J. TONEY.

DOOR LOCK.

APPLICATION FILED NOV. 13, 1917.

1,338,713.

Patented May 4, 1920.

FIG. 3.

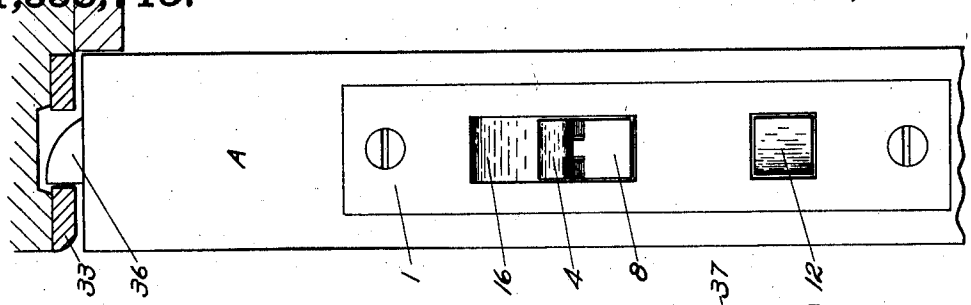


FIG. 2.

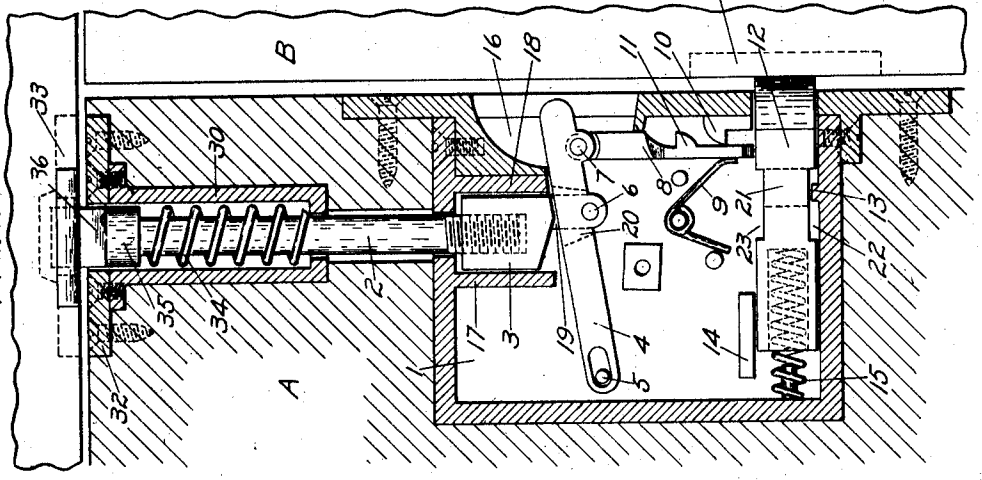
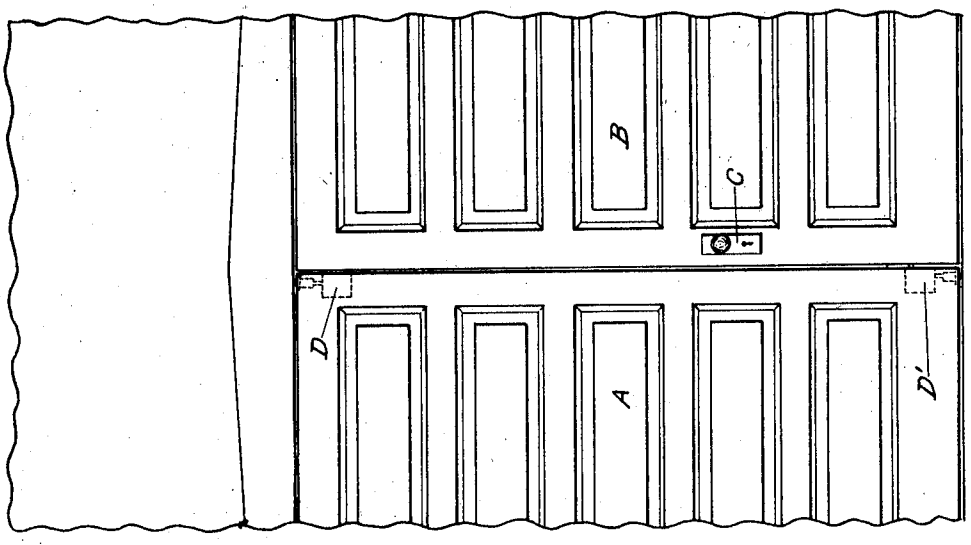


FIG. 1.



