April 18, 1950 C. R. ABRAHAM 2,504,483

LOCKING DEVICE

Filed Sept. 30, 1946

2 Sheets-Sheet 1

Fig. 1.

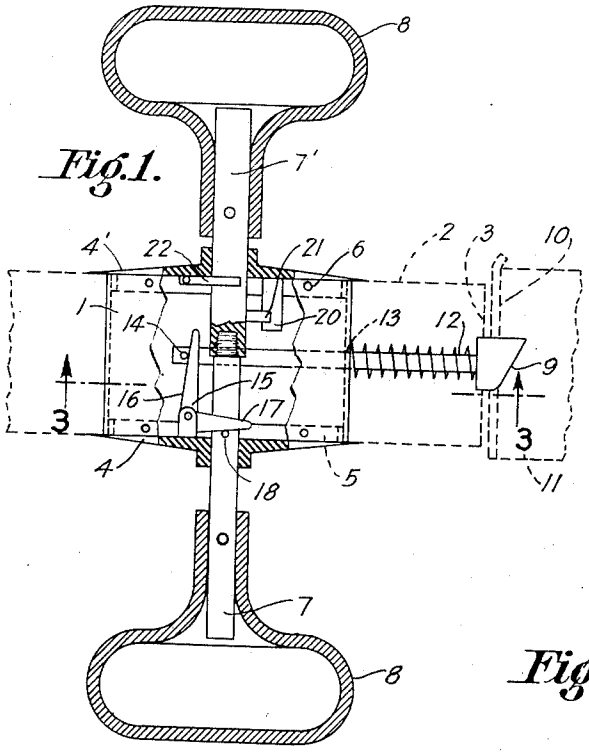


Fig. 2.

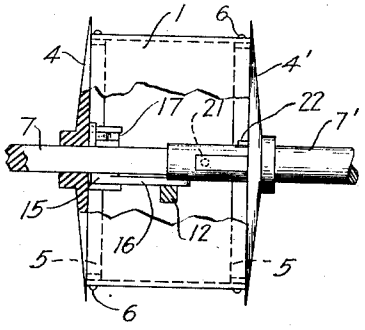


Fig. 4.

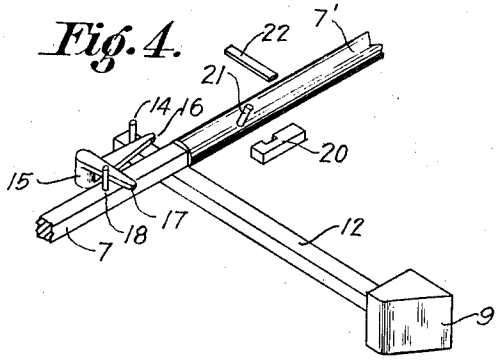
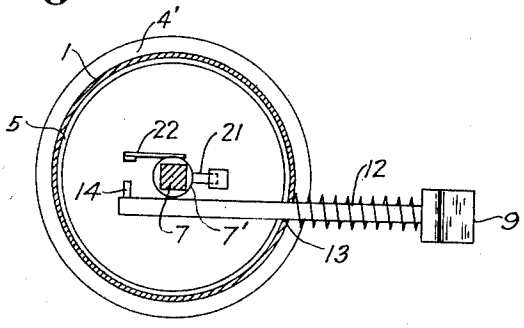


Fig. 3.



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Fig. 5.

