April 2, 1929. F. E. BEST ET AL 1,707,215

MORTISE KNOB LOCK

Original Filed Feb. 11, 1925 2 Sheets-Sheet 1

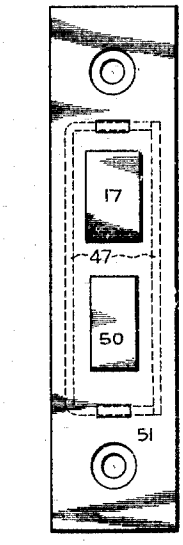


Fig. 2

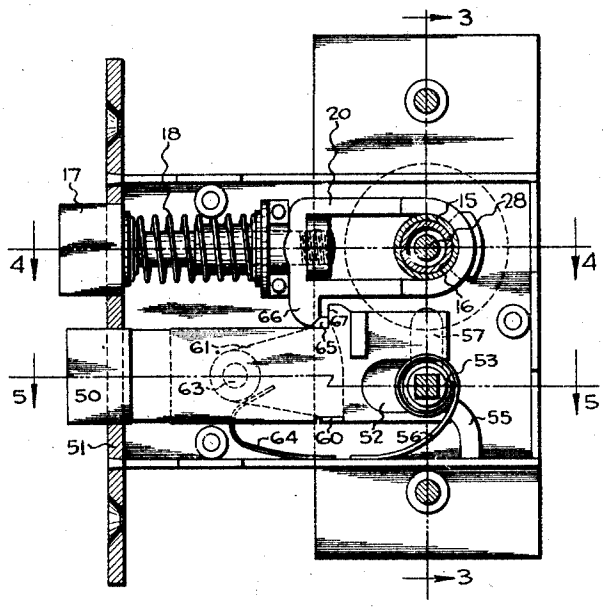


Fig. 1

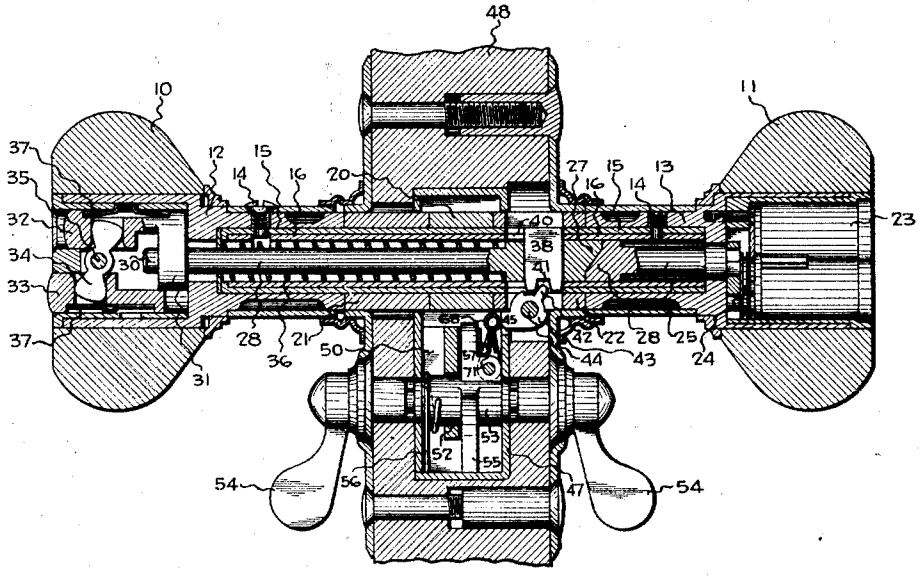


Fig. 3

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FIG- 5

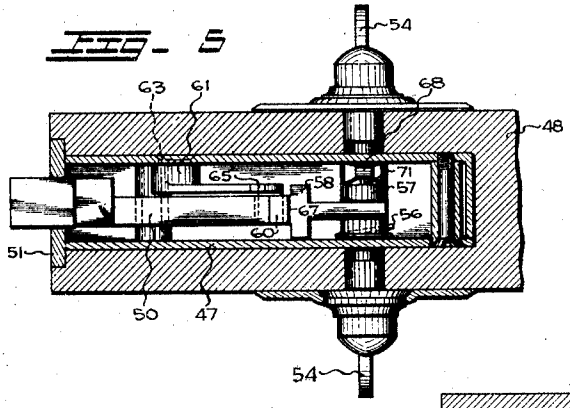


FIG- 4

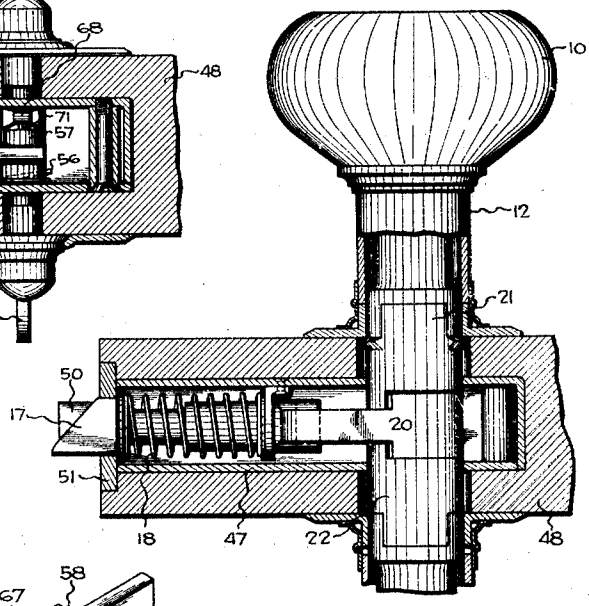


FIG- 6

