

Sept. 29, 1942.

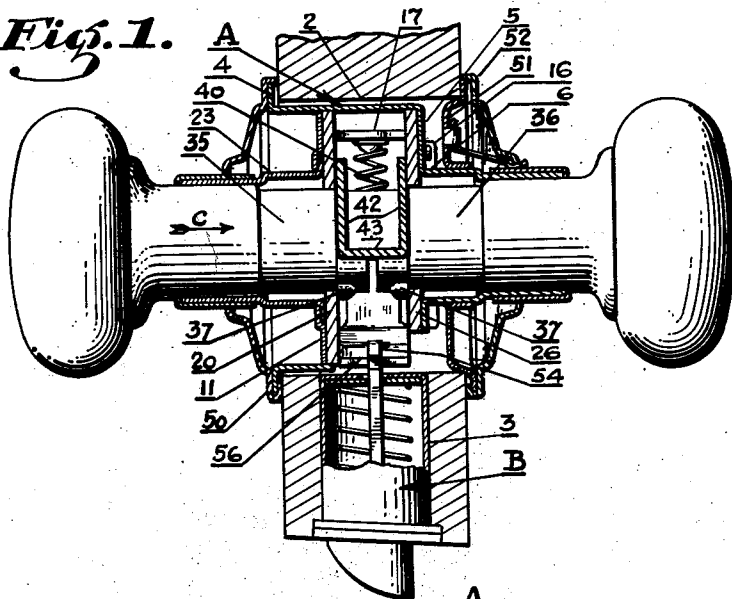
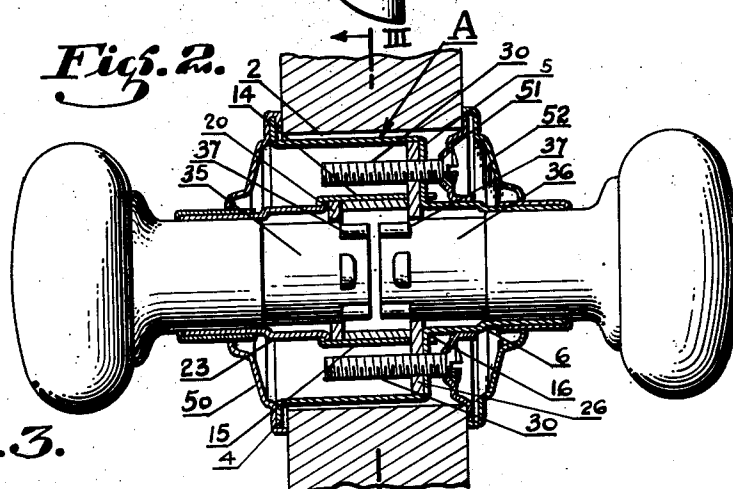
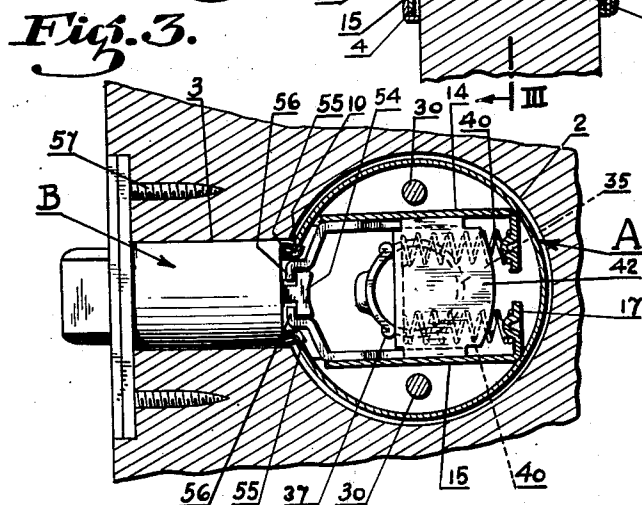
W. R. SCHLAGE

