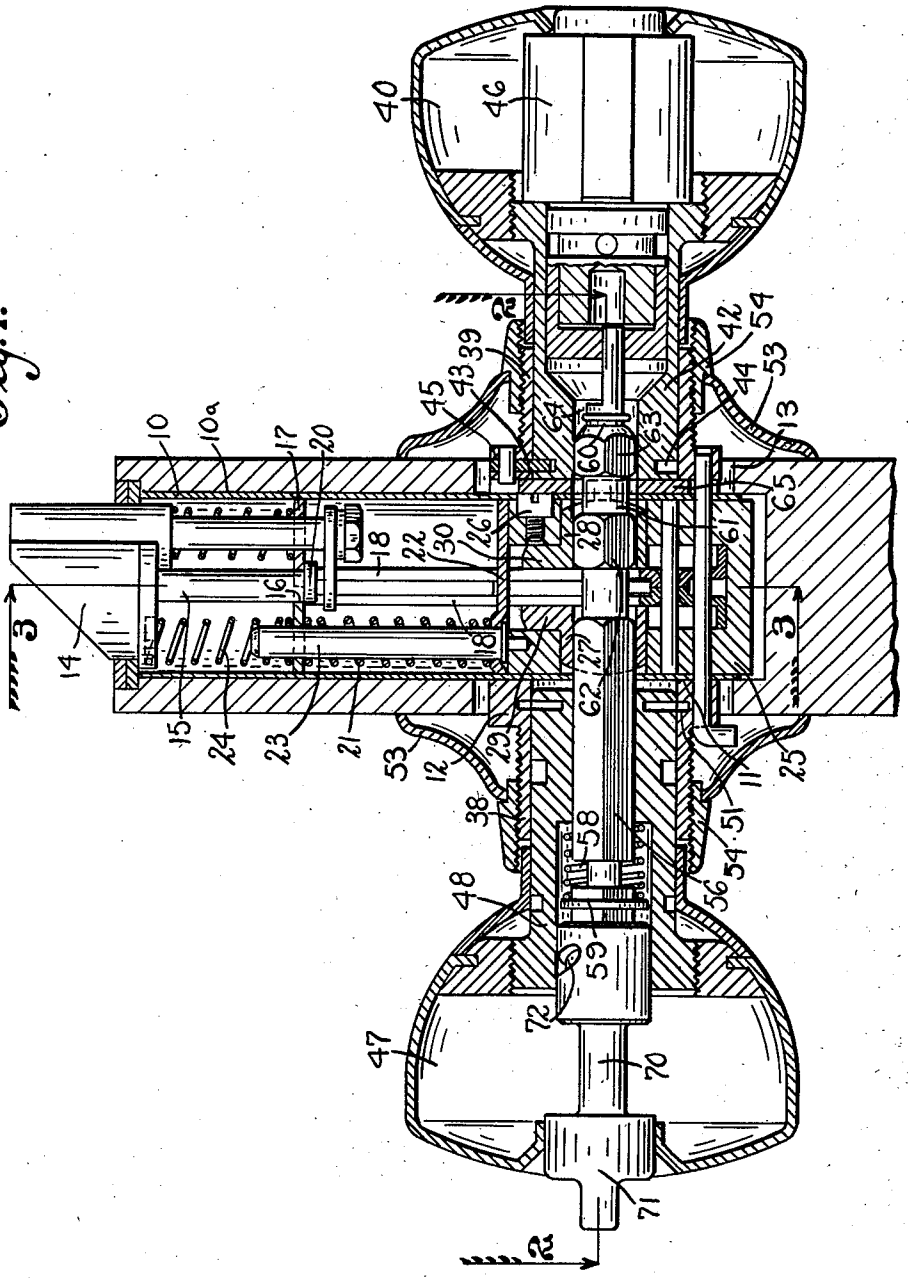
June 2, 1953 G. W. WARDWELL, JR 2,640,345

DOOR LOCK

Filed Nov. 26, 1949 2 Sheets-Sheet 1

Fig. 1.



