

H. W. SIMPSON.
LOCK.

(Application filed Nov. 26, 1901.)

(No Model.)

2 Sheets—Sheet 1.

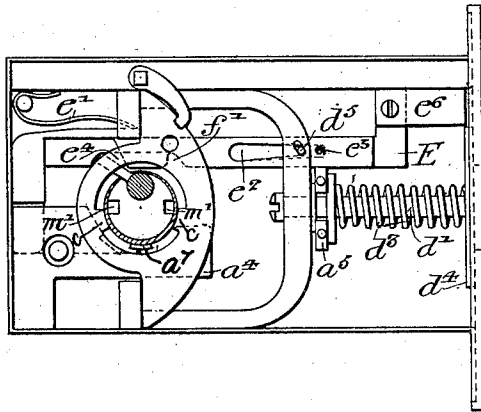


Fig. 3.

Fig. 11.

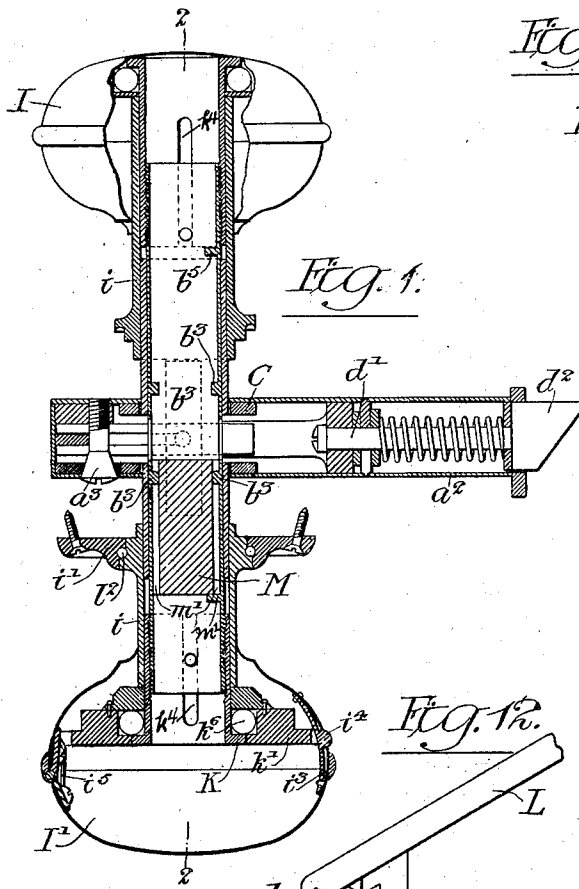
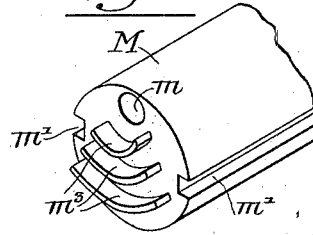


Fig. 1.

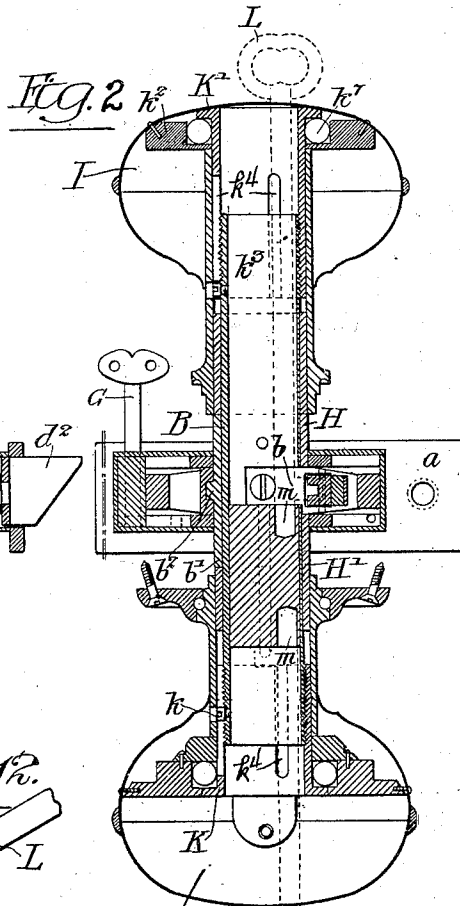
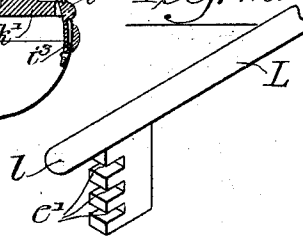


Fig. 2.

