March 6, 1945. W. R. SCHLAGE 2,370,690

DOOR LOCK

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Fig. 1.

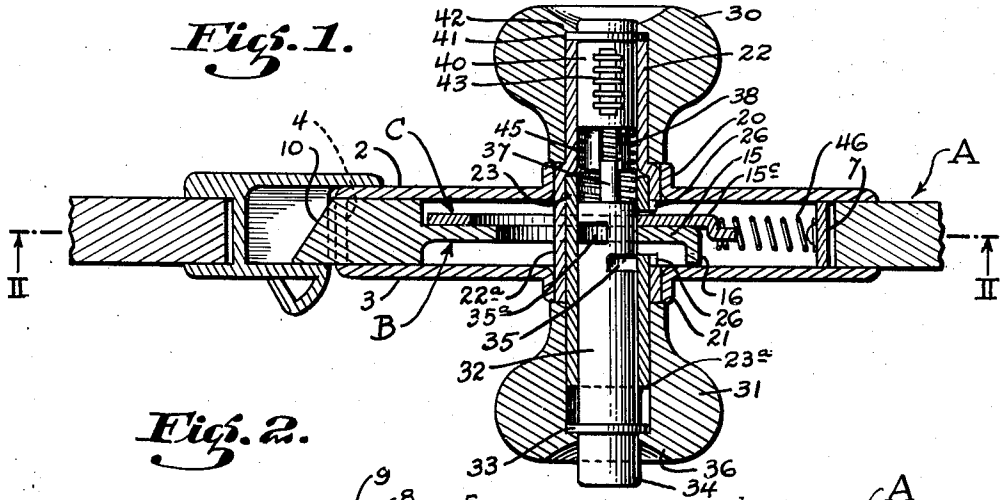


Fig. 2.

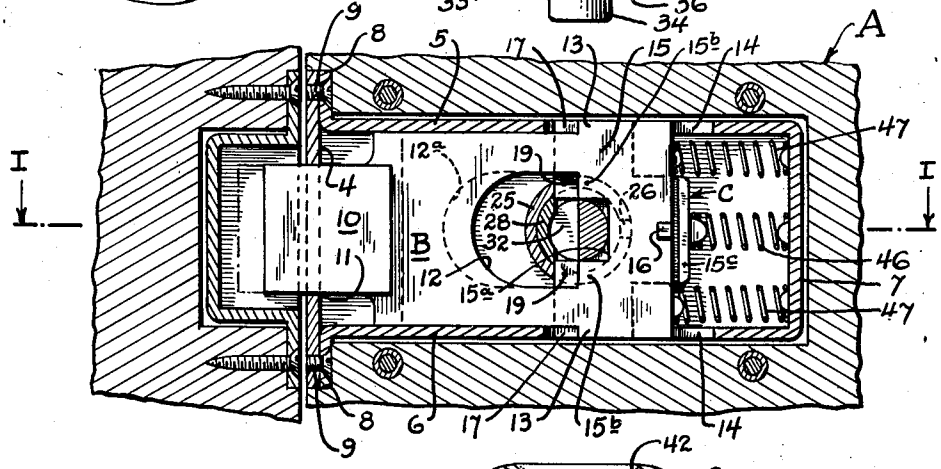
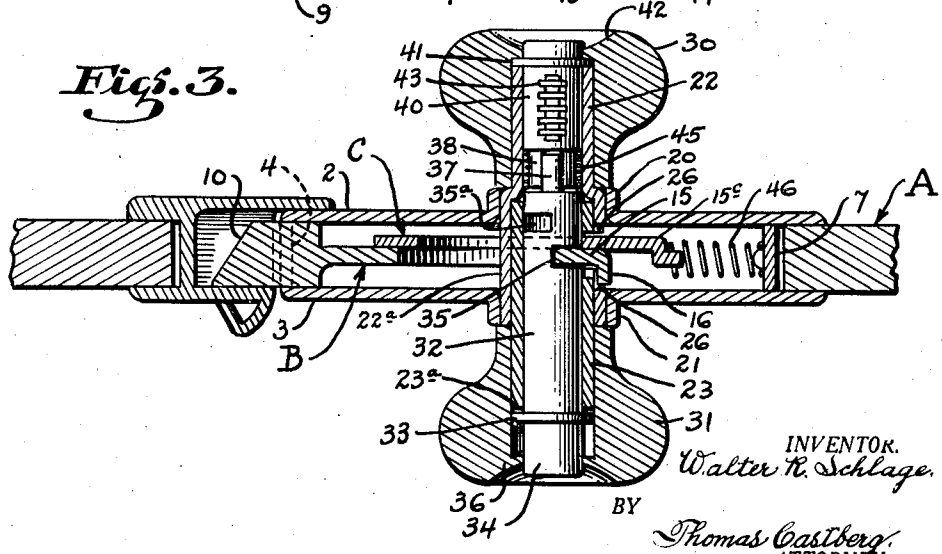