2,297,077

DOOR LOCK

Filed June 23, 1941

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

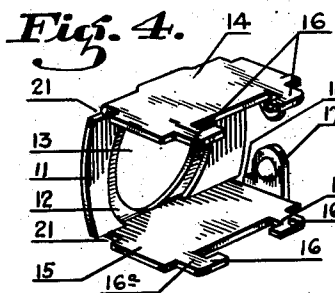
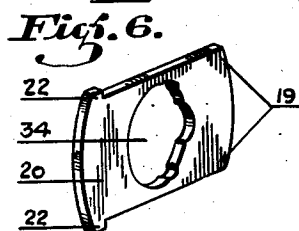
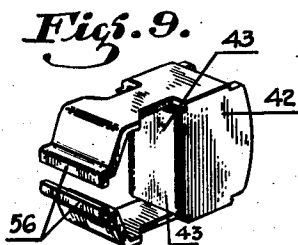
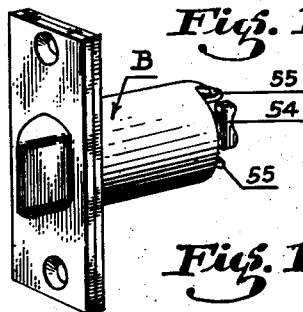
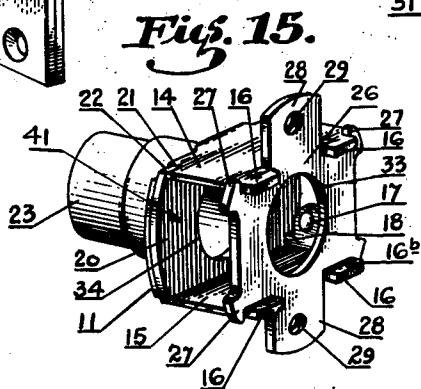


Fig. 5.

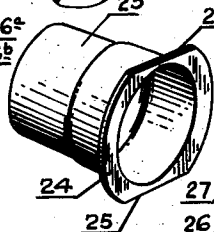


Fig. 10.

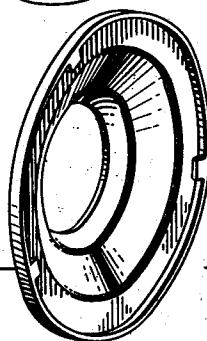


Fig. 12.

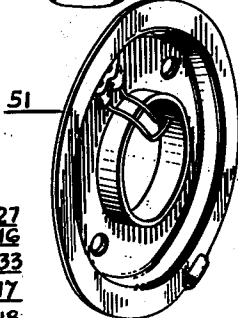


Fig. 8.

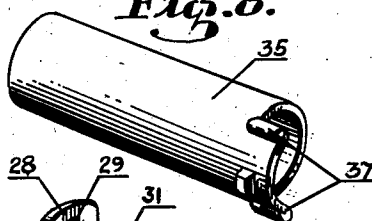


Fig. 7.

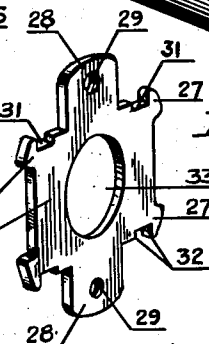


Fig. 11.

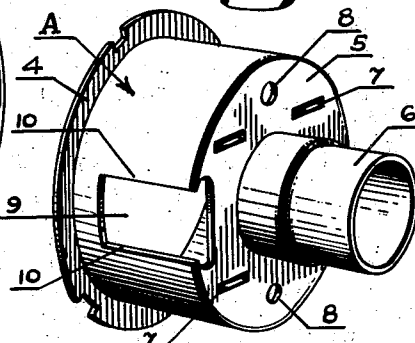
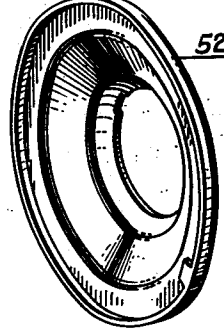


Fig. 13.



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UNITED STATES PATENT OFFICE

2,297,077

DOOR LOCK

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Application June 23, 1941, Serial No. 399,298

7 Claims. (Cl. 292—337)

This invention relates to door locks and especially to improvements in the construction of the type of lock shown in my former patent, No. 1,751,101, entitled "Door lock," issued March 8, 1930.

The object of the present invention is generally to improve and simplify the construction and operation of door locks of the character described; to provide a lock structure in which the greater number of parts may be made from light gauge metal and only the parts subjected to wear and stress from heavier metal; to provide bearings of increased area for the knob spindles and the rollback members carried thereby; to make one of said bearings detachable; to reduce the weight and simplify the construction of the retractor guide; to reinforce the retractor guide by placing combination thrust and wearing plates on opposite sides thereof so as to take up spindle end thrust and wear produced by the retractor; to secure detachably said combination thrust and wear plates with relation to the retractor guide; and further, to secure said plates by an enclosing housing.

