July 4, 1933. J. HILLGREN ET AL 1,916,266

DOORLOCK

Filed June 16, 1930

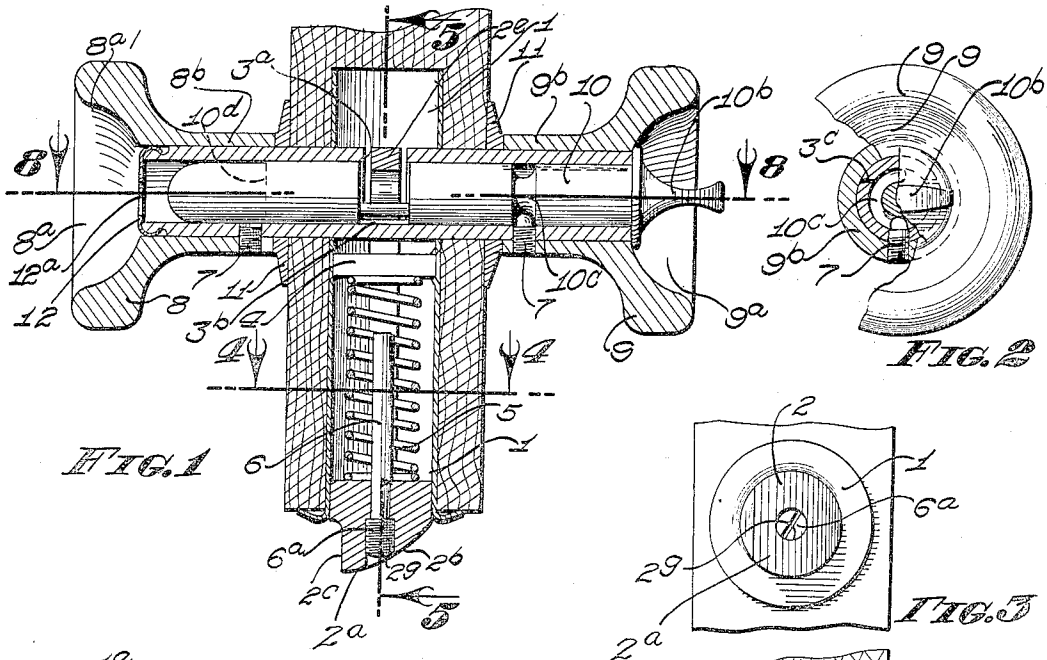


FIG. 1

FIG. 2

FIG. 3

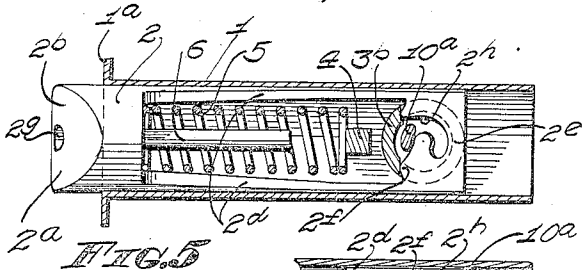


FIG. 5

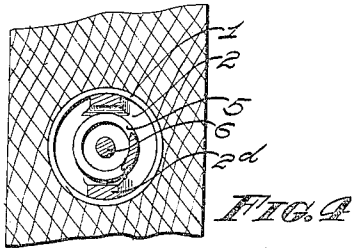


FIG. 4

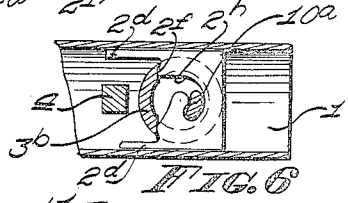


FIG. 6

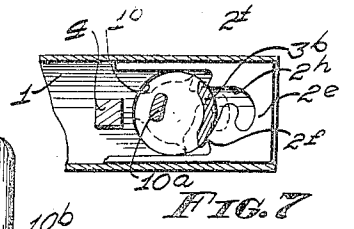


FIG. 7

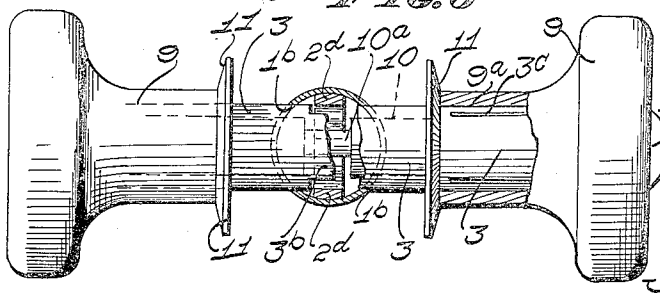


FIG. 8

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UNITED STATES PATENT OFFICE

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DOORLOCK

Application filed June 16, 1930. Serial No. 461,452.

Our invention relates to door locks, and the objects of our invention are:

First, to provide a door lock in which a brace and bit or the equivalent is all that is necessary to prepare a door for receiving said door lock, all need of large cut out portions in the door for receiving clumsy lock cages, or the like, being unnecessary;

Second, to provide a door lock in which the locking means is contained within the door knob spindle, and in which the operating portions of said locking means are centered in the door knob;

Third, to provide a door lock which is particularly compact, all parts excepting the door knobs being within the margins of either one of two intersecting circular cylinders;

Fourth, to provide a door lock which is extremely easy to install;

Fifth, to provide a door lock which is particularly economical of construction, being composed of a minimum number of parts, and these being simply made; and

Sixth, to provide on a whole a novelly constructed door lock which is durable, sturdy, efficient in its action, and which will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter, our invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawing and to the characters of reference thereon, which form a part of this application, in which:

Figure 1 is a fragmentary sectional view in plan of a door and our door lock shown in connection therewith, with parts and portions in elevation to facilitate the illustration; Fig. 2 is an end elevational view of one of the door knobs with parts and portions in section; Fig. 3 is an end elevational view of the locking bolt and its casing, and adjacent portions of the door shown fragmentarily; Fig. 4 is a transverse