March 24, 1925. 1,530,655

F. J. DOWLING

THREE-STAGE TRIPLE BOLT LOCK

Filed Aug. 15, 1921 2 Sheets-Sheet 1

Fig. 1.

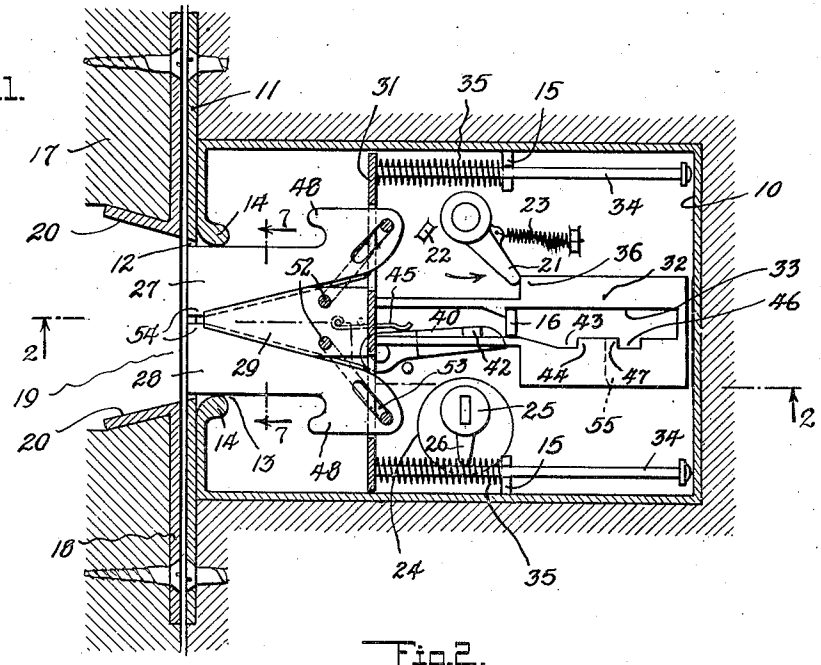


Fig. 2.

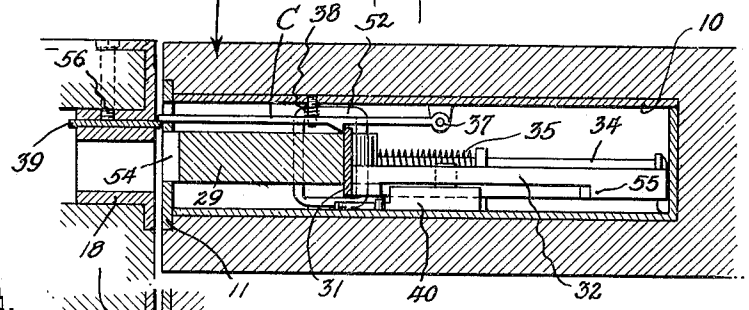
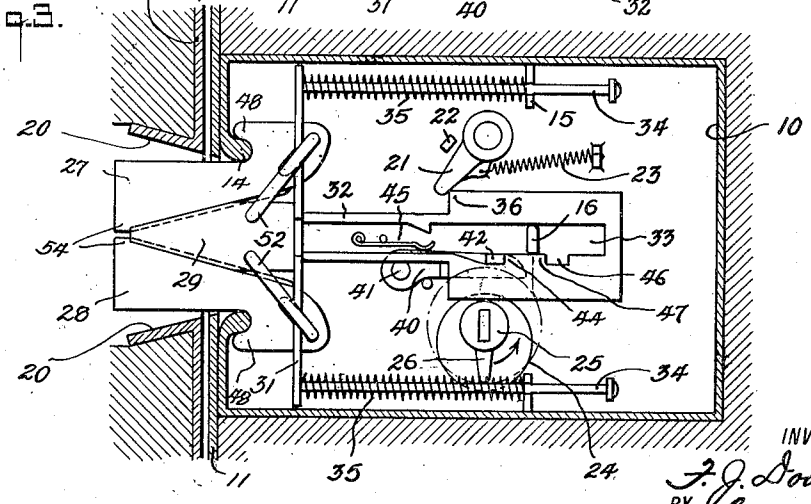


Fig. 3.



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Fig.4.