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DOOR-LOCK.

1,338,713. Specification of Letters Patent. Patented May 4, 1920.

Application filed November 13, 1917. Serial No. 201,881.

To all whom it may concern:

Be it known that I, JAY TONEY, a citizen of the United States of America, and a resident of Omaha, county of Douglas, and State of Nebraska, have invented certain new and useful Improvements in Door-Locks, of which the following is a specification.

My invention relates in general to door locks but more particularly to a door lock of the type used to secure the idle or normally stationary door of a pair of swinging doors; and the object of the invention is to provide an automatic lock of this character possessing certain novel features calculated to eliminate a number of operating defects inherent in prior locks.

Heretofore, it has been customary, when swinging doors are provided in pairs, to provide securing means for one of the doors, the idle door comprising a simple manually operable bolt, with suitable fittings, either at the top or bottom of the door or both, such bolt or bolts being normally kept in locked position. The other door, the one ordinarily used for entrance or egress, may be fitted with the usual lock equipment comprising generally a knob operated latch and a key operated locking bolt, both latch and bolt being adapted to engage a perforated striking plate in the idle door. When it is desired to open both doors, the door ordinarily used is opened first, then the locking bolts on the other door are withdrawn by hand and it may be opened also. Obviously when closing and locking the doors these operations must be performed in reverse order, it being necessary to bolt the idle door before any security is afforded for retaining the other door in locked position.

However, it happens quite frequently that a person in locking the doors will merely swing them shut and turn the key, forgetting entirely to bolt the idle door. Under these circumstances, if entrance should be attempted in the usual way by turning the door knob, both doors will swing inward under pressure, resulting in bending the bolt, in splitting the striking plate off from the idle door, or in otherwise damaging the lock. From the foregoing, the extreme desirability of an automatic lock to replace the old manually operated bolts will readily be perceived. My invention provides a lock adapted to be placed either at the top or bottom of a door comprising one of a pair of swinging doors, and is so constructed that the bolt is automatically thrown and the door locked by the act of closing the other door of the pair. In other words, whenever both doors are closed, the one provided with my automatic lock will be bolted and secured automatically, entirely independent of any attention on the part of the person closing them; and furthermore, such locking is invariable, and cannot be defeated either intentionally or through inadvertence.

The preferred embodiment of the invention, whereby the foregoing and other useful objects not now specifically mentioned are attained, will be fully described and explained in the detailed specification which is to follow, reference being had to the accompanying drawing forming a part thereof.

In the drawing, Figure 1 shows as much of a pair of swinging doors as is deemed necessary to show clearly the general aspect of the invention; Fig. 2, is a section through one corner of a door equipped with the invention, showing the interior mechanism of the lock; and Fig. 3 is a view of the edge of the door, and part of the door casing in section.

Referring to Fig. 1, the reference character A represents the idle door of a pair of ordinary swinging doors, while B represents the door which is in everyday use. The usual lock which may be of any well known type is indicated by the reference character C. At the upper right hand corner of door A there is shown in dotted lines and indicated by reference character D the automatic lock provided by this invention, while the position of a similar lock D′ is shown at the lower right hand corner. The locking bolts of locks D and D′ engage striking plates in the upper door casing and in the door sill, respectively, and the locks obviously afford means for securing the door A, thereby permitting door B to be held by the lock C. It will be understood, of course, that only one lock need be provided for the idle door, located either at the top or bottom, as is found most convenient, although greater security is had where both are provided.

Considering now the construction of the lock in detail, and referring to Figs. 2 and

3, the complete lock comprises essentially a lock casing 1, containing the operating mechanism of the lock; and a locking bolt 2 with suitable fittings. These latter consist of a bolt casing 30, and a coil spring 34, an escutcheon plate 32, and a striking plate 33. The bolt casing 30 is of rectangular cross section and its inside dimensions are such that they provide an easy fit for the rounded portion 35 of the bolt head. The escutcheon plate 32 is attached to the casing by means of countersunk machine screws, is provided with a square hole adapted to fit the square portion 36 of the bolt head, and affords means for holding the bolt casing and bolt in position, being fitted in a mortise in the upper edge of the door and held by wood screws. The shank of the bolt is round. It is of somewhat smaller diameter than the rounded portion 35 of the bolt head and passes through a hole in the bottom of the casing. Owing to the reduced size of the shank there exists a space between it and the casing which thus serves as a housing for the spring 34. The striking plate 33 is secured to the door casing in the usual manner.