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DOOR LOCK

Filed Nov. 26, 1949 2 Sheets-Sheet 2

Fig. 2.

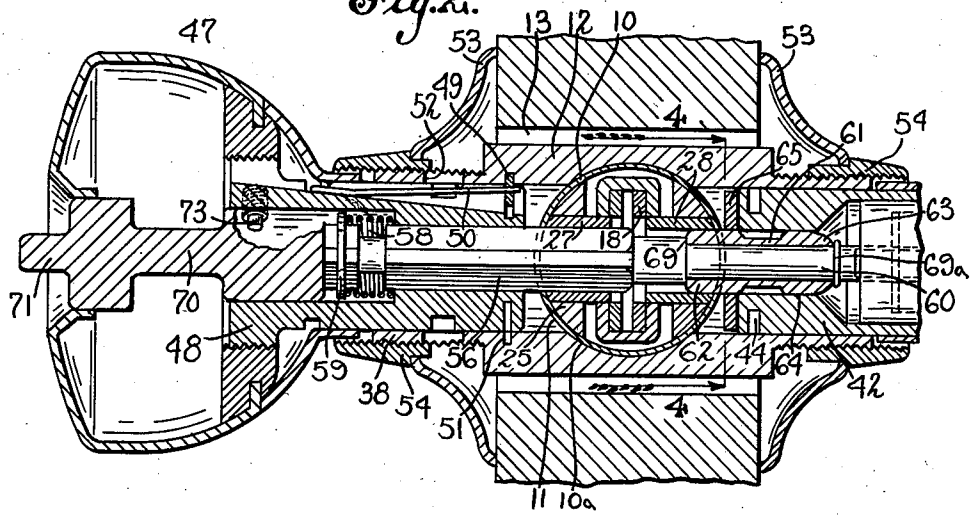


Fig. 3.

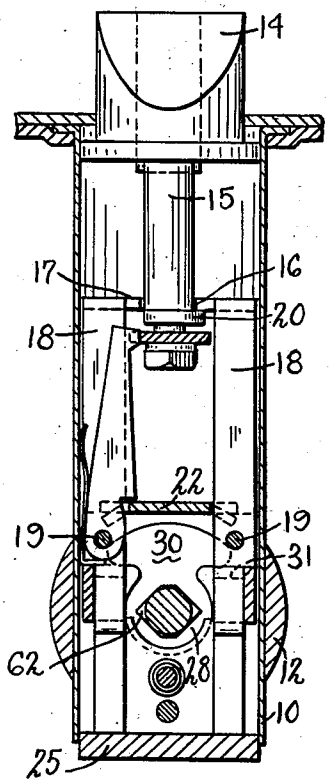


Fig. 4.

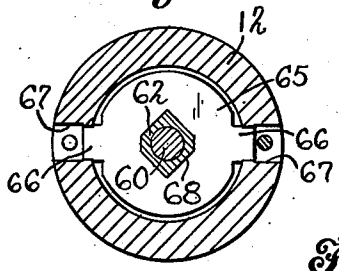


Fig. 5.

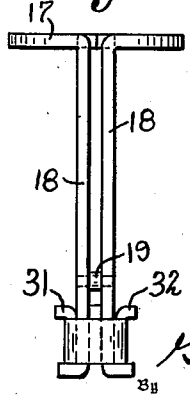
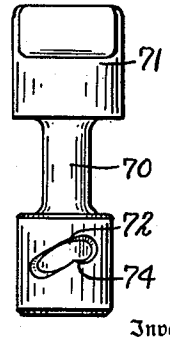


Fig. 6.