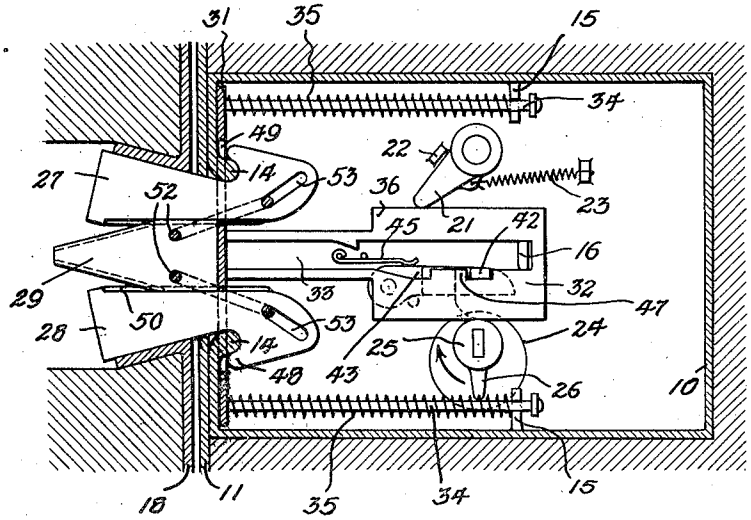


Fig.5.

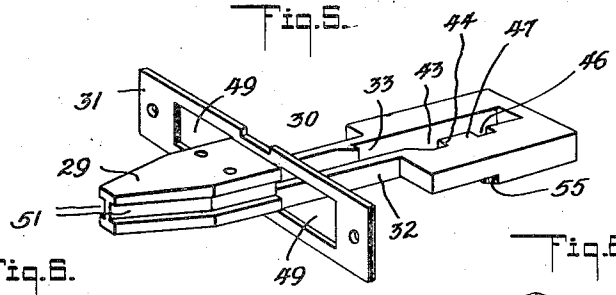


Fig.8.

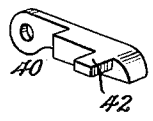


Fig.6.

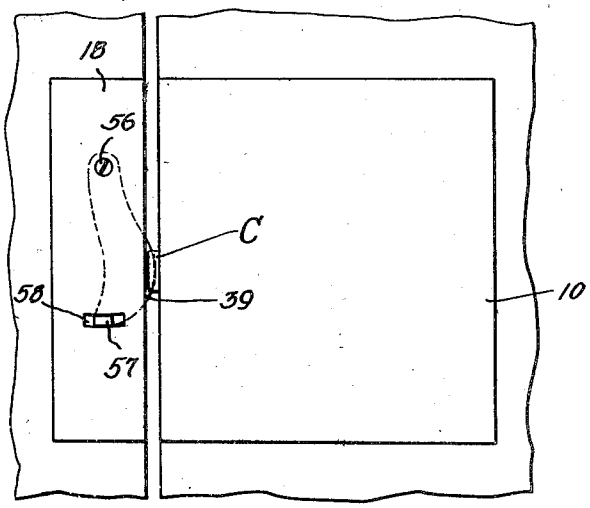
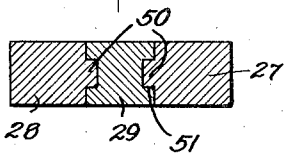


Fig.7.



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Patented Mar. 24, 1925. 1,530,655

UNITED STATES PATENT OFFICE.

FRANCIS J. DOWLING, OF NEW YORK, N. Y.

THREE-STAGE TRIPLE BOLT LOCK.

Application filed August 15, 1921. Serial No. 492,386.

To all whom it may concern:

Be it known that I, FRANCIS J. DOWLING, a citizen of the United States, residing at the city of New York, borough of Manhattan, in the county of New York and State of New York, have invented certain new and useful Improvements in Three-Stage Triple Bolt Locks, of which the following is a specification.

This invention relates to builders' hardware and relates especially to locks adapted for doors, such as swinging, sliding, or fire, and whether right or left handed.

Among the objects of the invention is to provide a lock, the bolt of which serves in one position as the equivalent of the spring actuated keeper of an ordinary door lock, while in another position it makes interlocking anchoring engagement with the door jamb, making it impossible for the door to be jimmied.

Another object of the invention is to provide a door lock, the bolt of which is adapted to occupy three distinct stages or positions, according to the position of the door, or the desire of the operator.

With the foregoing and many other objects in view reference is had to the following detailed description and to the accompanying drawings on which similar parts are referred to by like reference characters, and in which—

Figure 1 is a vertical section with the bolt retracted or in stage 1.

Fig. 2 is a horizontal section of the same on the line 2—2.

Fig. 3 is a view corresponding to Fig. 1, but showing the bolt in intermediate position or stage 2.

