Sept. 17, 1940. W. R. SCHLAGE 2,215,109

DOOR LOCK

Filed July 20, 1938 2 Sheets-Sheet 1

Fig. 1.

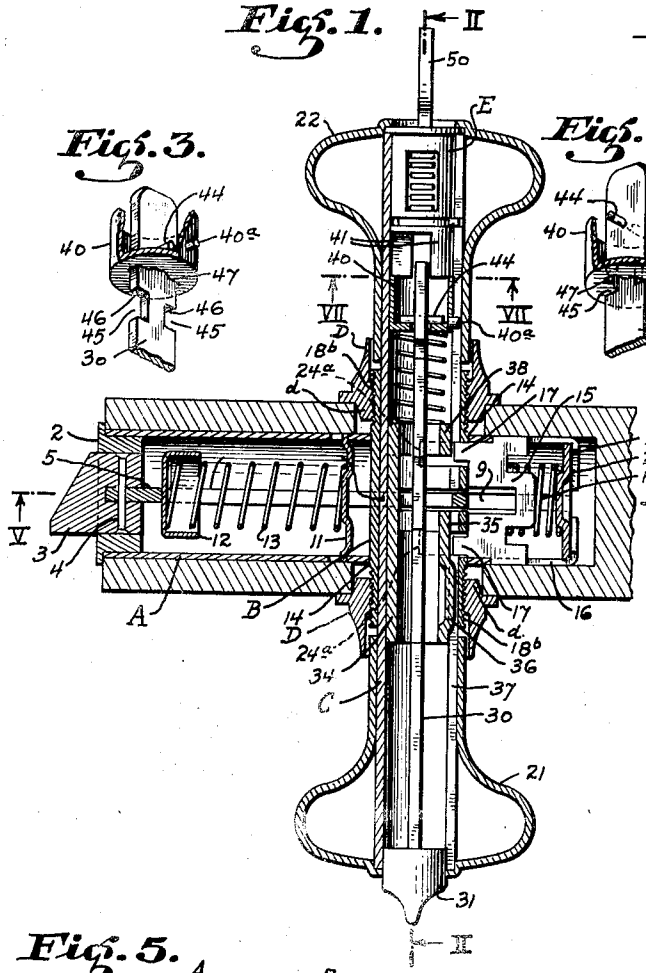


Fig. 2.

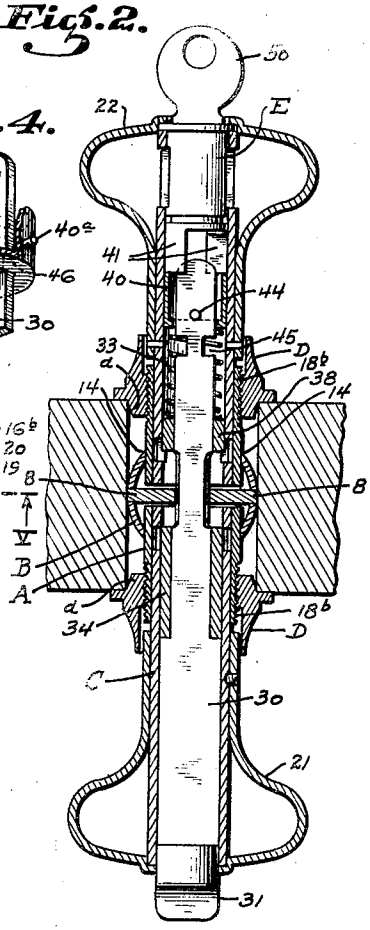


Fig. 3.

Fig. 4.

Fig. 5.

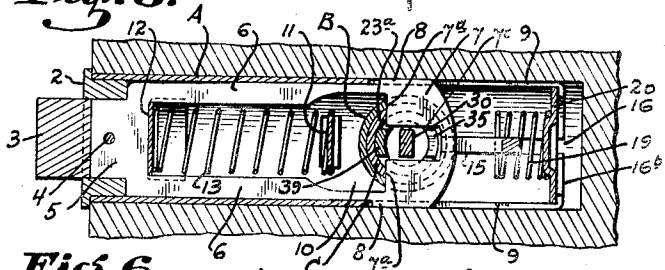


Fig. 6.