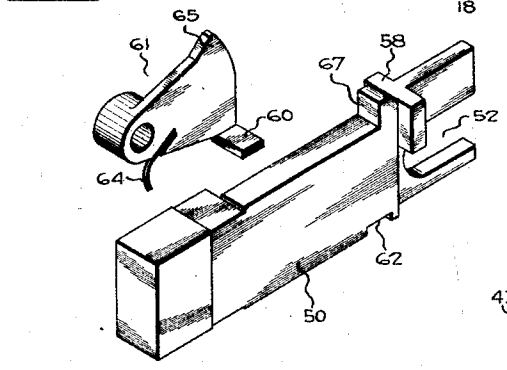
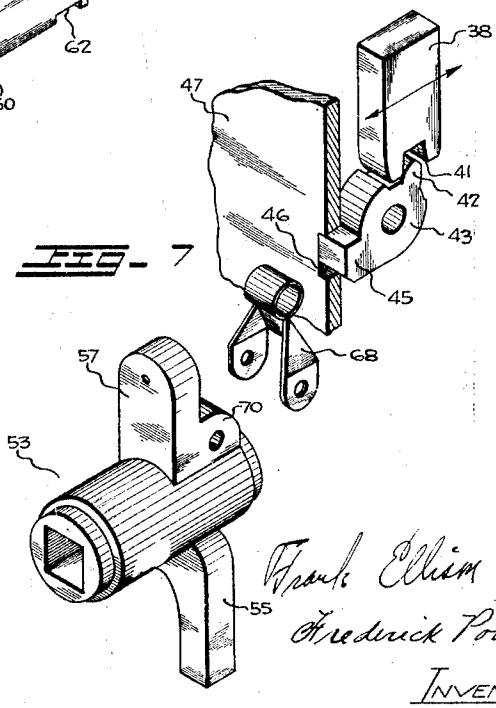


FIG- 7



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UNITED STATES PATENT OFFICE.

FRANK ELLISON BEST AND FREDERICK POWELL, OF SEATTLE, WASHINGTON, ASSIGNORS TO FRANK E. BEST, INC., OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON.

MORTISE KNOB LOCK.

Application filed February 11, 1925, Serial No. 8,493. Renewed August 28, 1928.