Fig. 12.



Witnesses:-

Aug. B. Coffer

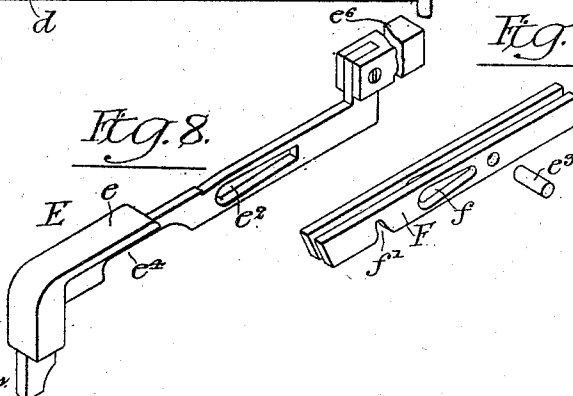
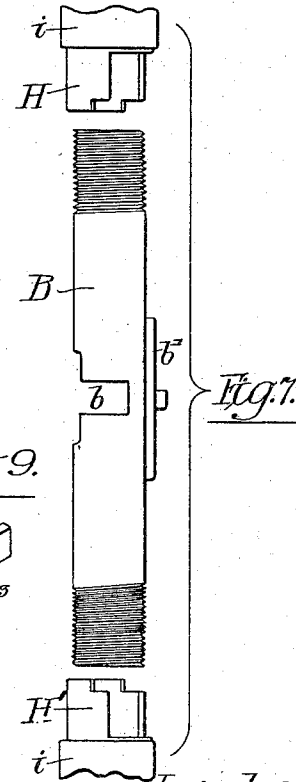
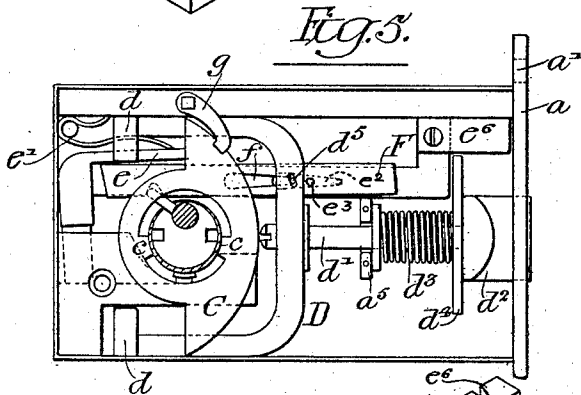
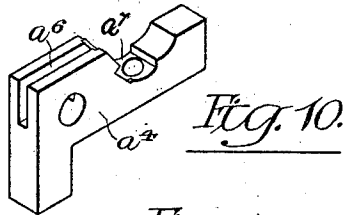
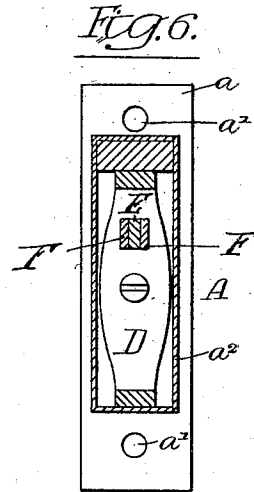
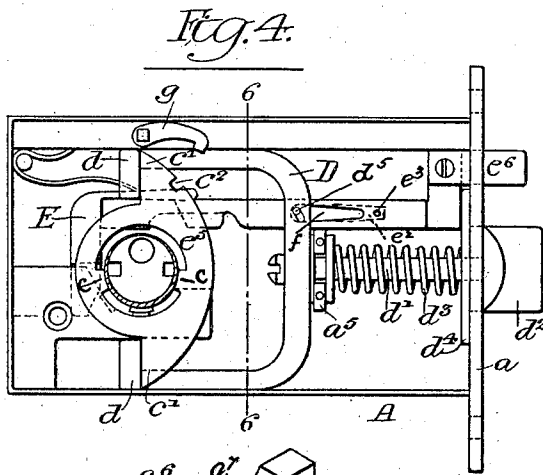
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UNITED STATES PATENT OFFICE.