sectional view through 4—4 of Fig. 1; Fig. 5 is a sectional view through 5—5 of Fig. 1, with the door omitted and with parts and portions in elevation; Fig. 6 is a fragmentary view similar to Fig. 5, showing the locking means in position for locking the bolt; and Fig. 7 is another similar fragmentary sectional view showing the bolt in its retracted positions; and Fig. 8 is a sectional view through 8—8 of Fig. 1, with parts and portions in elevation to facilitate the illustration.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawing.

Bolt casing 1, latch bolt 2, knob spindle 3, spring support 4, spring 5, stop 6, set screws 7, knobs 8 and 9, locking rods 10, escutcheons 11, and key plate 12 constitute the principal parts and portions of our novel door lock.

The bolt casing 1 is in the form of an open-ended circular cylinder, which is adapted to fit into a recess bored into the edge of a door. The outer end of the casing 1 is provided with an external flange 1*a*, which fits against the edge margin of the door, as shown in Figs. 1, 3, and 5.

Slidably mounted in the bolt casing 1 is a latch bolt 2. The latch bolt 2 comprises a head portion 2*a* of circular cross section, which is adapted to fit snugly within the casing 1 and protrude therefrom. The protruding portion of the head 2*a* is provided with a beveled side 2*b*. The opposite exposed side of the head 2*a* is notched back so as to form a flat axially extending surface 2*c*, adapted to lock in a conventional keeper mounted on the door jamb, not shown.

Extending rearwardly from the head 2*a* at the upper and lower margins thereof and contiguous to the walls of the casing 1 are a pair of arms 2*d*, which are integral with the head 2*a*, and are joined together at their extended ends by a cross portion 2*e*.

Near the extended ends of the arms 2*d*, the opposite side walls of the casing 1 are provided with alined openings 1*b*. Extending at right angles to the casing 1 through these openings 1*b*, is a knob spindle 3, which is also in the form of a hollow annular cylinder, but of less diameter than the casing 1. The walls of the spindle 3 are considerably thicker than the walls of the casing 1. The

knob spindle 3 has a diameter small enough to fit between the arms 2*d* of the bolt 2.

