Dec. 22, 1925. 1,566,575

F. E. BEST

CYLINDRICAL SHELL MORTISE KNOB LOCK

Filed July 23, 1923 2 Sheets-Sheet 1

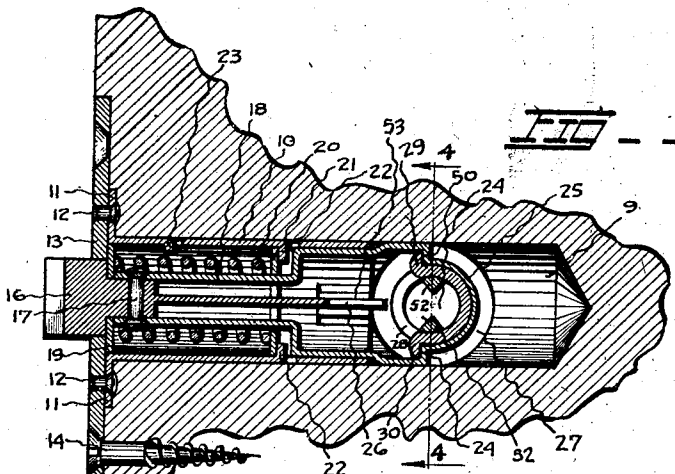


FIG - 1

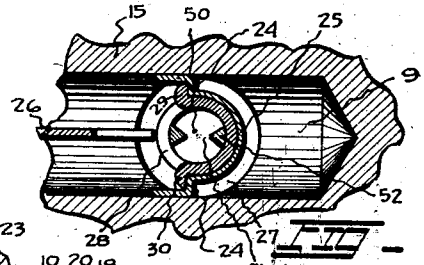


FIG - 3

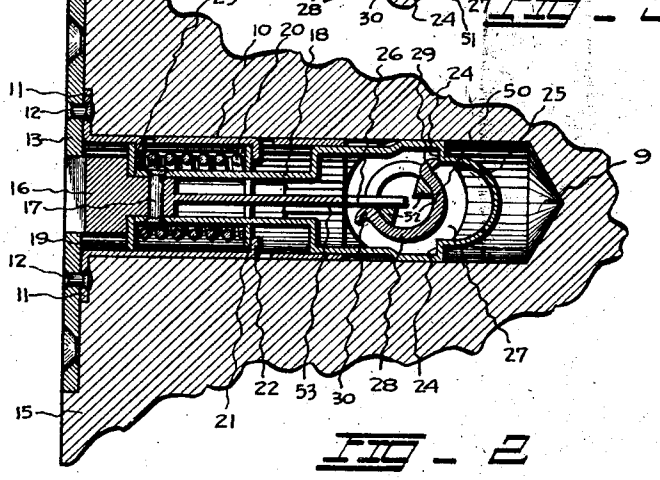


FIG - 2

Frank Ellis Best

INVENTOR.

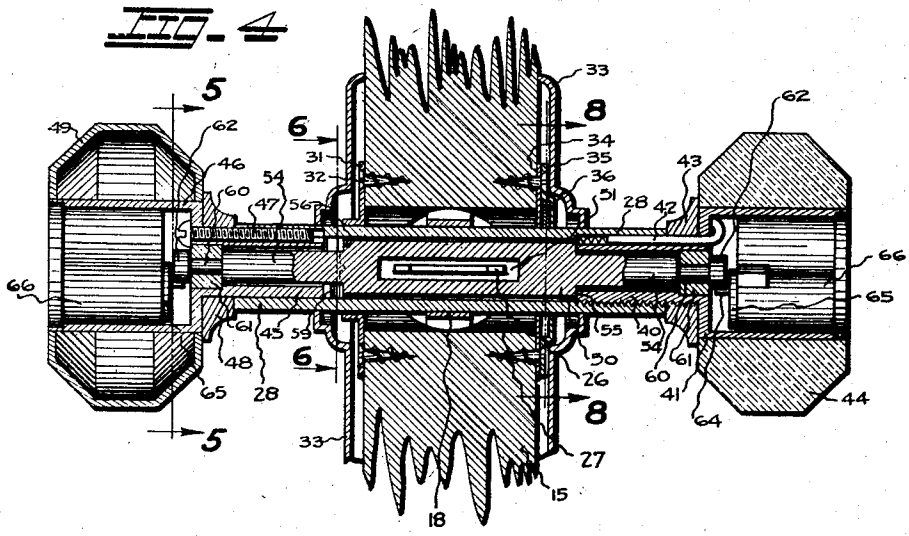
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CYLINDRICAL SHELL MORTISE KNOB LOCK

