Aug. 15, 1944. W. R. SCHLAGE 2,355,682

DOOR LOCK

Filed Dec. 22, 1941 4 Sheets-Sheet 1

Fig. 1.

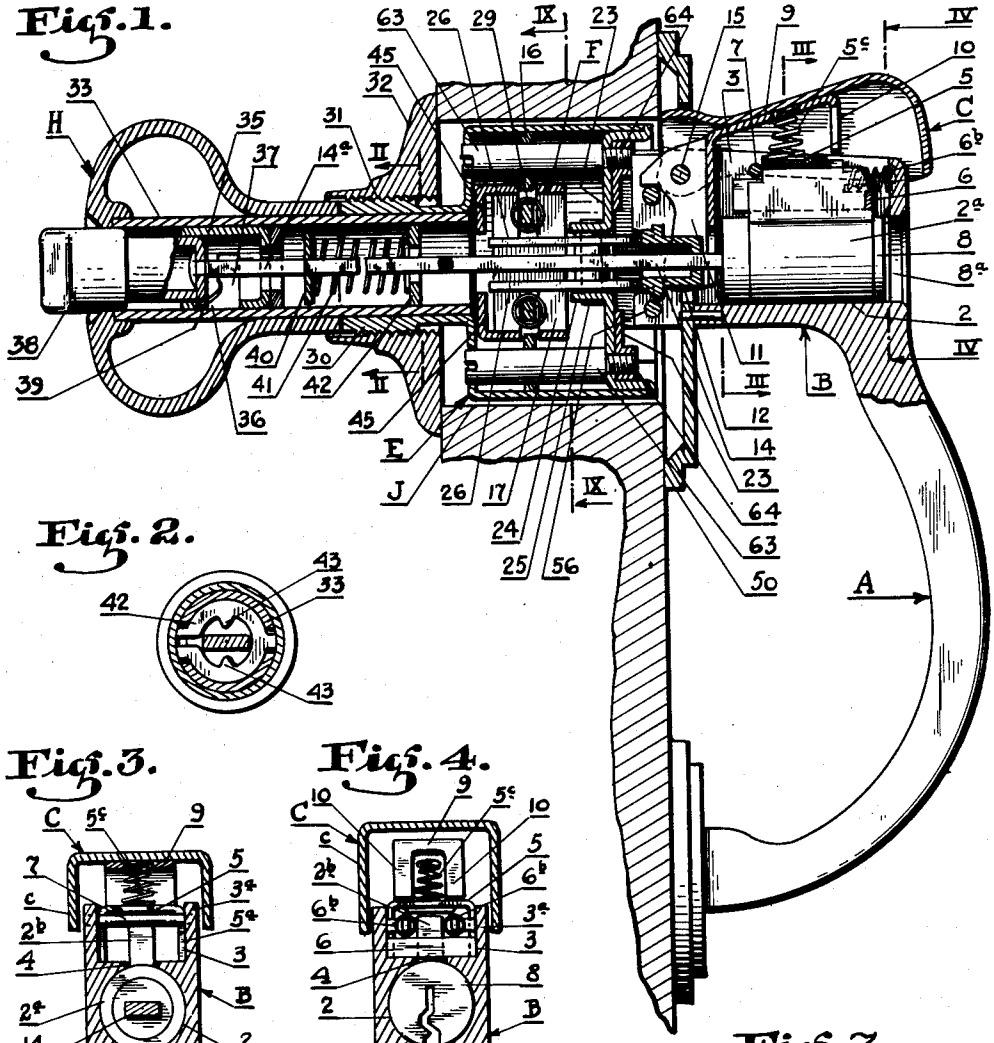


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 7.

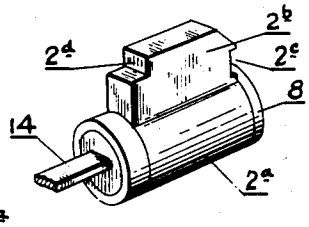


Fig. 5.

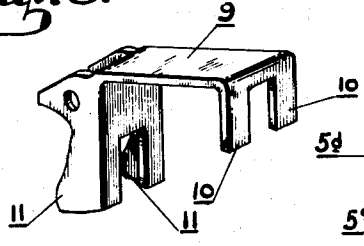
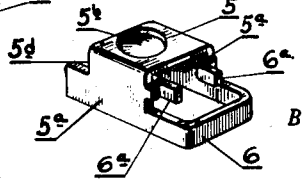


Fig. 6.



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DOOR LOCK

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Fig. 8.

