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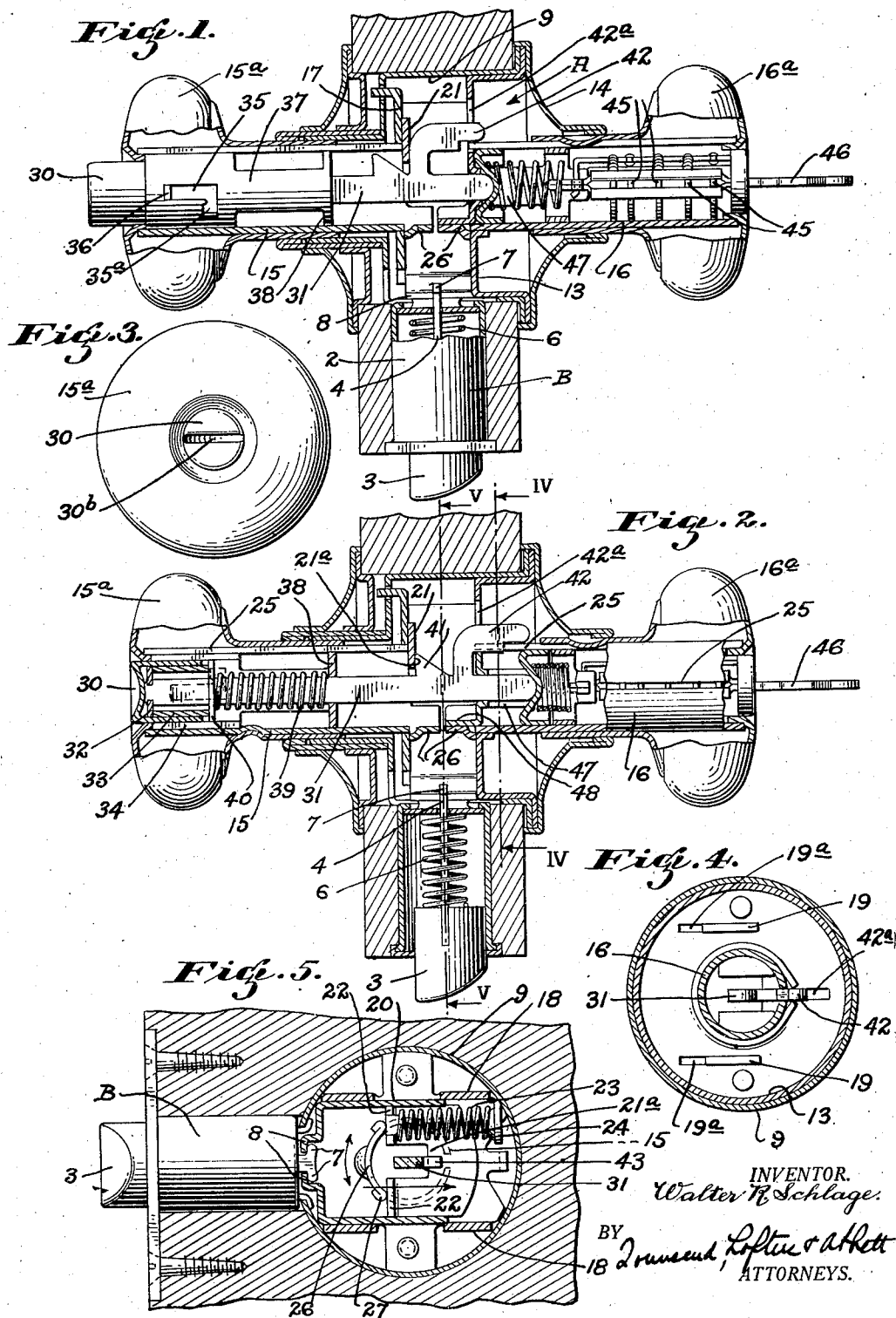
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1,991,031