The operating mechanism of the lock comprises essentially a finger lever 4; a sliding member 3 and a latch 8, both of which are attached to the finger lever; and a sliding operating bolt 12, together with certain springs and minor details which will be described. The finger lever 4 is of rectangular cross section, as seen in Fig. 3, and is pivoted at 5. The right hand end of the finger lever projects into a finger opening 16 in the face of the lock casing. Somewhat to the right of the center of the finger lever there is cut a vertical slot 20 adapted to receive the tongue 19 of the sliding member 3, the tongue being pivotally secured to the finger lever at 6. The sliding member 3 is of the form shown in the drawing, and is provided with a central vertical hole which is tapped to receive the threaded end of the bolt 2. The member 3 is obviously adapted to be given a sliding up and down movement by means of the finger lever 4; it is held in position by means of the lug 17 and by a shoulder 18 which may be formed integrally with the casing. The latch 8 is secured to the finger lever near to its right hand extremity by a knuckle joint, the pivot being indicated at 7. The upper portion of the latch is of sufficient thickness to close the lower part of the finger opening 16 when the finger lever is in its uppermost position. This is clearly shown in Fig. 3. The lower portion of the latch is of reduced thickness and is provided with a projection or catch 11 which is adapted to engage a corresponding projection 10 on the casing. To insure that these projections shall engage when the finger lever is depressed, the spring 9 is provided which keeps the lower end of the latch pressed to the right.

The operating bolt 12 is slidably mounted between the bottom of the casing and the lug 14, and the head of the bolt projects through a hole in the face of the lock. The under surface of the bolt is cut away at 22 adjacent the projection 13 on the casing, this projection having obviously the function of limiting the endwise movement of the bolt. The rear end of the bolt is drilled out as shown in dotted lines to receive the spring 15. This spring is normally under compression and tends to force the bolt to the right. Near the center of the bolt at 21 there is a central vertical slot indicated by the dotted lines, which is so positioned that when the bolt 12 reaches the limit of its travel to the right the slot will be directly beneath the end of the latch 8. If under these circumstances the finger lever should be depressed the end of the latch will pass down into the slot. To provide for actuating the operating bolt when the door B is closed, a striking plate 37 is suitably fitted to the door B in the usual manner.

In assembling the lock, suitable recesses are first cut in the door to receive the lock casing 1 and the bolt casing 30 with the escutcheon plate 32. A hole of somewhat greater diameter than the bolt 2 is then bored to connect the two recesses. The lock casing 1 may now be fitted in place in the usual manner, and the bolt casing 30, plate 32 being detached therefrom, may also be placed in its recess. Spring 34 is now placed inside the bolt casing and the shank of the bolt 2 is passed down through the spring, through the hole in the bottom of the casing, and through the corresponding holes in the door and in the upper wall of the casing 1 in alinement therewith, until its lower threaded end reaches the tapped hole in the sliding member 3. The bolt is now screwed down with a wrench, compressing the spring 34 until the top of the rounded portion 35 of the head is just flush with the top of the bolt casing. The escutcheon plate 32 is now slipped over the squared portion 36 of the bolt head and is fastened to the bolt casing by means of the machine screws, after which the wood screws holding the plate itself in position in its recess are driven home. It will be observed that when the lock is assembled the bolt is prevented from turning or working loose by reason of its squared head 36 which fits a similar opening in the escutcheon plate 32.

The operation of the lock is as follows:

Assuming first that both doors are closed and that it is desired to open them, it will be apparent that the right hand door B must

be opened first, for this door in its closed position effectually closes the finger opening in the free edge of the door A through which access is had to the finger lever 4. Door B, therefore, being first opened in the usual manner, it follows as an immediate result that the operating bolt 12 is forced to the right by spring 15 until further movement is arrested by the engagement of projection 13 with the rear edge of recess 22. In this position of the operating bolt the slot 21 is directly beneath the end of latch 8. The finger lever 4 may now be pulled down by hand, the lower end of latch 8 passing into slot 21, far enough to permit projection or catch 11 to engage projection 10. The operation of the finger lever of course produces a movement of the sliding member 3 in a downward direction, whereby the locking bolt 2 is withdrawn against the pressure of spring 34. It will be clear that the finger lever and locking bolt are retained in their advanced position by the latch 8. Door A may now be opened.