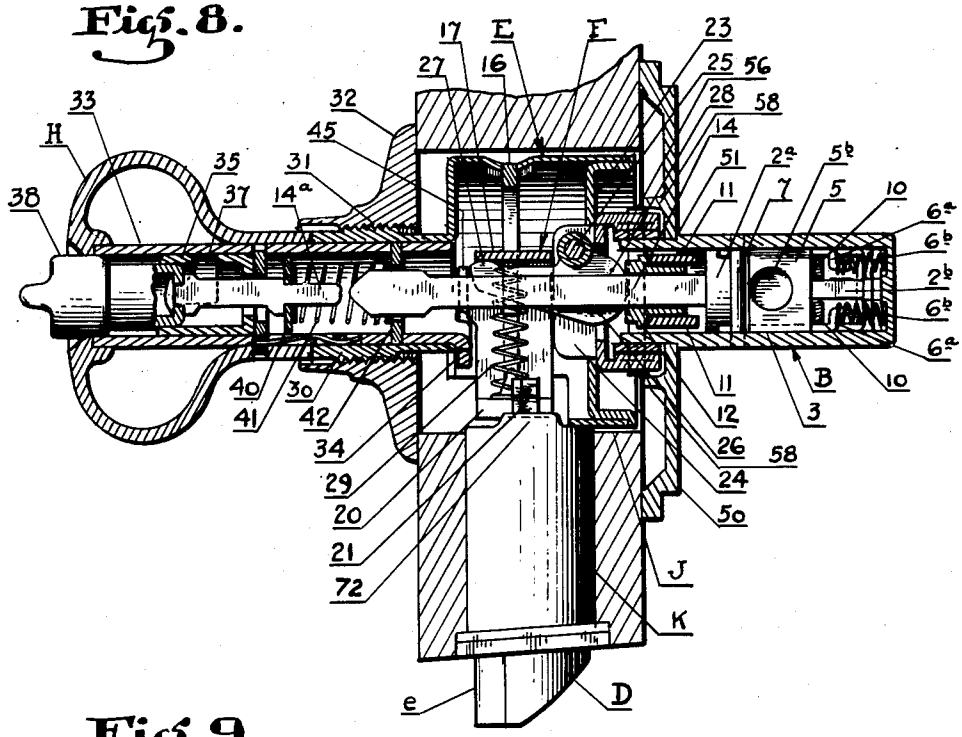
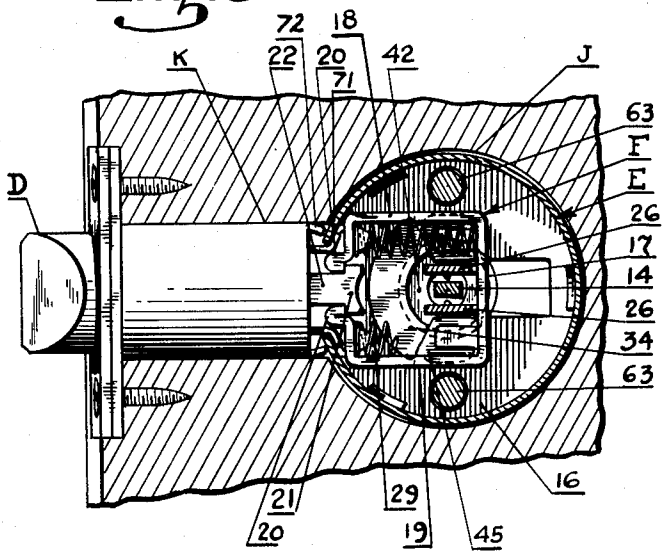


Fig. 9.



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DOOR LOCK

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Fig. 10.

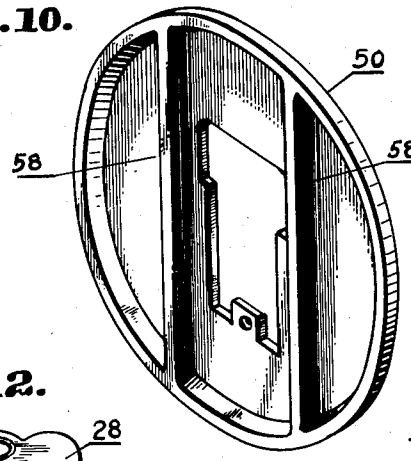


Fig. 11.

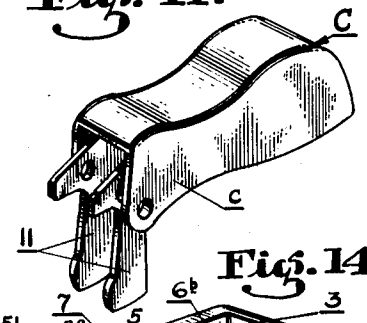


Fig. 12.



