary transverse sectional view of a door on which is installed a latch mechanism, the free turning knob being shown in longitudinal section for illustrating the mechanism whereby the knob may be disconnected operatively from the actuating spindle;

Figure 2 is a fragmentary sectional view of the door provided with an opening therethrough and showing the means for mounting the escutcheons thereon, the latch mechanism being omitted;

Figure 3 is a sectional view substantially on the line 3—3 of Figure 1, showing the latch bolt assembly;

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Figure 4 is a plan view of the spindle carried cam member; and

Figure 5 is a perspective view of the cam member carried by the lock cylinder.

The illustrated embodiment of the invention comprises a door 10 which has a relatively large hole 11 therein extending from said to side. Intersecting the hole 11 is a hole 12 which extends from the free edge of the door. Mounted in the hole 11 is a latch bolt assembly 13 which can be installed as a unit as will hereinafter be described. The assembly 13 comprises a face plate 14 which is secured in the recessed portion at the free edge of the door by screws 15. The face plate 14 is suitably connected to one part of a two-part guide housing 16, the parts being held together by a screw 17 extending through one part and threadedly engaging a post 18 on the other part. The housing 16 is tubular in form and slidable therein is a latch bolt or shank 19 which is arcuate in cross section and has a slot 20 in the lower side thereof through which the post 18 projects.

Integral with the outer end of the latch bolt 19 is a solid bolt nose 21 which extends through an opening 22 in the face plate 14. Disposed within the arcuate body of the latch bolt 19 is a helically coiled spring 23, the front edge of which bears against the rear face of the bolt nose 21 and the inner end abuts against the post 18. The spring 23 is of such diameter as substantially to fill the arcuate interior of the bolt 19. It will thus be apparent that the bolt is urged to its latching position by the coil spring 23 which is compressed upon retraction of the bolt between the post 18 and the inner face of the bolt nose 21. The post 18 also serves to limit the latching or outward movement of the bolt by engagement between the inner edge of the slot 20 and the inner side of the post 18.

The latch bolt or shank 19 terminates in a pair of substantially parallel arms 24, each of which is formed near its inner end with a raised shoulder 25. The inner end portion 16a of the guide housing 16 is reduced as shown in Figure 1, and each of the parts thereof is provided with a semi-circular opening to receive semi-circular hub portions of a rotatable roll back 26 which is formed with a pair of shoulders 27 respectively adjacent the shoulder portions 25 of the latch bolt. It will be apparent that upon rotation of the roll back 26 in one direction or the other, the respective shoulders 27 are engaging the adjacent latch bolt shoulder 25 and thereby retract the latch bolt nose 21 for unlatching or opening the door.

The roll back is formed with a notch 28 which is U-shaped with the opening facing inwardly so that the operating spindle 29 which is square in cross section may be engaged by the spindle by means of an axial movement of the latch bolt assembly. For example, the spindle 29 may first be mounted in position of use and thereafter the latch bolt assembly 13 may be inserted from the edge of the door to engage the spindle 29 which has previously been inserted crosswise of the door through the opening 11. The spindle 29 extends through and is rotatable in an escutcheon member 30 on one side of the door and an operating knob 31 is fixed to the spindle by means of a set screw 32. The corner portions of the spindle 29 adjacent the outer end portion are screw-threaded and the bore of the knob 31 is likewise screw-threaded so that the knob can be screwed onto the end of the spindle to the proper distance, whereupon the set screw 32 is tightened to secure these parts together. The escutcheon 30 is suitably secured as by screws to the door 10 and by rotating the knob 32, the spindle 29 may be rotated through the mechanism above described to retract the latch bolt nose 21 in either direction of movement.

On the opposite end of the spindle 29 is an operating knob assembly 33 which, as will hereinafter be more fully explained, is permanently attached to the spindle 29 but is equipped with clutch elements which, when engaged, enable the spindle 29 to be turned for retracting the latch bolt. However, by manipulation of a key, the clutch members are disengaged or rendered ineffective so that the knob may be freely turned without imparting turning movement to the spindle 29. Thus it will be apparent that the spindle and knob assemblies may be employed in replacement of knob and spindle installations in doors, the advantage of this structure residing in the key operated mechanism whereby the knob may be disconnected from the spindle so that retraction of the latch bolt can not be accomplished until the key has again been employed to render the clutch elements effective.