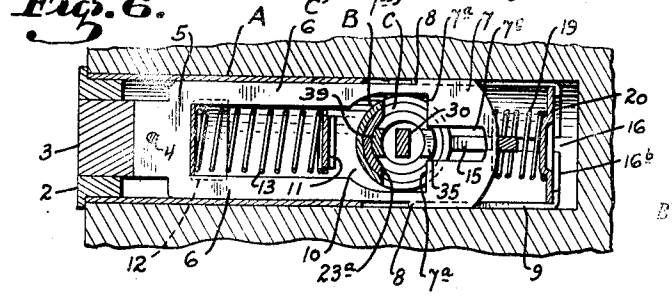
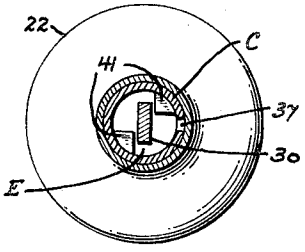


Fig. 7.



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DOOR LOCK

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Fig. 8.

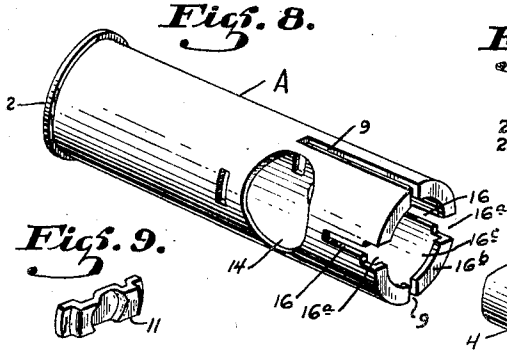


Fig. 9.

Fig. 10.

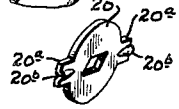


Fig. 11.



Fig. 12.

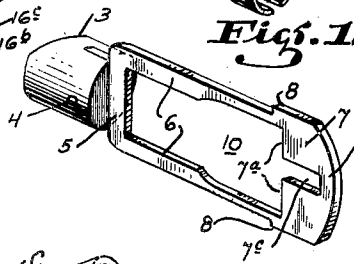


Fig. 13.



Fig. 14.

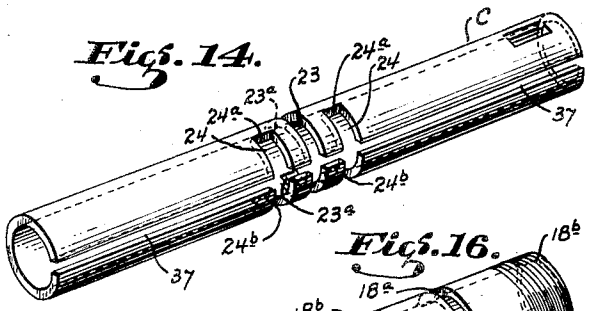


Fig. 15.

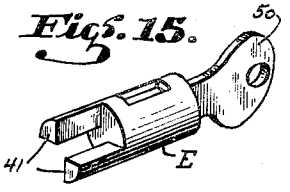


Fig. 16.

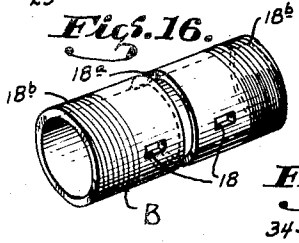


Fig. 17.

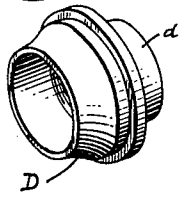


Fig. 18.

