Sept. 18, 1951 R. C. CLARK 2,568,273

DOOR LOCK

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Fig. 1

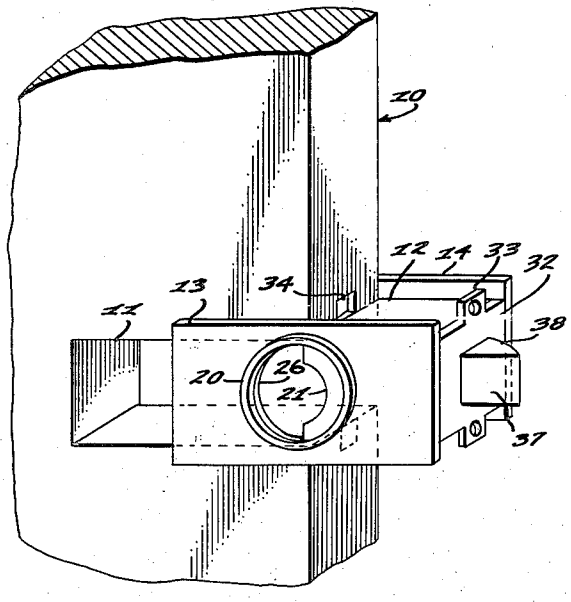


Fig. 7

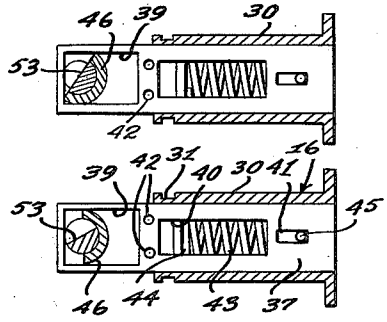


Fig. 8

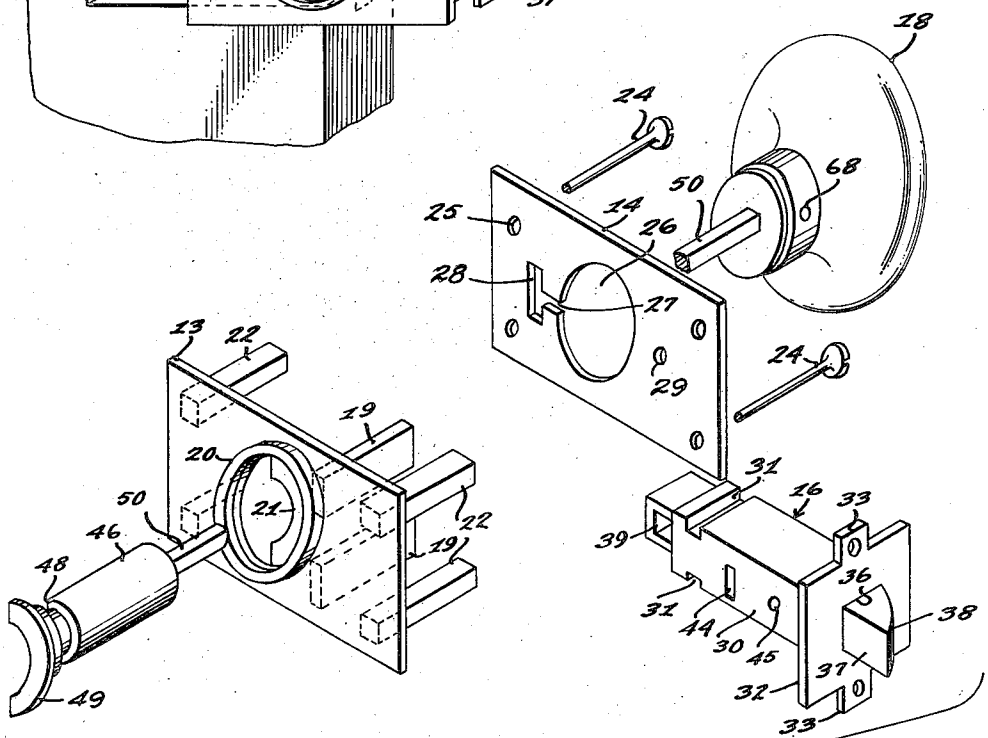


Fig. 2

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Fig. 3

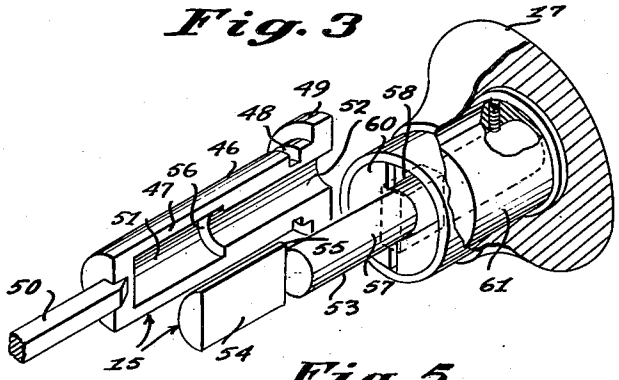
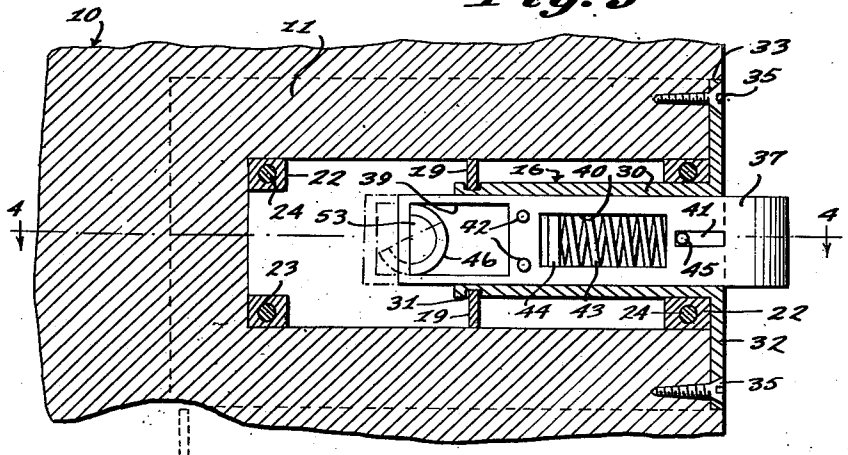


Fig. 5



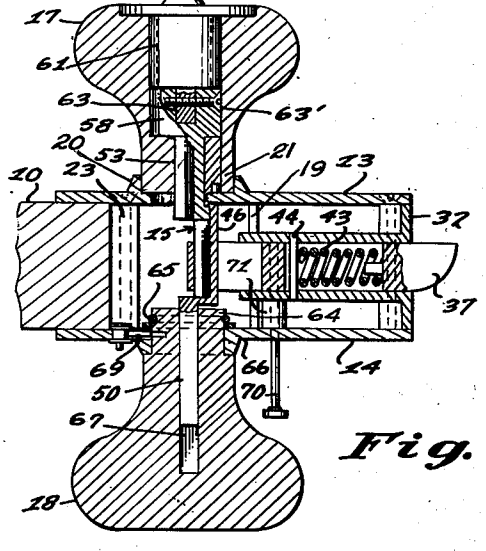
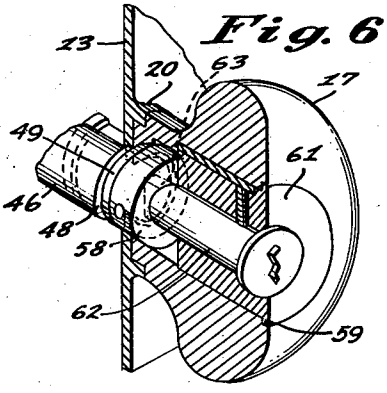


Fig. 4

Fig. 6



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Patented Sept. 18, 1951 2,568,273

UNITED STATES PATENT OFFICE

2,568,273

DOOR LOCK

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Application June 18, 1948, Serial No. 33,882

2 Claims. (Cl. 292—169)

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This invention relates to improvements in door locks, and more particularly to a lock adapted to be set into a rectangular notch or mortise opening provided in a door and opening to one edge of the latter.

