I. BREIRATHER.

LOCK.

APPLICATION FILED JAN. 16, 1915. RENEWED JAN. 3, 1918.

1,270,372. Patented June 25, 1918.

3 SHEETS—SHEET 1.

Fig. 1.

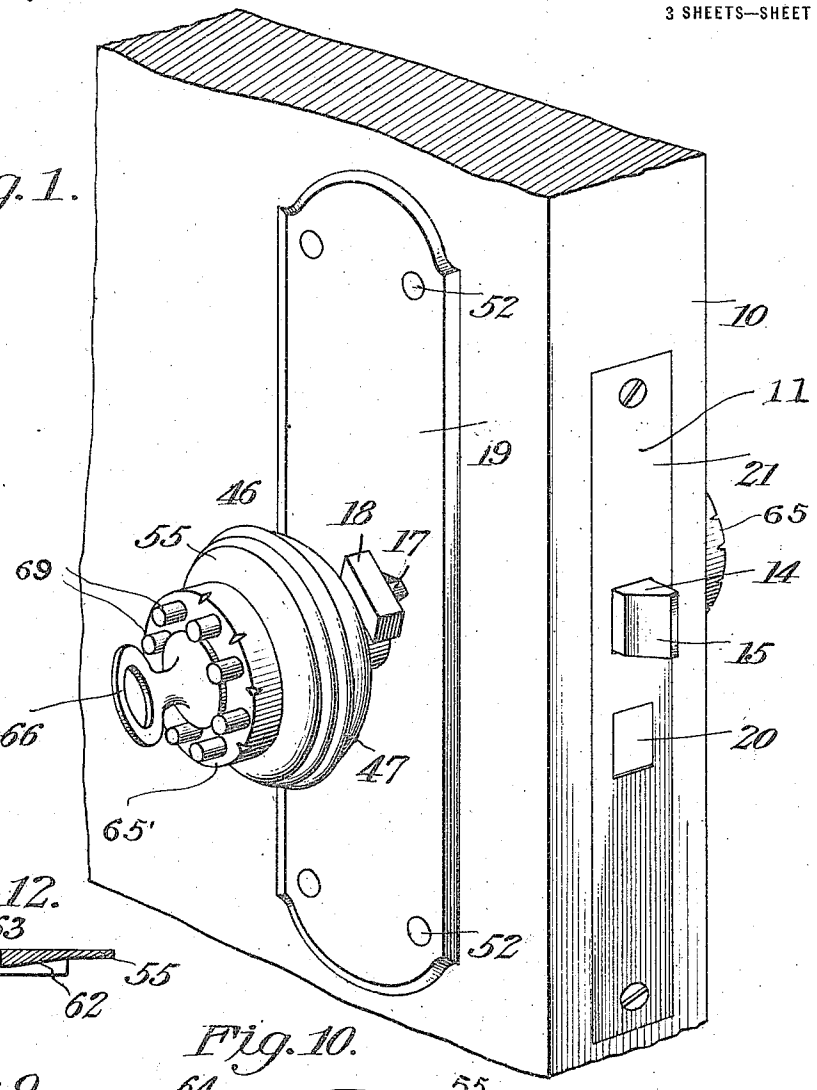


Fig. 12.

Fig. 10.

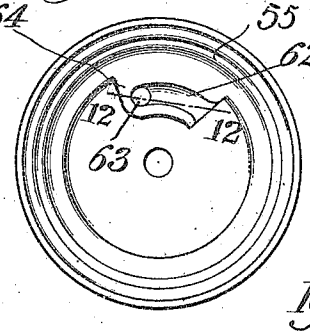


Fig. 9.

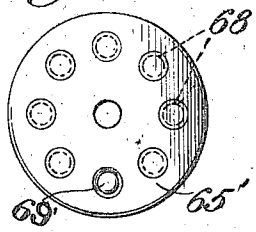
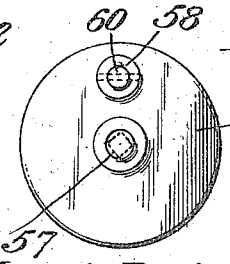


Fig. 11



Witnesses

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3 SHEETS—SHEET 2.

Fig. 2.