Fig. 4 is another view similar to Fig. 1, but showing the bolt in anchoring or interlocking position stage 3.

Fig. 5 is a detail perspective view of the actuator part of the bolt.

Fig. 6 is a detail face view indicating the adjustable trip plate.

Fig. 7 is a transverse sectional detail on the line 7—7 of Fig. 1.

Fig. 8 is a detail perspective view of the key actuated dog.

Referring now more specifically to the drawings, but without intending to be limited either to the specific devices shown or the materials from which the various parts may be made, I indicate a casing 10 of any suitable design or construction, and adapted for use either as a mortise lock or a rim lock. The casing is shown provided with a face plate 11, having a bolt opening 12, and adjacent to the plate 11 the casing is provided with a bolt opening 13 registering with the opening 12 and having the upper and lower boundaries of said opening 13 enlarged or reinforced with rounded bearings 14. The upper and lower parts of the casing are fitted with a pair of guide lugs 15, and the side of the casing between said lugs is provided with a stop lug 16.

While the casing is described herein as being carried by a door or other movable part, it will be understood that the lock casing might be carried by a stationary part, but as indicated, the door jamb 17 is fitted with a keeper plate 18 having an inwardly flared or dove tailed mouth or opening 19 with divergent walls 20. The opening 19 registers with the aforesaid openings 12 and 13 when the door is shut.

Arranged in the upper part of the casing is a knob actuated arm 21 typifying any suitable means to manually control the bolt. The arm is limited in its movement in one direction by a fixed stop 22, and a spring 23 tends to swing the arm away from said stop. As one convenient means to control the position of the bolt by means of a key I provide a key barrel 24 in another part of the lock casing, and in this barrel is journaled a key socket 25, having a finger 26 whose normal position is indicated in Figs. 1, 3 and 4, the position in which the socket must be located in order to withdraw or insert the key.

The bolt, in order to carry out the three stage effect, may be variously constructed or designed, but as indicated the bolt as a whole comprises three parts or bolts, namely, upper and lower tapered anchor members 27 and 28, and an intermediate wedge member 29 constituting a part of or carried by the actuator 30. Fig. 5. As shown in Figs. 1 and 3, or while the bolt is moving between stages 1 and 2, the upper edge of anchor member 27 is parallel to the lower edge of the anchor member 28, while the proximate edges of said two anchor members are divergent, having direct contact with the tapered wedge member 29. In Fig. 1 the bolt members may be regarded as a single bolt, and so the three parts are movable bodily from stage 1 to stage 2 or the

reverse. The actuator includes a cross bar 31 perpendicular to the axis of the wedge 29 rigidly connected thereto, and extending inward or rearward from the cross bar is the shank 32, having a longitudinal central slot 33 in which the stop lug 16 is located, the lug cooperating with the walls of the slot. Secured to the ends of the cross bar are a pair of rods 34 extending rearward through the guide lugs 15, and surrounding said rods and between the lugs 15 and the cross bar are expansion springs 35 tending to force the bolt forward or outward.

The shank is provided at its upper edge with a shoulder 36 against which the knob arm 21 is adapted to strike for the manipulation of the bolt into stage 1 position, as indicated in Fig. 1. When the bolt moves from stage 1 to stages 2 and 3 the arm 21 is carried by said shoulder toward the lug 22, and the arm is held from rotation by the shank in either of said second and third stages, except that the intended unlocking movement from stage 2 is permitted. It will be understood that the bolt even though it comprises several relatively movable or expansible parts operates from the stage 1 to the stage 2 or reverse as a single bolt or unit and between stages 2 and 3 and reverse the upper and lower portions operate independently of each other and of the intermediate wedge portion. It must be pointed out however that not only does the bolt as a whole partake of three distinct stages or positions but each of the three main elements composing the bolt is likewise adapted to occupy three distinct stages or positions corresponding to Figs. 1, 3, and 4 respectively. In other words, in considering these three distinct stages any transitory positions that any of the bolt members may occupy during the shift from one stage to another are not considered. Any suitable means may be provided to lock or hold the bolt actuator from movement within the casing. When the actuator is moved by means of the arm 21 to stage 1 a catch C pivoted on the casing at 37, engages any suitable part of the actuator, as the cross bar 31, and by virtue of a spring 38 the catch is normally urged toward the bolt, in the direction in which the door moves while closing. The free end of the catch extends forward beyond the casing plate 11 and so is adapted to span a portion of the space between the striking edge of the door and the jamb. A trip member shown as a plate 39 is adjustably carried by the jamb or keeper 18, and by adjustment of the plate 39 a portion of it is made to extend into the path of said free end of the catch. The parts are so arranged that while the door is going shut as shown in Fig. 2, the catch strikes the trip member 39 after the bolt has passed the edge of the jamb and is nearly opposite the opening in the keeper plate. This contact between the catch and the trip member releases the bolt free to be projected bodily by the force of the springs 35 into stage 2, Fig. 3, and from which position it may be retracted at any time by the operation of the knob arm as above described. The bolt is prevented during the operation just described from being shot beyond stage 2 by a suitable means, as for instance, by means of a dog 40 pivoted on the inside of the casing at 41 and having a projection 42 snapping downward from the slot 33 into a notch 43, having adjacent to one end thereof a shoulder 44, and at the other end of the notch the structure is beveled so that the dog will not prevent the normal retraction of the bolt. A spring 45 acts upon the dog tending to force it downward into the notch 43 or subsequently into a notch 46 behind another shoulder 47 when the bolt is in stage 3.