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FIG. 4



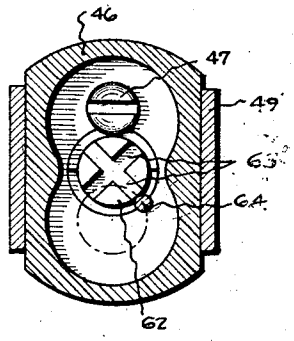


FIG. 5

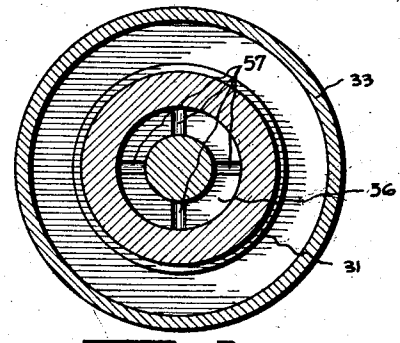


FIG. 6

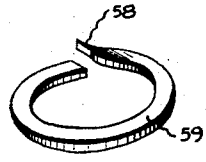


FIG. 7

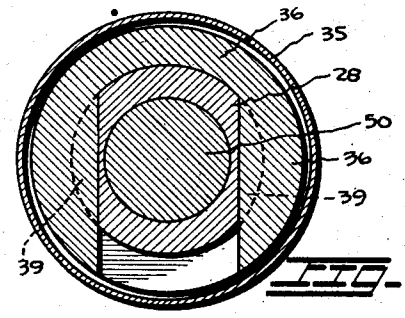


FIG. 8

Frank Ellis Best
INVENTOR

Patented Dec. 22, 1925. 1,566,575

UNITED STATES PATENT OFFICE.

FRANK ELLISON BEST, OF SEATTLE, WASHINGTON, ASSIGNOR TO FRANK E. BEST, INC., OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON.

CYLINDRICAL-SHELL MORTISE KNOB LOCK.

Application filed July 23, 1923. Serial No. 653,290.

To all whom it may concern:

Be it known that I, FRANK ELLISON BEST, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented a new and useful Cylindrical-Shell Mortise Knob Lock, of which the following is a specification.

My invention relates to improvements in mortise locks for doors, and the object of my improvement is to provide a mortise lock that may be installed in a door without necessitating the cutting of the usual rectangular mortise in the edge of the door, the latch mechanism of said mortise lock being adapted to fit within a cylindrical opening that may be bored instead of being chiseled or mortised into the edge of the door, thus saving much time and labor in installation due to the fact that it is very much quicker and easier to bore a cylindrical hole than it is to mortise a rectangular hole in a door.

Another object is to provide a mortise lock of this nature that is especially well adapted to be incorporated into a knob lock structure.

A further object is to provide a mortise knob lock of this nature embodying novel and efficient locking devices arranged to be controlled by pin tumbler locking mechanism.

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

Before describing the invention in detail I desire to have it understood that the invention is not limited to the particular construction and arrangement of parts which I have illustrated and shall hereinafter describe and that various changes may be made in the mechanism shown without departing from the spirit or scope of the invention and that the phraseology which I employ is for the purpose of description and not for limitation.

In the accompanying drawings, Figure 1 is a view in longitudinal mid section through the secondary lock or latch mechanism of a lock constructed in accordance with my invention, said section being taken in the plane of the door and the latch mechanism being shown in an engaged or latched position.

Fig. 2 is a similar view showing the latch mechanism as it may appear when withdrawn by turning the knob.

Fig. 3 is a similar fragmentary view showing parts of the knob lock mechanism in a locked position which will prevent the retraction of the latch bolt by the turning of the knob.

Fig. 4 is a sectional view on broken line 4—4 of Fig. 1.

Figs. 5 and 6 are sectional views on broken lines 5—5 and 6—6 respectively of Fig. 4.

Fig. 7 is a detached view in perspective of a lock washer embodied in the invention.

Fig. 8 is a sectional view on broken line 8—8 of Fig. 4.

Like reference numerals designate like parts throughout the several views.

In the drawings 10 designates a cylindrical latch housing, open at both ends and having at its forward end, outwardly extending flanges 11 that are secured as by rivets 12 to a face plate 13 which is arranged to be secured by screws 14 to a door 15, a fragment only of the door being shown, said door having a cylindrical recess or auger hole 9 extending inwardly from the front edge wherein the latch housing 10 may be inserted.

Disposed within the housing member 10 is latch mechanism embodying a latch bolt 16 having an inner end portion of reduced size that is secured by a rivet 17 to the ends of a bolt operating member 18 that is preferably formed of a thin flat piece of metal bent double. A washer 19 is provided on the bolt 16 between the shouldered portion of such bolt and the ends of the bolt operating member 18 to afford a flange against which the end of compression spring 20 may abut, the other end of said spring abutting against a plate 21 that is carried on the bolt operating member 18 and that is supported against the pressure of the spring 20 by lugs 22 that are bent inwardly from the latch housing. Another lug 23 this is bent inwardly from the wall of the latch housing

serves as a stop to limit the inward movement of the bolt 16 as shown in Fig. 2.