Our invention relates to improvements in mortise knob locks and is in the nature of an improvement on the knob lock shown and described in our prior application Serial Number 733,810 filed August 23, 1924.

The objects of this improvement are to provide a knob lock of this nature having in combination a dead bolt arranged to be manually operated from either side of the door and having means connected with and operated by the knob lock mechanism for making it impossible to throw the dead bolt until the knob lock mechanism is locked and for preventing the retraction of the dead bolt in any way except by turning the knob.

Other and more specific objects will be apparent from the following description taken in connection with the accompanying drawings.

In the drawings Figure 1 is a view with the cover plate removed of a lock constructed in accordance with this invention.

Fig. 2 is an edge view showing the front plate of the lock.

Fig. 3 is a sectional view substantially on broken line 3—3 of Fig. 1 parts being shown in plan.

Fig. 4 is a sectional view substantially on broken line 4—4 of Fig. 1, parts being shown in plan.

Fig. 5 is a view partly in section and partly in elevation substantially on broken line 5—5 of Fig. 1.

Fig. 6 is an isometric view showing a dead bolt and a catch member therefor.

Fig. 7 is a similar isometric view showing dead bolt throw mechanism and certain devices for locking the knob spindles and the dead bolt throw means.

Like reference numerals designate like parts throughout the several views.

Referring to the drawings, we show a knob lock of the type disclosed in the prior application hereinbefore mentioned comprising inner and outer knobs 10 and 11 mounted on shanks 12 and 13 respectively that are secured by screws 14 to certain tubular spindles 15 and 16 and are arranged, when turned, to retract a latch bolt 17 that is urged outwardly by a spring 18. The inner end of the latch bolt 17 is slidably connected with a stirrup member 20 through which the knob shanks 15 and 16 extend, said stirrup 20 being arranged to be engaged and retracted by sleeves 21 and 22 on the spindles 15 and 16 that are turned by rotation of the knobs. If an attempt is made to pick the lock by inserting a thin instrument between the door and the jamb and forcing the latch bolt back by pressure on the inclined surface of said latch bolt the shank of the latch bolt will slide rearwardly through stirrup 20 without moving said stirrup.

A pin tumbler lock 23 is provided in the outer knob shank 13 and is connected by suitable throw mechanism 24 with a rotatably supported locking spindle 25 having on one end a cam 26 that engages with a corresponding cam 27 on a longitudinally movable locking spindle 28 so that when the spindle 25 is turned the spindle 28 will be moved endwise, the endwise movement of spindle 28 controlling the locking and unlocking of the bolts as hereinafter described. Spindle 28 extends into inner knob shank 12 and terminates in a head 30 that engages with a rigid cross member 31 on a push button 32. Another push button 33 is provided in knob shank 12 and is connected with push button 32 by a small beam 34 that is pivoted at 35 and is arranged so that when one push button is pressed inwardly the other push button will snap out. A spring 36 urges spindle 28 outwardly and is arranged to compress when the spindle 28 is moved inwardly by depressing push button 33. Springs 37 form yielding detent means for holding the push buttons at the limit of their movement in either direction.

All of the above mentioned parts are substantially the same as those described in our preceding application hereinbefore referred to.

Our present invention consists in the provision in connection with this lock of a manually operated dead bolt and in the interconnection of said dead bolt with the latch bolt mechanism in such a manner that the dead bolt cannot be thrown unless the latch bolt is in a locked position and that after the dead bolt is thrown it can only be retracted by the turning of the knobs after the same are unlocked.

For the purpose of locking the spindle 28 against rotary movement we provide a dog 38 that is rigid with said spindle and extends outwardly through slots 40 in sleeves 15 and 16 and has, in its end a recess 41 for the reception of a tooth 42 on a locking member 43 that is secured by pivot 44 to the sleeve 22 which sleeve is connected with the outer

knob shank and arranged to be rotated by the turning of the outer knob 13 when the locking member 43 is in unlocked position, that is, when the spindle 28 is moved to the limit of its inward movement.