It is among the objects of the invention to provide an improved door lock which may be set into a rectangular notch or mortise opening in the edge of the door and clamped to the door by the same fastening elements which secure the parts of the lock together in operative assembly, which can be completely assembled with the use of not more than four screw fasteners, can be simultaneously assembled and mounted in a door in a minimum amount of time, is simple, strong and durable in construction, economical to manufacture, and neat and attractive in appearance.

Other objects and advantages will become apparent from a consideration of the following description and appended claims in conjunction with the accompanying drawings, wherein:

Figure 1 is a somewhat diagrammatic perspective view showing a lock illustrative of the invention partially assembled with a door;

Figure 2 is an exploded perspective view of the lock illustrated in Figure 1;

Figure 3 is an exploded perspective view of a knob-and-spindle assembly constituting a portion of the lock illustrated in Figures 1 and 2;

Figure 4 is a transverse medial cross-section through the lock illustrated in Figure 2 with the lock in operatively assembled condition;

Figure 5 is a longitudinal medial cross-section through the lock and a fragmentary portion of a door in which the lock is mounted;

Figure 6 is a cross-section perspective of the knob-and-spindle assembly illustrated in Figure 3;

Figure 7 is a longitudinal cross-section through a latch bolt housing and latch-operating spindle showing the parts in one latch-retracting position; and

Figure 8 is a view similar to Figure 7, showing the parts in a different latch-retracting position.

With continued reference to the drawings, the numeral 10 generally indicates a conventional door having a rectangular notch or mortise opening 11 therein, opening to the free edge of the door.

The improved lock is especially designed to fit into such a rectangular notch or mortise opening in the door and comprises a pair of plates 13 and 14, a spindle assembly, generally indicated at 15, a latch bolt and latch bolt housing assembly, generally indicated at 16, and a pair of knobs 17 and 18.

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The rectangular side plate 13 is somewhat larger than the lock-receiving opening in the door and is provided substantially centrally thereof with an apertured boss 20 within which is a semi-circular tongue 21 for releasably securing the spindle assembly in operative position in the lock, as will later appear. Four legs 22, preferably of rectangular cross-section extend perpendicularly from the side of plate 13 opposite the boss 20 near the respective corners of the plate, and a pair of opposed, spaced-apart ribs or keys 19 project outwardly from the plate intermediate the length thereof substantially parallel to the legs 22. Each leg 22 is provided in its end opposite the plate 13 with a screw-threaded well 23 which wells receive respective screws 24 insertable through corresponding screw-receiving apertures 25 in plate 14.

The two plates 13 and 14 are somewhat larger than the lock-receiving opening in the door so that when the plates are secured in operative assembly by the screws 24, the plates marginally overlie the door around the notch 11 and are held by the screws in clamping association with the door to firmly secure the lock in operative assembly with the door.

Plate 14 has a substantially central spindle-receiving opening 26 therein, a slot 27 extending outwardly from the aperture at one side thereof, and terminating in a cross portion or T 28 and with a dead-bolt-pin-receiving aperture 29 adjacent the aperture 26.