The bolt operating member 18 is bent outwardly or expanded at a point to the rear of the lugs 22 to fit the housing 10, is further bent outwardly at a point to the rear of the housing 10, is thence bent inwardly to form shoulders 24 and, between the shoulders 24 is bent in semicircular shape to form a terminal end loop 25.

A locking tongue 26, preferably relatively flat, and forked at its rear end is integral with or otherwise rigidly secured to the bolt 16 and projects rearwardly therefrom as shown in Figs. 1, 2 and 3.

Extending crosswise through the door 15 and intersecting the auger hole 9 at right angles thereto is another auger hole 27 wherein is disposed a cylindrical knob shank 28 that extends through the terminal end loop 25 of the bolt actuating member and that is provided at the location of said bolt actuating member with two substantially opposite outwardly bent pawls 29 and 30 that are arranged to engage with the shoulders 24 and withdraw the bolt 16 as shown in Fig. 2 when the shank 28 is turned in either direction. Upon release of the shank 28 the spring 20 will return the several parts to the positions shown in Fig. 1.

The knob shank 28 is rotatably supported at one side of the door by a smaller bearing plate 31 secured to the door by screws 32 and by a larger door plate 33 that covers the bearing plate 31 and said knob shank is rotatably supported at the other side of door by two bearing plates 34 and 35 and a door plate 33. The bearing plates 34 and 35 are suitably formed for the reception therebetween of a disc 36 having a U shaped slot therein, see Figs. 4 and 8, and arranged to fit within grooves 39 in opposite sides of the shank 28 to prevent longitudinal movement of said shank. The disc 36 is loosely supported and is free to rotate between the plates 34 and 35. Two or more pairs of grooves 39 are preferably provided in the shank 28 to permit adjustment of the disc 36 to doors of different thickness.

I have shown one end of the shank 28 internally threaded for the reception of the externally threaded stem 40 of a lock housing 41, the stem 40 being secured against rotation in the shank 28 by a key 42 accessible only from the interior of the lock housing. A collar 43 is preferably interposed between the end of the shank 28 and the end of the lock housing 41 and a door knob 44 is secured on said lock housing. The other end of the shank 28 I have shown as adapted to slidably receive a non-threaded stem 45 on the end of a lock housing 46, the stem 45 being secured to the shank 28 by a key screw 47 embedded partly in the stem 45 and partly in the shank 28 and accessible only from the interior of the lock housing 46. A collar 48 is interposed between the end of the shank 28 and the end of the lock housing 46 and a knob 49 is secured on the housing 46. The knob 49 is shown as a shell knob while the knob 44 is shown solid. Either of the above described forms of door knob and either above described means for securing the lock housing on which the door knob is mounted to the shank 28 may be used at either end or at both ends of the shank 28 as desired.

Disposed within the shank 28 is a rotatable lock member having a central portion 50 of larger diameter that is slotted as at 51 to afford clearance for the end of the locking tongue 26 and to leave two oppositely disposed segments 52 of substantially triangular cross sectional shape against which the end of the tongue 26 may abut when the locking member is in the locked position.

The rear end of the locking tongue is preferably of forked construction to afford clearance space into which the pawls 29 and 30 may be moved when the knob is turned and said forked rear end of said tongue is guided between lugs 53 formed at the rear end of the cylindrical latch housing 10.

The ends 54 of the rotatable locking member are of smaller diameter than the central portion 50 and afford shoulders 55 and 56 one of which is arranged to abut against the adjacent end of the lock housing stem 40. The other shoulder 56 is provided with four radial grooves 57, Fig. 6, and is arranged to be engaged by the outwardly bent end 58 of a split resilient washer 59, Fig. 7, which washer is rigidly secured to the end of the adjacent lock housing stem 45, and serves as positioning means for the rotatable locking member.

Smaller bearing portions 60 at the extremities of the end portions 54 of the rotatable locking member are journaled in two part bushings 61 in the ends of the lock housing stems 40 and 45 and terminate in end discs 62 in each of which are provided four radial slots 63 arranged at intervals of ninety degrees and intersecting each other at the center. A pin 64 eccentrically positioned on a disc or throw member 65 is arranged to engage within the slots 63 in the end discs 62 to rotate the locking member. The throw members 65 are secured to key plugs, not shown, that are provided within lock cores 66 which are removably locked within the lock core housings 41 and 46. The pins 64 are arranged to describe an arc as shown by dotted lines in Fig. 5 when the throw members 65 are rotated, and, in moving in either direction through that part of their path of movement that overlaps the end of the locking member 50 the pins 64 will turn the rotatable locking member 50 through an angle of ninety degrees, thus

moving said locking member either from the position shown in Fig. 1, in which it permits retraction of bolt 16 to the position shown in Fig. 3, in which it blocks retraction of the bolt 16, or vice-versa.