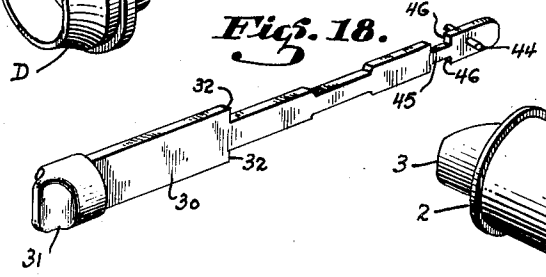


Fig. 19.

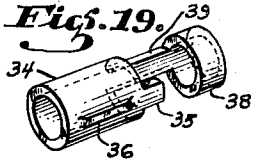


Fig. 20.

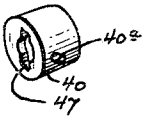
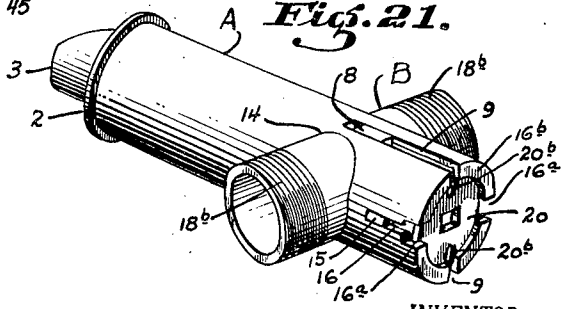


Fig. 21.



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Patented Sept. 17, 1940 2,215,109

UNITED STATES PATENT OFFICE

2,215,109

DOOR LOCK

Walter R. Schlage, Palo Alto, Calif., assignor to Schlage Lock Company, San Francisco, Calif., a corporation of California

Application July 20, 1938, Serial No. 220,273

12 Claims. (Cl. 70—147)

This invention relates to a door lock and especially to an improved or modified form of the mechanism disclosed in my co-pending application entiled "Door lock," Serial No. 185,373, filed January 17, 1938.

The object of the present invention is generally to improve and simplify the construction and operation of door lock structures; to provide a door lock mechanism which is enclosed in a pair of tubular housings, to wit, a housing containing a latch bolt mechanism and a housing containing a latch bolt actuating mechanism; to provide a housing assembly in which the housing containing the latch bolt actuating mechanism extends through the housing containing the latch bolt mechanism; to provide a releasable anchor plate carried by the latch bolt housing for automatically interlocking the housings with relation to each other and at the same time securing the housings against endwise and rotational movement with relation to each other; to provide an anchor member of the character described which projects through the latch bolt actuating housing into engagement with a spindle mounted therein to limit rotational movement of the spindle; to provide means extending through the spindle for dogging the spindle against rotation; to provide means at one end of the spindle for manually dogging or releasing the dogging means; and further, to provide key-actuated means at the opposite end of the spindle for releasing the dogging means when in dogging position.

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

Fig. 1 is a horizontal longitudinal section taken through the lock, said section showing the lock mounted in a door;

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

Fig. 3 is a perspective view of the inner end of the dogging bar showing the dogging bar in released position;

Fig. 4 is a similar view showing the dogging bar in dogging position;

Fig. 5 is a vertical section taken on line V—V of Fig. 1;

Fig. 6 is a view similar to Fig. 5 showing the latch bolt and connected mechanism in depressed position;

Fog. 7 is a cross section taken on line VII—VII of Fig. 1;

Fig. 8 is a perspective view of the latch bolt housing;

Fig. 9 is a perspective view of the spring saddle;

Fig. 10 is a perspective view of an end closing plate used in conjunction with the latch bolt housing;

Fig. 11 is a perspective view of a spring receiving cup;

Fig. 12 is a perspective view of the latch bolt and the retractor secured thereto;

Fig. 13 is a perspective view of the anchor plate;

Fig. 14 is a perspective view of the spindle;

Fig. 15 is a perspective view of the key-actuated mechanism;

Fig. 16 is a perspective view of the latch bolt actuating housing;

Fig. 17 is a perspective view of one of the escutcheon plates;

Fig. 18 is a perspective view of the dogging bar;

Fig. 19 is a perspective view of the sleeve which carries the dogging member;

Fig. 20 is a perspective view of the cup through which the outer end of the dogging bar extends; and

Fig. 21 is a perspective view of the housings containing the latch bolt mechanism and the latch bolt actuating mechanism.