The spindle 3 is provided with a notched portion 3*a*, leading an eccentrically located arcuate crank portion 3*b*. The arms 2*d*, a slight distance forwardly of the cross portion 2*e*, are provided with inwardly extending projections 2*f* forming shoulders which are adapted to be engaged by the marginal portions of the crank 3*b*, as shown best in Figs. 5, 6, and 7.

A slight distance forwardly of the crank portion 3*b*, the casing 1 supports a transversely extending spring support 4 in the form of a polygonal shaped bar, which is secured at its ends to the walls of the casing, as shown best in Figs. 1 and 5.

A spring 5 extends between the support 4 and the head 2*a* of the latch bolt. This spring tends to force the latch bolt to its extended or forward position and bring the shoulders 2*f* into yieldable contact with the margins of the crank 3*b*.

The head 2*a* of the latch bolt is provided with a centrally located axially extending opening 2*g* therethrough, which is adapted to receive a stop pin 6. The stop pin 6 is provided with a head portion 6*a*, which is externally threaded so as to fit into an internally threaded portion of the opening 2*g*. The stop pin 6 extends rearwardly from the head 2*a* of the latch bolt, and is arranged so that its rearward or extended end engages the support when the latch bolt has moved inwardly a predetermined distance.

When the spindle 3 is turned in either direction, the web 3*b* engages one or the other of the shoulders 2*f* so as to draw the lock bolt inwardly or rearwardly against the action of the spring 5. This movement is shown by dotted lines in Fig. 7. The stop pin 6 is adjusted so that the bolt cannot normally move inwardly to the solid line position shown in Fig. 7. However, in installing or removing the door lock, the stop pin 6 is shifted so as to allow the bolt to move into the solid line position shown in Fig. 7, whereupon the knob spindle 3 may be withdrawn from the door.

The knob spindle 3 extends transversely through the door and protrudes from the sides thereof. Secured to the protruding ends of the spindle 3, by set screws 7, are door knobs 8 and 9, which are provided with substantially semi-spherical depressions 8*a* and 9*a*, in their outer faces intersected by the bore through the shank portions 8*b* and 9*b*, respectively, of the two knobs.

Rotatably mounted within the hollow knob spindle 3, is a locking rod 10. Opposite the notched portion 3*a* of the spindle 3, the locking rod 10 is cut away except for an eccentrically located web portion 10*a*.

Cut into the cross portion 2*e*, from the forward side thereof, is an arcuate slot 2*h*, its center of curvature substantially coinciding with the axis of the spindle 2, as shown best in Figs. 5, 6, and 7. The slot 2*h* is widened as it approaches the forward margin of the cross portion 2*b*, so as to provide space for the web 10*a*. The web 10*a* is adapted to rotate in a path conforming to the slots 2*h*. When the web 10*a* is in the position shown in Fig. 5, the latch bolt is free to move within its casing. When the locking rod 10 is rotated so that the web 10*a* is in the position shown in Fig. 6, the latch bolt is locked against movement.

The one end of the locking rod 10 is provided with a handle portion 10*b*, which extends into the recess portion 9*a* of the knob 9. The handle portion 10*b* is arranged to be engaged by the thumb and forefinger of the hand.

In order to definitely limit its movement, the locking rod 10 is provided with an arcuate channel 10*c* therein opposite one of the pins 7, which receives said pin. This is shown in Figs. 1 and 2.

To prevent the locking rod 10 from turning too easily, the walls of the spindle 3 within the shank 9*b* of the handle 9 are provided with slits 10*c*, and bifurcated portions thus formed are pressed together so as to yieldably engage the locking rod.

The end of locking rod 10 opposite from the handle 10*b* is provided with a suitably formed notch 10*d* adapted to receive a key inserted in the end of the spindle 3 having the knob 8. This end of the spindle 3 may be provided with a suitable cap 12, having a slot 12*a* cut therein adapted to receive a particularly designed key.

Suitable escutcheon plates 11 may be provided between the knobs 8 and 9 of the door so as to give the door lock a finished appearance.