Having described briefly the operation of unlocking and opening the doors, the reverse operation of closing and locking them will be explained. Door A is closed first and then door B. As the striking plate on the latter door engages the operating bolt 12, the said operating bolt is forced to the left, carrying the lower end of latch 8, which protrudes down into slot 21, to the left also. It follows that the latch is disengaged and the locking bolt 2 released. The compressed spring instantly forces the bolt home and the door A thereupon becomes locked. Door B is then locked by the key in the usual manner.

It is to be pointed out that in the operation described above no attention need be paid to door A to insure its being locked, the locking bolt of the automatic lock being released automatically by the act of closing the other door.

Suppose now, it is desired to close and lock door A without closing door B. To accomplish this the door is swung shut and the operating bolt 12 is pressed in with the finger. The lower end of latch 8 is by this operation carried far enough to the left to become disengaged, with the result that the locking bolt 2 is released and is forced into locking position as before by the spring 34. As an alternative method of locking door A independently, the operating bolt 12 may be pressed in to free the latch 8 and release the locking bolt before the door is closed. With the lock in this position when the door is swung shut the curved surface of the end of the locking bolt engages the striking plate 33 and the bolt is thus forced down sufficiently to permit the door to close after which it resumes its locking position under control of the spring. It is to be noted that when the door is closed and locked in the above manner the locking bolt is not moved downward far enough to bring about the engagement of the latch 8.

The foregoing description considered in connection with the drawing is believed to be amply sufficient to enable anyone possessing ordinary skill in the art to understand the invention. Before closing, however, attention is called to a feature of the lock by which it is rendered immune from "picking", or unauthorized opening by one not in possession of the key. This feature consists in the arrangement of parts comprising the latch 8 and operating bolt 12, the latter of which in its left hand position absolutely prevents any downward movement of the latch and finger lever. Were it not for this provision, it might be possible by the insertion of some thin instrument between the edges of the doors to press the finger lever down and thus "pick" the lock; but as stated the successful issue of any such attempt is rendered impossible by the means indicated.

Having described my invention, what I consider to be new and desire to have protected by Letters Patent will be pointed out in the appended claims:

I claim:

1. The combination, with a pair of hinged swinging doors, of a locking mechanism for one of said doors comprising a locking bolt, a member suitably attached to the door casing with which said bolt coöperates to lock the door, and suitable controlling devices for said bolt whereby the act of closing the other door of the pair serves to release the said bolt to lock the said first door.

2. The combination, with a pair of doors, of a lock for one of said doors operated automatically by the closing of the other door, and a manually controlled member for unlocking said first door accessible only after the second door is opened.

3. The combination, with a pair of doors, and independent locking mechanism for one of said doors comprising a locking bolt for engagement with the door casing, of manually operated means for withdrawing said bolt to unlock the said first door, and means operated automatically by the closing of the other door of the pair for operating said bolt to lock the said first door.

4. The combination, with a pair of hinged swinging doors, of a locking mechanism for one of said doors comprising a spring operated locking bolt for engagement with the door casing, a manually operable device for withdrawing said bolt to unlock the door, a latch for retaining said bolt in unlocked position, a manually operable latch controlling member for releasing the said bolt to lock the door, and a device on the other door of the pair adapted to engage said

latch controlling member when the said other door is closed, whereby if the said bolt is not already released it will be released by the act of closing the said other door.

5. The combination, with a pair of doors, of a bolt for locking one of said doors, manually operable means for withdrawing said bolt to unlock the door, and means for positively preventing the operation of said withdrawing means while the other door is closed.

6. The combination, with a pair of doors, of a bolt for locking one of said doors, manually operable means for withdrawing said bolt to unlock the door, and a movable stop actuated by the closing of the other door for rendering said withdrawing means inoperative.

7. The combination, with a pair of cooperating swinging doors, of a movable bolt incased in one of said doors for locking the same, a manually operable unlocking member also incased in said door, and a finger opening through which said member may be reached, said opening being located in the edge of the door whereby it is rendered inaccessible by the closing of the other door.

8. The combination, with a pair of doors, of an automatic bolt mechanism for locking one of said doors, manually operable means for actuating said bolt mechanism to unlock the door, and releasing mechanism comprising a movable stop actuated by the closing of the other door for releasing said bolt mechanism and for rendering said manually operable means inoperative.

Signed at Omaha this 10 day of Nov., 1917.

JAY TONEY.