The latch bolt and latch-bolt-housing assembly 16 comprises an elongated, hollow housing 30 of rectangular cross-section having adjacent one end thereof oppositely-disposed grooves 31 which slidably receive the keys or ribs 19 to operatively secure the housing to plate 13. The housing 30 is provided at its opposite end with a perpendicularly-extending, rectangular plate 32 of a size and shape to overlie the open end of notch 11 between the corresponding ends of the side plates 13 and 14. Plate 32 is provided on its upper and lower edges with outwardly-extending, apertured, rectangular tongues 33 which are received in recesses 34 provided in the edge of the door above and below the notch 11, and receive wood screws 35 for firmly securing the latch-bolt housing to the door. These two small wood screws 35 are the only screws which are screwed into the material of the door to secure the latch thereto, and these may be omitted without, in any way, affecting the scope of the invention. Plate 32 is also provided with a central, rectangular aperture 36 for the latch bolt 37. Latch bolt 37 is an elongated member of rec-

tangular cross-section having a beveled end 38, a substantially rectangular aperture 39 in its opposite end extending beyond the adjacent end of the housing 30, an elongated spring-receiving slot 40 therein and a small pin-receiving slot 41. Between the slot 40 and the aperture 39 the latch bolt is provided with a pair of dead-bolt-pin-receiving apertures 42.

A coiled compression spring 43 is received in the slot 40 and bears at its forward end against the end of the slot and at its rearward end against an abutment plate 44 slidably received in the slot and extending through abutment plate apertures provided in the opposite side walls of the housing 30, so that the spring acts to resiliently urge the latch bolt out of the latch bolt housing to the operative, keeper-engaging position, illustrated in Figures 1 and 2. Pin 45 secured in the opposite side walls of the housing and extending through pin slot 41 limits the movement of the latch bolt 37 relative to the latch bolt housing 30, so that the latch bolt can be moved between its extended and retracted positions, but cannot be moved beyond either one of these positions without first removing the pin 45.

The operated spindle assembly 15 comprises a first or knob spindle 46 having an elongated portion 47 of semi-circular cross-section which extends through the lock between the side plates 13 and 14. This spindle 46 has, adjacent one end thereof, a groove 48, which receives the semi-circular tongue 21 in plate 13 to lock the spindle in operative assembly in the plate. The tongue may be engaged in the groove by inserting the spindle through the plate in a position 180 degrees out of its operative position and then rotating it until the key is engaged in the groove. At said one end, the spindle is provided with an outwardly-extending, semi-circular flange 49 received in the knob 17 in a manner which will presently appear.

An elongated, co-axial stem 50 of non-circular, preferably rectangular, cross-section extends from the end of spindle 46 opposite flange 49 to receive knob 18 thereon and the spindle 46 is provided in its flat or diametrical face with an elongated, semi-cylindrical recess 51 adjacent the end from which the stem 50 extends, and a semi-cylindrical recess 52 of smaller diameter than the recess 51 extending from the adjacent end of recess 51 to the flanged end of the spindle.

A second or key operated spindle 53 has a semi-cylindrical portion 54 received in the recess 51 and held against longitudinal movement relative to the spindle 46 by the abutment of its end 55 with the internal shoulder 56 in spindle 46 between recesses 51 and 52. Spindle 53 also has a cylindrical shank 57 partly receivable in the recess 52 and provided at its end opposite the semi-cylindrical portion 54 with a socket 58 having a transverse aperture therethrough. Knob 17 is provided in the end thereof received in boss 20 with a semi-cylindrical abutment 60 the diametrical face of which abuts the diametrical face of the semi-cylindrical flange 49 on spindle 46 so that spindle 46 will be rotated whenever knob 17 is rotated.

A lock tumbler barrel 61 is secured in an axial bore in knob 17 and has at its outer end a knot-retaining flange 59. This barrel receives a key cylinder 62 having on its inner end a rectangular apertured lug 63 received in the socket 58 provided on spindle 53 and secured therein by suitable means, such as the transverse screw 63'. Screw 63 secures knob 17 to spindle 53 which is, in turn, secured to spindle 46, as explained above, so that the knob is held in operative association with the lock by the spindles 46 and 53.