Referring to the drawings in detail, and particularly to Figs. 1 and 2, it will be noted that a lock is shown which employs two tubular housings, indicated at A and B respectively. The housing A contains the latch bolt mechanism, and the housing B the latch bolt actuating mechanism.

The housing A is closed at the outer end by a plug 2 in which is formed an opening to receive and guide a latch bolt 3. Secured as at 4 to the inner end of the latch bolt is a plate 5 which is punched or cut out to form a pair of arms 6—6 (see Fig. 5) connected at their inner ends by a bar 7 which will hereinafter be referred to as the retractor bar. Lugs 8—8 are formed on the arms, and these extend into slots 9—9 formed at the inner end of the housing or tube A to guide the retractor bar. Between the arms 6—6 and the retractor bar 7 is formed an elongated opening 10. Extending through the opening and crosswise of the tube A is a spring saddle 11, and interposed between said saddle and a cup 12 secured to the plate 5 is a spring 13, of which the main function is that of normally maintaining the latch bolt 3 in a projected position. Openings such as shown at 14 are formed in opposite sides of the housing A, and near the inner end thereof, through which the housing B extends when the two housings are assembled in a door, thereby securing the housing A both against ro-

tation and against endwise movement with relation to the housing B and also with relation to a door when mounted therein.

Means are also provided for securing the housing B against rotation and transverse movement with relation to the housing A and to the door in which it is mounted. This is accomplished by providing an anchor plate 15 which is slidably mounted in slots 16—16 formed in the inner end of the housing A. The anchor plate has a pair of lugs 17—17 formed thereon which enter perforations 18—18 (see Figs. 1 and 16) formed in the housing B. The interlock formed by the lugs entering the perforations is maintained by a spring 19 interposed between the anchor plate and a cap 20 which closes the inner end of the housing A. The lugs on the anchor plate, by entering the perforations in the housing B, secure said housing against both rotation and transverse movement with relation to the housing A and the door in which it is mounted. The cap or plate 20 is applied to the end of the housing in the following manner: First of all, it will be noted that the end of the housing A (see Fig. 8) is provided with four slots, the two slots indicated at 9—9 which function as guides for the retractor bar 7, and secondly, the two slots indicated at 16—16 which are provided for the reception and guidance of the anchor plate 15. These slots are enlarged at their outer ends as shown at 16*a*. Lugs 20*a* are formed on opposite sides of the cap or plate 20, and these will enter the enlarged ends 16*a* of the slots 16 when the cap or plate is applied and pressed inwardly.

An annular flange 16*b* is formed at the end of the housing A. The central opening 16*c* formed within said flange is of slightly larger diameter than the diameter of the cap 20; hence the cap may be freely inserted in this opening, and the lugs 20*a* in the slot 16*a*. Then by rotating the cap 20 approximately 90°, lugs 20*a* will pass in under the annular flange 16*b* until the lugs 20*a* register with the slots 9. Detents 20*b* are formed on the surface of the lugs 20*a*, and they will then enter the slots 9 and secure the cap against further rotation, it being understood that the cap at all times is held in engagement with the inner face of the annular flange 16*b* by the spring 19.

