

No. 618,547.

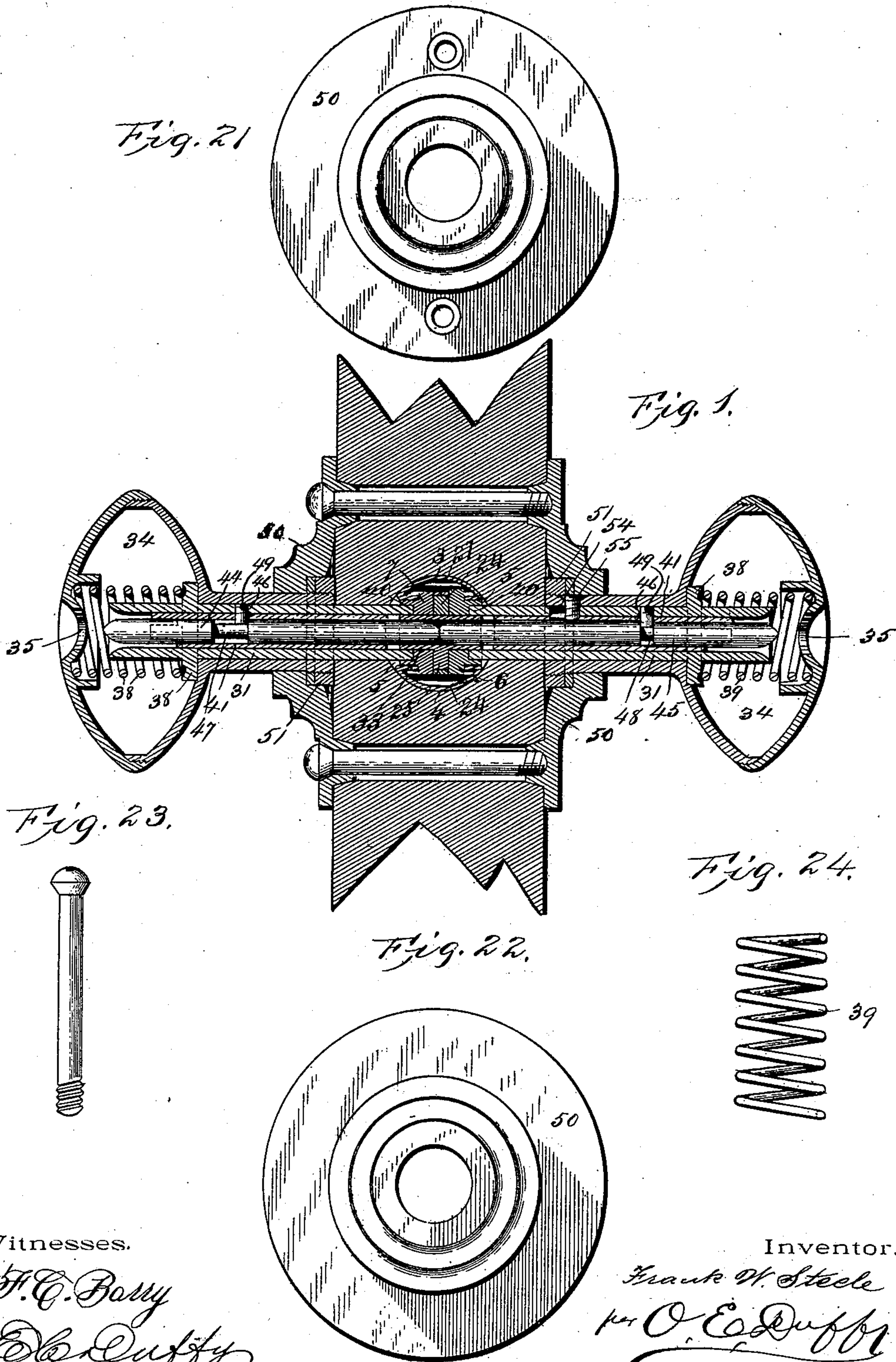
Patented Jan. 31, 1899.

F. W. STEELE.  
KNOB LOCK.

(Application filed Feb. 25, 1898.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses.

*H. C. Barry*  
*O. E. Duffy*

Inventor.

*Frank W. Steele*  
*per O. E. Duffy*

Attorney.