The structural improvements are shown in the accompanying drawings, in which

Fig. 1 is a horizontal section of a door showing the door lock installed;

Fig. 2 is a vertical section of the lock installed in a door;

Fig. 3 is a longitudinal vertical section taken on line III—III of Fig. 2, said view showing the latch bolt unit in full lines;

Fig. 4 is a perspective view of the retractor guide;

Fig. 5 is a perspective view of the outer spindle bearing;

Figs. 6 and 7 are perspective views of the reinforcing plates employed in conjunction with the retractor guide;

Fig. 8 is a perspective view of one of the door knob spindles;

Fig. 9 is a perspective view of the retractor;

Fig. 10 is a perspective view of the outer escutcheon plate;

Fig. 11 is a perspective view of the housing enclosing the latch bolt actuating mechanism;

Fig. 12 is a perspective view of the clamping plate;

Fig. 13 is a perspective view of the inner escutcheon plate;

Fig. 14 is a perspective view of the latch bolt unit; and

Fig. 15 is a perspective view of the retractor guide, the outer spindle bearing and the reinforc-

ing plates assembled and applied to the retractor guide.

Referring to the drawings in detail, and particularly to Figs. 1 to 3, A indicates in general a latch bolt actuating unit and B a latch bolt unit. These units are adapted to be separately installed in a door and each contains a complete self-contained mechanism. The latch bolt actuating unit is installed transversely of a door, while the latch bolt unit B is installed endwise of the door or, in other words, at right angles to the latch bolt actuating unit. The respective housings are cylindrical in cross section, and in order to prepare a door, it is only necessary to bore a pair of holes as indicated at 2 and 3 with an ordinary brace and bit, the hole 2 being provided for the reception of the housing or unit A, and the hole 3 for the housing or unit B. The unit B is secured by screws which pass through a face plate forming a part of the latch bolt unit B, as will hereinafter be described, while the latch bolt actuating unit A is secured by means of a clamping plate 51, as will hereinafter be described.

The latch bolt actuating unit contains the structural improvements forming the subject matter of this application and these improvements are best illustrated in Figs. 1 to 11 inclusive. It consists of a housing A (see Fig. 11) one end of which is flanged as at 4 and open, while the other end is closed by an end section 5 which is provided with an integral bearing extension 6. The housing is cylindrical or cup-shaped as shown. The end 5 is provided with 35 four elongated slots 7 and two circular perforations 8, while the side of the housing is cut out as at 9 to form a pair of parallel retaining flanges 10—10 the purpose of which will hereinafter be described.

Adapted to be received and secured within the housing A is a retractor guide (see Fig. 4). This consists of an end plate 11 in which is formed a recess 12 and an opening 13. Formed integral with the end plate is a top plate 14 and a bottom plate 15 and formed on the free edges of said plates are lugs 16—16 which are adapted to extend through the slots 7 of housing A as will hereinafter be described. Two right angular bent lugs 17—17 are provided on one or both of the plates to form spring seats and shoulders 18—18 are formed between said lugs and the end plate 11 to receive and retain one end 19 of a plate 20 (see Fig. 6). Notches 21 are formed at the opposite ends of the plates and these serve to receive and retain a pair of ears 22 formed on plate 20.

The plate 20 serves three functions: first, that of reinforcing the end plate 11 of the retractor guide; second, that of a thrust and wear absorbing plate; and third, that of a retainer for a bearing member generally indicated at 23 (see Fig. 5). One end of this member is flanged as at 24, and opposite sides of the flange are cut away as at 25 to permit the bearing to be inserted between the top and bottom plates 14 and 15 and to extend through the opening 13 in the end plate 11. When so inserted the flange 24 will seat in the recess 12 of the end plate 11, and the flat sides 25 of the flange will engage the inner faces of the top and bottom plates and secure the bearing against rotation and the bearing will be secured against endwise removal when the plate 20 is inserted.

A second thrust and wear absorbing plate 26 (see Fig. 7) is applied and secured to the retractor guide shown in Fig. 4. This plate has two pairs of lugs 27—27 and 28—28. The lugs 28 are drilled and tapped as indicated at 29 to receive a pair of clamping screws 30—30 (see Fig. 2). Recesses 31 are formed on opposite sides of the lugs 27 to receive the arms 16a of the lugs 16 and the lugs which may be said to be L shaped will accordingly overlie shoulder sections 32 formed at the inner ends and on opposite sides of the lugs 28.