Fig. 3.



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Fig. 6.

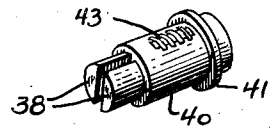


Fig. 4.

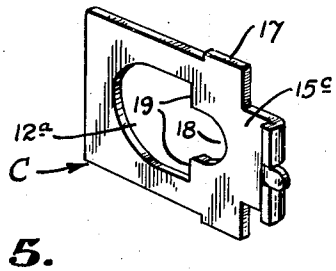


Fig. 7

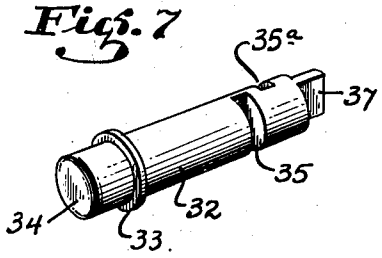


Fig. 5.

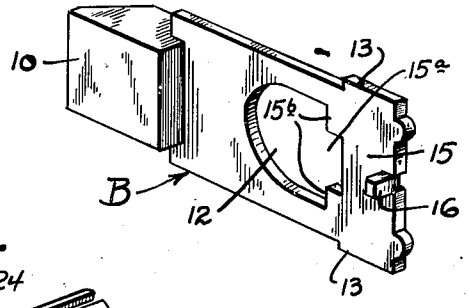


Fig. 9.

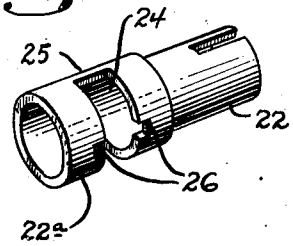
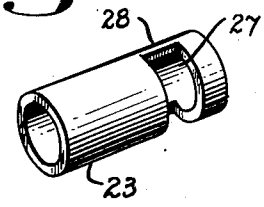


Fig. 8.



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DOOR LOCK

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

Application April 2, 1941, Serial No. 386,479

17 Claims. (Cl. 70—143)

This invention relates to a door lock, and especially to a double throw latch bolt therefor.

The object of the present invention is generally to improve and simplify the construction and operation of locks of the character described; to provide a door lock having a latch bolt which is adapted to assume two positions, first a normal half-projected position, and second a fully projected position; to provide means for simultaneously dogging an outer knob of the lock against rotation or operation when the latch bolt assumes its fully projected position; to provide pushbutton actuated means operable through an inner knob for controlling the position of the latch bolt; to provide key actuated means in an outer knob for controlling the position of the latch bolt; and further, to provide means whereby rotation of the inner knob or depression of the latch bolt when it assumes a full projected position will restore it to the normal projected position, and at the same time undog the outer knob and restore the push button to normal operation.

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

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

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

Fig. 3 is a section similar to Fig. 1, showing the latch bolt in its extended position and the outer spindle dogged against rotation;

Fig. 4 is a perspective view of the secondary retractor plate;

Fig. 5 is a perspective view of a main retractor plate and a latch bolt secured thereto;

Fig. 6 is a perspective view of the key actuated tumbler cylinder;

Fig. 7 is a perspective view of the pushbutton and the bar actuated thereby;

Fig. 8 is a perspective view of the inner spindle; and

Fig. 9 is a perspective view of the outer spindle.

