Jan. 13, 1925. 1,523,346

E. O. MURMANN

LOCK BOLT OPERATING MECHANISM

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Fig. 1.

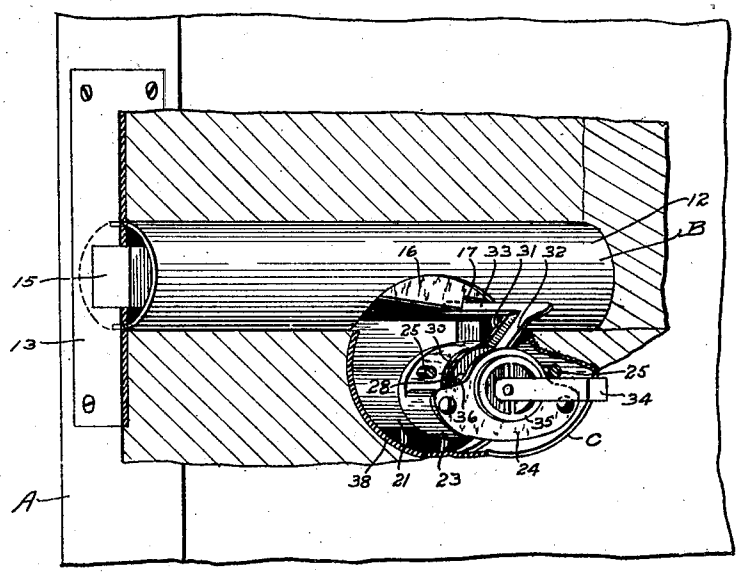


Fig. 3.

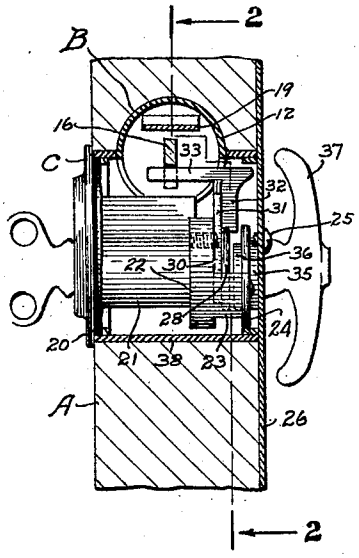
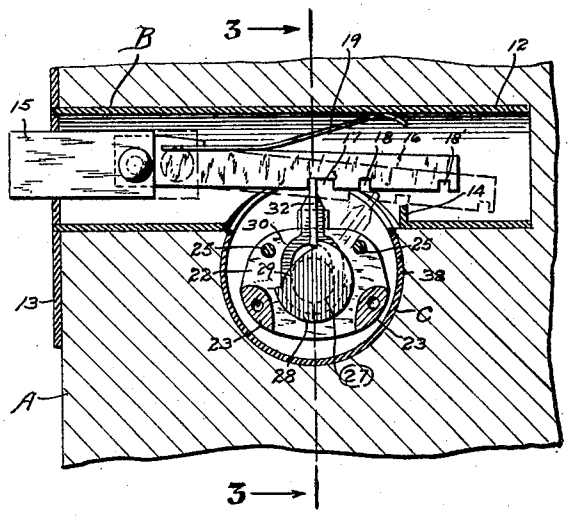


Fig. 2.



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Fig. 4.

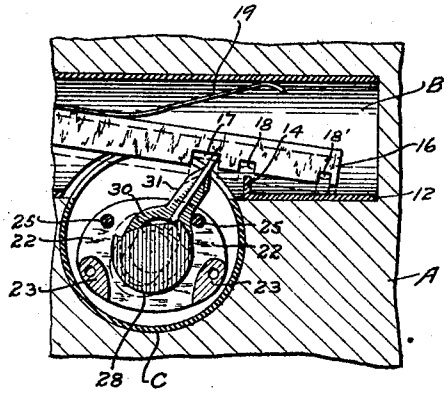


Fig. 5.