DOORLOCK

Filed Nov. 10, 1928

2 Sheets-Sheet 1



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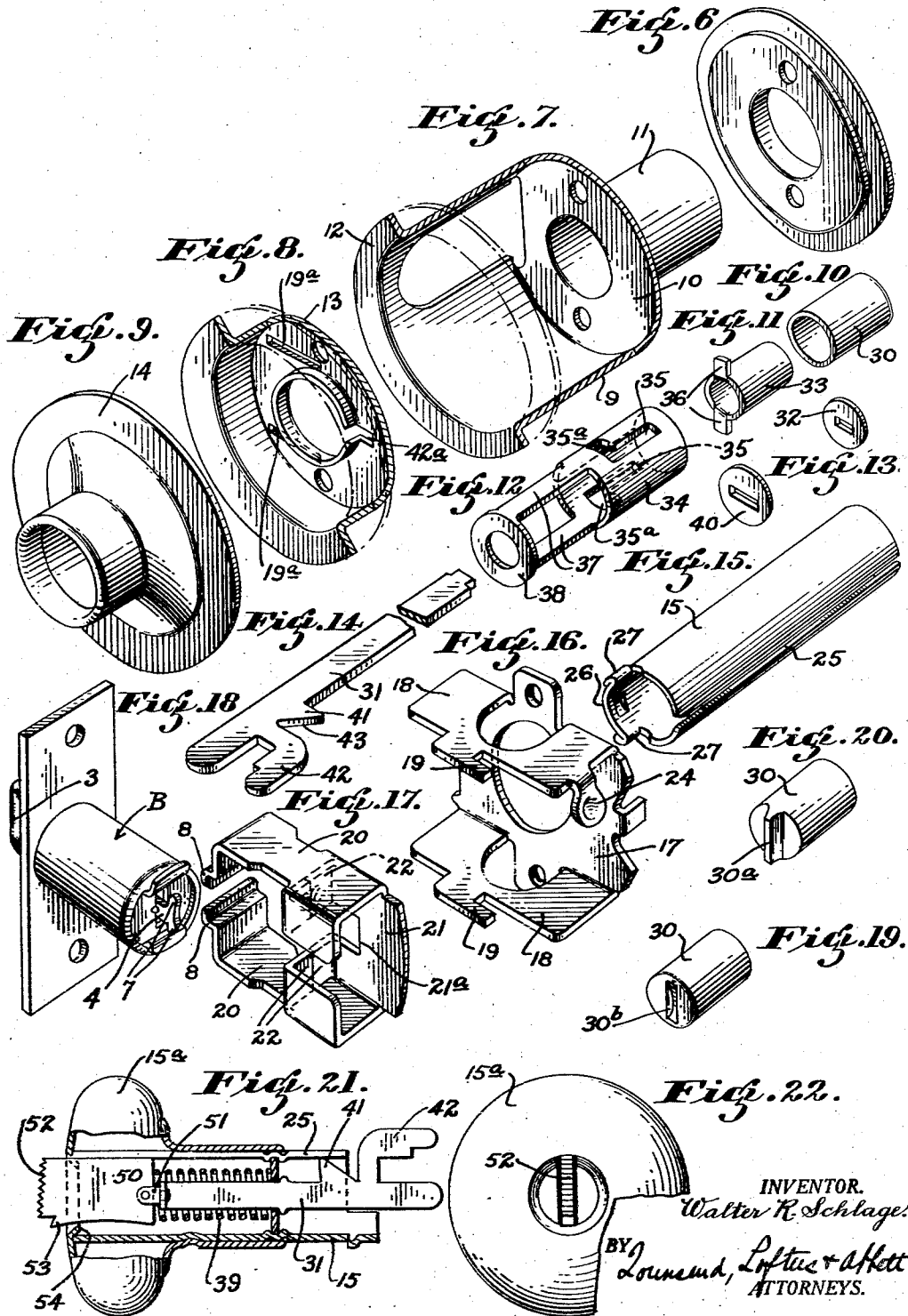
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

1,991,031

DOORLOCK

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23 Claims. (Cl. 70—91)

This invention relates to door locks, and especially to improvements on the structure shown in Patent Number 1,579,457 entitled "Door lock" issued April 6, 1926.