The locking member 43 is provided with a pawl 45 arranged to enter and lock within a slot 46 in a latch housing 47 that is mortised into the door 48 on which the device is installed to thereby lock the sleeve 22 and outer knob 13 against turning. Endwise movement of spindle 28 will turn locking member 43 on its pivot thereby moving pawl 45 from locked to unlocked position and vice versa in an obvious manner.

Disposed within the latch housing 47 below the latch bolt 17 is a dead bolt 50 guided at its outer end in a plate 51 and having a slot 52 in its inner end that fits over a transverse bolt operating member 53 that is provided, on both the inner and outer sides of the door with thumb turns 54 by which it may be turned. A stop member 55 on bolt operating member 53 engages the bottom of latch housing 47 and serves as a stop to always keep thumb turns 54 vertical, a spring 56 on bolt operating member 53 always urging said member back into the position shown in the drawings after the thumb turns 54 have been turned.

The bolt operating member 53 is provided with an arm 57 that is arranged to engage with a lug 58 on dead bolt 50 to move said dead bolt into a locked position.

When the dead bolt 50 is moved outwardly into the locked position a catch member 60 on a dead bolt locking dog 61 drops into a notch 62 in the bottom edge of the dead bolt and locks the same in outwardly projected position so that it can not be retracted except by turning one of the knobs and retracting the latch bolt. The dead bolt locking dog 61 is connected to the housing 47 by pivot 63, is urged upwardly by spring 64 and is provided with a cam point 65 that is arranged to be engaged by a lug 66 on the bottom side of stirrup member 20 to depress the locking dog and withdraw the catch member 61 from the notch 62 in dead bolt 50 at the first rearward movement of latch bolt 17 thus allowing the dead bolt 50 to be moved rearwardly or retracted by retraction of the latch bolt 17 the lug 66 on the stirrup 20 striking a shoulder 67 on dead bolt 50 as it moves rearwardly. The arrangement just described provides means for locking the dead bolt 50 so that it cannot be moved rearwardly by any instrument that might be inserted between the door and the door jamb in an attempt to pick the lock and yet will be automatically retracted by turning a knob and retracting the latch bolt.

To prevent the dead bolt 50 from being thrown into locked position except when the knob lock mechanism is locked we provide on the bolt operating member 53 a pawl 68 arranged to be pivoted on a lug 70 and to be moved outwardly by a spring 71 into the notch 46 when the pawl 45 is withdrawn from said notch into the unlocked position.

In the operation of this lock when the knob lock mechanism is in unlocked position either knob may be freely turned to operate the latch bolt 17 in the usual manner, the pawl 45 being clear of the notch 46 and the dead bolt locking pawl 68 being within such notch thus preventing the dead bolt 50 from being thrown into locked position. When the locking spindle 28 is moved outwardly by depressing push button 32, the locking member 43 will be turned and pawl 45 will be caused to enter slot 46 thus locking the outer knob 11 against turning and at the same time moving the pawl 68 out of such notch so that the dead bolt may be thrown by either thumb turn 54. When the dead bolt 50 is thrown into locking position it will be caught and held by the dog 60 and cannot be retracted by the thumb turn or in any other way except by turning the knob from the inside or unlocking the lock and turning the knob from the outside.

The inner knob 10 may always be turned regardless of whether the knob lock mechanism is in a locked or an unlocked position. The outer knob is free to turn when in an unlocked position but cannot be turned except by the use of a key when locked and when it is so turned by the use of a key will again resume its locked position as soon as the key is withdrawn. The dead bolt 50 is always retracted by the retraction of the latch bolt 17 but may be locked by the thumb turn 54 on either side of the door when the knob lock mechanism is in locked position.

The foregoing description and accompanying drawings clearly disclose a preferred embodiment of our invention but it will be understood that this disclosure is merely illustrative and that changes in the invention may be made within the scope and spirit of the following claims.

We claim:

1. The combination with a lock having a latch bolt, of a dead bolt, means for locking said dead bolt in outwardly projected position and means for automatically unlocking and retracting said dead bolt when said latch bolt is retracted.