Fig. 13.

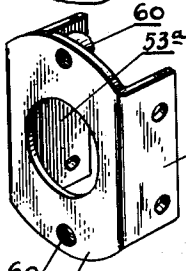


Fig. 14.

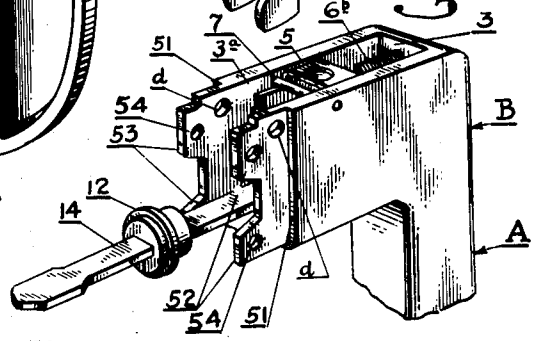


Fig. 15.

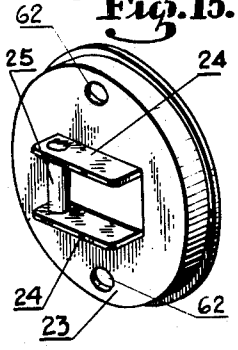


Fig. 16.

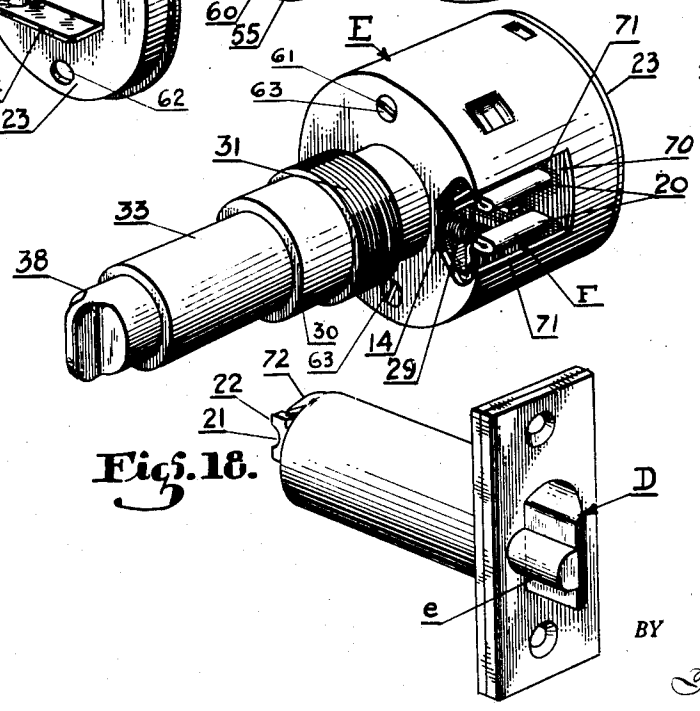


Fig. 17.

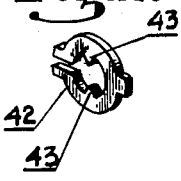


Fig. 18.

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Fig. 20.

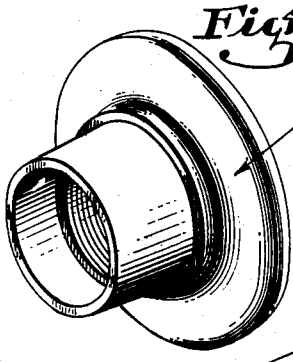


Fig. 19.

Fig. 21.

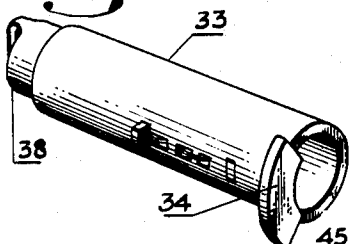


Fig. 22.

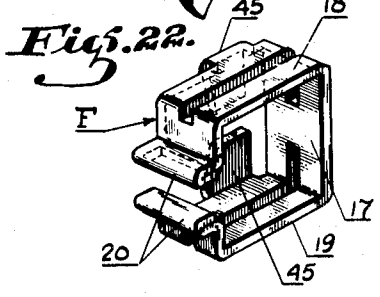
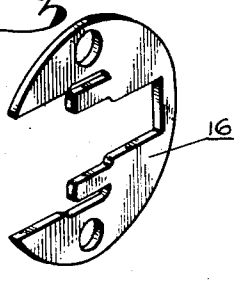


Fig. 23.