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UNITED STATES PATENT OFFICE

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DOOR LOCK

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Application November 26, 1949, Serial No. 129,607

8 Claims. (Cl. 70—146)

1

This invention relates to door locks, and more particularly to a lock mounted in a cylindrical case designed to be inserted in a bore in the edge of a door, and which case is adapted to pass through an opening in a cylindrical tube which may be inserted in a bore through the face of the door, the present application being a continuation in part of my co-pending application, Serial No. 668,401, filed May 9, 1946, now Patent No. 2,497,750, issued February 2, 1950.

In tubular locks, it is more or less customary to employ a bolt case which is inserted in a bore made through the edge of the door and to pass through this case a spindle connected to knobs at the inner and outer faces of the door, which spindle is designed to actuate the bolt-retracting mechanism. As the spindle is aligned by the cylindrical case in which the knobs are carried, it sometimes occurs that this knob case does not stand in the proper position with respect to the bolt mechanism case and, in that event, the spindle will tend to bind. This often is a result of the fact that the knob spindle is not accurately placed at right angles to the direction of reciprocation of the bolt, but may also be due to other errors in the mounting of the parts.

Moreover, it is desirable that a firm and rigid connection be made between the two housings or casings, that is, between the housing which carries the bolt and bolt-actuating mechanism and the housing which carries the knobs, and it is also desirable that the lock be universal in character in that it may be capable of being mounted on a door of either hand and which opens in either direction without any alteration in the position of the parts. That is to say, the lock should be capable of being used with a door of either hand and bevel without removing any parts from the case and changing their position.

I achieve the above objects in the structure disclosed in the present application and also provide novel means for dogging the outside knob against rotation, but at the same time permitting rotation of the inner knob spindle so that this spindle may be rotated either by the inner knob or by a key in the outside of the door in order that even though the outside knob be dogged, the door may be entered by one equipped with the proper key.

One object of the invention is to provide a door lock of relatively simple construction which may be readily installed through cylndrical openings or bores made through the door and the edge of the door, and the parts of which will be so arranged that there will be no tendency for them to bind or fail to operate freely.

2

A still further object of the invention is to provide a door lock of the character described which will be provided with novel means for dogging the outer knob against rotation.

Still another object of the invention is the provision of a door lock having a spindle rotated by the inner knob and a sleeve on this spindle adapted to be rotated by the outer knob, the sleeve and the spindle being longitudinally movable so that the outer knob and sleeve may be held against rotation while permitting the spindle and inner knob to turn, it being understood that rotation of the spindle serves to retract the bolt.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a sectional view of a door lock embodying my invention, the lock being shown in mounted position upon a door;

Fig. 2 is a partial sectional view on line 2—2 of Fig. 1;

Fig. 3 is a sectional view on line 3—3 of Fig. 1;

Fig. 4 is a sectional view on line 4—4 of Fig. 2;

Fig. 5 is a detailed view of the latch bolt retractor; and

Fig. 6 is a detailed view of the plunger mounted in the inside knob.

To illustrate a preferred embodiment of my invention, I have shown a door lock comprising a case 10 of cylindrical shape, this case being adapted to contain the latch bolt and actuating mechanism therefor as will be hereinafter explained, and also being adapted, when inserted within the bore 10^a in the edge of the door, to pass through an opening 11 (Fig. 2) in the body portion 12 of a cylindrical aligning tube adapted to be inserted in a bore 13 bored through the face of the door.

A latch bolt is reciprocably mounted in the case 10, this bolt comprising a beveled head 14 and a stem 15, this stem passing loosely at its rear end through an opening 16 in a bolt retractor shown in Fig. 5. This retractor comprises a pair of members of substantially identical shape, each comprising a substantially semi-circular head, which heads together form a disk-like member 17, and a pair of flat stems 18 which project rearwardly from the portion 17 and which are secured together in pairs by spacing pins 19. The stem 15 is provided with a head 20 rearwardly of the part 17 of the retractor so that movement of the latter will carry the bolt therewith, although the bolt may move independently of the retractor, the stem 15 sliding through the opening 16.