In assembling the lock, a sub-assembly is first made by placing the key cylinder 62 in the tumbler barrel 61, placing the lug 63 of the key cylinder in the socket 58 of the key-operated spindle 53 and inserting the screw 63' through the lug and the socket to secure the tumbler barrel and key cylinder to spindle 53. The key cylinder has a flanged end opposite its end carrying the lock 63 so that the key cylinder cannot pass through the tumbler barrel. The spindle 53, tumbler barrel 61 and key cylinder 62 are then passed through the tumbler barrel-receiving bore in the knob 17 from the outer end of the knob until the socket on the key-operated spindle bears against the semi-circular abutment 60 in the end of the knob, which maintains the lock barrel assembly and key-operated spindle against passing through the knob. Knob-operated spindle 46 is now assembled with the key-operated spindle 53 and knob 17 by inserting the end of spindle 46 carrying flange 49 in the knob bore at the inner end of the knob, so that the diametrical face of spindle flange 49 is opposed to and substantially in contact with the diametrical face of the semi-circular abutment 60 in the knob bore at the inner end of the knob, and then placing the semi-cylindrical portion 54 of spindle 53 in the semi-cylindrical recess 51 in spindle 46. This completes the first sub-assembly.

The knob 18 is now assembled with plate 14. This knob has a cylindrical arbor 64 rotatable in the plate aperture 26. At the inner end of this arbor the knob 18 is provided with an annular shoulder which bears against the outer side of plate 14 to limit movement of the knob inwardly of the plate and the arbor 64 is provided in its outer end with an annular groove. The arbor portion 64 of knob 18 is inserted through aperture 46 in plate 14, a thrust washer 65 is placed on the arbor portion at the inner side of the plate, and a split, circular snap ring 65 is placed in the annular groove in arbor portion 64 to lock knob 18 to plate 14 while permitting free rotation of the knob relative to the plate. This completes a second sub-assembly.

The latch bolt and latch bolt housing assembly with movement-limiting pin 45 omitted is now assembled with the plate 13 by sliding the portion of housing 30 having the grooves 31 therein between the ribs 19, care being taken to see that the latch bolt is beveled in the proper direction for the particular door. This completes a third sub-assembly.

The two spindles 46 and 53 are now inserted through the apertured boss 20 on plate 13 and through aperture 39 in latch bolt 37, and are rotated 180° from their normal operative position so that the flat sides of the two spindles will pass by the diametrical face of the semi-circular tongue 21 in boss 20 until groove 48 in spindle 46 is opposite tongue 21. To permit this rotation of the spindles, latch bolt 37 is retracted into housing 30 beyond its normal limiting position. After groove 48 is brought opposite tongue 21, the two spindles 46 and 53 are rotated to seat tongue 21 in groove 48. This releases latch bolt 37 for movement to a position within its normal range of movement, and pin 45 is now inserted so that the spindles cannot be rotated to a position to release spindle 46 from tongue 21. Knob 17 and spindles 46 and 53 are now secured to plate

13 along with latch assembly 16 and this completes a fourth sub-assembly.

Knob 18 is provided with a bore 67 of non-circular cross-sectional shape opening to the end of the knob on which the arbor portion 64 is provided, which bore receives the stem 50 on spindle 46. The second sub-assembly is now assembled with the fourth sub-assembly by entering the outer end of stem 50 in the bore 67 in knob 18 and bringing plate 14 to bear at its corners on the ends of legs 22 remote from plate 13, plate 14 being so positioned that the dead pin aperture 29 in this plate overlies one of the dead pin apertures 42 in latch bolt housing 30. Screws 24 are now inserted through respective apertures 25 in plate 14 and threaded into the screw-receiving wells in legs 22. This completes the assembly of the lock, and the lock may now be assembled with a door by placing the lock in a lock-receiving notch in the door before the screws 24 are fully tightened, and then tightening the screws to cause the plates 13 and 14 to clamp the door between them.