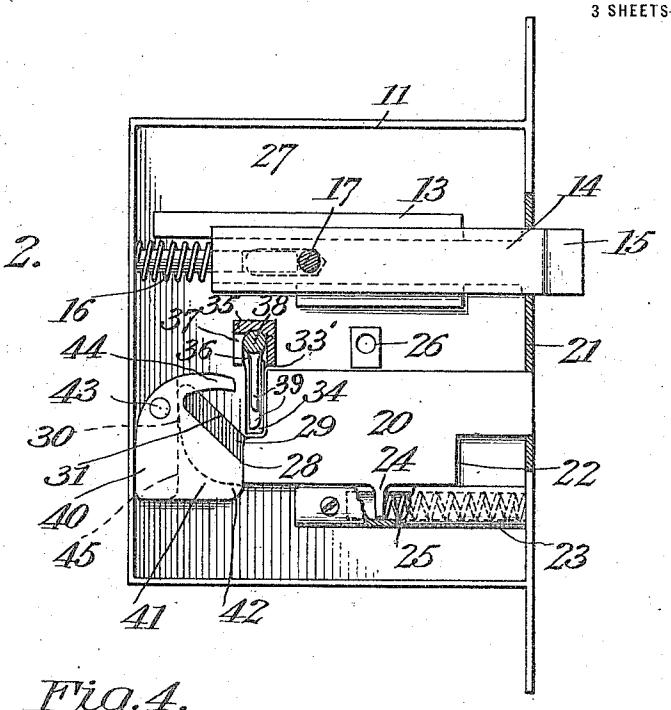


Fig. 4.

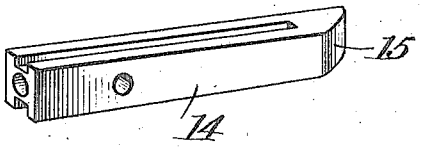


Fig. 5.

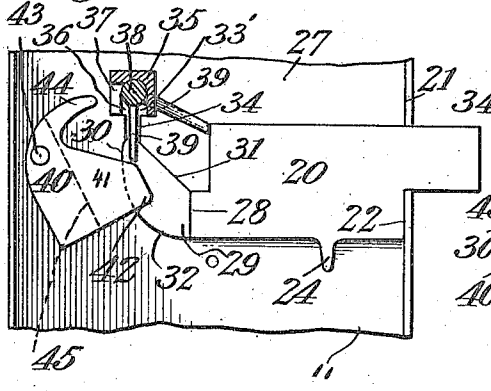
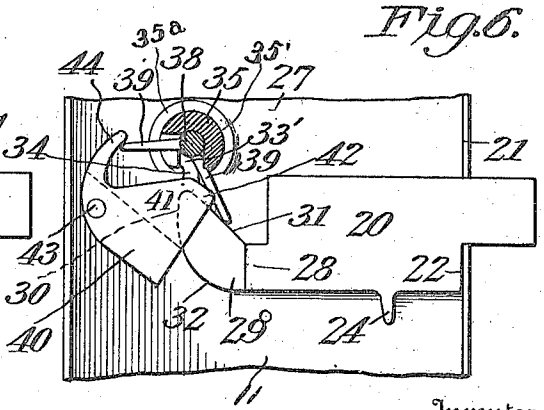


Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 3.