In order to hold the retractor in extended

position, a spring 21 acts between the disk 17 and a stop plate 22 within the lock case, the spring surrounding a post 23 which extends through an opening in the member 17. In order to urge the bolt to projected position, a second spring 24 is disposed between the bolt head and the member 17. It will be seen, therefore, that when the bolt 14 is retracted by engagement with the strike plate of the door jamb it is not necessary to compress the relatively strong spring 21 in order to move the bolt head into the case. The stop plate 22 is held in place by a yoke 25 inserted into the rear end of the lock case, which yoke, as will be hereinafter explained, serves as a support for certain parts of the mechanism within the casing, this yoke being held in place by the screw 26.

Rotatably mounted in transverse openings in the yoke 25 are inner and outer rollback hubs 27 and 28, these hubs carrying rollbacks 29 and 30 adapted to engage laterally turned lugs 31 and 32 carried by the retractor stems 18 as shown more especially in Figs. 3 and 5 so that, upon the turning of the rollbacks, the retractor will be drawn rearwardly and the latch bolt retracted into the case.

The aligning tube which supports the knob and spindle mechanism which will now be described is also of cylindrical shape and comprises a main body portion 12 and reduced end portions or sleeves 38 and 39, these sleeves being threaded exteriorly and provided with internal bores of the same size as that of the main portion 12, which latter bore is at right angles to the opening 11 which receives the case 10.

The outer knob is shown at 40, this knob having a shank 42 rotatably mounted within the sleeve 39 and retained therein by means of a key 43 which enters an annular slot 44 in the knob shank and is disposed in an opening 45 in the outer edge of the central portion 12 of the aligning tube. Mounted in the knob is a key-operated lock shown conventionally at 46, which will be hereinatfer referred to.

The inner knob is shown at 47 and is likewise provided with a shank 48 rotatably mounted in the sleeve 38 and retained in place by a key 49 carried upon the end of a flat spring 50 secured to the knob shank 48, the key 49 being received in a slot 51 in the body portion 12 of the aligning tube so as to permit rotation of the shank while preventing it from being withdrawn in a longitudinal direction. The sleeve 38 is provided with an opening 52 through which a tool may be inserted to depress the spring 50 and release the knob, when desired.

Escutcheons or roses 53 are mounted at the inner and outer surfaces of the door, these members being held in place by sleeves 54 threaded upon the sleeve portions 38 and 39 of the aligning tube so that the roses and sleeves 54 cover the ends of this tube.

As shown more particularly in Figs. 1 and 2, a knob spindle is provided which extends through the case of the lock mechanism and engages one of the rollback hubs to rotate the same upon the turning of the inner knob. This spindle is provided with a squared portion 56 non-rotatably and slidably received within a correspondingly shaped opening in the knob shank 48 and also non-rotatably received in a similarly shaped opening in the inner rollback hub 27, the spindle being urged toward the knob by the spring 58 which surrounds the spindle and acts against a washer 59 adjacent one end of the spindle.

Adjacent its other end, the spindle is reduced in size as shown at 60, and upon this reduced end is rotatably mounted a sleeve 61 having a squared portion 62 disposed in a similarly shaped opening in the outer rollback hub 28 and a second squared portion 63 disposed within a similarly shaped opening 64 in the shank of the outer knob so that when the outer knob is turned, the sleeve 61 will be rotated and, if the parts are in the position shown in Fig. 1, will rotate the outer rollback 30 and retract the bolt.

The squared portion 56 of the spindle and the squared portion 62 of the sleeve 61 are slidably received in openings in the lock case which will, of course, permit rotation as well as longitudinal movement of the spindle portion 56. The reduced end 60 of the main spindle projects from the sleeve 61 and is connected with a key-operated lock 46 in the outer knob so that the spindle may be rotated by this lock when the sleeve 61 and outer knob are dogged against rotation.