Extending through the housing B and journaled therein is a spindle C (see Figs. 1, 2 and 14), and secured on opposite ends thereof are knobs 21 and 22. Knob 21 will hereinafter be referred to as the inner knob and knob 22 as the outer knob. The spindle is in this instance provided with a central transverse slot 23, and a pair of similar slots 24—24 are arranged one on each side thereof. The central slot 23 forms a rollback member 23*a*, while the slots 24—24 form pairs of stop-shoulders 24*a* and 24*b*, whereby rotational movement of the spindle is limited. That is, the anchor lugs 17—17 do not only enter the perforations 18—18 formed in the tubular housing B, but they actually extend completely through the same and into the transverse slots 24—24 formed in the spindle, and as such will engage the stop-shoulders 24*a* and 24*b* when the spindle is rotated, and thus limit rotational movement of the spindle. The spindle is also secured against endwise removal from the housing B when the lock mechanism is assembled in a door, as the retractor bar 7 will under normal conditions extend into the central slot 23, with its front faces 7*a* in normal engagement with the rollback member 23*a*, this engagement being maintained by the compression action of the spring 13. The spring 13, in other words, not only maintains the latch bolt 3 in projected position, but it also maintains the front faces 7*a* of the retractor bar in engagement with the rollback member 23*a*, and while such engagement is maintained, the spindle can not be removed; nor can it be removed when the latch bolt is depressed to assume the position shown in Fig. 6, as it will be noted that portions of the retractor bar are still within the transverse slot 23. The only time the spindle can be removed is by further depression of the latch bolt; that is, to a point beyond its normal retracted or depressed position. When such further depression of the latch bolt takes place, all parts of the retractor bar will assume a position rearwardly of the spindle and also of the housing B, which has a similar transverse slot formed therein, as indicated at 18*a* (see Fig. 16). In this innermost position assumed by the latch bolt 3, the rear inner end 7*b* of the retractor bar will engage the anchor plate 15 and also move it inwardly or rearwardly, thereby removing the lugs 17 from the slots 24 in the spindle, and the perforations 18 in the housing. In this position the spindle may be removed, and so may the housing B if that is desired.

The housing B serves the following main purposes: first, that of securing the housing A against rotation and endwise removal when inserted in a door; secondly, that of forming a support and journal for the spindle C; third, that of receiving a pair of escutcheon plates such as indicated at D—D, the ends of the housing B being threaded as shown at 18*b* to receive the escutcheon plates.

The anchor plate 15 has the following two main functions: first, that of intelocking the housing A and B, and securing the housing B against rotation and endwise removal with relation to the housing A; and secondly, the lugs 17 of the anchor plate function by entering the slots 24—24 of the spindle to limit rotational movement thereof.

In actual practice, it is desirable, where a door lock of this character is employed, to dog the outer knob 22 against rotation, so that unauthorized persons may not enter, or in other words be able to open the door from the outside. The key-actuated mechanism generally indicated at E is, however, provided, so that any authorized person having the proper key may insert such key and thereby release the dogging mechanism and enter.

The dogging mechanism consists of a bar 30 (see Figs. 1, 2 and 18) which extends through the spindle C. The inner end of the bar projects through the knob 21 and is provided with a combination turn- and push-button 31. Mounted on the bar 30 and held against a shoulder 32 by a spring 33 is a sleeve 34 (see Figs. 1, 2 and 19); on this sleeve is mounted a dogging lug 35, and on the retractor bar 7 is formed a longitudinal extending slot 7*c* (see Figs. 1, 5 and 12). By grasping the button 31 and pushing it inwardly, sleeve 34 will be moved inwardly, and so will the dogging lug 35, and when it is pushed inwardly it will enter the slot 7*c* of the retractor bar; when it has entered the slot it will secure or dog the spindle against rotation, as sleeve 34 is splined by means of a key 36 to the spindle. That is, the spindle is slotted from end to end as shown at 37 (see Fig.

14), and the key 36 rides in this slot. This sleeve 34 and the spindle C will at all times rotate in unison, or they will be dogged or locked in unison. The sleeve 34 carries a second sleeve 38 which is connected with sleeve 34 through means of a connecting bar 39. The second sleeve 38 merely functions as a support for the spring 33, the other end of the spring engaging a cup 40 (see Figs. 1, 2, 3, 4 and 20), which in turn is held in engagement with a pair of lugs 41 formed on the inner end of the key-actuated mechanism or cylinder E. If a person enters a room and desires to lock the door so that no one but an authorized person having the proper key may enter, he or she merely grasps the button 31 and pushes it inwardly, and then imparts a slight rotation thereto. This inward movement, as previously stated, forces the dogging lug 35 into the slot 7c of the retractor bar. This locks or dogs the spindle C against rotation, as the spindle can not rotate when the dog is in this position, due to the fact that the sleeve 34 carrying the dog is splined to the spindle.