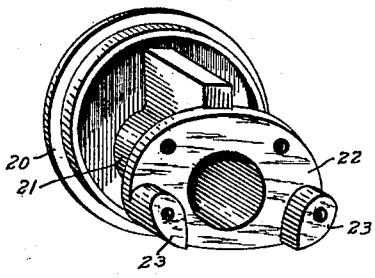


Fig. 6.

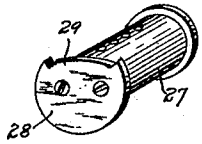


Fig. 7.

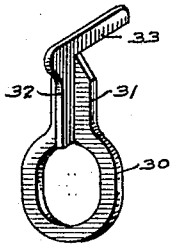


Fig. 8.

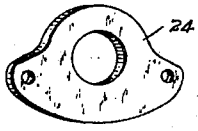


Fig. 9.

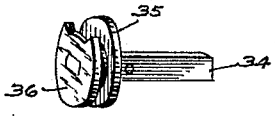


Fig. 11.

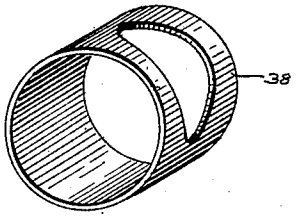
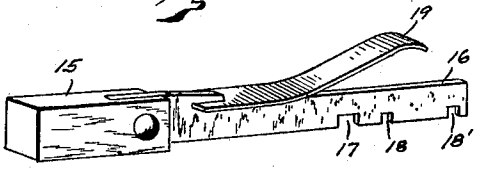


Fig. 10.



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Patented Jan. 13, 1925. 1,523,346

UNITED STATES PATENT OFFICE.

EUGENE O. MURMANN, OF GLENDALE, CALIFORNIA.

LOCK-BOLT-OPERATING MECHANISM.

Application filed February 8, 1923. Serial No. 617,713.

To all whom it may concern:

Be it known that I, EUGENE O. MURMANN, a citizen of the United States, and resident of Glendale, in the county of Los Angeles and State of California, have invented new and useful Improvements in a Lock-Bolt-Operating Mechanism, of which the following is a specification.

This invention relates to improvements in locks, and pertains particularly to the mechanism for protracting and retracting the bolt. The present invention is especially adaptable for embodiment in a mortise lock operable by a key actuable mechanism. It is in some cases desirable that when the bolt is protracted it be deadlocked and when retracted it be held against protraction, except as effected by the bolt operating mechanism.

This invention contemplates the movement of the bolt to its full protracted or retracted position by means of a partial rotation of the key or of a knob. In present devices, when the key is used without complete rotation, it is impossible to withdraw it after protraction or retraction. An object of the present invention is to provide a mechanism of the character described which will permit withdrawal of the key after protraction or retraction. Other objects are the provision of a simple, compact, positively operating structure which may be easily installed in the door.

These objects together with other objects and corresponding accomplishments are obtained by means of the embodiment of my invention illustrated in the accompanying drawing, in which:

Fig. 1 is a perspective view partially in section showing a fragment of the door with my improved lock installed therein; Fig. 2 is a section through the mechanism as seen on the line 2—2 of Fig. 3; Fig. 3 is a section as seen on the line 3—3 of Fig. 2; Fig. 4 is a view similar to Fig. 2 showing the parts in another position; Fig. 5 is a perspective view of the lock barrel; Fig. 6 is a perspective view of the cylinder plug and cam; Fig. 7 is a perspective view of the idler arm; Fig. 8 is a perspective view of a plate for the barrel; Fig. 9 is a perspective view of the knob shank and cam; Fig. 10 is a perspective view of the bolt; and Fig. 11 is a perspective view of the case for the key mechanism.

Referring more particularly to the drawing, the invention is shown embodied in a mortise lock, which can be installed by boring cylindrical recesses in a door instead of cutting retangular recesses, as is now the usual practice. However, the invention is not limited to such a construction. A door is indicated by A, and has a cylindrical recess extending from the edge thereof. Disposed therein is the bolt member indicated by B. Extending from one face of the door to the other and intersecting the bolt member recess is a cylindrical recess for the bolt operating member C. The present invention is embodied in the bolt operating member.