The above patent discloses a door lock comprising a main lock housing; a bolt or latch bolt mounted therein; a retractor connected with the latch bolt; an inner and an outer spindle whereby reciprocal movement is imparted to the retractor and the latch bolt; a pair of door knobs secured one on each spindle; and a button actuated locking mechanism in the inner knob and spindle whereby the outer knob and spindle may be locked against rotation, said button actuated locking mechanism being automatically released when the inner knob and spindle is turned.

The general locking mechanism disclosed in the present application is substantially identical in structure and operation to that described in connection with the above patent, but improvements have been added to permit positive locking of the button actuated locking mechanism when in locked position, or automatic release thereof as desired, and further, a key actuated mechanism has been placed in the outer knob and spindle to permit retraction of the latch bolt with or without releasing the button actuated locking mechanism, depending upon whether the button actuated locking mechanism has been locked or not.

The present invention embodies the improvements above specified, and are shown by way of illustration in the accompanying drawings, in which:

Fig. 1 is a horizontal section of the door lock showing it in position in a door, said section showing the button actuated locking bar in its released position,

Fig. 2 is a similar section showing the button actuated locking bar in its locked position,

Fig. 3 is an end view of the inner door knob and the push button mounted therein,

Fig. 4 is a section taken on line IV—IV of Fig. 2, said section showing the locking bar in full lines,

Fig. 5 is a vertical longitudinal cross section taken on line V—V of Fig. 2, said view showing the latch bolt and the latch bolt housing in side elevation,

Fig. 6 is a perspective view of the clamping plate,

Fig. 7 is a perspective view partially in section, showing the main lock housing,

Fig. 8 is a perspective view partially in section

showing the outer cover plate for the main lock housing,

Fig. 9 is a perspective view of the outer escutcheon plate,

Fig. 10 is a perspective view of the push button,

Fig. 11 is a perspective view of a sleeve which is pressed into the push button and secured with relation thereto,

Fig. 12 is a perspective view of the slotted sleeve whereby the push button is retained when depressed to locking position,

Fig. 13 is a perspective view of a pair of washers used in conjunction with the locking bar,

Fig. 14 is a perspective view of the locking bar,

Fig. 15 is a perspective view of one of the spindles,

Fig. 16 is a perspective view of the retractor guide,

Fig. 17 is a perspective view of the retractor,

Fig. 18 is a perspective view of the latch bolt unit,

Fig. 19 is a perspective view of the outer end of the push button,

Fig. 20 is a perspective view of a modified form of the push button,

Fig. 21 is a sectional view showing a modified form of push button, the button employed being in the form of a plate,

Fig. 22 is an end view of the door knob shown in Fig. 21.

Referring to the drawings in detail, particularly Figs. 1 and 2, A indicates in general a latch bolt actuating unit, and B a latch bolt unit. The latch bolt unit comprises a cylindrical shaped housing 2, in the outer end of which is slidably mounted a latch bolt 3. Secured to the rear end of the latch bolt 3 is a latch bolt bar 4, and surrounding the latch bolt bar and interposed between the inner end of the housing 2, and the inner end of the latch bolt 3 is a spring 6, which serves the function of normally maintaining the latch bolt in a projected position. The inner end of the latch bolt bar projects through the inner end of the cylindrical shaped housing 2, and it terminates in a pair of lugs 7, see Figs. 5 and 18, which are grasped by a pair of fingers 8 forming a part of a retractor, which is best illustrated in Fig. 17 which will later be described.

The latch bolt actuating unit consists of a main cup-shaped housing 9, see Fig. 7. The inner end of the housing is permanently closed by an end section 10, and this end section is provided with a hub or bearing extension 11. The opposite end of the housing is provided with an annular flange 12, and this forms a seat for

an end or cover plate 13, see Fig. 8, this cover plate in turn being closed or covered by an exterior escutcheon plate such as shown at 14, see Fig. 9.