From what has been stated above it will be understood that when the door goes shut the catch C will be withdrawn automatically from the bolt, and the springs 35 will project the bolt bodily into the position of Fig. 3, stage 2, and from which it may be retracted to stage 1 by the simple manipulation of the knob arm 21, but if it is desired to lock the door, which is usually preferred to be done from the outside of the building, a key introduced into the socket 25 and rotated as shown in Fig. 3 will cause the lifting or release of the dog lug 42 from behind the shoulder 44 and allow the actuator to be shot outward by the force of the springs 35, whereby the wedge 29 will spread or expand the anchor members 27 and 28, causing them to rotate slightly around the bearings 14 which have hooked engagement with the hooks 48 of said anchor members and thereby causing the expanded bolt to fit as a tenon into the dovetailed mortise in the jamb piece. The outward movement of the bolt anchor members is checked in stage 2 by said bearings. The rear ends of the anchor members operate in openings 49 of the cross bar 31 and are adapted for free movement therein both longitudinally and laterally of the actuator. The adjacent edges of the wedge and anchor members are provided with tongues 50 and grooves 51 so as to prevent relative lateral movement between these parts. While the wedge and anchor members between the second and third stages are adapted for relative movement, I provide means to compel movement of the anchor members along with the movement of the wedge, especially when the bolt is being retracted from stage 3 back to stage 2 and thereafter to stage 1. Any suitable means may be provided to effect

this movement, but for this purpose I show a pair of links 52 having fixed pivotal connection in one of these parts and having lost motion as through slots 53 with the others. The bodily movement of the anchor members with the wedge from stage 1 outward is insured by means of shoulders 54 at the ends of the anchor members against which the point of the wedge has positive contact, and so the swinging movement of the anchor members around the bearings 14 is initiated between the second and third stages. When the bolt is retracted, the anchor members are returned to their parallel position as a result of the rearward and spreading thrust of the links 52.

While in the third stage the bolt cannot be retracted by the knob because its arm 21 rests at such time on the top of the actuator shank, but it may be retracted into the second stage by movement of the key in the direction of the arrow on Fig. 4, the finger 26 at such time wiping against a shoulder 55 formed on the lower portion of the shank. When the second stage is reached in this movement, the finger 26 has passed inward and below the dog, permitting the lug 42 thereof to snap into the position of Fig. 3. The key will now be withdrawn, and the door may be opened by actuation of the knob arm, or from the position of Fig. 3 to that of Fig. 1. It will be understood that the operator in thus moving the bolt to stage 1 will retain his grasp upon the knob long enough for the catch C to come into engagement with the actuator as in Fig. 2 where it will remain until the door is closed again.

The plate 39 is adjustable with respect to the keeper 18 for several reasons. First, the gap or clearance between the door and the jamb varies in different doors and from time to time in the same door; hence, by loosening the screw 56 or any similar clamping means the plate may be adjusted so as to extend more or less across said gap, by manipulation of a lug 57 extending laterally through a slot 58. Again, in some cases, as when the door is provided with a spring closer, it may be desired to permit the door to go shut without releasing the bolt and so the door may be opened thereafter without turning the knob. To this end the plate 39 is adjusted so as not to lie in the path of the free end of the catch C. When applied to certain types of locks, such as rim locks, it may not be desirable for the bolt to stop at stage 2, and so it will be obvious that by omitting the means to hold the bolt at stage 2 it will be shot directly into stage 3.