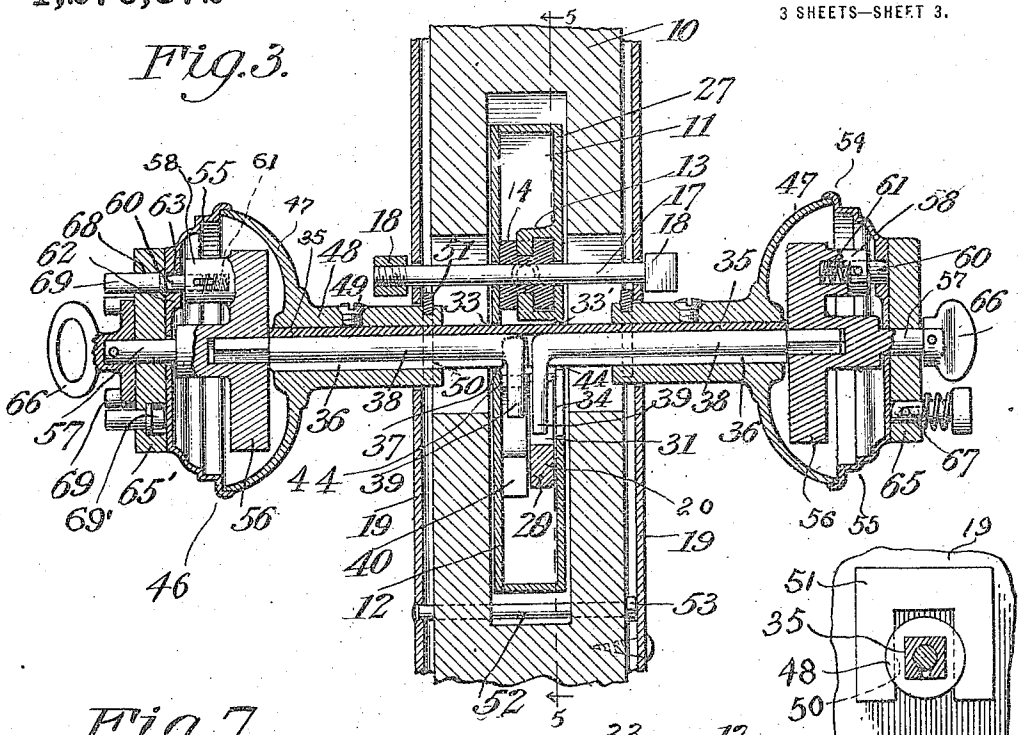


Fig. 3a.

Fig. 7.

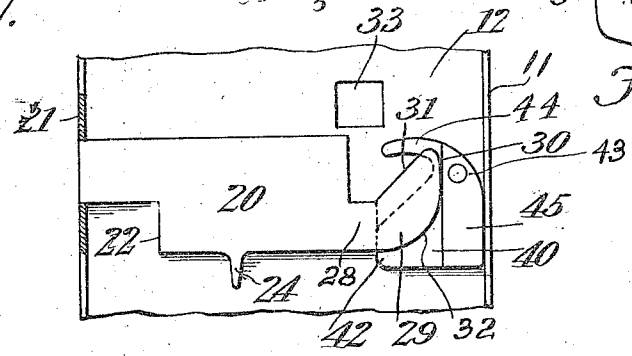
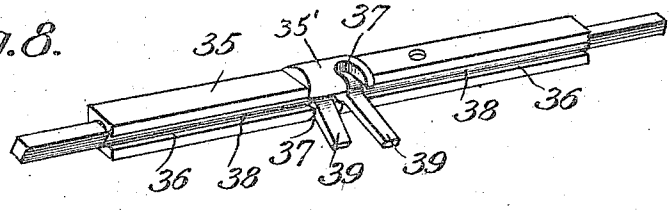


Fig. 8.



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UNITED STATES PATENT OFFICE.

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1,270,372. Specification of Letters Patent. Patented June 25, 1918.

Application filed January 16, 1915, Serial No. 2,634. Renewed January 3, 1918. Serial No. 210,229.

To all whom it may concern:

Be it known that I, IGNATZ BREIRATHER, a citizen of the United States, residing at Plymouth, in the county of Sheboygan and State of Wisconsin, have invented certain new and useful Improvements in Locks, of which the following is a specification.

The invention has for an object to provide a lock adapted to be operated by a knob and to give means whereby it may be set in locked position so that it can not be operated by unauthorized persons. A further object is to provide a new form of combination lock suitable for incorporation in a door knob. A purpose is to enable the construction of a knob lock so that strains and shocks to which the knob proper may be subjected will not be liable to damage the lock mechanism. It is another important purpose to construct a lock so that it may be unlocked from either side by clockwise rotation of an operating element. It is also an aim to present a novel and useful construction of lock mechanism proper. It is sought to give a construction which will be easy to operate as regards the physical effort required for its manipulation.

Additional objects and advantages will appear from the following description and from the drawings, in which:

Figure 1 is a fragmentary perspective view of a door equipped with my invention,

Fig. 2 is a view of the lock mechanism with certain parts removed,

Fig. 3 is a vertical section through the device as illustrated in Fig. 1,

Fig. 3ª is a fragmentary view showing the manner of securing the knob against withdrawal.