Installation and operation of the door lock is as follows: A recess large enough to receive the casing 1 is bored into the edge of the door. A hole only large enough to receive the knob spindle 3 is bored at right angles to the recess so as to intersect therewith. The casing 1 is inserted in the recess until the openings 1*b* are in alinement with the hole bored through the door. The latch bolt 2 is pressed inwardly until in the position shown in Fig. 7, whereupon the knob spindle 3 is inserted through the door until the cut away portion 3*a* coincides with the latch bolt. The knobs and escutcheon plates are placed on the extended ends of the spindle. The locking rod is inserted within the spindle and the set screws are positioned. The spindle is then turned until in the position shown in Fig. 5, and the lock pin is adjusted so that the locking bolt is limited to the desired movement.

The latch is normally in the extended position shown in Fig. 1. A turn on the knob

in either direction from this normal position draws the latch bolt 2 within the casing 1, and upon releasing either knob, the latch bolt tends to return to its normal position.

When desiring to lock the bolt in position, the locking rod 10 is turned so that the web 10*a* shifts from the position shown in Fig. 5 to the position shown in Fig. 6, whereby the latch bolt cannot shift without engaging the web 10*a*.

Though we have shown and described a particular construction, combination and arrangement of parts and portions, we do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the scope of our invention the construction, combination and arrangement substantially as set forth in the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a door lock, a cylindrical bolt casing fitted into the edge of a door, a latch bolt slidably mounted therein, a hollow cylindrical spindle intersecting said bolt casing in said door, a crank operated by said hollow spindle engageable with said latch bolt at its inner end, an eccentric locking bar rotatable in said spindle and extending through said latch bolt, and a hook means carried by said latch bolt and arranged to coact with said locking bar.

2. In a door lock arranged to fit within an annular cylindrical recess formed at the edge of a door, and a similar intersecting opening passing through said door, a cylindrical bolt casing arranged to fit in said recess, a latch bolt mounted within said bolt casing, a hollow spindle extending through said opening and transversely through said casing, said latch bolt comprising a head portion arranged to protrude from said casing, and an integral closed loop portion extending inwardly therefrom around said spindle, a crank portion formed by said spindle engageable with said loop portion for forcing said latch bolt into said casing, and a locking bar extending through said spindle and through said loop portion, said spindle provided with an aperture therein, at said crank portion, an eccentric portion disposed intermediate the ends of said locking bar and exposed by said aperture, and a hook portion carried by said latch bolt and protruding into said loop portion, said hook portion arranged to be engaged by said eccentric portion and be held thereby against the action of said spindle.

3. In a door lock arranged to fit within an annular cylindrical recess formed in the middle of the edge of a door and a similar intersecting opening passing through said door, a cylindrical bolt casing secured in said recess, a latch bolt mounted in said recess consisting of a head, and a pair of side members extending backwardly therefrom and forming a loop at its opposite end, a spring guide mounted centrally in said head, a spring mounted around said guide and abutting said head, a hollow cylindrical spindle extending through said opening and transversely through said casing, said spindle cut away at its middle portion adjacent the looped end of said latch bolt and leaving a portion on one side thereof forming a crank of said spindle, said side portions engageable with said looped portion for forcing said latch bolt into said casing, a cylindrical lock means revolubly mounted in said spindle cut away similarly to said spindle at its middle portion and provided with a lug portion at said cut away portion, said lug portion adapted to engage a notch in the looped portion of said latch bolt and locking said latch bolt with said lug member for turning in a certain position in said spindle.

4. In a door lock arranged to fit within an annular cylindrical recess formed in the middle of the edge of a door and a similar intersecting opening passing through said door, a cylindrical bolt casing secured in said recess, a latch bolt mounted in said recess consisting of a head, and a pair of side members extending backwardly therefrom and forming a loop at its opposite end, a spring guide mounted centrally in said head, a spring mounted around said guide and abutting said head, a hollow cylindrical spindle extending through said opening and transversely through said casing, said spindle cut away at its middle portion adjacent the looped end of said latch bolt and leaving a portion on one side thereof forming a crank of said spindle, said side portions engageable with said looped portion for forcing said latch bolt into said casing, a cylindrical lock means revolubly mounted in said spindle cut away similarly to said spindle at its middle portion and provided with a lug portion at said cut away portion, said lug portion adapted to engage a notch in the looped portion of said latch bolt and locking said latch bolt with said lug member for turning in a certain position in said spindle, and knobs secured on the outer ends of said spindle and a knob secured on the end of said lug means positioned centrally in one of said knobs.