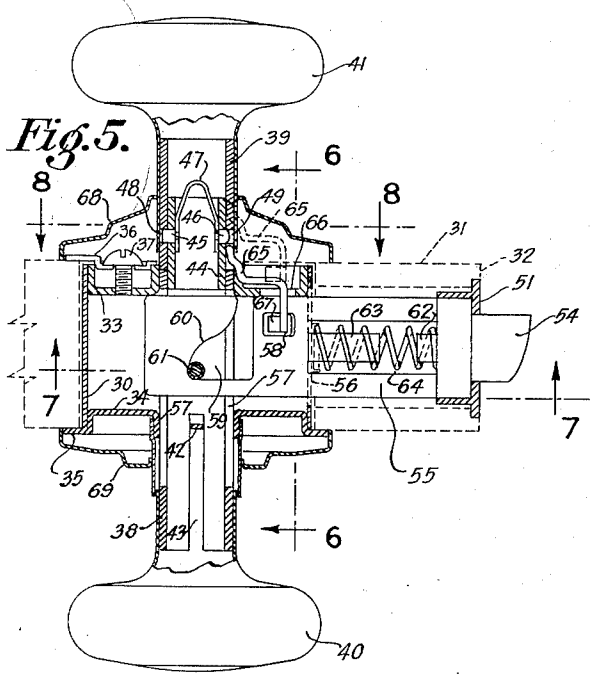


Fig. 6.

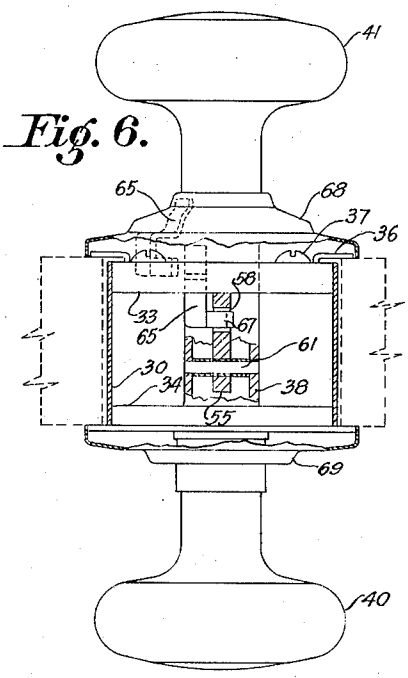


Fig. 7.

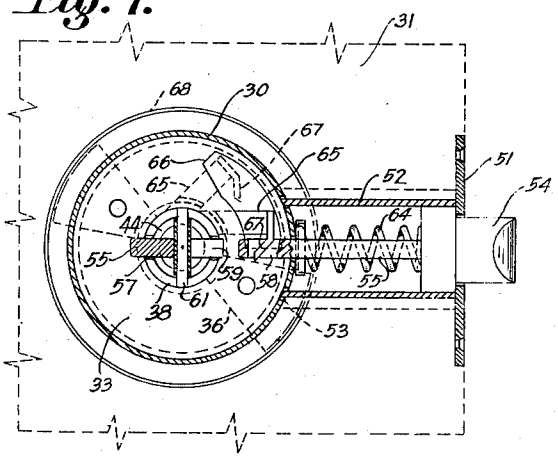
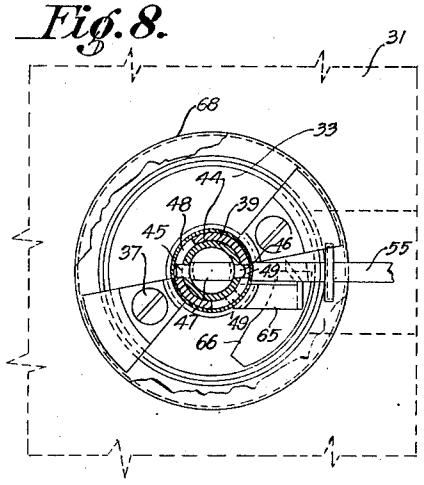


Fig. 8.



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LOCKING DEVICE

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Application September 30, 1946, Serial No. 700,191

3 Claims. (Cl. 292—174)

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This invention relates to a locking device, designed particularly for use on doors, having a handle on each of the opposite faces of the door and a latching element in the door edge, whereby a push or pull movement of the respective handles either toward or from the door will disengage the latching element from the latch strike, and an oscillating movement of one of the handles will lock the latching element in engagement with the latch strike and render the other handle temporarily inoperative.