HENRY W. SIMPSON, OF ITHACA, NEW YORK.

LOCK.

SPECIFICATION forming part of Letters Patent No. 707,028, dated August 12, 1902.

Application filed November 26, 1901. Serial No. 83,783. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. SIMPSON, a citizen of the United States, and a resident of Ithaca, New York, have invented certain Improvements in Locks, of which the following is a specification.

My invention relates to certain improvements in locks, and more particularly to an improved form of knob-lock in which the key for operating the same is inserted through the handle and spindle of the door-knob.

The object of my invention is to provide an improved device of the character described in which the latch shall be controlled by the two knobs independently of each other and to provide mechanism operated by a key inserted through the knob-spindle which shall retain the latch in its extended position against any movement of the knobs.

A further object of the invention is to provide mechanism whereby one or both of the knobs may be prevented from operating the latch, while this latter is still movable by the key.

These objects, together with various improvements of construction, I attain as follows, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of my improved device, taken in a plane through the knob-spindle and latch. Fig. 2 is a vertical sectional view taken on the line 2 2, Fig. 1. Figs. 3, 4, and 5 are plan views of the interior of the latch-casing, showing the mechanism therein contained in the various positions which it may occupy when the device is operated. Fig. 6 is a vertical sectional view on the line 6 6, Fig. 4. Fig. 7 is an outside view of the knob-spindle, a portion of the sleeves attached to the knobs being also shown. Figs. 8 and 9 are perspective views of portions of the lock mechanism. Fig. 10 is a perspective view of the piece for retaining the knob-spindle within the lock-casing; and Figs. 11 and 12 are enlarged perspective views showing the preferred construction of the face of the key-guide and key, such construction having been omitted from the other figures for the sake of clearness.

In the above drawings, A is the casing of an ordinary mortise-lock, provided with a face-plate *a*, in which are the usual holes *a'* for

the screws used in fixing the lock in position and having also an opening for the passage of a single door-latch and an opening for an auxiliary lock-bolt *e'*. This casing has a removable cover-plate *a''*, held in position by means of a screw *a'''*.

Extending through the casing A is a hollow knob-spindle B, cut away at *b*, where it passes through said casing, and preferably made with its internal bore eccentric to its outer cylindric surface for the purpose of securing increased thickness, and consequently greater strength, in the uncut portion adjacent to the opening *b*. In addition to the above this uncut section of the spindle is reinforced by a strip of material *b'*, extending in the direction of the length thereof. A pin or projection *b''* extends from this reinforced piece and is designed to engage with a fixed piece *a''* within the casing, thereby preventing longitudinal motion of the knob-spindle, the reinforced piece *b'* fitting a notch *a'''* in said piece and preventing rotary motion of the spindle.

Within the casing and extending around the knob-spindle are two independent tumblers C of the shape shown, each having an opening through it of a diameter larger than that of the spindle B. When the various parts are assembled, the lateral wings *c'* of the tumblers are placed so as to normally rest in contact with the lugs *d* of the yoke-piece D. This yoke-piece is made, preferably, of the shape shown in the figures and has passing through the center of its body a latch-bolt *d'*, which is fixed to the latch *d''*. This bolt *d'* passes through a U-shaped piece *a''*, fixed to and extending upwardly within the casing, and there is a spring *d'''* confined between said piece and a plate *d''*. This is fixed to the back of the latch and extends transversely on both sides of the same, being held normally in contact with the interior surface of the face-plate *a* of the casing proper by means of the said spring *d'''*.

Between one of the side members of the yoke D and the latch-bolt is a locking-bolt E, extending through an opening in said yoke, this bolt having one end extending at right angles to its length into a slot *a''*, formed in the fixed piece *a''*, and the other made with an L-shaped projection, the end *e'* of which acts as an auxiliary lock or bolt, extending

through an opening in the face-plate a of the casing when the bolt E is in its forward position.

