July 22, 1941. W. R. SCHLAGE 2,250,036

LOCK EXTENSION UNIT

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Fig. 1.

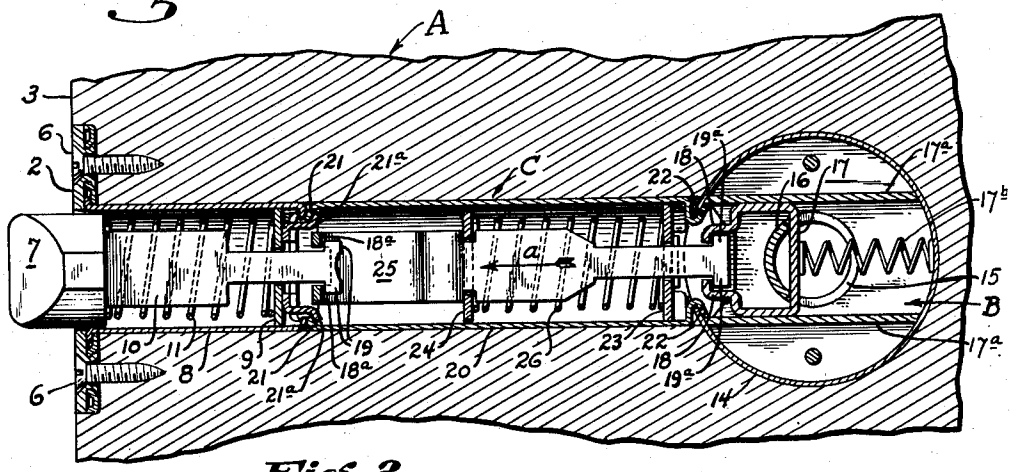


Fig. 2.

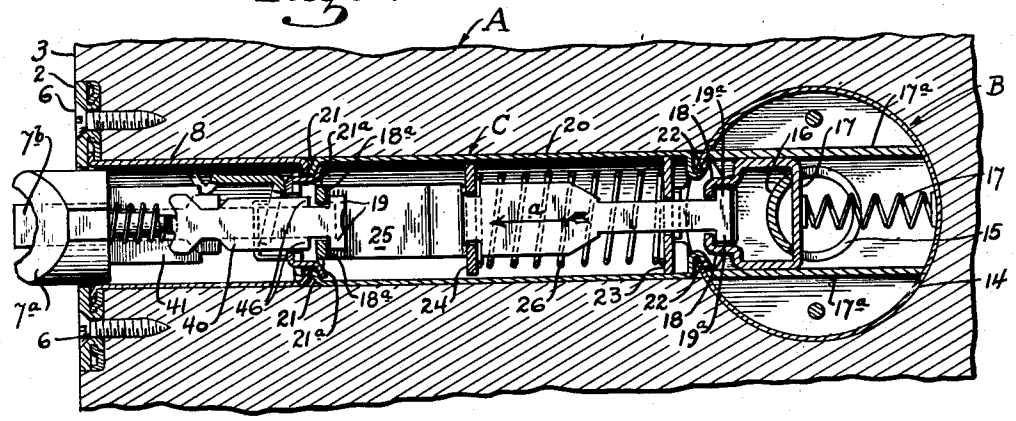


Fig. 3.

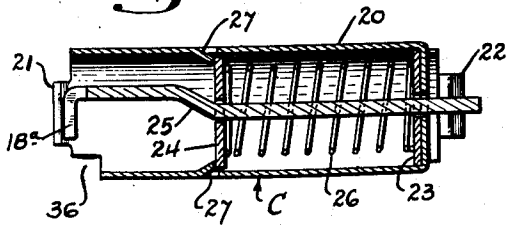
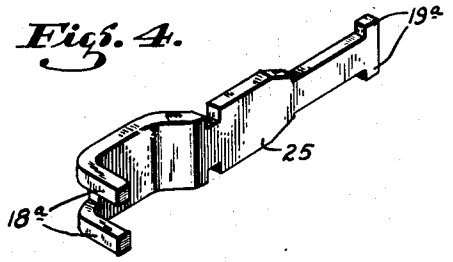


Fig. 4.