An object of the invention is to provide a locking device that will be superior in point of simplicity, inexpensiveness of construction, positiveness of operation, and facility and convenience in use and general efficiency.

In this specification and the annexed drawings, the invention is illustrated in the forms considered to be best, but it is to be understood that the invention is not limited to such forms, because it may be embodied in other forms; and it is also to be understood that in and by the claims following the description, it is desired to cover the invention in whatsoever form it may be embodied.

In the accompanying drawings:

Figure 1 is a plan view of a locking device constructed in accordance with my invention and showing the same mounted in relation to a door and the strike plate on a door jamb;

Figure 2 is a front view of Figure 1;

Figure 3 is a section taken through Figure 1 on the line 3—3;

Figure 4 is a diagrammatic perspective view of the mechanism constituting the locking device;

Figure 5 is a plan view of a modified form of the locking device embodied in the invention;

Figure 6 is a view in section taken along lines 6—6 of Figure 5;

Figure 7 is a view in section taken along lines 7—7 of Figure 5; and

Figure 8 is a view in section taken along lines 8—8 of Figure 5.

In detail the construction illustrated in Figures 1–4 of the drawings comprises a cylindrical barrel member 1 which is located transversely between the opposite faces of a door 2, a slight distance back from the edge 3 of said door.

The cover plates 4'—4' are adapted to enclose the opposite open ends of the barrel 1, each plate 4—4' having an annular shoulder 5 on the inside face thereof to fit within the bore of the barrel 1. A set screw 6 or similar locking device is provided to hold the plates 4—4' and barrel 1 together.

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The plate 4 is provided with a centrally disposed square bore in which a square shaft 7 is reciprocatingly mounted. The plate 4' has a centrally disposed round bore within which a shaft 7' is reciprocatingly and oscillatingly mounted. The shaft 7' is round while the shaft 7 is flat-sided. The inner end of the shaft 7' is formed to provide a recess therein in which the inner end of the shaft 7 is received. Suitable means connect the inner ends of the shafts 7, 7' together for mutual sliding movement while, at the same time, permitting the round shaft 7' to be rotated relative to the flat-sided shaft 7. A knob or handle 8 is secured to each of the outer ends of the shafts 7—7', there being a selected amount of space between the inner face of each handle 8 and the outer face of each plate 4, to permit of a reciprocative stroke of predetermined distance of the shafts 7'—7', as will hereinafter be described.

A latch bolt 9 extends out through the edge 3 of the door for contact with a strike plate 10 on the door jamb 11. The latch bolt 9 has a stem 12 thereon which is axially slidable in a guide 13 in the barrel 1, said stem 12 being long enough to extend across the longitudinal axis of the shafts 7—7' at right angles thereto. The extreme end of the stem 12 has a pin 14 thereon. A bell-crank has its elbow 15 pivoted to the inner face of the plate 4. One arm 16 of the bell-crank abuts against the pin 14 on the stem 12 while the other arm 17 of the bell-crank abuts against a pin 18 on the shaft 7.

The other plate 4' on its inside face, is provided with a projection having a notch 20 with which a pin 21 on the shaft 7' is adapted to be engaged when the said shaft 7' is oscillated through an arc of about 90°. A spring 22 is carried by the plate 4' and bears against the shaft 7' and barrel 1 to keep the pin 21 in a normal position of operation out of engagement with the notch 20. This is accomplished by any suitable frictional connection between spring 22 and shaft 7', such as spring receiving notches in the shaft 7'. By turning the shaft 7' and engaging the pin 21 with the notch 20, it then becomes impossible to actuate the stem 12 of the latch bolt 9 by the shaft 7 and thus the door 2 is maintained in a so-called "locked" position.

This particular locking device has been designed for doors which are required to be locked and unlocked from one side only. The connection of the shaft 7'—7' permits said shafts to be reciprocated, the shaft 7 by a "push" movement and the shaft 7' by a "pull" movement, for nor-

mally disengaging the latch bolt 9 from the strike plate.