There is a plate e fixed to the top surface of the bolt E, upon which bears a spring e' , suitably held in the casing and tending always to press the bolt E toward the knob-spindle, thereby keeping its end in the slot a^6 in the piece a^4 . The screw a^3 is placed so as to extend through this slot and prevent longitudinal motion of the locking-bolt E in a straight line as long as its end projects into the slot.

A slot e^2 in the main portion of the locking-bolt E is formed to receive a pin e^3 , which rigidly connects two elongated plates F, fitted to slide on both sides of the main portion of the locking-bolt E. These also have slots f in them corresponding in position to the slots e^2 when the said plates are in the position indicated in Fig. 3 relatively to the locking-bolt E. A pin d^5 in the yoke D extends through the slots e^2 and f , the said slots allowing of limited motion of the plates F and the bolt E through the opening in said yoke.

There is a single elongated notch e^4 in the bolt E and a notch f' in the two plates F, the end of the notch e^4 forming, with the inner ends of said plates when these are in their forward position, what is equivalent to a second notch, this being shown at e^5 in Fig. 4.

There is a thumb-latch G with a spindle constructed to extend from the latch-casing to the inner surface of the door, and it has fixed to it a pawl g , which is placed to engage the notch e^2 in one of the tumblers C when this latter is in its normal position.

Returning now to the door-knobs and their attached parts, it will be seen that there are on the knob-spindle on each side of the latch-casing sleeves H and H', to which the knobs are fixed and which with the said knobs are revoluble on the spindle B. This freedom to rotate for a limited extent is secured by cutting a section out of the lower end of each of the pieces H and H', as shown in Fig. 7. The remaining portion of the circular end of both of said sleeves engages with the tumblers C, fitting in the annular space between the tumbler on the spindle B and engaging with the lugs c , so that a rotary motion of the sleeve causes a rotary motion to a greater or less extent of the tumblers on the spindle B.

Each of the knobs I and I' has extending from it a hollow shank i , that connected to the knob I' being provided with a rose i' and having between it and the said rose ball-bearings i^2 . The knob I' is retained in position on the spindle B by means of an extension-piece K, which is screwed onto the threaded end of said spindle to an extent depending on the thickness of the door and is held there-to by means of a screw k , passing through an opening in the shank of the door-knob, the same effectually preventing revolution of the extension K on the spindle B. There are three longitudinal slots k^4 formed in the extension K and also an extension K', described here-

inafter. The screws k^3 are designed to pass through one of these slots in each extension and enter tapped holes in the ends of the spindle B, such construction permitting of the said extensions being screwed on the ends of said spindle to a greater or less distance to accommodate various thicknesses of doors. After this the screws are inserted and effectually prevent the extensions from coming unscrewed from the ends of said spindles after they have once been adjusted thereon.

The interior of the knob or handle I' is hollow, the outer half I² thereof being made separate from the remainder and being hinged to it, as shown in Fig. 1. There is a spring-latch i^3 on the inner half of the knob, having a button i^4 projecting through the same which upon being pressed releases the catch and permits the hinged portion of the knob to swing open under the influence of a spring i^5 .

A plate k' is fixed within the interior of the knob I' and is provided with means for the retention of ball-bearings k^6 , upon which rests the extension K of the spindle B. The knob I is also made with a removable hollow outer half, having within it a plate k^2 , carrying ball-bearings k^7 between itself and a second extension K' of the spindle B, this latter being held to the said spindle in a manner similar to that used with the extension K by means of a screw k^3 . This extension K' when in position is flush with the external surface of the knob I and like the extension K is hollow, allowing of the insertion of a key L into the interior of the spindle B. Within the spindle is a cylindrical sliding key-guide M, having a depression m in each of its faces for the reception of the end of the key-spindle l and being provided with one or more segmental projections m^3 , fitting into corresponding recesses or notches e' in the end of the key-blade, the relative arrangement of parts being as shown in Figs. 11 and 12. There are also two slots m' extending longitudinally in the sides of the key-guide, there being pins b^3 projecting inwardly from the walls of the hollow spindle and entering these slots, which thus act to direct the longitudinal movement of the guide M, as well as to prevent its rotation.