A locking plate 65 (Figs. 2 and 4) is provided in the main portion 12 of the aligning tube just without the casing 10 of the latch bolt, this plate being provided with wings 66 secured in recesses 67 provided in the walls of the tube so that the plate may be rigidly secured in place. This plate is provided with an enlarged opening 68 which is of non-circular shape so that it may non-rotatably receive the portion 62 of the sleeve 61.

It may here be stated that the latter sleeve is disposed between shoulders 69 and 69a on the spindle portion 60 so that while it is permitted to rotate upon the spindle, it is prevented from longitudinal movement with respect thereto. The spindle may be moved longitudinally of its axis from the position shown in Fig. 1 to that shown in Fig. 2 and when in the position shown in the latter figure, the squared portion 62 is engaged in the opening 68 of the locking plate 65 so as to prevent rotation of the sleeve and, therefore, prevent rotation of the outer knob and knob shank.

To move the spindle from one position to the other, a plunger or stem 70 is mounted in the inner knob 47 for longitudinal movement and connected to the end of the spindle. This member projects from the knob and is provided with a manually engageable part 71 by which the user may actuate it. As shown in Figs. 1, 2 and 6, one end of this member is disposed within the bore of the knob shank 48 and is provided with a helically disposed slot 72 in which is received a pin 73 secured to the knob shank. A small projection 74 may be provided in the slot 72 to retain the plunger in its inner position. It will be apparent, therefore, that upon rotation of the plunger 70 by the manually engageable part 71, the plunger will be caused to move inwardly and thus effect longitudinal movement of the main spindle and the sleeve 61.

With the parts in the position shown in Fig. 1 of the drawings, either of the knobs is free to rotate. The inner knob 47 will effect rotation of the knob shank 48 and of the spindle portion 56 to turn the inner rollback 29 and retract the bolt. Rotation of the outer knob effects rotation of the knob shank 42 and, thus, rotation of the sleeve 61, and, the squared portion of this sleeve being non-rotatably engaged with the outer rollback hub 28, the bolt will be retracted by rotation of the outside knob.

When it is desired to dog the outside knob

against rotation, the spindle is moved inwardly from the position shown in Fig. 1 to the position shown in Fig. 2, and it will be noted that in this position of the parts, while the portion **56** of the spindle still engages the rollback **27** so that this rollback may be operated by the inner knob, the squared portion **62** of the sleeve **61** now lies within the opening **68** of the locking plate **65** so that the sleeve **61** is locked against rotation. As this sleeve is non-rotatably engaged in the outer knob shank **42**, the outer knob will be dogged against turning. In this position of the parts, the latch bolt may only be retracted from the outside by use of the proper key in the lock **46**, as the main spindle will still be free to turn within the sleeve **61**. The spindle may be retracted to its original position by rotating the plunger **70** in the proper direction, the spring **58** returning the spindle to the position shown in Fig. 1.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the claims.

What I claim is:

1. In a door lock having a casing, a bolt reciprocably mounted therein, and inner and outer knobs operatively connected to the bolt to retract the same, a bolt actuating knob spindle passing through the case and connected to the inner knob only to be rotated thereby, a bolt-actuating sleeve rotatably mounted on the spindle and connected to the outer knob for rotation thereby, means to move said sleeve longitudinally of its axis from one position to another, means to dog said sleeve against rotation in one of said positions, and a key-operated member in the outer knob connected to said spindle to rotate the latter when the sleeve is dogged against rotation.

2. In a door lock having a casing, a bolt reciprocably mounted therein, and inner and outer knobs operatively connected to the bolt to retract the same, a bolt actuating knob spindle passing through the case and connected to the inner knob to be rotated thereby, a bolt-actuating sleeve rotatably mounted on the spindle and connected to the outer knob for rotation thereby, means to move said spindle and sleeve longitudinally of the spindle axis, a member fixed with respect to the casing to engage said sleeve and dog it against rotation, and a key-operated member in the outer knob connected to said spindle to rotate the latter when the sleeve is dogged against rotation.