In order to lock the door in a closed position from one side only, the shaft 7' is oscillated to engage the pin 21 and slot 20. At any time and particularly when the door is in the locked position the square shaft 7 is useless for the purpose of disengaging the pin 21 from the slot 20, although said shaft 7 may be reciprocated. When the shaft 7' has been turned to disengage the pin 21 from the slot 20, then the device functions in its normal manner.

A modification of the locking device shown in Figures 5–8 is comprised of a cylindrical barrel 30, which is located transversely between the opposite faces of a door 31, a slight distance back from the edge 32 of said door, an annular member 33 secured within one end of the bore of the barrel 30, and another annular member 34 secured within the opposite end of the barrel, said latter member having a flange 35 adapted to abut the door 31 to prevent transverse movement in one direction of the barrel with respect to the door. A plurality of cleats 36 secured to the annular member 33, as by screws 37, serve to prevent transverse movement in the other direction of the barrel 30.

A pair of co-axial shafts of equal diameter 38 and 39, having secured to the outer ends thereof knobs 40 and 41, are journalled for support in the annular members 33 and 34, shaft 38 being locked against rotation by a pin 42, carried by the annular member 34, extending within a longitudinal slot 43 in said shaft. A sleeve 44, press fitted or otherwise secured to the inner end of the shaft 39 so as to be non-rotatable with respect thereto, has a pair of diametrically opposed apertures having extending therethrough a key 45 and a catch button 46 yieldingly urged apart by a spring 47. The key 45 extends into an arcuate keyway 48 in the shaft 39 and the catch button 46 is adapted to selectively register with either of a pair of radially spaced apertures 49 in the shaft 39 as said shaft is rotated, for a purpose which will hereinafter appear. Shaft 39 is therefore locked for longitudinal travel with the shaft 38 by the key 45 while being relatively rotatable therewith.

A latch bolt guide, comprised of a plate 51 secured to the edge of the door 31 and a pair of arms 52 extending into open ended slots 53 in the barrel 30 to secure said barrel against rotation, contains a latch bolt 54 having a stem 55 extending through a slot 56 in the barrel 30 and through a diametral slot 57 in the shaft 38. The stem 55 has a rectangular locking aperture 58 therethrough, and an open ended cam slot 59 is also provided in the stem, said slot having a cam surface 60 adapted to be engaged by a pin 61 secured at each end to the internal surface of the shaft 38. The stem 55 is symmetrically cut away to provide guide tongues 62 and 63 for a spring 64 bearing against the barrel 30 and the latch bolt 54.

A locking arm 65 secured at one end to the shaft 39 is bent at a right angle to pass through a radial slot 66 in the annular member 33, said arm having a downwardly and reversely bent tongue 67, as shown most clearly in Figures 5 and 7, adapted to extend in one position of the arm 65 through the locking aperture 58 in the stem 55.

Annular cover plates 68 and 69 secured to opposite faces of the door 31 complete the structure of the locking device.

When the locking arm 65 is in the upper position of Figure 7, the catch button 46 is in registration with the lower aperture 49, as seen in Figure 8, and the locking device is in the unlocked position. The device is then operable to unlatch the door from the door jamb, not shown, in the following manner. A push on knob 40 or a pull on knob 41 is effective to move shafts 38 and 39 transversely of the barrel 30 to cause the pin 61 to move along the cam face 60 of the cam slot 59 to move the stem 55 inwardly of the barrel through the slot 56 therein and withdraw the latch bolt 54 from the door jamb against the opposing force of the spring 64. As this occurs, the locking arm 65 is withdrawn through the radial slot 66 in the annular member 33 to the position shown in dotted outline in Figure 5. The door 31 may then be opened.

When the hand of the operator is removed from either of the knobs 40 or 41, the stem 55 and shafts 38 and 39 are returned to the position of Figure 5 by the spring 64.