Fig. 4 is a perspective view of the latch bolt,

Fig. 5 is a fragmentary view of the mechanism in one position on the line 5—5 of Fig. 3,

Fig. 6 is a similar view showing the mechanism in a different position, and also illustrating a bearing for the shaft 35 and the journal portion on the shaft,

Fig. 7 is a similar view from the opposite side, showing the lock bolt retracted,

Fig. 8 is a perspective view of the shaft 35 illustrating also the journal portion which may be formed thereon,

Fig. 9 is a detail inner elevation of the block 65′,

Fig. 10 is an interior view of the outer section of a knob,

Fig. 11 is an outer view of the member 56.

Fig. 12 is a fragmentary sectional view on the line 12—12 of Fig. 10.

There is illustrated a fragment 10 of a door of ordinary construction, my invention in its present embodiment including the casing 11, which may be mortised in the door edge at its swinging side in the familiar way generally practised with ordinary lock casings. In the upper part of this casing, which is formed with a removable cover plate 12 there is formed a latch guide-way 13 in which a spring-pressed latch bolt 14 is mounted, beveled on one side as at 15, the spring 16 being confined between its inner end and the inner end of the casing. Fixed rigidly in this latch bolt there is a transversely extending shaft 17, projecting through each side of the door and carrying knobs 18 on each end outwardly of the escutcheon plates 19, whereby lateral pressure thereon will operate the latch. In the lower part of the casing there is mounted a lock bolt 20 projected slidably through the face plate 21 of the lock casing and having a shoulder 22 at its lower side to limit its outward movement by engagement against the face plate. The bolt is supported at its lower side by a guide piece 23, which may be formed on the casing body, and is open at its upper side to receive an arm 24, between which and the face plate there is confined a spring 25 holding the bolt normally retracted. Above the bolt 20 there is formed on the casing a boss 26 having a threaded bore therein receiving a suitable screw engaged through the cover plate to hold the latter in position. This boss also holds the bolt 20 against upward movement. The bolt is of a thickness to fit snugly between the cover and back plate 27 of the lock casing and at its inner end is formed with a longitudinal extension 28 of the full thickness of the bolt and approximately two-fifths of its vertical dimension from which, in turn, there is extended a triangular head 29 half the thickness of the bolt and substantially equal in height thereto. The head 29 has a base portion alined with that of the bolt, a vertical outer side 30, and a hypotenuse side 31 beginning at the top of the extension 28. The junction of the

base and vertical side of the head 29 is rounded as at 32. A rectangular opening 33 is formed in the cover and a similar one 33′ in the back plate 27 alined therewith, their lower sides level with the top of the bolt 20, their centers immediately over the extension 28 when the bolt is retracted. From one of these—in the present case the opening in the plate 27—a central key extension slot 34 is formed, stopping short of the adjacent extension 28. Engaged in these rectangular openings there is a rectangular hollow shaft 35 having a circular bore longitudinally therethrough and longitudinal slots 36 at the lower side stopping short of but closely adjacent each other at their inner ends, and provided with oppositely disposed lateral extensions 37 thereat. The shaft projects equal distances on each side of the lock and through suitable openings in the escutcheons 19 just below the shaft 17. Engaged revolubly in each end of the shaft there are key stems 38 having lateral bits 39 arranged to move into respective extensions of the slots under rotation of the stem. One of the keys is alined with the head 29, while the other is arranged to be clear thereof upon outward movement of the bolt. A cam block 40 is pivoted upon the back plate of the casing immediately inward of the head 29, and comprises a triangular outer part 41 half the thickness of the bolt 20 and lying beside the head 29, its outer lower part 42 being exposed to engage against the end of the extension 28 under rotation of the cam to initiate movement of the bolt, the cam block being pivoted at its upper part upon a suitable stud 43. The cam is provided with an arm 44 alined with its outer part 41, the arm being spaced thereabove and projected horizontally toward the bolt in alinement with the upper side thereof and stopping short of the inner end of the bolt a distance corresponding to the width of the slot 34. At the rear part the cam is provided with a vertically disposed lateral extension 45, having its inner face arranged to engage the vertical side 30 of the head 29 upon lifting of the arm 44. This arm is alined with that bit 39 which is cleared by the head 29. The slot extension 37 in the shaft 35 at the adjacent side of the lock is disposed next to and alined with the arm 44, whereby the respective key bit may be turned thereinto to engage the arm 44, raising the same and causing projection of the bolt 20. Opposite rotation of the key bit at the opposite side of the lock will cause it to engage directly against the inner end of the bolt, with the same result.