- 5 The main housing 9, together with the end or cover plate 13 encloses and supports the following mechanism:

First, a pair of spindles 15 and 16 on the outer ends of which are secured knobs, such as indicated at 15a and 16a,

10 Secondly, they enclose a retractor guide, such as illustrated in Fig. 16, and

Third, a retractor such as shown in Fig. 17.

The retractor guide consists of a main front plate 17, and a pair of side plates 18, the side plates being provided with hook-shaped lugs 19, whereby they are secured to the end or cover plate 13, this plate being slotted as at 19a, see Fig. 8, to receive the hook-shaped lugs 19 and to secure the retractor guide.

20 Supported by the retractor guide is the retractor shown in Fig. 17. This consists of upper and lower plates, such as shown at 20, the forward ends of these plates terminating in the fingers 8 already described. The rear ends of the plates are connected by a vertical plate 21, and are also provided with a pair of inwardly extending plates 22, which will hereinafter be referred to as the roll back plates, as they are engaged by roll back members when reciprocal movement is being transmitted to the retractor as a whole.

The retractor is mounted between the plates 18 and 17 of the retractor guide, and the retractor as a whole is reciprocally mounted with relation to the retractor guide. The retractor is normally held in the position shown in Fig. 5 by means of a spring 23, which is interposed between the lug 24 on the retractor guide and the lower face of one of the roll back plates, shown at 22. The two spindles 15 and 16 previously referred to are identical in construction and they are best illustrated in Fig. 15. They are tubular or cylindrical in formation, and are slotted from end to end, as indicated at 25. The inner end of each spindle is provided with an extension 26, which is semi-circular in shape, and reinforced at the ends, as shown at 27. The reinforced ends 27 serve the function of a roll back, as will readily be seen.

50 By referring to Fig. 5, the roll back extension on one of the spindles is clearly shown. The reinforced ends 27 thereof engage the roll back plates 22 of the retractor, hence, if the spindle to which the roll back extension is connected is rotated, in either of the directions indicated by the double arrow, the plates, together with the retractor will be depressed and moved in the direction of arrow a. Spring 23 will be compressed and as the fingers 8 engage the lugs 7 of the retractor bar, and as the retractor bar is connected to the latch bolt 3, this will be retracted and the door will be opened.

65 Again, if the spindle is released, spring 23 will extend and the retractor will return to normal position, as shown in Fig. 5, thereby permitting the spring 6 in the latch bolt housing to extend or project the latch bolt 3. Both of the spindles, as previously stated, are provided with roll back extensions 26, and as each spindle is provided with a knob, it is only necessary to rotate one knob or the other to retract the latch bolt 3 when it is desired to open the door.

75 One of the important features of the present invention is the provision of means for locking

the outer knob against rotation, or in other words, opening of the door from the outside, except by an authorized person who is in possession of a key. The locking mechanism employed is actuated by a button 30, which is mounted in the outer end of the inner spindle 15. The button, normally projects outwardly from the inner face of the knob 15a and when the button assumes this position the locking mechanism actuated thereby assumes its unlocked position. The locking mechanism comprises a locking bar, generally indicated at 31, see Figs. 1, 2 and 14, this bar being connected with the button 30 so that it may be moved from the position shown in Fig. 1 which is its unlocked position, to the position shown in Fig. 2, which is its locked position. The connection between the outer end of the locking bar and the button 30 is made as follows: a washer 32, see Fig. 13, is riveted or otherwise secured to the outer end of the locking bar. A sleeve 33, see Figs. 2 and 11, is pressed into the button 30, and sufficient space is left to permit the washer 32 to freely rotate. Suitably secured within the outer end of the spindle 15 is a sleeve 34, see Figs. 2 and 12, the outer end of the sleeve being provided with L-shaped slots such as indicated at 35 and lugs 36 formed on the inner end of the sleeve 33 project into said slots. The button 30 carrying the sleeve 33 is reciprocally mounted interior of the sleeve 34, hence if the button is depressed or pushed inwardly, as shown in Fig. 2, lugs 36 will slide from one end of the slots 35 to the other, and if a rotary movement is transmitted to the button when this point is reached, lugs 36 will enter the horizontal portions 35a of the L-shaped slots, and the button will be locked against release.