2. The combination with a lock having a latch bolt, of a dead bolt, a catch member for locking said dead bolt in outwardly projected position and means connected with said latch bolt for disengaging said catch member and retracting said dead bolt when said latch bolt is retracted.

3. The combination with a lock having a latch bolt, of means for retracting said latch bolt, devices for locking said retracting means, a dead bolt and means for automati-

cally locking said dead bolt in retracted position when said latch bolt retracting means is unlocked.

4. In a lock, a latch bolt, means for retracting said latch bolt, devices for locking said retracting means, a dead bolt, means for automatically retracting said dead bolt when said latch bolt is retracted, and means for automatically locking said dead bolt in retracted position when said devices for locking said retracting means are unlocked.

5. In a lock, a latch bolt, means for retracting said latch bolt, devices for locking said latch bolt retracting means, a dead bolt, means for locking said dead bolt in an outwardly projected position, means on said latch bolt retracting devices for engaging with and unlocking and retracting said dead bolt when said latch bolt is retracted and means for locking said dead bolt in retracted position when said latch bolt retracting means are unlocked.

6. In a door lock, a latch bolt, retracting means for said latch bolt, a dead bolt, thumb turns for operating said dead bolt, and means independent of said thumb turns for automatically retracting said dead bolt when said latch bolt is retracted.

7. In a door lock, a latch bolt, retracting means for said latch bolt, devices for locking said retracting means, a dead bolt, thumb turns for moving said dead bolt outwardly and devices on said latch bolt retracting means for automatically retracting said dead bolt when said latch bolt is retracted.

8. In a door lock, a latch bolt, retracting means for said latch bolt, locking devices for said retracting means, a dead bolt, thumb turns for moving said dead bolt into outwardly projected position, means for locking said dead bolt against retraction, devices on said latch bolt retracting means for unlocking said dead bolt and retracting the same when said latch bolt is retracted and means for locking said dead bolt in retracted position when said latch bolt retracting means is in unlocked position.

9. In a knob lock of the class described a latch bolt, knobs arranged to be turned to retract said latch bolt, knob lock means for locking said knobs against turning, a dead bolt, means for locking said dead bolt in retracted position when said knobs are unlocked and for releasing said dead bolt when said knobs are locked, thumb turn means for moving said dead bolt outwardly into a locking position, a catch member for holding said dead bolt in said locked position and means operated by the turning of said knobs for releasing said latch member and retracting said dead bolt when said latch bolt is retracted.

10. In a knob lock of the class described, an outer and an inner knob, a latch bolt, means operated by the turning of said knobs for retracting said latch bolt, means for locking the outer knob leaving the inner knob free to turn, a dead bolt, means for locking said dead bolt in retracted position when said outer knob is unlocked and for releasing said dead bolt when said outer knob is locked, thumb turns for moving said dead bolt into locking position and means for automatically retracting said dead bolt when said latch bolt is retracted by turning either of said knobs.

11. In a knob lock of the class described, an outer and an inner knob, a latch bolt, means operated by the turning of said knobs for retracting said latch bolt, means for locking said outer knob and leaving the inner knob free to turn, push buttons in the inner knob for operating said locking means, a lock in the outer knob for releasing said locking means, a dead bolt, means for locking said dead bolt in retracted position when said outer knob is unlocked and for releasing said dead bolt when said outer knob is locked, means on both sides of said lock for throwing said dead bolt into locking position, a latch member for holding said dead bolt in locking position and means for releasing said latch member and retracting said dead bolt when said latch bolt is retracted by turning said knobs.

12. In a knob lock a lock housing having a slot therein, rotatable knob means, a locking device on said rotatable knob means arranged to lock into said slot to prevent rotation of said knob means, a dead bolt, means for moving said dead bolt outwardly and a catch member on said dead bolt moving means arranged to lock into said slot when said locking device is withdrawn therefrom and to be displaced from said slot when said locking device is locked therein.

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