Knob 18 is provided in the portion thereof received in plate 14 with one or more radial apertures 68 and a dog 69 is slidably mounted in slot 27 and has a pointed end engageable in an aperture 68 to secure knob 18 against rotation.

By this means it is possible to lock the knob 18 and spindle 36 against rotation, so that the latch bolt 37 cannot be withdrawn by operation of either knob.

The manner in which the latch bolt is withdrawn by the knobs rotating spindle 46 is particularly illustrated in Figure 7, wherein both spindles are shown rotated in the latch bolt aperture 39 to a position at which the latch bolt is retracted into the housing 30.

When the knobs are locked by operation of dog 69, as explained above, the latch bolt 37 may still be retracted by use of a key in key cylinder 62 to rotate the second or key operated spindle 53, as illustrated in Figure 8. As shown in this figure, although spindle 46 is held against rotation, spindle 53 is rotatable in the aperture 39 to retract the bolt.

A dead bolt pin 70 is provided slidable through a recess 29 in plate 14 and through one of the apertured sleeves 71 projecting from the latch-bolt housing 30 for the plate 14, and into a corresponding dead-bolt-pin hole 72 in the latch bolt. When pin 70 is pushed inwardly into the corresponding hole 72, the latch bolt cannot be retracted either by the knobs or by a key.

If it is desired to dispense with the use of a key, a blank or dummy key cylinder may be substituted for the key cylinder 62 and forced into the barrel 61 so that it is frictionally held against rotation in the barrel, whereupon the two spindles 46 and 53 will be held in the relative position illustrated in Figure 7 and the spindle 53 will not be operative to retract the latch bolt when the spindle 46 is locked against rotation.

As certain parts of this lock are similar to corresponding parts in my copending application Serial No. 14,419, filed March 12, 1948, for a Door Lock, reference may be had to such copending application for a more detailed description of such parts.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are, therefore, intended to be embraced therein.

What is claimed is:

1. In a door lock, a first rectangular plate having a spindle receiving opening therein, legs extending perpendicularly from one side of said plate and disposed one at each corner of the plate and spaced inwardly from the adjacent plate edges, each of said legs having therein a longitudinally extending well internally screw threaded and opening to the end of the corresponding leg remote from said plate, and a pair of mutually opposed ribs projecting perpendicularly from said one side of said first plate adjacent said spindle receiving opening and spaced apart to receive a latch bolt housing therebetween, a rectangular latch bolt housing received at one end between said ribs and having in respectively opposite sides thereof transversely extending grooves slidably receiving the adjacent edge portions of said ribs, a second rectangular plate having screw receiving apertures disposed one near each corner thereof, and screws extending through the apertures in said second plate and threaded into the wells in said legs to hold said plates in assembled relationship at the respectively opposite sides of a door, said second plate having therein an opening aligned with the opening in said first plate and adapted to rotatably receive an end of a door knob.

2. In a door lock, a first rectangular plate having a spindle receiving opening therein, legs extending perpendicularly from one side of said plate and disposed one at each corner of the plate and spaced inwardly from the adjacent plate edges, each of said legs having therein a longitudinally extending well internally screw threaded and opening to the end of the corresponding leg remote from said plate, and a pair of mutually opposed ribs projecting perpendicularly from said one side of said first plate adjacent said spindle receiving opening and spaced apart to receive a latch bolt housing therebetween, a rectangular latch bolt housing received at one end between said ribs and having in respectively opposite sides thereof transversely extending grooves slidably receiving the adjacent edge portions of said ribs, a second rectangular plate having screw receiving apertures disposed one near each corner thereof, screws extending through the apertures in said second plate and threaded into the wells in said legs to hold said plates in assembled relationship at the respectively opposite sides of a door, said second plate having therein an opening aligned with the opening in said first plate and adapted to rotatably receive an end of a door knob, and an annular boss on the other side of said first plate surrounding said spindle receiving opening and adapted to rotatably receive an end of a door knob complementary to the first mentioned door knob.

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

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