The sleeve 34 is provided with a pair of extending arms 37 which are connected by a head member 38. This head member serves as a guide for the locking bar 31, and it also serves as a support for a spring 39 which surrounds the locking bar. The opposite end of this spring engages a washer 40, see Figs. 2 and 13, this washer being slotted to permit the locking bar to extend therethrough. The washer is freely rotatable with relation to the inner surface of the sleeve 34 and as it engages the lugged end 36 of the sleeve 33, it tends to force the sleeve together with the button 30 outwardly so that it will ordinarily assume the extended position shown in Fig. 1. The button will assume the depressed position shown in Fig. 2 when the lugs 36 are moved into engagement with the horizontal portion of the L-shaped slots 35.

The inner end of the locking bar is provided with a latch extension 41, and with a locking extension 42. The forward face of the latch 41 is inclined, as shown at 43, so that when the bar is moved inwardly to assume the position shown in Fig. 2 the inclined surface engages the plate 21 of the retractor at the point indicated at 21a, see Figs. 2 and 17, thereby moving the retractor inwardly. The moment, however, that the latch 41 passes beyond the plate 21 the plate instantly moves back to normal position, and as such gets behind the shoulder formed by the latch, and thereby secures the locking bar in its forward or locking position. The locking extension 42 will, in that instance, extend into a slot 42a see Figs. 2 and 8, formed in the end cover 13 of the main lock housing, and it will also extend into the slot 25 formed in the outer spindle 16. It is in this manner

that the outer knob is locked against rotation, for instance, if an attempt is made to rotate the outer spindle by means of the knob 16a, the slotted portion 25 of the spindle will engage one side or another of the locking portion 22 and as this is secured against movement by projecting through the slot 42a in the end cover plate 13, it is obvious that the spindle and outer knob will be locked against rotation. The inner knob and spindle, however, is free to rotate. If the button 30 has merely been pushed inwardly to lock the outer knob and spindle, the button and locking bar will be held in a locked position by the latch 41, and the latching plate 21 of the retractor. The moment, however, the inner knob is rotated the latching plate is moved inwardly away from the latch 41, and spring 39 will then retract the locking bar and at the same time move the button 30 to its extended position shown in Fig. 1.

On the other hand, if the button is depressed and the locking bar is moved to its forward locking position, it is possible to lock the locking bar in its forward position and to retain it against automatic release by merely imparting a slight rotary movement to the button 30 when in its depressed position, that is, by moving the lugs 36 into engagement with the horizontal portion of the slots 35. When the button has been rotated as described, the locking bar 31 is held in locking position without depending upon the latching plate 21. The inner knob is, however, free to rotate and the latch bolt 3 may be retracted or extended without affecting the locking mechanism but it should be realized that this can only be accomplished by means of the inner knob. Hence, if a person wishes to leave the door in a locked position when leaving his or her room or the house, it is only necessary to depress the button 30 and then to slightly rotate the same. He or she may then go out and slam the door and upon returning, will not be able to enter unless in possession of the proper key as the outer knob and spindle will be locked against rotation.

Any suitable form of key mechanism may be employed. In the present instance an ordinary form of cylinder lock is shown. The cylinder containing the tumblers indicated at 45 is inserted and secured within the outer end of the outer spindle. The plungers of the cylinder lock normally project into the slot 25 of the outer spindle and as such is locked with relation to the spindle, but when a key, such as shown at 46 is inserted, the pin tumblers are retracted and the cylinder may then be rotated by means of the key.

Suitably secured to the inner end of the cylinder is an extension 47. This is provided with a roll back member 48, similar to the roll back members indicated at 26, see Fig. 15. Hence, when the key 46 is inserted and the cylinder rotated, roll back 48 will also be rotated and a reciprocal movement will accordingly be transmitted to the retractor which will withdraw the latch bolt 3. It is accordingly possible to open the door from the outside by means of the key actuated mechanism. If the button 30 has been depressed and rotated or locked in its depressed position, opening of the door by the key actuated mechanism will not release the locking bar.