In order to limit the motion of the key-guide M, pins m^2 are placed so as to project far enough into the path of said piece to prevent it from coming out of the hollow spindle and to hold it at just the correct point within the same to permit the blade of the key to enter the slot formed by the cut-away portion on the side of the spindle, so that it may engage the locking mechanism. The pins b^3 prevent rotation of the key-guide M, and it will be noted that the holes or depressions in the ends thereof are eccentric to its center.

In operating my improved lock under normal conditions the turning of either knob will draw the latch d^2 in against the action of the spring d' in the well-known manner and that independently of and without moving the

other knob. If now it be desired to lock the latch so that it cannot be operated by the knobs, a key of the design shown in dotted lines in the drawings and of the detail construction shown particularly in Fig. 12 is inserted through the knob I, for instance, and through the hollow spindle B, its projecting end entering the hole *m* in the key-guide and pushing this latter into the position shown in Fig. 2. This hole *m* being eccentric to the axis of the hollow spindle, the turning of the key causes the blade thereof to pass through the opening in the spindle and to enter the notch formed by the ends of the plates F and the notch in the bolt E. As the turning of the key is continued it pushes forward both plates and lifts the bolt E, forcing its bent end section to pass over the screw *a*³ against the action of the spring *e*¹ and finally allowing it to assume the position shown in Fig. 4, with its forward end held tightly against the latch-plate *d*⁴ and the auxiliary bolt *e*⁶ projecting from the face-plate *a*. This keeps said bolt, with the latch, rigidly in an extended position and effectually locks the door against operation of the latch by means of the knobs, besides further locking it by means of the auxiliary bolt *e*⁶. The reverse of this action takes place when the key is turned in the opposite direction, and should this motion of the key be continued, so that it begins a second revolution, the blade enters the notch *f*¹ in the plates F, moving these back independently of the bolt E. The end of the slot *f*, however, almost immediately comes in contact with the pin *d*⁵, thus moving back the yoke D and with it the latch against the action of the spring *d*³, the said spring at once returning the latch to its normal position upon the release of the key.

When desired, the latch may be locked in position by means of the thumb-latch and pawl *g*, for when this latter is in engagement with the notch *c*² in either one or both of the tumblers revolution of the knob whose shank engages the tumblers so locked is impossible. However, the latch may then be operated from either side by means of the key, for upon inserting it through the tubular spindle as before and turning it in the direction to unlock or release the latch its blade is brought into the notch *f*¹ in the plates F. These being pinned to the yoke D, then move it back independently of the tumblers, when the key is turned farther, the pin *e*³ moving freely in the slot *e*², formed in the locking-bar E. The spring *d*³ immediately returns the latch with the yoke D and plates F to their normal positions as soon as the turning pressure on the key is relaxed.

Should it be desired to lock or unlock the door from the inner side, the key is inserted through the knob I¹, entering the guiding-hole *m* and engaging the projections *m*² in the rear face of the key-guide M. This latter is pushed inwardly, and when stopped by the pin *b*⁵ in the proper position the key may be

turned to operate the locking mechanism as before.

I claim as my invention—

1. The combination of a casing having a latch, tumblers for operating said latch, a hollow knob-spindle rigidly held in the casing and knobs having sleeves on said spindle operatively engaging the tumblers, said latch having mechanism whereby it may be operated by means of a key inserted through said hollow spindle, substantially as described.

2. The combination of a casing having a latch, tumblers for operating the same, a knob-spindle immovably held to said casing, sleeves revolubly carried on the spindle in operative engagement with the tumblers, knobs fixed to said sleeves, and antifriction-bearings between said spindle and the knobs, substantially as described.

3. The combination of a casing having a latch, tumblers for operating the same, a knob-spindle immovably held to said casing, extension-pieces for the spindle, sleeves revolubly carried on the spindle in operative engagement with the tumblers, knobs fixed to said sleeves and held in place by the extensions of the spindle, and antifriction-bearings between said spindle extensions and the knob, substantially as described.