Referring to the drawings in detail, and particularly Figs. 1 to 3, A indicates a portion of a door to which is suitably secured a lock housing consisting of two side plates 2 and 3 which are joined at their outer ends by a face plate 4. Secured between the plates 2 and 3 of the lock housing is a U-shaped frame consisting of upper and lower horizontally extending arms 5 and 6, connected at their rear ends by an end member 7, and provided at their forward ends with rightangular lugs 8 which are secured to the face plate 4 by rivets, countersunk screws or the like, indicated at 9.

The latch bolt of the lock is indicated at 10. It extends through an opening 11 formed in the face plate, and is guided thereby. The latch bolt is secured to a retractor plate generally indicated at B. This plate, together with the latch bolt, is best shown in Fig. 5. The plate is rectangular in shape and has an elongated opening formed therein, as shown at 12, through which the inner and outer spindle, hereinafter to be referred to, extend. It is provided with two guide lugs 13—13 which extend into slots 14—14 formed in the arms 5 and 6 of the frame, and it is provided at its rear end with a head member 15 on which is formed a dog 16. Said head is also provided with a notch 15a to straddle a bar 32 hereinafter to be described, and with a pair of shoulders 15b.

An auxiliary plate is also employed. This is generally indicated at C. It is rectangular in shape and has an elongated opening formed therein such as shown at 12a. Its rear end is provided with a head 15c which is clearly shown in Fig. 4. The plate C also has a straddling notch formed therein, as shown at 18, and on opposite sides thereof are shoulders 19—19 which engage the rollback members of the respective spindles, as will hereinafter be described.

Formed on the side plates 2 and 3 of the main lock housing are outwardly projecting annular flanges or hubs 20, 21. These hubs form bearings for a pair of tubular spindles generally indicated at 22 and 23; the spindle 22 will hereinafter be referred to as the outer spindle and the spindle 23 as the inner spindle. The outer spindle is best shown in Fig. 9. It has a reduced portion 22 and an enlarged portion 22a. This enlarged portion is cross-slotted as at 24 to form a rollback member 25, and the opposite sides of the cross-slot are notched as shown at 26 to form openings into which the dog 16 may enter to dog the outer spindle against rotation, as will hereinafter be described.

The inner spindle is best shown in Fig. 8. It is of uniform diameter throughout its length, and the diameter is such that it will telescope and snugly fit the interior of the enlarged portion 22a of the outer spindle. The inner spindle is also cross-slotted, as shown at 27, and thereby forms a rollback member, indicated at 28. The inner spindle 23 is journaled in the bearing 21 and the spindle 22 in the bearing 20. The spindle 22 has a knob 30 secured thereto, which will hereinafter be referred to as the outer knob, and the inner

spindle 23 has a knob 31 secured thereto which will be referred to as the inner knob.

Extending through the inner knob and the spindle 23 is a bar 32 (see Figs. 1, 3 and 7). This bar is circular in cross section and snugly fits the interior of the inner spindle. Its outer end is provided with a pushbutton 34 and a collar 35. This collar engages the outer end of the inner spindle, and an annular shoulder 35 on the inner knob overlies it, so that outward movement of the rod 32 and the pushbutton 34 will be limited. The push button and bar may, however, be moved inwardly with relation to the knob 31 and the inner spindle, as the inner spindle terminates at the point 23a. On the inner end of the bar 32 are formed two cross-slots, indicated at 35 and 35a. These slots point in opposite directions, and their function will hereinafter be described. Also formed on the inner end of the bar is a lug 37; this is straddled or engaged by a pair of lugs 38 (see Figs. 1, 3 and 6) which are formed on the inner end of a key-actuated tumbler cylinder 40. This cylinder is mounted in the outer end of the outer spindle 22, and is secured against endwise removal therefrom by a collar 41 overlaid by an annular shoulder 42 formed on the knob. The outer spindle functions as a housing for the cylinder. The tumblers 43 carried by the cylinder project into a slot formed in that housing, but when a key is inserted they are retracted and the cylinder can be rotated. Such rotation is transmitted through the lugs 38 to the lug 37, and this in turn rotates the bar 32; hence the bar is not only rotatable within the inner spindle but it is also longitudinally movable therein when pressure is exerted on the projecting pushbutton 34. The bar and pushbutton will, however, normally assume the extended position shown in Fig. 1, as a spring 45 is interposed between the key-actuated tumbler cylinder and the inner end of the bar 32.