The shaft 35 is inserted through the back plate 27 so as to fit snugly in the opening 33′, after which the cover plate 12 is engaged upon the casing. If desired a cylindrical portion 35′ may be formed centrally of the shaft as in Figs. 6 and 8, and a suitable bearing recess 35ª formed on the back plate 27 to support the shaft as in Fig. 6, this modification of the shaft serving the purpose to hold it securely positioned on a proper axis within the casing. A knob 46 is engaged upon the shaft at the outer side of the door, the knob comprising an inner section 47 having the integral shank 48 provided with a rectangular passage therethrough receiving the shaft 35 snugly, a binding screw 49 being engaged through the shank to hold it against loose movement on the shaft. The inner end of the shank is provided with parallel transverse key ways 50 on opposite sides, the escutcheon being provided with a suitable opening receiving the stem snugly therethrough, and a U-shaped key-yoke 51 is engaged in the slots inwardly of the escutcheon to prevent withdrawal of the knob. This escutcheon is held to the door by a series of bolts 52 having countersunk heads set in the escutcheon, the bolts being extended through the door and secured at the opposite side by nuts 53 concealed by the escutcheon on the inner side, which is secured by a number of screws engaged in the door. A second knob 54 similar in construction is secured on the inner end of the shaft 35 in a manner similar to that in which the knob 46 is secured. The interior construction of the knobs and key operating means being identical, but one will be described.

The inner section 47 of the knob is cupped and closed by an outer section 55, also cupped and suitably secured thereon. The shaft 35 stops short of the space within the knob, while the stem 38 projects thereinto and has secured thereon an operating block 56, the outer end of the stem being squared and fitted in a corresponding opening in the block. The block also has a stem 57 co-axial with the key stem, and engaged revolubly through a suitable opening in the outer section 55 of the knob. In the outer part of this block a passage 58 is formed, parallel to the axis of the stems, and a sliding detent 60 is engaged slidably therein having a transverse pin therethrough engaged in suitable slots in the block, limiting its outward movement. The detent 60 projects from the block and is held yieldably against the outer section 55 by a spring 61 engaged in the inner end of the passage in a suitable manner. On the inner side of the outer section 55 of the knob a rise 62 is formed, coincident with the path of the detent upon rotation of the block, the rise terminating at an opening 63, extending entirely through the outer section of the knob. On the far side of the opening from the rise 62 an extension or check-block 64 is formed, whereby the detent will be prevented from passing across

the opening. The opening 63 is located at a point to receive the detent therein when the key bit has been turned to fully shoot the bolt. Engaged loosely around the stem 57 of the block there is a rotatable circular block 65, at the inner side of the door, having a planiform inner side fitted against the corresponding face on the outer section of the knob, covering the opening 63, and extending therebeyond a short distance. Fixed upon the stem 57 there is a manipulating key head 66, the block being thereby held in place for rotation. At one point upon the block a spring pressed unlocking pin 67 is provided, normally at the outer limit of its movement, arranged to be moved into registry with the opening 63 by rotation of the block 65, and of a size to enter the opening for displacement of the detent 60. The pin 67 projects from the outer side of the block and is suitably shaped for manipulation. At the outer side of the door a block 65′ is provided, similar in form to the one 65, the other parts of the knob mechanism, etc., being the same as before described. The block 65′, however, is provided with a multiplicity of concentrically arranged passages 68 therethrough enlarged at their inner ends and having projected therefrom respectively loose studs 69, having enlarged inner portions engaged in the passages and held snugly between the reduced parts of the passages and the surface of the knob section 55. The enlarged parts of all of these pins, except one 69′, continue to their inner ends and exceed in diameter the width of the opening 63. The one 69′ is provided with an inner end portion reduced in diameter sufficiently to enter the opening 63.