On the other hand, if the button is merely depressed and is secured in a depressed position by the latch 41 only, opening of the door by the

key actuated mechanism will, in that instance, release the button and the locking bar actuated thereby. It is accordingly possible to open the door with a key without releasing the locking bar, and it is also possible to open the door by means of the key and at the same time to release the locking bar.

Any suitable recess or projection may be formed on the outer end of the button to impart a rotary movement thereto, for instance in Fig. 20 a small thumb extension 30a has been provided which may be grasped when rotary movement is to be transmitted to the button. In Fig. 19 the outer end of the button is shown as provided with a depression or slot 30b. In that instance the thumb nail, or a small coin may be inserted when the button is depressed, to impart a rotary movement.

Another form of the button mechanism is shown in Fig. 21. In this instance a flat plate, such as shown at 50, is employed, and this merely projects through a slot in the outer end of the knob. The button is connected through means of a universal joint 51 with the locking bar 31. When it is desired to move the locking bar to locking position, the outer end 52 of the plate is engaged and pushed inwardly. At the same time, a slight downward pressure is exerted so that a latch 53, formed on the lower end of the plate, will be thrown into engagement with the retaining shoulder 54.

The modification shown in Fig. 21 merely illustrates that a round button, such as shown in Figs. 19 and 20, is not essential; furthermore, that it is not essential to impart a rotary movement to the button to insure locking of the locking bar when projected to its locking position.

While certain features of the present invention are more or less specifically described, I wish it understood that various changes may be resorted to within the scope of the appended claims, similarly, that the materials and finishes of the several parts employed may be such as the manufacturer may decide, or varying conditions or uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. The combination with a latch bolt in a lock and a divided spindle whereby it is actuated; of an inner and an outer knob on the spindle; a locking bar associated with the inner knob; means for moving the locking bar to a position where it will lock the outer knob against rotation to prevent retraction of the latch bolt by turning of the outer knob; said locking bar leaving the inner knob free to rotate to retract the latch bolt; said bar being automatically released when the inner knob is rotated and other means for locking the locking bar in its locking position, said means being unaffected by rotation of the inner knob.

2. The combination with a latch bolt in a lock and a divided spindle whereby it is actuated; of an inner and an outer knob on the spindle; a locking bar adapted to assume two positions, one a locking position where it locks the outer knob against turning to prevent retraction of the latch bolt and a second released position in which it leaves the outer knob free to turn to retract the latch bolt; said locking bar leaving the inner knob free to turn to retract the latch bolt, whether one position or another is assumed by the locking bar; means for locking the bar in its locking position, said means

releasing the bar upon turning movement of the inner knob; and a second means for locking the bar in its locking position, said means being unaffected by turning movement of the inner knob.

3. The combination with a latch bolt in a lock and a divided spindle whereby it is actuated; of an inner and an outer knob on the spindle; a locking bar adapted to assume two positions, one a locking position where it locks the outer knob against turning to prevent retraction of the latch bolt and a second released position in which it leaves the outer knob free to turn to retract the latch bolt; said locking bar leaving the inner knob free to turn to retract the latch bolt, whether one position or another is assumed by the locking bar; means for locking the bar in its locking position, said means releasing the bar upon turning movement of the inner knob; a second means for locking the bar in its locking position, said means being unaffected by turning movement of the inner knob; a key actuated mechanism in the outer knob; and means actuated thereby for retracting the latch bolt, said means being operable whether the locking bar assumes a locking position or a released position.

4. In a lock of the character described a latch bolt; a divided spindle; a retractor; a connection between the retractor and the latch bolt; means whereby turning movement of the spindle is transmitted to impart a reciprocal movement to the retractor and the latch bolt to retract the latch bolt; an inner and an outer knob on the spindle; a locking bar; means for positioning the locking bar where it will lock the outer knob against turning to prevent retraction of the latch bolt by the outer knob, said locking bar leaving the inner knob free to rotate to retract the latch bolt; means on the retractor for securing the locking bar in its locking position, said means releasing the locking bar when the inner knob is turned; and other means for locking the locking bar against release during turning movement of the inner knob.