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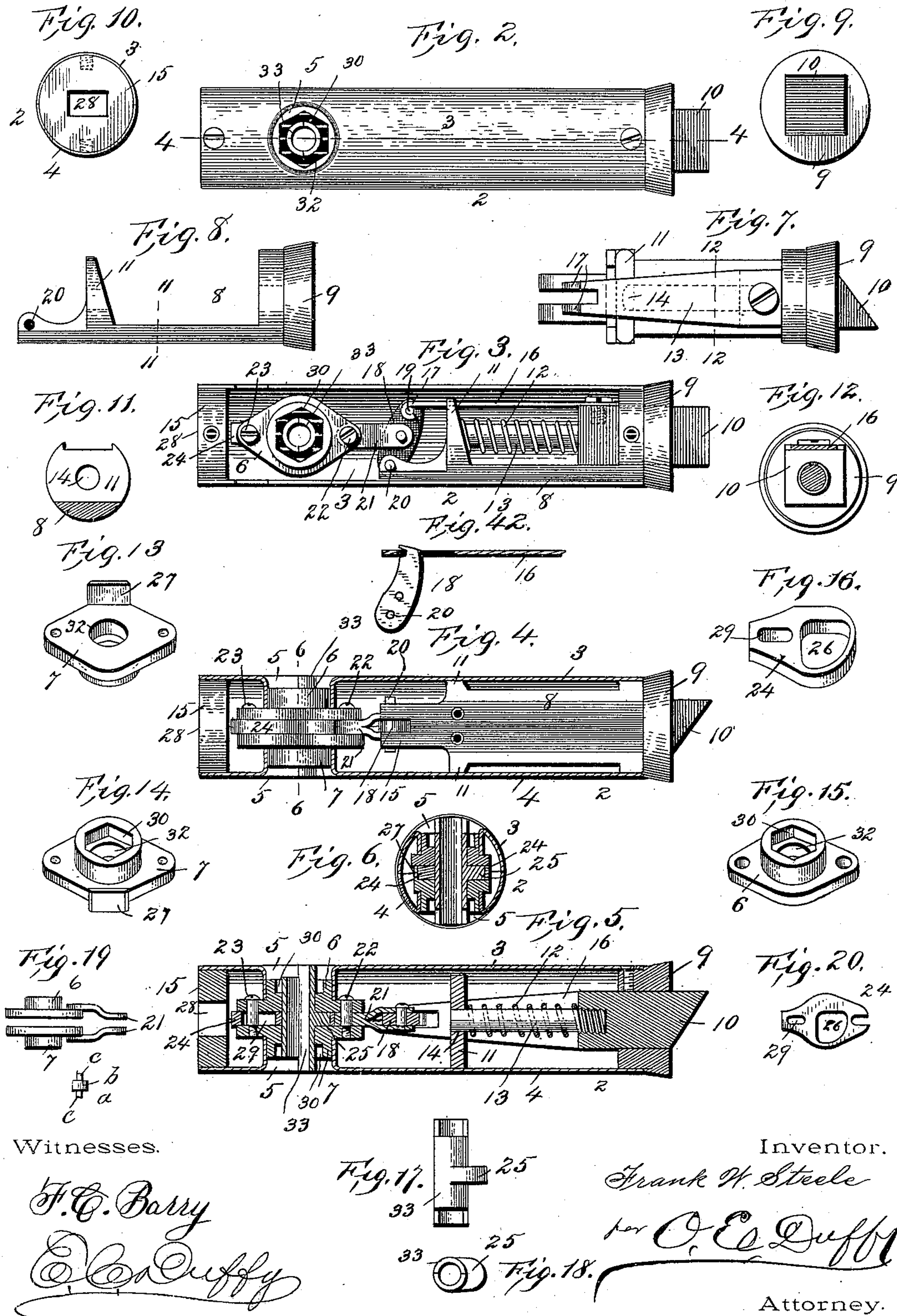
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