In use, it will be seen that the lock bolt is normally retracted by the spring engaged therewith and the door is free to open upon retraction of the latch 14, which is accomplished by pressing back the knob 18 at one side or the other. The rigid mounting of the knobs obviates the objectionable wabble and rattle which usually develops in the rotating door knobs and complications are absent from the operative means for the latch bolt. The locking of the bolt 20 is accomplished by a simple turn of the key head 66, and it is to be noted that this is accomplished by clock-wise movement from either side. The spring 25 will tend to draw the bolt upon release of the detent, but should this not occur provision is made whereby the key head operated from the inside may be given a counter clockwise movement to positively return the bolt to retracted position. It will be apparent that from the inner side of the door reverse operation of the bit 39 would cause it to engage the hypotenuse side 31 of the head 29 and this will force the bolt back.

It will be observed that the lock involves a comparatively small number of parts for the performance of the functions attained, and is readily adapted to be produced and installed at a minimum expense, both for materials and labor.

It is also obvious that the disclosure herein presents but one of many possible embodiments of the invention, within the scope of the invention.

It will be seen that with the parts assembled as shown in Fig. 2, the shaft 35 with the elements 38 may be withdrawn from the casing without disturbing any of the parts in the casing, and the withdrawn parts may be returned after the lock has been adjusted in a mortise in a door, by being inserted through a suitable opening formed through the door and communicating with the mortise, as will be readily understood. As shown in the drawings in Fig. 3, the bit 39 would strike the lower edge of the opening on one side of the door if the shaft 35 were drawn horizontally outward without movement of the casing. However, by first loosening the screws in the face plate 21, the lock casing may be raised sufficiently to permit withdrawal of the key element without obstruction, and the shaft 35 may be emplaced before the lock is finally secured in the door. The opening through the side of the door may also be shaped to permit ready withdrawal of the parts mentioned without loosening of the lock casing if desired.

One of the knobs 18 is threaded upon the stem 17, and the latter is fitted very tightly in the latch bolt 14, but may be driven out when necessary. By this snug fit the stem 17 is held rigidly in relation to the bolt 14.

The parts of the knobs do not require to be separated or taken down in order to install or remove the lock, from the door, and these parts as well as those in the lock casing may be assembled at the factory and left undisturbed during installation.

In installing the lock upon a door, the mortise being formed, and the necessary transverse openings being formed through the door communicating with the mortise, the shafts 17 and 35 are removed from the lock casing, and the casing inserted in the mortise. The shaft 35 is then inserted from the back side, on which the slot 34 is located, the bits 39 passing inward until one engages the cover, which will stop them in the proper positions, as shown in Fig. 3, or if the shaft 35 is formed with the enlarged journal 35′, this will engage within the bearing 35ª, on the back of the lock, as illustrated in Fig. 6, and check the parts in proper position for coaction with the lock mechanism. After emplacement of the shaft 35, escutcheon plates are next introduced over the ends of the shaft at each side, or positioned on the stems of the knobs,

after which the securing yokes 51 are put in position on the knobs stems. The knobs are then introduced on the ends of the shaft 35. The escutcheon plate 19 at the front side of the door is next secured by means of the bolts 52 and nuts 53, after which the escutcheon at the inner side of the door may be secured in place. Before or after this securement of the escutcheon plates the shaft 17 may be inserted through the escutcheon plate at one side, and the detached knob 18 engaged on the threaded end of the shaft, outwardly of the other escutcheon plate. In order that the ends of the stems 38 will engage properly in the elements 56 in the knobs, as the shanks of the knobs are forced inwardly upon the shaft 35, the key 66 may be turned, in case immediate engagement of the stem ends in the elements 56 does not occur.

In assembling the parts of the knob for the outer side of the door, from which the manner of assembling the inner knob will also be understood, the detent 60 is first mounted in the block 56, after which the stem 57 is inserted through the central opening in the outer section of the knob, and this section secured upon the inner section in the desired manner. The pins 69 and 69′ are then assembled in the block 65, which is then adjusted over the stem 57, and the key 66 then secured upon the outer end of the stem 57, thereby holding the parts in proper assembled relation. The outer section of the knob may be secured in place with the opening 63 on any desired radius of the axis of the knob.