5. In a lock of the character described a latch bolt; a divided spindle; a retractor; a connection between the retractor and the latch bolt; means whereby turning movement of the spindle is transmitted to impart a reciprocal movement to the retractor and the latch bolt to retract the latch bolt; an inner and an outer knob on the spindle; a locking bar; means for positioning the locking bar where it will lock the outer knob against turning to prevent retraction of the latch bolt by the outer knob, said locking bar leaving the inner knob free to rotate to retract the latch bolt; means on the retractor for securing the locking bar in its locking position, said means releasing the locking bar when the inner knob is turned; other means for locking the locking bar against release during turning movement of the inner knob; a key actuated mechanism in the outer knob; and means actuated thereby for retracting the latch bolt, said means being operable whether the locking bar is locked by either locking means.

6. The combination with a latch bolt in a lock and a divided spindle whereby it is actuated, of an inner and an outer knob on the spindle; a locking bar; a push button in the inner knob and connected with the locking bar; said button and locking bar when pushed inwardly

causing the locking bar to assume a position where it locks the outer knob against turning movement to prevent retraction of the latch bolt by turning of the outer knob; means for retaining the locking bar in its locking position, said means being normally releasable upon turning of the inner knob; and means operable independently of said means for preventing release of the locking bar upon turning of the inner knob.

7. The combination with a latch bolt in a lock and a divided spindle whereby it is actuated, of an inner and an outer knob on the spindle; a locking bar; a push button in the inner knob and connected with the locking bar; said button and locking bar when pushed inwardly causing the locking bar to assume a position where it locks the outer knob against turning movement to prevent retraction of the latch bolt by turning of the outer knob; means for retaining the locking bar in its locking position, said means being normally releasable upon turning of the inner knob; and means actuated by turning movement of the button about its longitudinal axis for locking the locking bar in its locking position against release upon turning of the inner knob.

8. The combination with a latch bolt in a lock, and a divided spindle whereby it is actuated, of an inner and an outer knob on the spindle; a depressible push button in the inner knob; means actuated by depression of the button for locking the outer knob against turning to prevent retraction of the latch bolt by turning the outer knob, said locking means leaving the inner knob free to turn; means actuated by turning movement of the inner knob for releasing the locking mechanism and for returning the push button to extended position; and other means for locking the push button and the locking mechanism actuated thereby in locking position, said means being unaffected by turning movement of the inner knob.

9. The combination with a latch bolt in a lock, and a divided spindle whereby it is actuated; of an inner and an outer knob on the spindle; a locking bar; means for moving the locking bar to a position where it will lock the outer knob against rotation to prevent retraction of the latch bolt by turning of the outer knob; and means for retaining the locking bar in locking position; during rotation of the inner knob.

10. The combination with a latch bolt in a lock and a divided spindle whereby it is actuated; of an inner and an outer knob on the spindle; a locking bar; a push button in the inner knob connected with the locking bar; said button when pushed inwardly causing the locking bar to assume a position where it locks the outer knob against turning movement to prevent retraction of the latch bolt by turning of the outer knob; but leaving the inner knob free to rotate; and means for securing the locking bar in its locking position; during rotation of the inner knob.

11. In a lock of the character described, a latch bolt, an inner and an outer latch bolt actuator, a locking member, means for moving the locking member to a position where it will lock the outer latch bolt actuator against operation, means for releasing said locking member when the inner latch bolt actuator is operated, and other means for retaining the lock-

ing member in a locking position when the inner latch bolt actuator is operated, said means leaving the inner latch bolt actuator free to actuate the latch bolt.

12. In a lock of the character described, a latch bolt, an inner knob whereby the latch bolt is retracted, an outer actuator whereby the latch bolt is retracted, a locking member carried by the inner knob, means on the inner knob for moving the locking member to a position where it will lock the outer actuator against operation, said means leaving the inner knob free to retract the latch bolt, and said locking member being automatically released upon rotation of the inner knob, and other means for retaining the locking member in locking position when the inner knob is rotated.