It is, however, necessary to secure the button, the bar 30, and the sleeve 34 in the dogging position, as spring 33 would otherwise return them to normal extended position. To accomplish this, the cup 40 is provided. Extending through the inner end of the bar 30 is a pin 44. This pin normally rests on the bottom of the cup and thereby limits outward movement of the bar 30 and button 31 (see Fig. 1). Formed on the bar near the inner end is a reduced portion 45 which forms a pair of shoulders 46. The bottom of the cup is slotted as shown at 47 to permit the bar to pass therethrough. When the bar is pressed inwardly by means of the button, the reduced portion 45 will enter or straddle the slotted portion 47, then by slightly rotating the button, and hence the bar, the shoulders 46 formed by the reduced portion will assume a position at substantially right angles to the slot 47, and the bar and button are thus secured in their innermost or depressed position, where the dog 35 secures the spindle against rotation. In this position it may be released by merely rotating the button 31 in the opposite direction, as the moment the shoulders 46 align with the slot 47, spring 33 will restore the parts to normal position.

It is also possible to restore the parts to normal position, or in other words to release the dog, by inserting a key 50 in the cylinder E. When the key is inserted, the cylinder may be rotated, and as the inner end of the bar is straddled by the lugs 41 on the inner end of the cylinder, said lugs will engage the bar and rotate it until it aligns with the slot 47, when the spring will return the parts to normal position. Hence, the spindle may be undogged either manually by rotating the button 31 or it may be undogged by the manipulation of the key in the cylinder E.

The cup 40 is, as previously stated, held against the ends of the lugs 41 by means of the spring 33, but it must also be held against rotation, as the cup would otherwise have a tendency to rotate in unison with the bar 30 when this is rotated. A key or pin 40a is accordingly formed on the exterior surface of the cup, and this projects into the slot or keyway formed in the spindle, thereby securing its against rotation.

In actual practice, a lock of the character here shown is quickly and readily installed in a door, as it is only necessary to bore two holes through the door, one through the edge to receive the latch bolt housing A, and one at right angles or through the faces of the door to receive the tubular housing B. The latch bolt housing will under normal conditions contain the latch bolt, the saddle member 11, the spring 13, the anchor plate 15, the spring 19, and the end plate or cap 20. This unit is first inserted through the edge of the door when a lock is to be installed, and after it is inserted, the housing B will be inserted. This is accompilshed by depressing the latch bolt beyond its normal retracted position, or in other words, to a point where the retractor bar 7 leaves the openings through which the housing B is to be inserted clear and open. When the housing B has been inserted it will be immediately and automatically locked in place, when the latch bolt is released, as the anchor lugs 17 of the anchor plate will enter the perforations 18 and thereby secure the housing B against both rotation and endwise removal. The bar 7 will at the same time enter the slot 18a, and this will also secure the housing against endwise removal. The spindle C, containing the bar 30 and the rest of the dogging mechanism, is next inserted, but it is again necessary to depress the latch bolt beyond its normal depressed position, so that the interior of the housing B will be free and unobstructed by either the lugs 17 or any portion of the retractor bar 7. When this position is assumed by the lugs 17 and the retractor bar 7, the spindle is inserted, and when the transverse slots 24—24 align with the lugs 17, the latch bolt may be released to permit the lugs 17 to enter the transverse slots to function as a means for limiting rotational movement of the spindle. The retractor bar 7 will at the same time enter the central transverse slot 23, and the spindle is thus locked or secured against endwise removal. The escutcheon plates D are next slipped over the respective ends of the spindle, and screwed up against the opposite faces of the door, and thereafter the knobs may be applied and secured in any suitable manner, thereby completing the operation of installing the lock.