3. In a door lock having a casing, a bolt reciprocably mounted therein, and inner and outer knobs operatively connected to the bolt to retract the same, a bolt actuating knob spindle passing through the case and connected to the inner knob to be rotated thereby, a bolt-actuating sleeve rotatably mounted on the spindle and connected to the outer knob for rotation thereby, a member fixed with respect to the lock case, said member having an opening to non-rotatably receive a part of said sleeve when the latter is moved toward the outer knob, and a key-operated member in the outer knob connected to said spindle to rotate the latter when the sleeve is dogged against rotation.

4. In a door lock having a casing, a bolt reciprocably mounted therein, and inner and outer knobs operatively connected to the bolt to retract the same, a bolt actuating knob spindle passing through the case and connected to the inner knob to be rotated thereby, a bolt-actuating sleeve rotatably mounted on the spindle and connected to the outer knob for rotation thereby, said sleeve having a non-circular portion, a member fixed with respect to the case and having an opening to non-rotatably receive said portion, manually-engageable means for moving said spindle and sleeve to engage said portion in said opening and dog the sleeve against rotation, and a key-operated member in the outer knob connected to said spindle to rotate the latter when the sleeve is dogged against rotation.

5. In a door lock having a casing, a bolt reciprocably mounted therein, and inner and outer knobs operatively connected to the bolt to retract the same, a bolt actuating knob spindle passing through the case and connected to the inner knob to be rotated thereby, a bolt-actuating sleeve rotatably mounted on the spindle and connected to the outer knob for rotation thereby, said sleeve having a non-circular portion, a member fixed with respect to the case and having an opening to non-rotatably receive said portion, means for moving said spindle and sleeve to engage said portion in said opening and dog the sleeve against rotation, said means comprising a plunger mounted in the inner knob, and a key-operated member in the outer knob connected to said spindle to rotate the latter when the sleeve is dogged against rotation.

6. In a door lock having a casing, a bolt reciprocably mounted therein, and inner and outer knobs operatively connected to the bolt to retract the same, a bolt actuating knob spindle passing through the case and connected to the inner knob to be rotated thereby, a bolt-actuating sleeve rotatably mounted on the spindle and connected to the outer knob for rotation thereby, said sleeve having a non-circular portion, a member fixed with respect to the case and having an opening to non-rotatably receive said portion, means for moving said spindle and sleeve to engage said portion in said opening and dog the sleeve against rotation, and means for retaining said sleeve in dogged position, and a key-operated member in the outer knob connected to said spindle to rotate the latter when the sleeve is dogged against rotation.

7. In a door lock having a casing, a bolt reciprocably mounted therein, and inner and outer knobs operatively connected to the bolt to retract the same, a bolt actuating knob spindle passing through the case and connected to the inner knob to be rotated thereby, a bolt-actuating sleeve rotatably mounted on the spindle and connected to the outer knob for rotation thereby, said sleeve having a non-circular portion, a member fixed with respect to the case and having an opening to non-rotatably receive said portion, means for moving said spindle and sleeve to engage said portion in said opening and dog the sleeve against rotation, and spring means for urging said sleeve in a direction to free it from said member, and a key-operated member in the outer knob connected to said spindle to rotate the latter when the sleeve is dogged against rotation.

8. In a door lock having a casing, a bolt reciprocably mounted therein, and inner and outer knobs operatively connected to the bolt to retract the same, a bolt actuating knob spindle passing through the case and connected to the inner knob to be rotated thereby, a bolt-actuating sleeve rotatably mounted on the spindle and connected to the outer knob for rotation thereby, means to

move said spindle and sleeve longitudinally of the spindle axis, and a member fixed with respect to the case to engage said sleeve and dog it against rotation, said member comprising a locking plate mounted adjacent the wall of the case and having an opening non-rotatably receiving said sleeve, and a key-operated member in the outer knob connected to said spindle to rotate the latter when the sleeve is dogged against rotation.

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