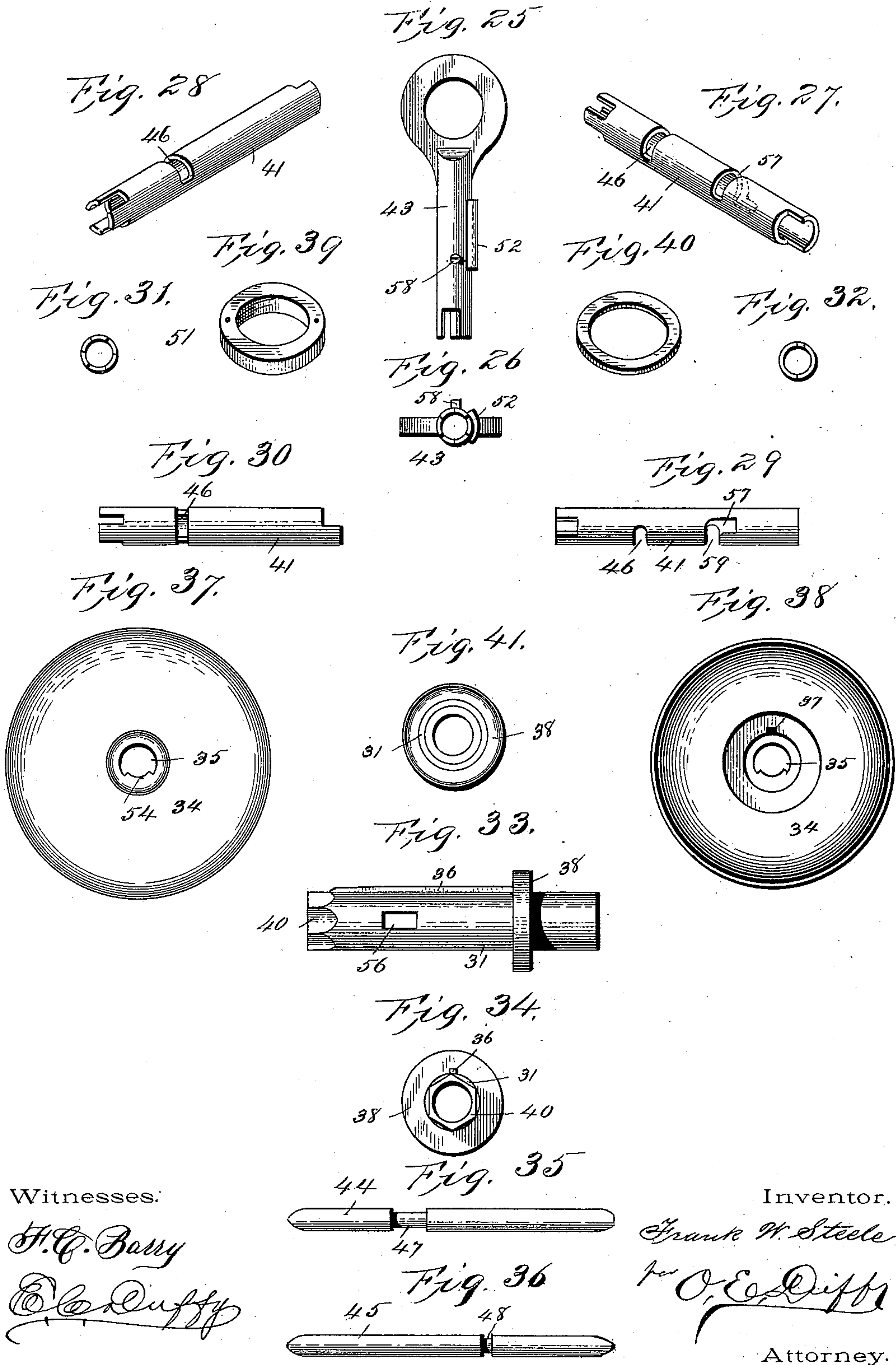
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3 Sheets—Sheet 3.