Referring more particularly to the details of the bolt member, it comprises a tubular member 12, to the end of which is secured a selvage or face plate 13. An opening is cut in the member 12 and a catch lug 14 upset therefrom at one end. An opening is provided in the selvage plate for a bolt 15. The bolt has a tail 16 pivotally secured thereto. The tail has on its under side a coupling notch 17 to receive the idler arm finger 33 and notches 18 and 18′ for deadlocking the bolt, thus, forming a catch. A leaf spring 19 is secured to the upper side of the tail and presses against the tubular casing tending to force the tail downwardly.

The bolt actuating member comprises a plate 20 adapted to cover one end of the door recess and a barrel body 21 preferably formed integral therewith. At the other end of the body is a flange 22 having spacing lugs 23 formed thereon. The spacing lugs have threaded apertures for screws, whereby a plate 24 may be fastened thereto. The plate 22 is also provided with threaded openings to receive screws 25 serving to hold an escutcheon plate 26 in position. The barrel body is provided with a bore in which the lock cylinder plug 27 is disposed. The plug and barrel are preferably of the well known cylinder lock type, the details of which are well known and need not be described herein. However, upon insertion of the proper key in the keyhole of the lock, the plug is released from the barrel so that it may be rotated. The end of the plug is provided with a cam 28, best shown in Fig. 6. This cam has a cylindrical surface concentric with the axis of the plug. Its operating face comprises a portion 29, low at the center and

high at the ends. This operating portion is symmetrical. It is provided with shoulders where it joins the cylindrical surface.

When the cylinder plug 27 is in position in the barrel, cam 28 is spaced from flange 22 so that the cylinder plug extends beyond the barrel. Mounted upon this extension is the idler arm, it comprises a ring 30 having an elongated opening therein and an arm 31 extending therefrom in the direction of the major axis. Projecting inwardly from the side of the arm is a rib 32. At the end of the arm and extending laterally is a finger 33. The finger is adapted for disposal in the notch 17. The idler arm is mounted upon the cylinder plug 27 between the flange 22 and the cam 28 so that it may be raised and lowered. The lower shoulder of the rib 32 rides upon the cam surface 29 so that rotation of the cylinder plug to the limit of its travel in either direction will raise the idler arm and thereby raise the tail of the bolt.

The knob shank best shown in Fig. 9, comprises a stem 34 to which a collar 35 is secured. Spaced from the outer portion of the collar is a cam 36 of form similar to cam 28. The collar 35 and cam 36 are spaced so as to be disposed on opposite sides of the plate 24. The operating portion of cam 36 is disposed beneath the shoulder on rib 32 so that rotation of the shank will move the idler arm. Secured to the stem 34 is a knob 37. The recess for the bolt housing is bored into the door to the desired depth. The recess for the bolt actuating mechanism is then bored through the door from face to face. The bolt tube is inserted into the door. Next the housing containing the bolt operating mechanism is inserted. The escutcheon plate 26 is then placed over the opening with the stem 34 of the knob shank extending therethrough. Screws 25 are passed through the escutcheon plate and secured to the body. The knob 37 is then fastened to the stem. When the bolt operating mechanism is inserted, finger 33 is disposed in notch 17 of the tail of the bolt.