As shown, the assembly comprises a knob 34 which has an axial opening in which is fixed an elongate barrel 35. Mounted within the barrel and with the outer end substantially flush with the end of the knob is a key lock cylinder 36 of any suitable or well-known type which may be actuated by a key 37 which, as will be readily understood, is inserted into or removed from a slot provided therefor. Suitably fixed to the inner end of the key lock cylinder is a cam 38 which is rotatable in response to the turning movements of the key 37. As shown, the cam member 38 is in the form of a shell having a pair of diametrically opposed tapered V-shaped cam grooves. Cooperating with the cam member 38 is a cam member 39 which, as shown, has a pair of V-shaped teeth-like projections which fit the cam grooves of the rotatable cam 38. As will hereinafter appear, by turning the key 37 and thereby rotating the cam member 38, the cam 39 which is held against rotation is thereby required to move axially.

Suitably fixed to the inner side of the cam member 39 is a stem 41, square in cross section, which extends through a square hole in a stationary guide disc 42 suitably fixed within the cylinder 35 and carries a clutch part 43 at its inner end. The clutch part 43 is in the form of an annulus, the peripheral edge portions of which are serrated or ribbed. Intermediate the

stationary guide disc 42 and the inner face of the cam 39 is a conically shaped coil spring 44 which urges the clutch part 43 out of clutching engagement when the key 37 has been turned to a position so that the cam 39 is in the position shown on Figure 1.

The clutch part 43 is adapted to cooperate with a ring-shaped clutch part 45 which is similarly formed with serrations or axially disposed alternate ribs and grooves. Thus when the clutch parts 43 and 45 are in the position shown in Figure 1, turning of the knob 34 operates to turn the actuating spindle 29. The clutch part 45 is carried by an annular cage 46 which forms a cavity 47 of greater diameter than the diameter of the clutch part 43. Thus when the clutch part 43 is moved to the left of Figure 1, it enters the cavity 47 where it is free from clutching engagement with the spindle 29 and the latter can rotate relatively to the clutch part 43. Manifestly, this movement of the clutch part 43 into the cavity 47 is made possible by turning the key 37 so that the cam 39 is caused to move to the left of the figure. The cage 46 is fixed to or forms an integral part of the end portion of the spindle 29 and intermediate the cage 46 and the shouldered portion 48 of the spindle is a ball bearing unit 49, the outer race of which is secured in place by a flanged sleeve 50, the outer surface of which is screw-threaded for threadedly engaging the inside of the barrel 35. Suitably fixed to the outside of the barrel is a sleeve 51, the inner end of which is turned inwardly to provide a bearing portion which seats in a cupped inner portion on an escutcheon 52. Interposed between the escutcheon 52 and the adjacent side of the door 10 is a washer 52*a* which has a central aperture sufficiently large to enable rotary movement of the spindle 29.

As shown in Figure 2, the escutcheon may be held together by screws 53 which engage screw-threaded sleeves 54 screw-threadedly attached to the washer 52*a*. This enables a certain amount of adjustment in accordance with the thickness of the door and facilitates assembly of the parts.

From the above description, it will be manifest that I have produced an exceedingly simple and efficient free turning handle knob which can be clutched or declutched by actuation of a key. Thus the door may be closed and by turning the key and removing it, the outside knob may be rendered free turning to prevent retraction of the latch bolt. The knob and spindle assembly are permanently connected and may be welded as a unit separate from the remainder of the latch mechanism. It will be understood that in practice, the key 37 is turned in order to render the knob 34 operative for bolt retraction purposes, but the key can not be withdrawn until after it has been turned to its initial position, at which time, the knob 34 is disconnected or unclutched from the retracting spindle 29. Thus before the knob 34 can be turned for bolt retraction, the key 37 must have been inserted and turned to effect operative engagement between the clutch members. The latch bolt assembly can be readily and conveniently connected to the actuating spindle in a unique manner due to the notched form of roll back, thus reducing assembly costs.

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 claim.

What I claim is:

In a door latch having a latch bolt and a roll back for actuating said latch bolt, operating means for said roll back, said operating means comprising a spindle operatively engageable with the roll back, a knob unit permanently connected to one end of said spindle, an elongate barrel fixed from axial movements axially of said knob unit, a key lock unit fixed to said barrel, a cam on the inner end of said key lock unit and rotatable thereby, an annular clutch element having a serrated periphery, a cam member actuated by said key lock cam member, a stem connecting said annular clutch element with said cam member, a guide fixedly mounted within said barrel for said stem, a spring between said guide and said cam member for axially shifting same as well as the stem and annular clutch part, a clutch cage on the end of said spindle and including a tubular serrated clutch part with which said annular clutch member operatively engages, said

annular clutch member being shiftable into said cage by said key operated lock unit for enabling rotation of the knob independently of said spindle, a ball bearing unit between said spindle and said knob, and a flanged sleeve for connecting the outer race of said ball bearing unit to said barrel.

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