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UNITED STATES PATENT OFFICE

2,355,682

DOOR LOCK

Walter R. Schlage, Burlingame, Calif.

Application December 22, 1941, Serial No. 424,089

7 Claims. (Cl. 70—147)

This invention relates to door locks, and especially to that type which is known as an entrance door lock.

The object of the present invention is generally to improve and simplify the construction and operation of locks of the character described; to provide an entrance door lock having a single latch bolt adapted to be retracted from the exterior side of a door, either by a thumb depressable lever or a key actuated mechanism, and from the inner side of the door by a knob and spindle; to provide a push button in the knob whereby the thumb depressable lever may be dogged against operation; to provide a lock having on the exterior of the door a handle in which is mounted the key actuated mechanism and the thumb depressable lever; to provide a lock in which the push button is utilized to impart longitudinal movement to the key actuated mechanism, and in which the longitudinal movement of the key actuated mechanism causes dogging or undogging of the thumb depressable lever; to provide a lock in which longitudinal movement of the key actuated mechanism visibly indicates whether the thumb depressable lever is dogged or not, and at the same time permits or prevents full insertion of a key; and further, to provide a lock structure which is readily changeable for right or left hand mounting in a door.

The lock structure is shown by way of illustration in the accompanying drawings, in which

Fig. 1 is a central vertical longitudinal section of the lock, showing it mounted in a door;

Fig. 2 is a cross section taken on line II—II of Fig. 1;

Fig. 3 is a cross section taken on line III—III of Fig. 1;

Fig. 4 is a cross section taken on line IV—IV of Fig. 1;

Fig. 5 is a perspective view of the plate 9 forming a part of the thumb depressable lever;

Fig. 6 is a perspective view of the spring supporting plate 5;

Fig. 7 is a perspective view of the pin tumbler key actuated cylinder lock;

Fig. 8 is a horizontal longitudinal section of the lock, showing it mounted in a door;

Fig. 9 is a vertical cross section taken on line IX—IX of Fig. 1;

Fig. 10 is a perspective view of the exterior escutcheon plate;

Fig. 11 is a perspective view of the thumb depressable lever;

Fig. 12 is a perspective view of the rocker member 26;

Fig. 13 is a perspective view of a securing plate;

Fig. 14 is a perspective view of the head formed on the upper end of the door handle;

Fig. 15 is a perspective view of the end plate in the housing E;

Fig. 16 is a perspective view of the housing E and the spindle and push button carried thereby;

Fig. 17 is a perspective view of the washer 42;

Fig. 18 is a perspective view of the latch bolt housing;

Fig. 19 is a perspective view of the door handle, the exterior escutcheon plate, the housing E, the inner spindle and the push button, said parts being completely assembled and ready for installation in a door;

Fig. 20 is a perspective view of the inner escutcheon plate;

Fig. 21 is a perspective view of the spindle 33 showing the rollback member carried thereby;

Fig. 22 is a perspective view of the retractor slide; and

Fig. 23 is a perspective view of the plate on which the retractor slide is slidably mounted.

Referring to the drawings in detail, and particularly to Figs. 1 to 7, A indicates the handle of an entrance door lock, and formed or secured on the upper end thereof is a head member B, in which is formed a cylindrical-shaped recess 2, and above that a rectangular-shaped recess 3 (see Figs. 3, 4 and 14), said recesses having a slot 4 formed between them. Insertable in the cylindrical recess 2 is the housing 2*a* of a key actuated lock, said lock being of the pin tumbler cylinder type (see Fig. 7). The lock has a rib or extension 2*b* formed thereon for the reception of the pin tumblers in the usual manner, and the extension passes through the slot 4 up into the rectangular-shaped recess 3. Across the front end of the rib 2*b* is formed a groove 2*c* and at the rear of the rib is formed a shoulder 2*d*.

Adapted to fit between the side walls 3*a* of the upper recess 3, and to straddle the rib 2*b* and rest thereon is a spring supporting member (see Fig. 6), consisting of a top plate 5, having connected side plates 5*a*, which terminate in a loop 6. This loop rests in the recess 2*c* of the rib of the cylinder housing 2*a*. Formed just behind the loop 6 are a pair of lugs 6*a* which are provided for the reception of a pair of springs 6*b*, and formed in the top plate 5 is a recess 5*b* which is provided for the reception of a spring 5*c*.