The spring 19 presses the tail toward the bottom of the tube and in retracted position, the lug 14 would be disposed in notch 18, thereby forming a catch and preventing movement of the bolt. To lock the door, the key may be inserted in the plug and the latter turned. This turns the cam 28, thereby first lifting the idler arm and raising the tail so that the notch 18 is lifted above the lug 14 releasing the catch. Further rotation of the key causes the shoulder on the cam to engage the idler arm and swing the latter, thereby protracting the bolt. The key is now turned back for withdrawal. This causes the tail to drop, but does not rotate the idler arm. The tail drops so that lug 14 enters notch 18′ and the bolt is deadlocked. The key is in position to be withdrawn. To unlock the door, the key is inserted and the cylinder rotated in the opposite direction. The idler arm is first raised, thereby lifting the tail 16 so that the notch 18′ is clear of lug 14. The opposite shoulder on the cam 28 now engages the idler arm and swings the latter, causing the bolt to be retracted. To withdraw the key it is turned backward into its normal position, thereby permitting the idler arm to lower and the lug 14 to engage the notch 18. The bolt may be protracted and retracted by turning the knob 37 in a manner similar to the key. The cam 36 engages the idler arm and actuates it in the same manner that the key actuated it.

What I claim is:

1. In a lock, the combination of a key actuated rotatable cylinder, an idler arm pivotally mounted to swing in the same direction as said cylinder, abutment means on said cylinder to engage said idler arm and move the latter, whereby said idler arm has a lost motion with respect to said cylinder, a bolt operable by said idler arm, and a catch to deadlock said bolt operated to release the latter by movement of said abutment means.

2. In a lock, the combination of a key actuated rotatable cylinder, an idler arm pivotally mounted on said cylinder so as to swing in the same direction, abutment means on said cylinder to engage said idler arm and move the latter, whereby said idler arm has a lost motion with respect to said cylinder, a bolt operable by said idler arm, and a catch to deadlock said bolt operated to release the latter by movement of said abutment means.

3. In a lock, the combination of a key actuated rotatable cylinder, an idler arm pivotally mounted on the axis of said cylinder, abutment means on said cylinder to engage said idler arm and move the latter, whereby said idler arm has a lost motion with respect to said cylinder, a bolt operable by said idler arm, and a catch to deadlock said bolt operated to release the latter by movement of said abutment means.

4. A structure of the character described comprising a stationary deadlocking lug, a slidable bolt having a tail pivotally secured thereto and having locking notches on its lower face for engagement with said deadlocking lug, a key actuated rotatable device, a mechanical movement connecting said device and said bolt arranged so that partial rotation of said device will first lift said tail to disengage it from a deadlocking lug, said mechanical movement comprising a lost motion means to slide said bolt at the limit of its lifting movement and then permit a reverse rotation sufficient to withdraw the key without the sliding of said bolt.

5. A structure of the character described comprising a slidable bolt, a key actuated rotatable device, a lost motion means connecting said device and said bolt whereby partial rotation of said device will slide said bolt and at the limit of its movement will permit a reverse rotation sufficient to withdraw the key without sliding said bolt, characterized by the lost motion means comprising an idler arm, a cam secured to said rotatable device and having spaced abutments for swinging said idler arm and a cam surface between said abutments with a low point intermediate.

6. A structure of the character described comprising a stationary deadlocking lug, a slidable bolt having a tail pivotally secured thereto and having locking notches on its lower face for engagement with said deadlocking lug, a key actuated rotatable device, lost motion means connecting said device and said bolt whereby partial rotation of said device will first lift said tail to disengage it from a deadlocking lug and then slide said bolt and at the limit of said movement will permit a reverse rotation sufficient to withdraw the key without the sliding of said bolt characterized by the lost motion means comprising an idler arm, a cam secured to said rotatable device and having spaced abutments for engaging said idler arm with a low point intermediate said abutment, a finger extending laterally of said arm, and said tail having a notch in which said finger may be disposed.

7. A structure of the character described comprising a stationary deadlocking lug, a slidable bolt having a tail pivotally secured thereto and having locking notches on its lower face for engagement with said deadlocking lug, a key actuated rotatable device, an idler arm, a cam secured to said rotatable device and having spaced abutments for swinging said idler arm and a cam surface between said abutments with a low point intermediate and a second cam having spaced abutments for swinging said idler arm and a cam surface between said abutments with a low point intermediate.

In witness that I claim the foregoing I have hereunto subscribed my name this 27th day of January, 1923.

EUGENE O. MURMANN.