5. In a door lock, a latch bolt including a head portion, a loop portion extending therefrom and closed at its extended end, a hook at the extended end of said loop portion projecting towards said head portion into the aperture formed by said loop portion, and shifting lugs projecting into said aperture at opposite sides of said hook, means for slidably supporting said latch bolt, a hollow spindle including a crank portion intermediate its ends, said spindle arranged to extend through said aperture with said crank portion in engageable relation with said

shifting lugs, a locking bar rotatably mounted in said hollow spindle, and an eccentric portion formed intermediate the ends of said locking bar and disposed opposite said crank portion, said eccentric portion engageable with said hook.

6. In a door lock, a slidable latch bolt including a head portion, a loop portion extending therefrom and closed at its extremity, a hook at the extremity of said loop portion disposed so as to project towards said head portion into the aperture formed by said loop portion, means for shifting said latch bolt, and a rotatable locking bar projecting through the aperture in said latch bolt, said locking bar including an eccentric portion intermediate its ends arranged to rotate from an interlocked relation with said hook to a disengaged relation therewith.

7. In a door lock, a slidable latch bolt including a head portion, a loop portion extending therefrom and closed at its extremity, a hook at the extremity of said loop portion disposed so as to project towards said head portion into the aperture formed by said loop portion, means for shifting said latch bolt, a rotatable locking bar projecting through the aperture in said latch bolt, said locking bar including an eccentric portion intermediate its ends arranged to rotate from an interlocked relation with said hook to a disengaged relation therewith, means at one extremity of said locking bar arranged to coact with a key, and handle means at the other extremity of said locking bar.

8. In a door lock, a latch bolt including a head portion, a loop portion extending therefrom and closed at its extended end, a hook at the extended end of said loop portion projecting towards said head portion into the aperture formed by said loop portion, and shifting lugs projecting into said aperture at opposite sides of said hook, means for slidably supporting said latch bolt, a hollow spindle including a crank portion intermediate its ends, said spindle arranged to extend through said aperture with said crank portion in engageable relation with said shifting lugs, a locking bar rotatably mounted in said hollow spindle, an eccentric portion formed intermediate the ends of said locking bar and disposed opposite said crank portion, said eccentric portion engageable with said hook, means at one extremity of said locking bar arranged to coact with a key, and handle means at the other extremity of said locking bar.

9. In a door lock, a cylindrical casing, a latch bolt slidably mounted therein, said latch bolt provided with an aperture intermediate its ends, a hook carried by the inner end of said latch bolt and disposed so as to extend towards the outer end of said latch bolt and into said aperture, a rotatable locking bar extending through said aperture, said locking bar including a turning handle at one extremity, a key operable means at its other extremity, and a locking means intermediate its ends, said locking means shifted from an interlocking relation to a disengaged relation with said hook upon rotation of said locking bar.

10. In a door lock, a cylindrical casing, a latch bolt slidably mounted therein, said latch bolt provided with an aperture intermediate its ends, a hook carried by the inner end of said latch bolt and disposed so as to extend towards the outer end of said latch bolt and into said aperture, a spindle extending through said aperture, said spindle including a crank portion intermediate its ends, knobs at the extremities of said spindle, a locking bar rotatably mounted in said spindle and extending therewith into both of said knobs, said locking bar including a turning handle at one extremity, a key operable means at the other extremity, and a locking means intermediate its ends, said locking means disposed opposite the crank portion of said spindle and within the aperture of said latch bolt, said locking means being shiftable from an interlocked relation to a disengaged relation with said hook upon rotation of said locking bar.

In testimony whereof, we have hereunto set our hands at San Diego, California this 31st day of May, 1930.

JAMES HILLGREN.
CARL HILLGREN.