It will be seen that when the key 66 at the inner or right hand side of the door is turned in a clockwise direction, the bolt will be shot, and the detent moves into a position to hold it in locked position, as previously described. Movement of the key element 66 at the outer side of the door in a counter clockwise direction will similarly shoot the bolt, as previously described, the respective detent 60 adjacent serving to hold it in locked position. If the door be closed, and the bolt in locking position as described, in order to open the door at the outer side, it is necessary to rotate the block 65′ until the stud 69′ registers with the aperture 63, when the stud may be pressed inwardly, releasing the detent 60, and permitting the spring 25 to retract the bolt. To open the door from the inner side, the detent 60 on that side is released in a similar manner by manipulation of the block 65 and the pin 67. After the bolt has been retracted, the knob is grasped by the hand, and the thumb or forefinger, pressed against the knob 18 thereadjacent, to bear the latch bolt inwardly.

What is claimed:

1. A lock of the class described comprising a housing, a sliding bolt, resilient means engaged therewith tending to hold the bolt in retracted position, stationary knobs, means for shooting the bolt, including a member movable within each knob and a device to hold said movable member at a predetermined position in its movement.

2. A lock of the class described comprising a housing, a sliding bolt, stationary knobs, means to operate the bolt including separate members movable in respective knobs, a detent operative to hold said movable member in each knob at a predetermined position in its movement, means to release said detent, and means to move the said separate members.

3. A lock of the class described comprising a housing, a lock bolt movable therein, stationary knob members fixed with relation to the housing, movable members in the knobs, operative connections between the movable members and the lock bolt, a key head connected with each movable member and located exteriorly of the knob for manipulation, an eccentric aperture being formed at the outer side of the knob, a detent carried by each of said movable members in the knobs, constructed and arranged to engage in said aperture, and a plurality of devices carried exteriorly of the knob, at least one of which is constructed for manipulation to release said detent.

4. A lock of the class described comprising a housing, a lock bolt movable therein, stationary knob members fixed with relation to the housing, movable members in the knobs, operative connections between the movable members and the lock bolt, a spring pressed detent carried by said movable member and arranged to bear against the inner side of the knob for sliding movement under operating action of the movable member, an opening being formed in the knob in the path of the detent, a revoluble member carried exteriorly of the knob, at least one releasing member carried thereby for engagement in said opening, and means without the knob to operate said movable member therewithin.

5. A lock of the class described, comprising a housing, a sliding bolt therein, said housing having a key-receiving opening closely adjacent an inner end portion of the bolt, a key member having a bit to engage the end of the bolt upon rotation to shoot the bolt, a cam device constructed, arranged and mounted for rotation to engage and shoot the bolt and having a portion constructed and arranged to be engaged by a bit upon rotation the reverse of that above indicated for shooting the bolt to operate the cam to shoot the bolt, resilient means tending to move the bolt to retracted position, means to operate the key

member and means to hold the key member releasably in operative position at either limit of its movement.

6. A lock of the class described, comprising a housing, a lock bolt movable therein having a transverse key receiving face, a key member having a bit therein revoluble on an axis adjacent one longitudinal edge of the bolt, the bolt having an extension provided with an inclined face arranged to lie adjacent the bit when operated to shoot the bolt for engagement by the key bit under reverse movement to retract the bolt, a cam member pivoted inwardly of the bolt arranged to shoot the bolt under movement in one direction, and having a key engaging arm opposed to said transverse face of the bolt adjacent the opposite side of the casing from said bit, a second key having a bit positioned to engage said arm of the cam, said cam having also a portion arranged to lie adjacent the second named bit when operated, to be engaged under reverse operation of the key and connections between the cam and bolt for retraction of the bolt under movement of the cam the reverse of that first mentioned.

7. A lock of the class described, comprising a housing, a lock bolt movable therein having a transverse key receiving face, a key member therein having a bit adjacent one side of the casing, the bolt having a longitudinal extension provided with an inclined face arranged to lie adjacent inwardly of and in the path of the bit when operated to shoot the bolt, a cam member pivoted inwardly of the bolt arranged to shoot the bolt under movement in one direction, and having a key engaging arm opposed to said transverse face of the bolt adjacent the opposite side of the casing from said bit and a second key having a bit positioned to engage said arm of the cam.

In testimony whereof I affix my signature in presence of two witnesses.

IGNATZ BREIRATHER.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."