At the rear of the spring supporting member shown in Fig. 6 is a pair of shoulders 5*d* which align with the shoulder 2*d* in the rib and extending through the side walls 3*a* of the recess 3 and

behind the shoulders 5d and 2d is a stop pin 7. This pin limits rearward movement of the spring supporting member and the housing 2a of the pin tumbler cylinder lock. That is, the springs 6b are interposed between the front end of the head B and the lugs 6a, and as such tend to force the spring supporting member and the housing of the cylinder lock inwardly or rearwardly, and such inward or rearward movement is limited by the pin 7. The whole unit, to-wit, the cylinder housing 2a and the spring supporting member carried thereby, may move forward approximately ⅛ inch, or to the extent that the front end 8 of a key receiving cylinder mounted within the housing 2a may move into a recess 8a formed in the front face of the head B, but rear or inward movement is limited by the pin 7, and it is to be understood that the cylinder housing and the spring supporting member normally assume their innermost position due to the pressure exerted by the springs 6b.

This limited movement of the cylinder housing and the spring supporting member is utilized to block or dog movement of a thumb actuated lever generally indicated at C (see Fig. 11). This lever has a plate 9 formed integrally therewith, or secured thereto as by spot welding, soldering, or the like. A fork-shaped dog 10 is formed on the forward end of the plate 9 (see Figs. 1 and 5) and this will straddle the rib 2b of the cylinder housing and permit depression of the thumb actuated lever when the cylinder housing and the spring supporting member assume their inner position, but when they are moved forwardly, as will hereinafter be described, the front end of the plate 5 becomes disposed directly under the fork-shaped dog 10 and the thumb actuated lever C is then locked or dogged against movement.

The plate 9 forming a part of the thumb actuated lever C, has two downwardly extending arms 11 formed thereon, and their lower ends engage a collar 12 (see Figs. 1 and 14) which is slidably mounted on a bar 14. The upper ends of the arms 11 are perforated, as shown, and so are the sides c of the thumb actuated lever (see Fig. 11). A pin 15 extends through these perforations, and similar perforations d formed in the side walls 3a of the head B, and as such form a pivotal support for the thumb actuated lever. This lever normally assumes the position shown in Fig. 1, being held in that position by the spring 5c, but when it is depressed by thumb action the outer end will move downwardly and compress the spring 5c, while the arms 11, which are nothing more or less than crank arms, will swing rearwardly and push the collar 12 inwardly on the bar 14.

This inward sliding movement of the collar 12 is utilized to retract a latch bolt generally indicated at D (see Figs. 8, 9 and 18), and this latch may be an ordinary latch bolt or it may be a latch bolt which is adapted to be deadlocked when extended, in which instance, a secondary deadlocking bolt e will be employed, but as that forms no part of the present invention, a detailed description thereof is here unnecessary.

The retracting mechanism is mounted within a cylindrical-shaped housing, generally indicated at E (see Figs. 1, 8, 9 and 16). Secured within the housing and substantially centrally of its length is a plate 16 (see Figs. 1, 8, 9 and 23) and slidably mounted thereon is a retractor slide generally indicated at F. The retractor slide is best shown in Fig. 22, and has a back wall section 17, upper and lower arms 18 and 19, and hook-shaped front arms 20. These hook-shaped members are adapted to engage lugs 21 formed at the rear or inner end of a bar 22, which is secured to the latch bolt D. Also secured in the housing E is a circular plate 23 (see Fig. 15) upon which are formed two inturned lugs 24. These are perforated at one end to receive a pin 25, and on this pin is pivoted a rocker arm consisting of two spaced arms 26, the forward ends 27 of which are adapted to engage the rear end 17 of the retractor slide, while the opposite ends 28 are engaged by the collar 12. Thus when the thumb lever C is depressed and swung about its pivot pin 15, the lower ends of the crank arms 11 will swing inwardly and engage the collar 12 and force it inwardly on the bar 14. During this inward movement of the collar 12, the rear ends 28 of the arms 26 are engaged and the arms 26 will thus be swung about their pivot pin 25, thereby causing the opposite ends 27 to engage the rear wall of the retractor slide and thereby force the retractor slide inwardly on the plate 16 against the tension of a pair of springs 29, and as the hook shaped ends 20 engage the lugs at the inner end of the bar 22, the latch bolt will be retracted. Conversely, when the thumb latch is released, it will be returned to normal position by the spring 5c, and the latch bolt D will be projected by a spring within its housing, while the retractor slide will be returned to normal position by its springs 29; and as the retractor slide returns to normal position, it engages the forward ends 27 of the arms 26, thus returning them to normal position and at the same time forcing the collar 12 outwardly on the bar 14 or back to normal position.