4. The combination of a casing having a latch, a tumbler for operating the latch, a hollow knob-spindle rigidly held in the casing, a knob having a sleeve engaging the tumbler and revoluble on the spindle, with locking mechanism in the casing for locking the said latch in its extended position, the same being constructed to be operated through said hollow spindle, substantially as described.

5. The combination of a casing having a latch, a tumbler for operating the latch, a hollow knob-spindle rigidly held in the casing, a knob having a sleeve engaging the tumbler and revoluble on the spindle, with locking mechanism in the casing for locking said latch in its extended position, the same being constructed to be operated through said hollow spindle, with a guide-piece in the hollow spindle for holding the key during its action upon the said mechanism, substantially as described.

6. The combination of a casing having a latch, a tumbler for operating the latch, a hollow knob-spindle rigidly held in the casing, a knob having a sleeve engaging the tumbler and revoluble on the spindle, with locking mechanism in the casing for locking the said latch in its extended position, the same being constructed to be operated through said hollow spindle, with a guide-piece in the hollow spindle having a hole for the end of the key, said hole being eccentric to the bore of said spindle, substantially as described.

7. The combination of a casing having a latch, a tumbler for operating the latch, a hollow knob-spindle rigidly held in the casing, a knob having a sleeve engaging the tumbler and revoluble on the spindle, with locking

- mechanism in the casing for locking the said latch in its extended position, the same being constructed to be operated through said hollow spindle, a movable guide-piece in the hollow spindle, the same serving to hold the key during its operation upon said mechanism, irrespective of the end of the spindle through which said key is inserted, substantially as described.
8. The combination of a casing having a latch, a tumbler for operating the latch, a hollow knob-spindle rigidly held in the casing, knobs having sleeves engaging the tumblers and revoluble on the spindle, with locking mechanism in the casing for locking the latch in its extended position, the same being constructed to be operated through said hollow spindle, a guide-piece made to slide in said spindle, having means to prevent its rotation and being provided with a hole in each end eccentric to the bore of the spindle, said piece being movable by the key so that said key will be free to act upon the locking mechanism when inserted in the spindle from either end thereof, substantially as described.
9. The combination with a casing having a latch and mechanism for locking the same in an extended position, of a hollow spindle carrying knobs for operating the latch, said spindle having an opening where it passes through the casing, a pin fixed to the spindle and engaging a fixed part of said casing, whereby said spindle is held from longitudinal movement, substantially as described.
10. The combination with a casing having a latch and mechanism for locking the same in an extended position, of a hollow spindle carrying knobs for operating the latch, a portion of said spindle being cut away where it passes through the casing, a reinforcing-piece on the spindle engaging the casing, for preventing rotary motion of the spindle, and a projection also on the spindle and also engaging the casing for preventing longitudinal motion of said spindle, substantially as described.
11. The combination with a casing having a latch and mechanism for locking the same in an extended position, of a hollow spindle carrying knobs for operating the latch, the opening through said spindle being eccentric to the outside surface thereof, means for preventing motion of the spindle and means for guiding a key inserted into the same, to bring it into contact with the locking mechanism, substantially as described.
12. The combination with a casing having a latch and locking mechanism for retaining the latch in an extended position, of a hollow knob-spindle rigidly fixed to the casing, knobs operatively connected to the latch carried by the spindle, the bore of the spindle being eccentric to its outside surface, a key-guide piece within the spindle having means for engaging a key and for holding the same eccentric to the bore of said spindle, substantially as described.
13. A casing having a latch, a yoke-piece connected to the same, a tumbler engaging with said yoke, a knob having means connecting it to said tumbler, a locking-bar constructed to be engaged by a key, the same passing through the yoke and engaging a piece projecting from the latch, substantially as described.
14. A casing having a latch, a yoke-piece connected to the same, a tumbler engaging with said yoke, a knob having means connecting it to said tumbler, a locking-bolt constructed to be engaged by a key, said bolt passing through the yoke and engaging a piece projecting from the latch, means for preventing motion of the tumbler, a plate parallel to the said bolt and also passing through and connected to the yoke, the construction being such that motion of the plate will move the yoke independently of the tumblers, substantially as described.
15. The combination with a casing having a latch, a yoke connected thereto, and tumblers operated by the knobs, of a locking-bolt constructed to be moved by a key to prevent motion of the latch, a plate on each side of said locking-bolt said plates being pinned together and with the locking-bolt, passing through an opening in the yoke, a pin in the yoke passing through said plates and the locking-bolt, with means for preventing motion of the tumblers, substantially as described.
16. The combination of a casing, a latch, a tumbler, a yoke-piece connecting the latch and the tumbler, means for turning the tumbler so as to operate the latch, a locking-bolt for the latch having in it a notch, a plate sliding on the locking-bolt also having a notch, means for connecting the plate to the yoke whereby when the bolt and the plate are in position to lock the latch a single revolution of the key will operate the locking-bolt and the second revolution of the key will operate the latch independently of the tumblers, substantially as described.
17. The combination of a casing, a latch, a tumbler, a yoke-piece connecting the latch and the tumbler, means for turning the tumbler so as to operate the latch, means for locking the tumbler, a locking-bolt for the latch having in it a notch, a plate sliding on the locking-bolt also having a notch, a pin connecting the plate to the yoke, said plate having a slot through which said pin extends, said pin being at one end of the slot when the locking-bolt is in a position out of engagement with the latch, substantially as described.
18. In a latch mechanism of the character described, the combination of a yoke-piece, a locking-bolt, a plate lying on each side of the locking-bolt, a pin extending through the slot and rigidly holding said members together, a slot in each of the members, a pin in the yoke extending through said slots placed to engage one end of the same, whereby when the key engages said notched pair of members and is revolved, the yoke is moved back independ-