The two plates 20 and 26 are disposed on opposite sides of the retractor guide and they form guides between which a retractor, such as shown in Fig. 9 is slidably mounted. The plate 26 is provided with a central opening 33 and a similar opening 34 is formed in the plate 20. These openings are provided to permit insertion of a pair of opposed spindles 35 and 36. The spindles are identical one of them being shown in perspective in Fig. 8. Each spindle has a rollback member 37, formed on its inner end. They are preferably of tubular form and each carries a door knob as shown in Figs. 1 and 2 which may be secured on the spindles in any suitable manner.

The assembly and function of the lock will now be described. The bearing 23 is first inserted through the opening 13 formed in the retractor guide and pushed through to a point where the shoulder engages and seats in the recess 12 formed around the opening. The plate 20 is next inserted and is secured when the end 19 passes in under the shoulders 18 and the ears 22 enter the notches 21. In this position the flanged end of the bearing 23 will be clamped between the end plate 11 and the plate 20, and is thus secured against endwise movement and at the same time is also secured against rotation by the flattened sides 25 engaging the inner faces of the plates 14 and 15 of the retractor guide. The spindle 35 is next inserted through the bearing 23, next the springs 40 and then the retractor. The plate 26 is next applied as shown in Fig. 15 by pressing it down over the lugs 16, this being possible as the plates 14 and 15 together with the lugs 16 formed thereon will spread under downward pressure and will snap back so that the lugs 16 will overlie the shoulders 32 as shown in Fig. 15, and thereby retain and secure plate 26. The spindle 36 is inserted through the opening 33 in plate 26 with the rollback in the same position as that on the spindle 35. The operator slightly depresses the retractor during insertion of spindle 36 and then releases the retractor and when so released the springs will force the retractor outwardly into engagement with the rollbacks on the respective spindles and as such will retain the spindles. The unit will now be inserted in the housing A and

when so inserted, spindle 36 will pass through the bearing 6 while the lugs 16 will pass through the slots 7 formed in the end 5 of housing A and the unit will there be secured by passing a pair of cotter pins through opposite lugs 16 which are perforated as at 16b for their reception.

The assembly of the latch bolt actuating unit is completed by applying an outer escutcheon plate 50, a clamping plate 51, a pair of clamping screws 30, an inner escutcheon plate 52, and the respective door knobs shown in Figs. 1 and 2.

The present invention is directed to the construction, function and assembly of the latch bolt actuating mechanism. The latch bolt unit has, nevertheless, been illustrated in Figs. 1, 3 and 14, as it renders the description of the lock mechanism as a whole more readily understandable.

In installing the lock in a door, the latch bolt unit B is first inserted through the opening formed in the edge of the door, as shown in Fig. 3. The latch bolt has a bar attached to it known as the retractor bar. The inner end of this bar is provided with two laterally extending lugs 54, which project through the inner end of the housing and into the transverse opening formed in the door. The inner end of the housing of the latch bolt unit is provided with a pair of hook-shaped lugs 55 which also project into the transverse opening in the door. After the latch bolt unit has been inserted, the latch bolt actuating unit A cannot be inserted until the inner knob, the inner escutcheon plate, the clamping plate 51, and the clamping screws 52 have been removed. When these have been removed, the housing A is inserted in the transverse opening in the direction of arrow c (see Fig. 1) and when thus inserted, the flange 4 and the outer escutcheon plate secured thereto will engage the outer face of the door. Also during the insertion of the latch bolt actuating unit, the flanges 10—10 formed by the cutaway portion 9 of the housing A will ride over the hook-shaped lugs 55 formed on the inner end of the housing B, and the two housings will thus be interlocked. The retractor shown in Figs. 9 and 3 has a pair of hook-shaped jaws 56 formed at the forward end, and these jaws will ride over the lugs 54 formed on the inner end of the retractor bar. Thus the two housings are interlocked by means of the flanges 10—10 and the hooks 55, while the mechanism is interlocked by the jaws 56 and the lugs 55.

The clamping plate is next applied to the inner face of the door. The screws 30 are passed through the holes formed in the plate, and then, as these align with the threaded openings 29 formed in the lugs 28 of the plate 26, there will be a threaded engagement and the screws will be tightened until the clamping plate firmly engages the inner face of the door and the flange 4 the outer face of the door. The inner escutcheon plate may then be applied and so may the inner knob, and then, by finally applying screws 57 to the face plate of the latch bolt unit, the installation will be complete.