Thus the latch bolt D may be retracted from the exterior side of the door by depression of the thumb actuated lever C. The latch bolt may be also retracted from the exterior side of the door by key action and, in fact, by key action only if the thumb actuated lever is dogged by positioning the spring supporting plate 5 under the forked dogging member 10. This is accomplished as follows:

Forming an extension of the housing E is a hub 30, the outer exterior end of which is threaded as at 31 to receive an escutcheon plate 32. The sleeve or hub forms a bearing for a tubular spindle 33 on the inner end of which is formed a rollback member 34 (see Fig. 21). Secured on the outer end of the spindle is a sleeve 35 in which is formed a bayonet-shaped slot having a longitudinally extending portion 36 and a lateral portion 37. Extending through the knob H and into the sleeve 35 is a push button 38 on the outer end of which is formed a turn piece or grip whereby the button may be gripped and pushed inwardly and then turned to cause a lug 39 on the inner end of the button to ride down the longitudinal part of the slot and then into the lateral portion so as to secure the button in a depressed position. Secured to the inner end of the button is a bar 14a which aligns with the bar 14; a washer 40 is secured on the bar, and a spring 41 is interposed between the washer and a second washer 42, which is secured in the spindle 33. The spring 41 serves only one function, and that is to return the button 38 to the extended position shown in Fig. 1 when it is rotated to swing the lug 39 out of the lateral slot 37 into alignment with the longitudinal slot 36.

The washer 42 (see Figs. 1 and 17) serves sev-

eral functions besides that of a support for one end of the spring 41. First of all, it forms a support for the inner end of the bar 14 to maintain it in alignment with the bar 14a. Secondly, it is provided with two V-shaped lugs 43 which form a driving connection between bar 14 and the spindle 33, when bar 14 is rotated by means of the key mechanism, as will hereinafter be described. And third, it permits rotation of knob H and spindle 33 without imparting rotation to bar 14; that is, a person on the inner side of the door may at all times grasp the knob H and rotate it together with the spindle 33 on which it is secured, and when so rotated, the rollback member 34 will engage one or another of a pair of lugs 45 secured on the adjacent side of the retractor slide (see Figs. 9 and 22), and thereby cause retraction of the retractor slide and the latch bolt D. The rotation of the spindle is limited to approximately 45° in either direction, as the retractor slide and latch bolt are completely retracted by that amount of rotation, further rotation being stopped as the retractor slide at that point engages the housing E. Further rotation is also stopped by the washer 42 secured within the spindle as the V lugs 43 formed thereon will engage the bar 14 and thus cannot rotate except when key actuated, as its outer end extends into the housing 2a of the lock and is secured to the inner end of the key actuated cylinder mounted therein. In other words, the inner knob H and spindle 33 are free to be rotated approximately 45° in either direction or an amount sufficient to retract the latch bolt D regardless of the position of the push button 38 which controls dogging of the thumb actuated lever C.

If a person on the inside desires to dog the thumb actuated lever C against operation, that person will have only to grasp the outer end of the push button 38 and then push it inwardly and finally rotate it to cause the lug 39 to enter the latter slot 37. This inward movement of the push button causes inward movement of the bar 14a, and as it moves inwardly it engages the inner end of the bar 14 and pushes this together with the housing 2a of the key actuated lock outwardly a distance of approximately ⅛ inch, and as the spring supporting plate 5 must move in unison therewith, due to the fact that the yoke 6 is engaged in the notch 2c of the rib 2b, the plate 5 will also move forward the same distance and will thus be positioned directly under the fork-shaped dogging member 10. The thumb actuated lever C is thus dogged against operation by the push button and remains in dogging position until the button is again manually rotated and returned by the spring 41 to extended position. If that is done, the springs 6b will force the housing 2a and the spring supporting member 5 back to normal position or into engagement with the pin 7, and the thumb actuated latch will then be undogged. On the other hand, if it is dogged, there is no way of opening the door from the exterior except by the use of a key.

Such a key when inserted will be received by the cylinder within the housing 2a, and when so received the key may rotate the cylinder and the bar 14 and as this extends through the washer 42 the bar will, during rotation of the key in either direction, engage the V-shaped lugs 43 and thereby cause rotation of the inner spindle 33, and as the rollback member 34 is secured thereon, it will engage the lugs 45 on the side of the retractor slide and cause retraction of the retractor slide and the latch bolt D. Thus the latch bolt may be retracted either by key action from the exterior or by depression of the thumb actuated latch C, but if this is dogged, it can only be retracted from the outside by the key actuated mechanism just described, or from the inside by rotation of knob H. When the thumb actuated lever C is dogged against operation, the key mechanism assumes its outermost position, and when undogged, the innermost position shown in Fig. 1, thereby leaving a recess 8a in the outer face of the head B. This recess or space serves two functions, first, that of permitting longitudinal movement of the key mechanism to dog or undog the thumb actuated lever; and second, that of functioning as a visible indicator to indicate whether the thumb actuated lever is dogged or not. For instance, when the end 8 of the key mechanism assumes a position substantially flush with the end surface of the head B, it indicates that the thumb actuated lever is dogged. Conversely, when the key mechanism is moved inwardly and the recess appears in the outer face of the head B, it indicates that the thumb actuated lever is undogged. Similarly, the push button on the inner face of the lock also visibly indicates whether the thumb actuated lever is dogged or undogged. If, when the push button assumes its outermost position, it indicates that the thumb actuated lever is undogged, and when it is depressed and its outer end is flush with the surface of a door knob, then it indicates that the thumb actuated lever is dogged.