The purpose of the present invention is to provide a door lock having a latch bolt, such as shown at 10, which may assume two positions, that is, a double-throw latch bolt, the first or normal position assumed by the latch being a partially projected position such as shown in Fig. 1, and the second being an extended or fully projected position such as shown in Fig. 3. Another purpose of the invention is to provide means for automatically dogging the outer spindle and knob against rotation when the latch bolt assumes its fully projected position; another purpose is to permit retraction of the latch bolt from said last named position either by rotation of the inner knob and spindle or by key actuation through the outer knob and spindle, and a further purpose is to undog the outer spindle and knob and to return the latch bolt to a partially projected position by depressing the latch bolt when it assumes its fully projected position. The manner in which this is accomplished is as follows.

The position of the mechanism shown in Fig. 1 is its normal position; that is, the latch bolt assumes its first or partially projected position. In this position the latch bolt may be retracted by rotation of either knob, as the dogging member 16 carried by the inner end of the main retractor plate B is held out of engagement with the notches 26 formed in the enlarged end of the outer spindle. Two notches are shown, but only one dogging lug is shown; obviously only one notch would be required, but two are shown in Fig. 9, so as to permit the lock to fit either right- or left-hand installations, but it does not matter whether the dogging lug enters one notch or the other, as the spindle and outer knob will be dogged against rotation. Thus, if it is desired to open the door when the mechanism assumes the position shown in Fig. 1, it can be accomplished by rotation of either knob. For instance, if the inner knob is rotated the inner spindle 23 will also rotate, as the knob is secured thereto. The rollback member 28 formed on the inner spindle will in that instance engage one or another of the shoulders 19 formed on the auxiliary plate, and force this in a rearward direction against the action of a centrally positioned spring 46. As it moves rearwardly due to the action of the rollback member 28, the shoulders will finally align with the shoulders 15b of the head of the main retractor plate B, and the rollback member will then engage these shoulders, and the main retractor plate will also move rearwardly and the latch bolt 10 will thus be retracted. When the knob is released, both of the plates and the latch bolt will return to normal projected position, as the auxiliary plate will be returned to normal position by the spring 46, and the main plate will be returned by the springs indicated at 47. The same action will take place if the outer knob is rotated, as the rollback member 25 formed thereon will in that instance engage the shoulders 19 of the auxiliary plate and move it rearwardly until it aligns with the shoulders 15b of the main latch plate, and then the main latch plate will also move rearwardly, thus causing retraction of the latch 10.

If a person is in the room and desires to lock the door, against intruders, or against all persons except those in possession of the proper key, it is only necessary for that person to push on the button 34. When he or she does so, the rod 32 will move inwardly against the tension of the spring 45, and the notch 35 will assume a position in which it aligns with the head 15 of the main plate, and the moment this occurs the head will drop into the notch 35 and assume the position shown in Fig. 3. The main latch plate and the latch bolt are in this manner fully projected, or in other words extended to the second position, and it should also be noted that the outer spindle and knob becomes dogged against rotation, as the dogging lug 16 will drop into one or another of the notches 26 formed in the outer spindle.