It should be noted that the escutcheon plates are provided with cone-shaped inner ends d. This is desirable as it assists in centering the housing B with relation to the hole drilled through the opposite faces of the door, and it also permits the flange of the plug 2 to be drawn up snugly against the outer edge or face of the door. That is, if the transverse hole drilled in the door, which receives the housing B, is drilled at the proper distance from the outer edge, the outer end of the housing A will fit snugly against the face or edge of the door. If the transverse opening, on the other hand, is drilled too close to the edge, for instance, $\frac{1}{32}$ of an inch closer than it should be, then there would be play between the flange of the plug and the edg or face of the door. Such discrepancies can readily be taken care of, as the carpenter or other mechanic installing the lock would in that case only have to shave off $\frac{1}{32}$ of an inch of wood from the inner edge of the transverse opening, with a pocket knife or similar means, then when the cone-shaped ends of the plates D enter, they would seat themselves in the removed portion of the wood, and as such would draw the outer end of the housing A snugly against the face.

While certain 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 specific materials and finish of the several parts employed

may be such as the manufacturer desires or varying conditions demand.

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

1. A lock comprising a latch bolt housing, a second housing disposed at right angles and extending through the latch bolt housing, said second housing being perforated, a spindle journaled in the second housing, and an anchor plate carried by the latch bolt housing and having a lug formed thereon which projects through the perforation in the second housing to secure said housing against rotation and against endwise removal from the latch bolt housing, said lug also entering the spindle to limit rotational movement thereof.

2. A lock comprising a latch bolt housing, a second housing disposed at right angles and extending through the latch bolt housing, said second housing being perforated, a spindle journaled in the second housing, and an anchor plate carried by the latch bolt housing and having a pair of lugs formed thereon which project through the perforations in the second housing to secure said housing against rotation and against endwise removal from the latch bolt housing, said lugs also entering the spindle to limit rotational movement thereof.

3. A lock comprising a latch bolt housing, a second housing disposed at right angles and extending through the latch bolt housing, said second housing having a pair of perforations formed therein, a spindle journaled in the housing, a pair of slots formed in the spindle, said slots forming pairs of stop-shoulders, and an anchor plate carried by the latch bolt housing and having a pair of lugs formed thereon, which project through the perforations in the second housing to secure said housing against rotation and against endwise removal, said lugs also extending into the slots formed in the spindle, and being engageable with the pairs of stop-shoulders formed by the slots, to limit rotational movement of the spindle.

4. A lock comprising a latch bolt housing, a second housing disposed at right angles and extending through the latch bolt housing, a spindle journaled in the second housing, a latch bolt in the latch bolt housing, a retractor bar connected with the latch bolt, a rollback member on the spindle engaging the retractor bar and operable by rotation of the spindle to cause retraction of the latch bolt, a dogging bar extending into the spindle, a sleeve on said bar within the spindle, means keying the sleeve to the spindle but permitting longitudinal movement of the sleeve within the spindle, a dog on the sleeve, a slot formed in the retractor bar to receive the dog, a button secured to the bar and projecting through one end of the spindle to permit the button to be grasped to move the dogging bar and sleeve longitudinally and inwardly in the spindle, said inward movement causing the dog to enter the slot in the retractor bar and thereby dogging the spindle against rotation, a latch member on the inner end of the dogging bar, a keeper in the spindle into which the latch projects when the dog is moved into the slot in the retractor bar, said latch being engageable with the keeper by rotation of the dogging bar by the button, and other means for rotating the bar to release the latch with relation to the keeper and for simultaneously releasing the dog.

5. A lock comprising a latch bolt housing, a second housing disposed at right angles and extending through the latch bolt housing, a spindle journaled in the second housing, a latch bolt in the latch bolt housing, a retractor bar connected with the latch bolt, a rollback member on the spindle engaging the retractor bar and operable by rotation of the spindle to cause retraction of the latch bolt, a dogging bar extending into the spindle, a sleeve on said bar within the spindle, means keying the sleeve to the spindle but permitting longitudinal movement of the sleeve within the spindle, a dog on the sleeve, a slot formed in the retractor bar to receive the dog, a button secured to the bar and projecting through one end of the spindle to permit the button to be grasped to move the dogging bar and sleeve longitudinally and inwardly in the spindle, said inward movement causing the dog to enter the slot in the retractor bar and thereby dogging the spindle against rotation, a latch member on the inner end of the dogging bar, a keeper in the spindle into which the latch projects when the dog is moved into the slot in the retractor bar, said latch being engageable with the keeper by rotation of the dogging bar by the button, and key-actuated means in the opposite end of the spindle for rotating the latch to release it and the dog.