I claim:

1. A lock comprising a casing, a bolt in the casing adapted as a whole to occupy three distinct stages,—retracted, intermediate, and extended, said bolt comprising a plurality of members movable together as a unit between the first and second stages and movable directly away from each other in the extended stage, and means carried by the casing to control the several stages of the bolt.

2. In a lock, the combination of an expansible bolt every part of which is arranged to occupy three distinct positions,—retracted, as a catch, and interlocking, a rigid member within which the bolt is interlocked in the last named position, and means to control the bolt with respect to any desired one of said positions.

3. In a door lock, the combination with a keeper plate having an opening toward the door, of a bolt adapted to occupy three distinct stages,—retracted, intermediate, and anchored, the bolt comprising means to cause the end of the bolt to spread within the keeper to be anchored within said opening, means to manipulate the bolt, and means to hold the bolt retracted when the door is open.

4. A lock as set forth in claim 3 including also means to release the bolt holding means when the door goes shut, and means to cause the bolt to assume a different stage thereafter.

5. A lock as set forth in claim 3 including also means to release the bolt holding means when the door goes shut, and means to automatically move the bolt to its intermediate stage.

6. A lock as set forth in claim 3 including also positive means to automatically hold the bolt in its second stage.

7. In a lock of the class set forth, the combination of a bolt adapted to occupy three distinct stages,—retracted, intermediate, and expansibly anchored, manual means to retract the bolt from the intermediate to retracted stage, and means to automatically project the bolt outward from either its retracted or intermediate stage.

8. A lock as set forth in claim 7 including also key actuated means for releasing the bolt to permit the automatic movement of the bolt from intermediate to expanded anchored stage.

9. A lock as set forth in claim 3 including also means to prevent the projection of the bolt when the door goes shut.

10. A device as set forth in claim 3 including an adjustable trip member on the door jamb to not only withdraw the bolt holding means when the door goes shut, but also to provide by adjustment for the door to go shut without projecting the bolt.

11. In a lock of the character set forth, a casing, a bolt comprising a plurality of parts movable relatively to each other endwise, the bolt comprising a tapered expan-

sible anchoring member, a fixed pivot within the casing, a tapered wedging member, and means to cause said members to move bodily as a unit in one direction for a certain distance and thereafter to move in different directions as independent units, the anchoring member at such time moving around said pivot as an axis.

12. A lock as set forth in claim 11 in which the bolt is adapted as a whole to occupy three distinct stages comprising two spaced members having parallel edges in one position and a wedge member acting between the first mentioned members, means to cause the three bolt members to move forward from said position bodily as a unit, means to check such movement of the first mentioned members while the wedge member continues in the same direction causing the first mentioned members to spread apart, and means to cause the retraction of the wedge member to release the other bolt members.

13. A lock as set forth in claim 12 in which the last mentioned means includes a link pivoted to one member and having lost motion connection with another member.

14. In a door lock, a slidable bolt, a casing, means to hold the bolt retracted within the casing when the door is open, and means on the door jamb to release the bolt holding means aforesaid when the door comes shut, said jamb means being adjustable parallel to the direction of movement of the bolt while locking to compensate for variations in the gap between the jamb and the door.

15. A device as set forth in claim 14 in which means are included to permit the adjustable jamb member to be withdrawn far enough to allow the door to come shut without releasing the bolt from the casing.

16. The combination with a door lock including a casing, a multiple expansion bolt movable into and out of the casing, and fixed pivot means within the casing, of a jamb member constituting a keeper for the bolt, said keeper having a dovetailed socket against which respective parts of the bolt co-operate when expanded thereinto, movable around said pivot means.

17. A device as set forth in claim 16 in which the bolt comprises two parts for interlocking contact with the dovetailed portion and a third part acting as a wedge to compel the other two parts to approach said walls.

18. The combination with a lock casing and a keeper having an under-cut recess therein, of a longitudinally movable bolt comprising laterally expansible and non-expansible portions, said portions being movable as a unit into and out of the keeper while the expansible portion of the bolt remains unexpanded, the expansible portion of the bolt being mounted to move away from the other portion, connecting means within the casing for holding the expansible portion in position with respect to the non-expansible portion, and means to act upon the bolt after being moved into the keeper to cause lateral expansion thereof and cause the bolt to interlock in said keeper.

19. The combination with a keeper having a dovetailed mortise therein, of a longitudinally movable laterally expansible locking bolt movable into and out of the keeper and when in the keeper capable of lateral expansion to form a dovetailed tenon to fit the dovetailed mortise of the keeper, the side walls of said bolt being substantially parallel when contracted.

In testimony whereof I affix my signature.

FRANCIS J. DOWLING.