ently of the tumblers, substantially as described.

19. A casing having a latch, a yoke-piece connected to the same, a tumbler engaging with said yoke, a knob having means connecting it to said tumbler, a locking-bolt constructed to be engaged by a key, the same passing through the yoke and engaging a piece projecting from the latch, and an auxiliary lock-bolt operated by said locking-bolt, substantially as described.

20. A casing having a latch, a yoke-piece connected to the same, a tumbler engaging with said yoke, a knob having means connecting it to said tumbler, a locking-bolt constructed to be engaged by a key, the same passing through the yoke and engaging a piece projecting from the latch, and a bolt fixed to said locking-bolt and projecting beyond the casing when the locking-bolt is in its forward position, substantially as described.

21. In a locking mechanism of the character described, a hollow knob-spindle having an opening for the passage of the key-blade, a movable key-guide in said spindle having two faces for the reception of a key, said faces being of a contour requiring said key to be of a definite form in order to operate the lock, with means for limiting the motion of said key-guide, substantially as described.

22. In a locking mechanism of the character described, a hollow knob-spindle having an opening for the passage of the key-blade, a movable key-guide in said spindle having two faces for the reception of a key, the said faces being provided with projections placed to correspond with depressions on the end of the key thereby requiring a key of definite form to operate the lock, and means for limit-

ing the motion of the said key-guide, substantially as described.

23. In a locking mechanism of the character described, a hollow knob-spindle having an opening for the passage of the key-blade, a movable key-guide in said spindle having its face or faces engaged by the key, said faces being provided with a series of segmental projections, said guide being constructed to hold the key-spindle eccentric to the knob-spindle, with means for limiting the motion of the key-guide so as to bring the blade of the key into operative relation to the opening in the knob-spindle, substantially as described.

24. The combination of a casing having a latch, tumblers for operating said latch, a hollow knob-spindle held in the casing, knobs having sleeves on said spindle in operative engagement with said tumblers, said latch having mechanism whereby it may be operated by means of a key inserted through either end of the spindle, substantially as described.

25. The combination of a casing having a latch, tumblers for operating said latch, a hollow knob-spindle held in the casing, knobs having sleeves on said spindle in operative engagement with said tumblers, said latch having mechanism whereby it may be operated by means of a key inserted through either end of the spindle, said spindle having within it means for closing the direct passage there-through, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY W. SIMPSON.

Witnesses:

SIMEON SMITH,
GEORGE GRIFFIN.