13. In a lock of the character described the combination with the inner knob and the spindle upon which it is mounted, of a locking member extending through the spindle, means for moving the locking member to assume a locking position, said locking member being automatically released upon rotation of the spindle, and other means for securing the locking member against release when the spindle is rotated.

14. In a lock having an inner and an outer knob, a latch bolt adapted to be retracted by rotation of either knob, and a rotatable member carried by the inner knob and adapted to dog the outer knob against rotation, said rotatable member being adapted to assume two positions in both of which the inner knob is rotatable to retract the latch bolt, said rotatable member when assuming one position being automatically releasable by rotation of the inner knob and being non-releasable by rotation of the inner knob in the other position, said rotatable member leaving the inner knob free to rotate to retract the latch bolt.

15. In a lock having a rotatable inner and outer knob, means for dogging the outer knob against rotation, said means leaving the inner knob free to rotate, and an actuator for the dogging member, said actuator being capable of selective manipulation whereby when the actuator is moved to one position the dogging member is automatically released upon rotation of the inner knob and when moved to another position the dogging member remains in dogging position when the inner knob is rotated.

16. In a lock having an inner and an outer knob, a latch bolt adapted to be retracted by rotation of either knob, means carried by the inner knob for dogging the outer knob against rotation, said means leaving the inner knob free to rotate, and an actuator for the dogging member, said actuator adapted to assume two positions, one position in which the dogging member will be released upon rotation of the inner knob, and another position whereby the dogging member will remain in dogging position upon rotation of the inner knob.

17. In a lock of the character described, a cylindrical housing, a divided tubular spindle journaled in opposite ends thereof, a dogging member engageable with one of the spindles and adapted to dog said spindle against rotation, and an actuator for the dogging member

carried by the other spindle, said actuator adapted to assume two positions, one position whereby the dogging member will be released upon rotation of the spindle carrying the actuator, and a second position where the dogging member will remain dogged upon rotation of the spindle carrying the actuator.

18. In a door lock, a housing, a latchbolt, an inner and an outer latchbolt actuator whereby the latchbolt may be retracted, means for dogging the outer latchbolt actuator to prevent retraction of the latchbolt, key actuated means cooperating with the outer latchbolt actuator for retracting the latchbolt without releasing the dogging means, and means actuated by operation of the inner latchbolt actuator for releasing the dogging means to permit retraction of the latch bolt by the outer latchbolt actuator.

19. In a lock having a rotatable outer and inner knob, means for rendering the outer knob inoperative, said means leaving the inner knob free for operation, said means being capable of selective manipulation so as to release or not release the outer knob for operation when the inner knob is operated.

20. In a lock having an inner and outer latch retractor, movable means capable of selective manipulation to render the outer latch retractor operative or inoperative to retract the latch, said movable means in one position being automatically released upon operation of the inner latch retractor to permit operation of the outer latch retractor and in the other position rendering the outer latch retractor inoperative but leaving the inner latch retractor free for operation.

21. In a lock having an outer knob, a latch bolt adapted to be retracted by operation of the outer knob, key actuated means in the lock for retracting the latch bolt, and means in the lock for rendering the outer knob inoperative, said means being capable of selective manipulation so as to release or not release the outer knob for operation upon actuation of the key mechanism.

22. In a lock having an outer and an inner knob, a latch bolt adapted to be retracted by operation of either knob, key actuated means for retracting the latch bolt, means for rendering the outer knob inoperative, said means being automatically released to restore the outer knob for operation upon operation of either the inner knob or the key actuated mechanism, and other means for preventing release of said means upon operation of either the inner knob or the key actuated mechanism so as to maintain the outer knob inoperative.

23. In a lock having an outer and an inner knob, a latch bolt adapted to be retracted by operation of either knob, means for rendering the outer knob inoperative, said means being automatically released upon operation of the inner knob, key actuated means also capable of releasing the outer knob for operation, and other means for preventing release of the outer knob for operation either by operation of the key mechanism or operation of the inner knob.

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