A lock constructed as here shown may be mounted in a door by merely drilling or boring two holes therein, one crosswise of the door, as indicated at J, and the second hole, indicated at K, through the edge of the door and at right angles to the first hole. When these holes are bored, the latch bolt unit (see Fig. 18) must be first inserted in the hole K and then the latch bolt actuating unit, in assembled form, as shown in Fig. 19, is inserted from the exterior side of the door in hole J. An escutcheon plate 50 carried by the head B will then engage the exterior face of the door, while an escutcheon plate 32, secured on the threaded surface of the bearing 30, will engage and clamp the inner face of the door and secure the lock as a whole in place when the installation is completed by applying the knob H.

The manner in which the unit in Fig. 19 is assembled is as follows: The handle A having the head B formed at the upper end thereof will first receive the housing 2a of the key actuated pin tumbler cylinder lock, together with its contained mechanism, including the bar 14 and the collar 12 mounted thereon (see Fig. 14). The plate 5, together with the springs supported thereby, is next placed in the upper part of the head; then the pin 7 and finally the thumb actuated lever C and its pivot pin 15. Just forward of a pair of shoulders 51 formed on the head B are a pair of lugs 52 and 53, which are perforated as at 54. Adapted to slip over these lugs, and to be supported thereby, is an escutcheon plate 50. This plate 50 engages the shoulders 51 on the head B, and thereby limits outward movement of the plate. Adapted to abut the ends of the lugs 52 and 53, and to be secured thereto is a plate 55 (see Fig. 13). This plate has pairs of perforated lugs 52a and 53a formed thereon, which slip over and engage the exterior surfaces of the lugs 52 and 53, and as the perforations in the

lugs 52a and 53a register with the perforations 54 a pair of pins 56 may be driven through to secure the plate 55 rigidly to the inner end of the head B. The inner face of the plate 50 has two reinforcing ribs 58. The plate 55 forms an anchor or connector between the head B and the housing E (see Fig. 16), together with the mechanism contained therein, and for that reason is provided with two bosses 60 which are interiorly threaded. The housing E, as previously stated, is closed at one end by the plate 23 (see Fig. 15). This housing, together with the plate, is perforated as indicated at 61 and 62, respectively, and a pair of long headed screws 63 are provided, which extend through the perforations. Only the inner ends of the screws are threaded, as indicated at 64, and they extend into the interiorly threaded bosses of the plate 55, thus securing the housing E, or the unit shown in Fig. 16, to the plate 55; and when so secured, the unit shown in Fig. 19 will be completed and is ready for assembly or installation in a door. By referring to Fig. 19, housing E is shown in a position that permits the lock to be installed in a left hand opening door, by releasing the screws 63 unit E may be removed and rotated 90° and again secured by the screws 63 when the lock may be fitted to a right hand opening door. Thus by merely releasing the screws 63 and rotating the housing E 90° in one direction or another, the lock is changed from a right hand lock to a left hand lock, or vice versa.

By again referring to Fig. 9 it will be noted that the housing E has a slot 70 formed therein and that the opposite sides of the slot form flanges 71 which are engaged by a pair of flanges 72 formed at the inner end of the latch bolt housing D2 (see Figs. 8, 9, 16, 18 and 19). The flanges 71 and 72 interlock the housings E and D2 when they are assembled in a door and this is accomplished as follows:

Housing D2 is first inserted in the opening K drilled or bored through the edge of the door and the entire assembly shown in Fig. 19 is then inserted in the opening J bored cross-wise of the door. During insertion flanges 71 passes over the flanges 72 which project into the opening J and the two housings are thus interlocked. The retractor slide F similarly becomes interlocked with the lugs 21 on the inner end of the retractor bar 22 as the hook-shaped lugs 20 will pass over or in front of lugs 21 during insertion of housing E, hence, both housings and the mechanisms therein become interlocked. This interlocking feature is not new per se, as it has been disclosed in several patents heretofore issued, but it is new in the combination here disclosed, i. e. the hand grip A has anchored or secured thereto the housing E containing the latch bolt actuating mechanism also the inner spindle 33 the knob H and the inner and outer escutcheon plates 32 and 50 and these parts are interlocked with the latch bolt housing and the contained mechanism.