# UNITED STATES PATENT OFFICE.

FRANK W. STEELE, OF TERRE HAUTE, INDIANA.

## KNOB-LOCK.

SPECIFICATION forming part of Letters Patent No. 618,547, dated January 31, 1899.

Application filed February 25, 1898. Serial No. 671,618. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK W. STEELE, of Terre Haute, in the county of Vigo and State of Indiana, have invented certain new and  
5 useful Improvements in Locks, (Cylinder-Knob;) and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to  
10 make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form part of this specification.

This invention relates to certain new and  
15 useful improvements in mortise door-locks, and more particularly to the class known as "knob-locks."

The objects of the invention are to provide a knob-lock simple, cheap, and durable of construction, quick and effective in operation,  
20 composed of a minimum number of parts, and one that will not easily get out of order or be broken by ordinary usage.

A further object of the invention is to provide a lock of absolute security. Though  
25 the knob may be turned the lock cannot be reached.

A further object of the invention is to provide a lock adaptable to outer or inside doors  
30 and to doors of different thickness with only the variance of the key.

A further object is to provide means to take up lost motion and wobbling of the knobs.

A further object of the invention is to provide a key of small and convenient size and shape, the possibility of a great number of  
35 key changes operating their respective locks only with little change in the key-tube.

The invention consists in certain novel features of construction and in combination of  
40 parts more fully described hereinafter, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, like reference letters and figures mark the same parts through-  
45 out the different views, in which—

Figure 1 is a vertical section through the lock and knobs, the parts being in relative and operative position. Fig. 2 is a side elevation of the lock. Fig. 3 is a similar view

with one-half of the cylinder-casing removed. Fig. 4 is a longitudinal section of the cylinder-casing, taken on the line 4 4, Fig. 2, the operative mechanism being in elevation. Fig. 5 is a central longitudinal section on the line  
55 4 4, Fig. 2. Fig. 6 is a cross-section on line 6 6, Fig. 4. Fig. 7 is a top plan view of the base and latch-bolt. Fig. 8 is a side elevation of the base. Fig. 9 is a front view of the base-casting and latch-bolt. Fig. 10 is an  
60 elevation of the slotted mortised rear plug. Fig. 11 is a cross-section of the base on the line 11 11, Fig. 8. Fig. 12 is a cross-section of the base on the line 12 12, Fig. 7. Fig. 13 is a perspective view of one of the hubs. Fig. 14 is a similar view inverted. Fig. 15 is a perspective view of the other hub. Fig. 16 is a perspective view of the cam-bolt. Figs. 17 and 18 are respectively side and end views of  
70 the tumbler. Fig. 19 is a detail view of a modified form of hub-link. Fig. 20 is a detail view of a modified form of cam-bolt. Figs. 21 and 22 are detail views of rose-plates. Fig. 23 is a detail view of a securing-screw. Fig. 24 is a detail view of the knob-spring. Figs. 25 and 26 are respectively side and end views of key. Figs. 27 and 29 are detail views of the outside key-tube. Figs. 28 and 30 are detail views of the inside key-tube. Figs. 31 and 32 are respectively inner and outer edge  
80 views of the key-tubes. Fig. 33 is a side elevation of one of the spindles. Fig. 34 is an end view thereof. Figs. 35 and 36 are detail views of the inner and outer central bars or key-guides. Figs. 37 and 38 are detail views of the outside and inside of the knob. Fig. 39 is a detail perspective view of an abutment-ring. Fig. 40 is a similar view of a washer. Fig. 41 is an end view of the spindle, showing collar thereon. Fig. 42 is a detail view of a modified form of lever.

In the drawings, 2 is the sectional cylinder-casing, composed of two similar sections 3 and 4, having the internally-flanged holes 5, which form bearings for the hubs 6 and 7. This casing may be cylindrical, rectangular, or of any other desired shape in cross-section, carrying the lock, and is inserted in the edge of the door. Within this casing 2 is the base 8, having the face 9, through which the



latch-bolt 10 passes, and the abutment 11, against which the coil-spring 12 bears and through which the guide-pin 13 passes, said abutment also forming a rear bearing 14 for said guide-pin 13. These case-sections 3 and 4 are suitably secured by screws, rivets, or the like to the base 8 and also to the rear slotted mortised plug 15.

Rigidly secured to the rear of the latch-bolt 10 is a flat spring-link 16, having the forked rear end 17 to straddle the lever 18, the forked ends being curved to engage the pin 19 in the upper end of said lever 18. The lower end of said lever 18 is pivoted to the base 8 at 20 and connected at its center by links 21 to the hubs 6 and 7 by means of the rivet or bolt 22, which also secures the said hubs together at the outer ends, while a similar rivet or bolt 23 secures the inner ends of the hubs.

In Fig. 19 I show a somewhat-modified form of links 21. In this instance they are divided and straddle the hubs and are secured thereto by means of a bolt or rivet *a*, having the enlarged body *b* to hold the hubs the desired distance apart, while the smaller ends *c* secure the hubs together.

The rivets or bolts 22 and 23 are so formed that they will secure the hubs rigidly together and at the same time keep them a distance apart for the purpose of allowing the cam-bolt 24 to slide laterally between them when actuated by means of the tumbler 25 working in the cam-shaped recess 26. The hub 7 has on its upper edge a projection 27, against which the upper flat edge of the cam-bolt 24 bears and which keeps said cam-bolt from turning out of line of the locking-slot 28 in the mortised plug 15. The cam-bolt is also provided with an elongated slot 29, through which the hub-securing rivet or bolt 23 passes.