The main changes in the present structure when comparison is made with the structure shown in my former patent, No. 1,751,101, is that the retractor guide is secured to the housing A and that the retractor guide is provided with two plates 20 and 26 which reinforce and strengthen the retractor guide, and in addition thereto take up all thrusts and wear applied thereto by the knob spindles and the retractor. Furthermore, by employing the plate 20 it be-

comes possible to apply a spindle bearing to the retractor guide and to secure it by means of said plate. In addition to the above, it becomes possible to simplify the construction of most of the parts forming the lock mechanism and to make them from comparatively light gauge steel. This also simplifies die construction and increases the life of the dies. The only parts which require a heavier gauge metal are the plates 20 and 26 and as these are flat and of simple design, dies of the blanking type may be employed. The plates 20 and 26 are rounded at opposite ends and snugly fit the interior of the housing A, thus rigidly supporting the retractor guide within the housing; also as plate 26 is tapped as at 29 to receive the clamping screws, the retractor guide and the reinforcing plates will be rigidly clamped against the closed end 5 of the housing.

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

1. In a lock of the character described, a retractor guide comprising an end plate, a top and a bottom plate formed integral therewith and bent at right angles thereto, said end plate having an opening formed therein, a bearing sleeve adapted to extend through said opening, a recess formed in the plate around the opening, a flange on the bearing sleeve adapted to seat in said recess, and removable means carried by the retractor guide engageable with the flanged end of the bearing sleeve to secure the bearing sleeve against removal.

2. In a lock of the character described, a retractor guide comprising an end plate, a top and a bottom plate formed integral therewith and bent at right angles thereto, said end plate having an opening formed therein, a bearing sleeve adapted to extend through said opening, a recess formed in the plate around the opening, a flange on the bearing sleeve adapted to seat in said recess, a plate insertable endwise between the top and bottom plates, and means maintaining said plate in engagement with the inner face of the end plate to secure the bearing sleeve against removal.

3. In a lock of the character described, a retractor guide comprising an end plate, a top and a bottom plate formed integral therewith and bent at right angles thereto, said end plate having an opening formed therein, a bearing sleeve adapted to extend through said opening, a recess formed in the plate around the opening, a flange on the bearing sleeve adapted to seat in said recess, a plate insertable endwise between the top and bottom plates, means maintaining said plate in engagement with the inner face of the end plate to secure the bearing sleeve against removal, and other means for securing the insertable plate against endwise removal from between the top and bottom plates.

4. In a lock of the character described, a re-

tractor guide comprising an end plate, a top and a bottom plate formed integral therewith and bent at right angles thereto, an elongated wear and thrust absorbing plate insertable endwise between the top and bottom plates, means for retaining said insertable plate in engagement with the inner face of the end plate, a second wear and thrust absorbing plate, and means for detachably securing said plate to the free edges of the top and bottom plates.

5. In a lock of the character described, a retractor guide comprising an end plate, a top and a bottom plate formed integral therewith and bent at right angles thereto, an elongated wear and thrust absorbing plate insertable endwise between the top and bottom plates, means for retaining said insertable plate in engagement with the inner face of the end plate, a plurality of lugs formed on the free edge of the top plate and on the free edge of the bottom plate, a second wear and thrust absorbing plate, and means for detachably securing said plate with relation to said lugs.

6. In a lock of the character described, a retractor guide comprising an end plate, a top and a bottom plate formed integral therewith and bent at right angles thereto, said end plate presenting inner and outer faces and having an opening formed therein, a recess formed in the inner face of the end plate around the opening, a bearing sleeve extending through the opening, a flange on one end of the sleeve and seating in the recess, said flange securing the bearing sleeve against rotation and also securing the bearing sleeve against endwise removal from the end plate in an outward direction, and other means securing the bearing sleeve against endwise removal in an inward direction.

7. In a lock of the character described, a retractor guide comprising an end plate, a top and a bottom plate formed integral therewith and bent at right angles thereto, said end plate presenting inner and outer faces and having an opening formed therein, a recess formed in the inner face of the end plate around the opening, a bearing sleeve extending through the opening, a flange on one end of the sleeve and seating in the recess, said flange securing the bearing sleeve against rotation and also securing the bearing sleeve against endwise removal from the end plate in an outward direction, a plate insertable endwise between the top and bottom plates and in contact with the inner face of the end plate to secure the bearing sleeve against endwise removal in an inward direction, a cylindrical shaped housing open at one end and closed at the other, said retractor guide and the plate carried thereby being insertable in the housing, and the housing securing the plate against removal from the retractor guide, and means for securing the retractor guide within the housing.

WALTER R. SCHLAGE.