While this and other features of my invention have been more or less specifically described and illustrated, I nevertheless wish it understood that changes may be resorted to within the scope of the appended claims, and that the materials and finish of the various parts employed may be varied according to what the experience of the manufacturer and varying conditions of use may demand.

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

1. In a door lock a latch bolt actuating unit, a latch bolt adapted to be retracted thereby, a thumb depressable member on the exterior side of the door for operating the latch bolt actuating unit to retract the latch bolt, a longitudinally movable key mechanism on the exterior side of the lock, a push button operable from the inner side of the lock, means actuated by depression of the push button for imparting longitudinal movement to the key mechanism, and means actuated by longitudinal movement of the key mechanism for dogging the thumb depressable member against operation.

2. In a front door lock, a handle, a head member on the handle, a latch bolt actuating unit secured to the head member, a retractor slide mounted in said unit, a rocker arm pivotally mounted in said unit and engageable with the retractor slide to operate the same, a thumb depressable lever pivotally mounted on the head member, a bar carried by the head member, and a collar slidably mounted on the bar, said collar being interposed between the thumb depressable lever and the rocker arm to transmit pivotal movement of the thumb depressable lever to the rocker arm.

3. In a front door lock, a handle, a head member on the handle, a latch bolt actuating unit secured to the head member, a retractor slide mounted in said unit, a spindle journalled in said unit, a rollback member on the spindle engageable with the retractor slide a rocker arm pivotally mounted in said unit and engageable with the retractor slide, a thumb depressable lever pivotally mounted on the head member, a bar carried by the head member, a collar slidably mounted on the bar and interposed between the thumb depressable lever and the rocker arm to transmit pivotal movement of the thumb depressable lever to the rocker arm a driving connection between the bar and the spindle, and means for imparting rotary movement to the bar and through the driving connector to the spindle to cause the rollback member to operate the retractor slide.

4. In a door lock, a latch bolt actuating unit, a latch bolt adapted to be retracted thereby, a thumb depressable lever operable from the exterior side of the lock to operate the latch bolt actuating unit, a key mechanism mounted on the exterior side of the lock, said key mechanism being both rotatable and longitudinally movable, means actuated by rotation of the key mechanism for operating the latch bolt actuating unit, and means actuated by longitudinal movement of the key mechanism for dogging the thumb depressable lever against operation.

5. In a door lock, a latch bolt actuating unit, a latch bolt adapted to be retracted thereby, a rollback member whereby the latch bolt actuating unit is operated, a key mechanism operable from the exterior side of the lock, said key mechanism being both rotatable and longitudinally movable, means actuated by rotation of the key mechanism for operating the rollback member and thereby the latch bolt actuating unit, a depressable member on the exterior side of the lock for operating the latch bolt actuating unit independently of the rollback member, means operable from the inner side of the lock imparting longitudinal movement to the key mechanism, and means actuated by said longitudinal movement for dogging the depressable member against operation.

6. In a door lock, a latch bolt actuating unit, a latch bolt adapted to be retracted thereby, a roll-

back member whereby the latch bolt actuating unit is operated, a key mechanism operable from the exterior side of the lock, said key mechanism being both rotatable and longitudinally movable, means actuated by rotation of the key mechanism for operating the rollback member and thereby the latch bolt actuating unit, a depressable member on the exterior side of the lock for operating the latch bolt actuating unit independently of the rollback member, means operable from the inner side of the lock imparting longitudinal movement to the key mechanism, and means actuated by said longitudinal movement for dogging the depressable member against operation, said longitudinal movement of the key mechanism visibly indicating whether the thumb depressable lever is dogged or not.

7. In a front door lock, a head member disposed on the exterior side of the door, a latch bolt actuating unit secured to said head member, a latch bolt adapted to be retracted thereby, a thumb depressable member carried by the head for operating the latch bolt actuating unit to retract the latch bolt, a key cylinder mounted in the head on the exterior side of the door for operating the latch bolt actuating unit to retract the latch bolt independently of the thumb depressable member, a push button operable from the inner side of the door, and means operated by depression of the push button for moving the key cylinder outwardly in the head from an inner position to an outer position, said movement of the key cylinder dogging the thumb depressable member against operation and at the same time affording a visible indication that the thumb depressable member is dogged.

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