Thus by merely depressing the pushbutton, two things are accomplished: the latch bolt is extended to its second or fully projected position, and the outer spindle and knob are simultaneously dogged against operation; thus no one can enter except a person having the proper key. Such person may, however, enter by inserting the key and rotating the cylinder 40. Such rotation will rotate the bar 32 and the rear portion of the bar or that opposite the notch 35 will thus force the head member 15 rearwardly to the position shown in Fig. 1, and when this happens the bar 32 becomes released, and the spring 45 will immediately project it to assume the extended position shown in Fig. 1. If a person inside the room, after having locked the door, that is, having depressed the pushbutton and caused full extension of the latch bolt and dogging of the outer spindle and knob, desires to leave the room, he or she will only have to rotate the inner knob and spindle. In doing so the rollback member 28 will immediately engage the plates B and C and force them rearwardly. When this happens the

latch bolt 10 is retracted, and the rod 32 with the button 34 formed at its outer end, is released and will again become automatically extended.

There is still one other method of releasing the dogging member, and that is by depressing the latch bolt from the exterior. For instance, a person not familiar with the lock might depress the button before leaving the room and then go out and close the door. In this case the fully extended latch bolt 10 would engage the striker plate and would become depressed. Obviously, if it becomes depressed the head 15 will move out of the notch 35, and the pushbutton and connected rod will be released and extended. Thus it is impossible to lock the door from the inside and then leave the room, and this is desirable in certain instances, as a person might forget the key and, if he did so, he would not be able to re-enter. The only manner in which the door can be locked from the outside is for the person leaving the room to insert a key in the outer knob after closing the door, and then rotate the key cylinder, whereupon the notch 35*a* will assume a reverse position from that shown in Fig. 1. In other words, it would then register with the head member 15, and this would automatically enter and cause full projection of the latch bolt 10, and at the same time dog the spindle. On the other hand, if the same person wants to re-enter, he or she would re-insert the key and reverse the rotation of the bar 32 and return the notch 35*a* to the position shown in Fig. 1. The head 15 would then be expelled, and the outer spindle and knob would be undogged and would thus be free to be rotated to retract the latch bolt.

Earlier in the specification it was stated that both the main retractor plate B and the auxiliary plate C had an elongated opening 12 and 12*a* formed therein. These openings are provided merely to permit the spindles to pass through the plates, and to permit the plates to move longitudinally during retraction. The auxiliary plate C performs only one function, and if it were not for that function it could be entirely eliminated. That function is to hold the knobs against free rotation. That is, the normal position assumed by the main retractor plate is that shown in Fig. 2; in this position it will be noted that the shoulders 15*b* are spaced from and disposed rearwardly of the rollback members 25 and 28, and as such do not engage them. The rollback members and both spindles and knobs would thus be free to rotate until they engage a shoulder 15*b*, and such free rotation would not be desirable. It is for this reason that the auxiliary plate is employed. It has a pair of shoulders 19 on opposite sides of the notch 18; they engage the forward edges of the rollback members 25 and 28, and they are held in such engagement by the spring 46. Thus the respective spindles and knobs are held against free rotation, but they are nevertheless rotatable in the usual manner, that is, by grasping the knobs and rotating them against the pressure of the spring 46, and finally against the pressure of the springs 47.

While this and other features of my invention have been more or less specifically described, I 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 such as the experience of the manufacturer and varying conditions of use may demand.

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

1. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a rotatable member within the spindles, and means on said member controlling either partial or full projection of the latch bolt.

2. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a rotatable member within the spindles, and means on said member controlling either partial or full projection of the latch bolt, and key actuated means for imparting rotational movement to the rotatable member.

3. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a longitudinally movable member within the spindles, and means on the longitudinally movable member controlling either partial or full projection of the latch bolt.

4. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a longitudinally movable member within the spindles, means on the longitudinally movable member controlling either partial or full projection of the latch bolt, and a push button projecting from one end of one of the spindles for imparting longitudinal movement to the longitudinally movable member.

5. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a member within the spindles, selective means for imparting either longitudinal or rotational movement to said member, and means on said member controlling either partial or full projection of the latch bolt, said means being actuated either by longitudinal or rotational movement.

6. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a member within the spindles, said member being both rotatable and longitudinally movable, means on said member controlling either partial or full projection of the latch bolt, said means being actuated both by rotating and longitudinal movement, key actuated means for imparting rotation to the member, and a push button for imparting longitudinal movement to the member.

7. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a rotatable member within the spindles, means on said member controlling either partial or full projection of the latch bolt, and means actuated by full projection of the latch bolt for dogging the outer spindle against operation.

8. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a longitudinally movable member within the spindles, means on the longitudinally movable

member controlling either partial or full projection of the latch bolt, a push button projecting from one end of one of the spindles for imparting longitudinal movement to the longitudinally movable member, means actuated by full projection of the latch bolt for dogging the outer spindle against operation, and key actuated means for rotating the rotatable member to undog the outer spindle to permit operation of said spindle.

9. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a longitudinally movable member within the spindles, means on the longitudinally movable member controlling either partial or full projection of the latch bolt, a push button projecting from one end of one of the spindles for imparting longitudinal movement to the longitudinally movable member, means actuated by full projection of the latch bolt for dogging the outer spindle against operation, and means actuated by depression of the latch bolt when fully extended for undogging the outer spindle to permit operation of said spindle.

10. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a rotatable member within the spindles, means on said member controlling either partial or full projection of the latch bolt, means actuated by full projection of the latch bolt for dogging the outer spindle against operation, and means actuated by rotation of the inner spindle for undogging the outer spindle to permit operation thereof.

11. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a rotatable member within the spindles, means on said member controlling either partial or full projection of the latch bolt, means actuated by full projection of the latch bolt for dogging the outer spindle against operation, key actuated means for rotating the rotatable member, said member when rotated in one direction undogging the outer spindle and simultaneously retracting the latch bolt from full to partial projected position, and means actuated by rotation of the rotatable member in the opposite direction for projecting the latch bolt from partial to full projection and simultaneously causing dogging of the outer spindle.

12. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a member within the spindles, said member being both rotatable and longitudinally movable, means on said member controlling either partial or full projection of the latch bolt, said means being actuated both by rotating and longitudinal movement, means actuated by full projection of the latch bolt for dogging the outer spindle against operation, means actuated by longitudinal movement of the member for extending the latch bolt to full projected position, and means actuated by rotation of the member for undogging the outer spindle to permit operation of said spindle.

13. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a dog for dogging the outer spindle against operation, and means within the spindles and operative independently thereof for retracting the latch bolt from full to partial projected position and for simultaneously actuating said dog and undogging the outer spindle.

14. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a dog for dogging the outer spindle against operation, and means within the spindles controlling movement of the latch bolt from partial to full projection and for simultaneously actuating said dog and dogging the outer spindle.

15. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer independently operative spindle, a dog for dogging the outer spindle against operation, means within the spindles controlling movement of the latch bolt from partial to full projection and for simultaneously actuating said dog and dogging the outer spindle, and a key operated mechanism for actuating the means within the spindles.

16. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer tubular spindle, a rollback member on the inner spindle adapted to retract the latch bolt from either position, a rollback member on the outer spindle adapted to retract the latch bolt from the partially projected position only, a dog connected with and movable in unison with the latch bolt, said dog dogging the outer spindle against operation when the latch bolt is fully projected and thereby preventing retraction of the latch bolt by the outer spindle, a key actuated member within the tubular spindles, and means on said member controlling full or partial projection of the latch bolt.

17. In a lock, a latch bolt adapted to assume a partially or a fully projected position, means operative to project said bolt to said positions, an inner and an outer tubular spindle, a rollback member on the inner spindle adapted to retract the latch bolt from either position, a rollback member on the outer spindle adapted to retract the latch bolt from the partially projected position only, a dog connected with and movable in unison with the latch bolt, said dog dogging the outer spindle against operation when the latch bolt is fully projected and thereby preventing retraction of the latch bolt by the outer spindle, a manually actuated member within the tubular spindles, and means on said member controlling full or partial projection of the latch bolt.

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