6. In a door lock, a tubular latch bolt housing, having an outer and an inner end, the inner end of the housing being open but being provided with an annular inturned flange, said flange having a pair of opposed slots formed therein, a plate having a pair of opposed peripheral lugs formed thereon, said plate being insertable through the open end of the housing and said lugs passing through the slots when the plate is inserted, said plate adapted to be rotated after insertion to bring the lugs under the inturned flange, and a spring in the housing to hold the lugs in engagement with the inner face of the flange.

7. In a door lock, a tubular latch bolt housing, having an outer and an inner end, the inner end of the housing being open but being provided with an annular inturned flange, said flange having a pair of opposed peripheral lugs formed thereon, said plate being insertable through the open end of the housing and said lugs passing through the slots when the plate is inserted, said plate adapted to be rotated after insertion to bring the lugs under the inturned flange, a spring in the housing to hold the lugs in engagement with the inner face of the flange, and detent means to normally secure the plate and lugs against rotation.

8. A lock comprising a latch bolt housing, a spindle extending at right angles through said housing, an anchor plate carried by the latch bolt housing, and means on said plate for locking the spindle against endwise movement with relation to the latch bolt housing and for limiting rotational movement of the spindle.

9. A lock comprising a latch bolt housing, a spindle extending at right angles through said housing, an anchor plate carried by the latch bolt housing, means on said plate for locking the spindle against endwise movement with relation to the latch bolt housing and for limiting rotational movement of the spindle, a latch bolt slidably mounted in the latch bolt housing, means actuated by the spindle for imparting a pre-determined sliding movement to the latch bolt, said latch bolt being manually depressible beyond said pre-determined sliding movement, and means

actuated by depression of the latch bolt beyond its pre-determined sliding movement for releasing the anchor plate to permit endwise removal of the spindle.

10. A lock comprising a latch bolt housing, a spindle journalled in the housing, a pair of slots formed in the spindle, said slots forming pairs of stop-shoulders, an anchor plate carried by the latch bolt housing and having a pair of lugs formed thereon which project into the slots formed on the spindle so as to engage the stop-shoulders formed on the slots to limit rotational movement of the spindle and to secure the spindle against endwise removal, a rollback member on the spindle, a latch bolt mounted in the latch bolt housing and actuated by said rollback member, said latch bolt being manually depressible independent of the rollback member and beyond the normal movement imparted to the latch bolt by the rollback member, and means actuated by manual depression of the latch bolt beyond its normal limit for releasing the anchor plate so as to permit free rotation and endwise removal of the spindle.

11. A lock comprising a latch bolt housing, a spindle housing extending through the latch bolt housing, a spindle journalled in the spindle housing, an anchor plate carried by the latch bolt housing, and means on said plate for locking the spindle housing against rotational and longitudinal movement with relation to the latch bolt housing, said means also securing the spindle against endwise removal from the latch bolt housing.

12. A lock comprising a latch bolt housing, a spindle housing extending through the latch bolt housing, a spindle journalled in the spindle housing, an anchor plate carried by the latch bolt housing, means on said plate for locking the spindle housing against rotational and longitudinal movement with relation to the latch bolt housing, said means also securing the spindle against endwise removal from the latch bolt housing, a latch bolt slidably mounted in a latch bolt housing and having normal retractable movement, said latch bolt being manually depressible beyond its normal retractible movement, and means actuated by depression beyond the normal retractable movement for releasing the anchor plate to permit endwise removal of both the spindle and the spindle housing.

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