The hubs 6 and 7 are provided on their outer sides with hexagon or the like shaped sockets 30 for the reception of the spindles 31. They are also provided with circular openings 32, forming bearings for the tumbler-stem 33, which extends out through each hub.

The striking plate or latch-socket is mortised in the jamb of the door and is flush therewith, having a beveled guide projecting therefrom far enough to throw back the latch-bolt and allow it to enter the socket.

The knobs 34 are made in sections and screwed or spun together, having a central opening or keyhole 35. Through the shanks of the knobs pass spindles 31, hexagonal in cross-section or provided with a longitudinal rib 36, which engages a slot 37 in said knob-shank to prevent them turning without the knob or the knob turning without the spindle. The inner ends 40 of these spindles are hexagonal to correspond with and enter the hexagonal sockets 30 in the hubs 6 and 7. The outer ends are provided with abutment-collars 38, against which the coil-spring 39 bears, forcing the hexagonal ends 40 into

their respective sockets in the hubs, the spring expanding between the abutment-ring 38 and the outer wall of the knobs 34.

Within the knobs 34 and turning therein one half-revolution are the cylindrical key-tubes 41, halved at their inner ends to engage and operate the tubular stem 33 of the tumbler 25. At their outer ends the said tubes 41 are serrated to correspond and engage the key 43, which is also serrated to match its own particular lock.

Turning freely within the key-tubes 41 are the straight rods 44 and 45, pointed at each end and long enough to meet in the center of the lock within the tubular stem of tumbler 25 and still project into the knobs 34, where they form guides for the key 43.

The key-tubes have the slots 46 cut in their walls near their outer ends, and corresponding to these slots in the central rods 44 and 45 are formed the grooves or necks 47 and 48 to receive the ends of screws 49, passed through the spindles 31 and the said slots 46 of the key-tubes, where they rest in the grooves or necks 47 48 of the central guide-rods 44 45, holding the three in relative position, allowing the central rods 44 and 45 to turn indefinitely and the key-tubes 41 to turn one half-revolution.

It is readily seen that any attempt to draw the central rods 44 and 45 would move the key-tubes 41 and spindles 31, which would contract the springs in the knobs by reason of the abutment-collars 38, carried by the spindles 31, and said springs would automatically return the parts to their normal position as soon as the pull is released. These springs also serve to take up lost motion and rattle where the lock is used on thinner doors.

The knobs are attached to rose-plates 50 by any suitable means, such as collars or abutment-rings 51, to take up all strain or pull thereon without affecting the working of the lock or latch.

The key is formed tubular and serrated to correspond with key-tube and has a projection or block 52 on its outer wall, by which when inserted in the keyhole 35 the key is only allowed to turn one half-revolution by reason of the projection 54 in the said key-hole 35.

In the outer knob-shank a steady-pin 55 is tapped, covered by the rose-plate, as shown, which passes freely through a slot 56 in the spindle 31 and engages an angular slot 57 in the wall of the outer key-tube 41. The inner central rod 44 has the groove or neck 47 corresponding in length with the angular slot 57, so that when the door is to be more securely locked from the inside the key 43 is pressed in far enough to allow the pin 58 in its shank to pass under projecting tooth 54 in the inner keyhole and the key to engage the end of the inner central rod 44, which bears against the outer central rod 45, forcing it outwardly against the tension of the coil-



spring in the outer knob, carrying the outer key-tube 41 and the spindle 31 out of engagement with the halved tubular tumbler-stem 33 and the hexagonal socket 30, respectively.

5 The key is then turned to locked position and the steady-pin 55, passing into the transverse opening 59 of the angular slot 57, holds the locking mechanism of the outer knob out of engagement, and as the key cannot be with-  
10 drawn from the inside on account of the pin 58 and tooth 54 the outer knob may be turned in either direction without engaging any of the locking or latching mechanism.

The serrations in the key and key-tube are  
15 long enough to allow the key to be pushed in far enough to engage the central rod without pressure on the key-tube.

When the key is turned to unlocked position, it can be withdrawn, when the spring  
20 will come into play and automatically replace the parts in operative position—the key-tube to engage the tumbler-stem and the spindle to engage the hexagonal socket in the outer hub.