When the triangular members 52 are in the position shown in Fig. 1 they will be clear of the locking tongue 26 and will permit the bolt 16 to be retracted into the position shown in Fig. 2 if the shank 28 is turned by exerting a torque on either door knob, engagement of the pawls 29 or 30 with the adjacent shoulder 24 serving to withdraw the bolt. When the triangular members 52 are in the position shown in Fig. 3 they will be in alignment with the locking tongue 26 which will strike against such members and prevent retraction of the bolt 16 when an attempt is made to turn either door knob.

Seating of the spring-like end 58 of the washer 59 in the radial grooves 57 of shoulder 62 frictionally prevents displacement of the rotary locking member 50 within the shank 28, and insures that the grooves 63 will always be properly positioned to receive the pins 64 and the triangular locking segments 52 will always be accurately held either in the unlocked position shown in Fig. 1 or the locked position shown in Fig. 3.

When the knob shank 28 is rotated the locking member 50 will be rotated therewith thus carrying the triangular segments 52 around into the position shown in Fig. 3 when the bolt 16 is retracted.

The knobs on both sides being provided with lock mechanism, make it possible either to lock or unlock the door from either side.

The lock is relatively simple in construction, is reliable and efficient in operation, is not expensive to manufacture, and is especially well adapted to be incorporated into knob lock structures where ornamental features and beauty of design are emphasized.

Simplicity of installation is an important feature of this lock, the usual mortise being dispensed with and it only being necessary to bore two intersecting holes in a door to install the lock.

The foregoing description and accompanying drawings clearly disclose what I now consider to be a preferred embodiment of the invention but it will be understood that this disclosure is merely illustrative and that such changes in the device may be made as are within the scope and spirit of the following claims.

I claim:

1. A lock of the class described embodying a cylindrical latch housing, a bolt operating member in said latch housing, a bolt secured to said bolt operating member, shoulders formed at the rear end of said bolt operating member, a tubular knob shank extending crosswise of the rear end of said bolt operating member oppositely disposed lugs protruding from said knob shank, the walls of said knob shank being cut away between said lugs on the forward side, a rotatable locking member in said knob shank, lock controlled means for positioning said locking member in said knob shank, yielding means for holding said locking member in a fixed position in said knob shank, and a locking tongue on said bolt arranged to project through the opening in said knob shank and to engage with said locking member when said locking member is in a locked position.

2. In a lock of the class described a rotatably mounted locking member having a flat disc like end provided with four radial grooves arranged at intervals of ninety degrees, and a pin movable in an arc and arranged to enter said grooves and turn said locking member through an angle of ninety degrees.

3. In a lock of the class described, a rotatably mounted locking member having a flat disc like end provided with four radial grooves arranged at intervals of ninety degrees, a key operated lock having a throw member arranged to be rotated about an axis external to, and adjacent the periphery of the disc like end of said locking member and a pin on said throw member at a point removed from the center and arranged to enter said grooves and move said locking member through an angle of ninety degrees when said throw member is rotated.

4. In a lock of the class described a cylindrical latch housing, a bolt operable in said latch housing, a spring urging said bolt outwardly, a bolt operating member embodying a strip bent double and having its forward ends secured to said bolt, a knob shank extending through the rear portion of said bolt operating member and arranged to retract said bolt when rotated, a rigid locking tongue on said bolt protruding rearwardly to a point near said knob shank, and a rotatable locking member in said knob shank arranged to be positioned so as to prevent rearward movement of said locking tongue.

5. In a lock of the class described a cylindrical latch housing, a bolt operating member formed of a strip of metal bent double and operatively disposed in said latch housing, a bolt secured to one end of said bolt operating member, means guiding said bolt operating member for sliding movement in said latch housing, resilient devices urging said bolt operating member outwardly, a loop portion formed in the rear end of said bolt operating member shoulders adjacent said loop portion, a tubular knob shank extending through said loop portion, oppositely disposed outwardly protruding lugs on said knob shank arranged to engage with the shoulders on said bolt operating member to move said bolt operating member rearwardly when said knob shank is turned, said knob

shank having its front wall cut away between said lugs, a locking member rotatable in said knob shank and cut away at the location of the cut away portion of said knob shank to leave two oppositely disposed segments, lock controlled means for positioning said locking member in said knob shank, and a locking tongue extending rearwardly from said bolt and terminating adjacent the opening in the wall of said knob shank.

Signed at Seattle Washington this 13th day of July 1923.

FRANK ELLISON BEST.