The relatively slight frictional engagement between the button 46 and the aperture 49 is sufficient to prevent an accidental rotation of the shaft 39 and possible locking of the device when this result is not desired. An intentional locking of the device may be had by turning the knob 41 so as to rotate the shaft 39 in a clockwise direction, as viewed in Figure 7. The shaft 39 is rotated until the button 46 audibly snaps into engagement with the other of the two apertures 49 in the shaft 39. The arm 65 is thus moved within the radial slot 66 to the lower position of Figure 7 to move the tongue 67 of the arm within the locking aperture 58 in the stem 55. Any attempt to open the door by a transverse movement of the shafts 38 and 39 therein is now thwarted, since a slight movement of said shafts is effective to bring the tongue 67 into engagement with the side of the aperture 58 to prevent further relative movement between the pin 61 and the cam face 60 before the latch bolt 54 is freed from the door jamb.

In the event that the door is closed with the arm 65 in the locking position, damage to the latch bolt 54 is prevented since the latch bolt is forcibly moved inwardly by the door jamb to cause the slightly inclined end of the locking aperture to strike the reversely bent portion of the tongue 67 and pivot the locking arm to the unlocking position, as best shown in Figure 7.

It is apparent from an examination of the drawings that the structure of the locking device of the modification prevents the occurrence of a situation where the device is thought to be in a locked position, when it is in fact not locked. For example, if the latch bolt 54 should happen to be retained in the withdrawn position after the device has been operated to open the door, the operator, upon closing the door and turning the knob 41 toward the locking position, cannot reasonably be led to believe that the door is locked, since the locking aperture 58 is not in position where the tongue 67 can be depressed therein. This being so, the knob 41 will not be rotatable in the degree necessary to normally accomplish the locking of the door, and the button 46 will not audibly snap into registration with one of the apertures 49 in the shaft 39 to indicate to the operator that the device is in the locking position.

What I claim as new and desire to secure by Letters Patent is:

1. In a locking device, including a latch bolt

and means mounting said latch bolt for reciprocal movement into and out of a locking position; means for actuating said bolt, comprising a pair of axially aligned shafts, means mounting one of said shafts for sliding movement at right angles to said bolt, means mounting the other shaft for similar sliding movement and also for rotary movement, handles fixed on the outer ends of said shafts, means connecting the adjacent inner ends of said shafts together for mutual sliding movement but adapted to permit rotary movement of said second shaft relative to said first shaft, an operative connection between said first shaft and said bolt and adapted to reciprocate said bolt upon sliding movement of said shafts, and means carried by said second shaft adapted to be engaged with the latch bolt when said second shaft is rotated to lock both shafts against sliding movement, said means being adapted to be moved out of engagement with said latch bolt to free the shafts for sliding movement upon the application of a force directly to the latch bolt sufficient to urge said latch bolt to an unlocking position.

2. In a locking device, including a latch bolt and means mounting said latch bolt for reciprocal movement into and out of a locking position, means for actuating said bolt comprising a shaft, means mounting said shaft for sliding movement at right angles to said bolt, handles fixed on the outer ends of said shaft, an operative connection between said shaft and said bolt and adapted to reciprocate said bolt upon sliding movement of said shaft, and means adapted to be engaged with the latch bolt to lock the shaft against sliding movement, said means being adapted to be moved out of engagement with said

latch bolt to free the shaft for sliding movement upon the application of a force directly to the latch bolt normally sufficient to urge said latch bolt to an unlocking position.

3. In a locking device, including a latch bolt and means mounting said latch bolt for reciprocal movement into and out of a locking position, means for actuating said bolt comprising a shaft, means mounting said shaft for sliding movement at right angles to said bolt, handles fixed on the outer ends of said shaft, an operative connection between said shaft and said bolt and adapted to reciprocate said bolt upon sliding movement of said shaft, and locking means associated with said shaft adapted to be engaged with the latch bolt to lock the shaft against sliding movement, said locking means being such that the shaft cannot be locked against sliding movement when the latch bolt is withdrawn a predetermined degree from its normal locking position.

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