25 The operation of the lock is very simple, the parts being set in operative position, the spindle 31 engaging the hexagonal sockets 30 in the hubs 6 and 7, the key-tubes 41 within said spindles engaging the halved tubular stem 33  
30 of the tumbler 25, said tumbler engaging the cam-slot 26 of the cam-bolt 24, which is slidable between the hubs 6 and 7. Now the knobs being turned the spindles 31, carried thereby, turn and rock the hubs 6 and 7 in  
35 their bearings 5, formed by the internally-flanged holes in the casing-sections 3 and 4. The hubs 6 and 7 when rocked operate the lever 18, which is pivoted at 20 in the base 8, which draws the latch 10 against the tension  
40 of the coil-spring 12, which surrounds the guide-stem 13 and bears against the abutment 11, by reason of the flat spring-link 16, which is connected to the top of the lever 18 and the latch-bolt head 10. This link is made flexi-  
45 ble to allow the lever to gain its highest vertical position and draw the latch-bolt 10. When the lock is to be locked, the key-tubes 41 are turned independently of the spindles and hubs by the key 43, which engages the  
50 serrated end of the key-tube, while the inner ends thereof engage the halved tubular stem 33 of the tumbler 25, which when turned operates the cam-bolt, forcing its rear end into the mortise 28 in the rear mortised plug 15,  
55 where it is held against rotation and prevents the hubs 6 and 7 from turning to operate the latch by reason of the elongated slot 29 and the flat upper edge of the cam-bolt bearing against the projection 27 of the hub 7, which  
60 prevents the hubs and cam-bolt turning independently. This also may be done with the construction shown in Figs. 19 and 20, where two slots are used instead of the projection on the hub. However, I do not limit  
65 myself to these specific constructions. I also

show a modified form of lever in Fig. 42 which may be substituted for lever 18, if so desired.

It is evident that various slight changes might be made in the forms, arrangement, and construction of the parts described with-  
70 out departing from the spirit of the invention. Hence I do not wish to limit myself to the exact construction herein set forth, but consider myself entitled to all such changes as fall within the scope of my invention. 75

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A mortised door-lock comprising a casing, internally-flanged openings therein, rock-  
80 able hubs working in said openings, a base in said casing carrying a spring-actuated latch-bolt, a lever pivoted to said base, at one end, a spring-link connecting the other end with the latch-bolt, links connecting said  
85 lever and hubs, a socket in said hubs, a spindle adapted to engage said sockets and operate the hubs, substantially as described.

2. A mortised door-lock comprising a casing, internally-flanged openings therein, rock-  
90 able hubs working in said openings, a base in said casing carrying a spring-actuated latch-bolt, a lever pivoted to said base, at one end, a spring-link connecting the other end with the latch-bolt, links connecting said  
95 lever and hubs, a socket in said hubs, a spindle adapted to engage said sockets and operate the hubs, a cam-bolt slidable between said hubs, bearings in said hubs, a tumbler having a tubular stem working in said bear-  
100 ings, and a key-tube adapted to engage and operate said tumbler and cam-bolt, substantially as set forth.

3. A mortised lock comprising the casing, a latch-bolt therein, hubs operating said latch-  
105 bolt, a slidable cam-bolt between said hubs, a tumbler operating said cam-bolt, and a mortised plug having a locking-slot into which said cam-bolt is slid and held, thereby preventing the hubs from rocking when locked,  
110 substantially as described.

4. A mortised lock comprising the casing, a latch-bolt slidable therein, internally-flanged openings in said casing, hubs rockable in said  
115 openings operating said latch-bolt, sockets in said hubs and spindles engaging said sockets carried and operated by the door-knobs, substantially as set forth.

5. A mortised lock comprising the casing, carrying a latch-bolt, rockable hubs in said  
120 casing, bearings in said hubs, a cam-bolt slidable between said hubs, a cam-shaped recess in said cam-bolt, a tumbler working in said recess, a tubular stem carried by said tumbler and turning in said bearings, sockets in  
125 said hubs, spindles adapted to fit said sockets, a key-tube within said spindle halved to correspond with said tumbler-stem at their inner ends, and serrated at their outer ends to receive a correspondingly-serrated key as de-  
130



signed to slide the cam-bolt into the locking-slot, substantially as described.

6. A mortise-lock having a casing, locking mechanism therein, spindles adapted to operate said locking mechanism, key-tubes within said spindles to lock said mechanism, central rods within said key-tubes meeting in the center of the lock and adapted to disengage the locking mechanism from the outer knob when locked from the inside and springs

in said knob to automatically replace the operative parts when the lock is unlocked, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

FRANK W. STEELE. [L. S.]

Witnesses:

JAMES E. SOMES,

WILLIAM E. EASTERDAY.