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Fig. 5.

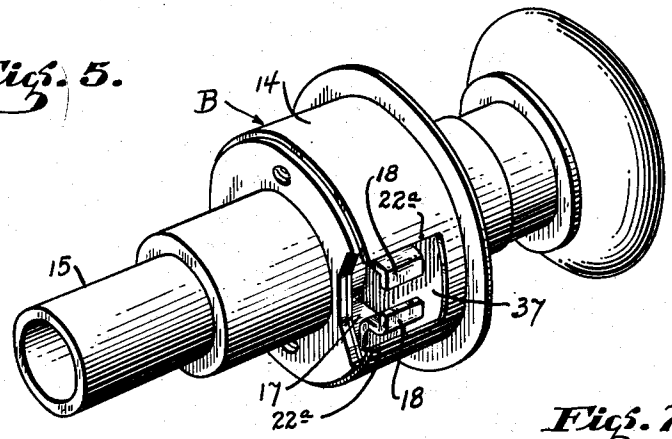


Fig. 7.

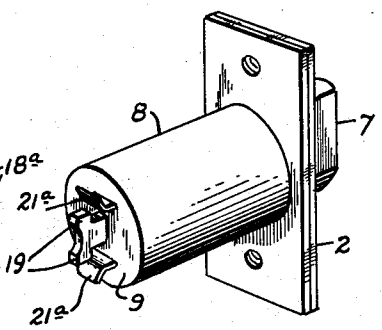


Fig. 6.

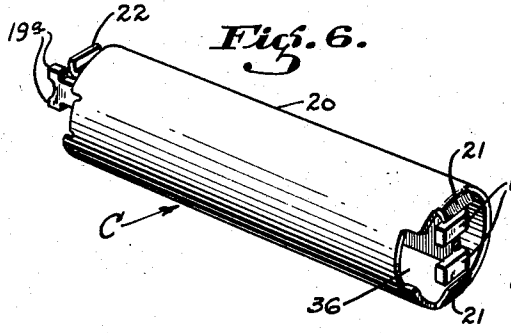
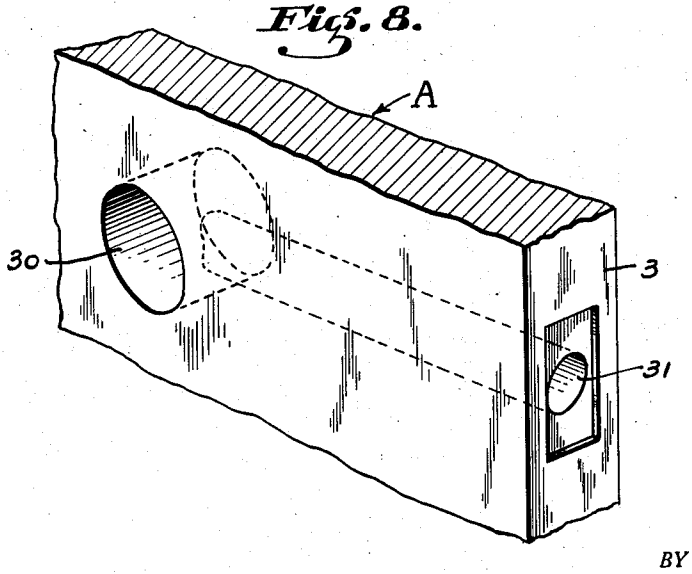


Fig. 8.



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UNITED STATES PATENT OFFICE

2,250,036

LOCK EXTENSION UNIT

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Application June 7, 1939, Serial No. 277,768

2 Claims. (Cl. 292—337)

This invention relates to an extension unit whereby the backset of a lock unit when installed in a door may be materially increased.

"Backset" is a term used in the door lock and building industry, and refers to the measurement or distance between the edge of the door and the center of the lock spindle. The average backset on inside doors is 2½ inches, and the backset on outside or so-called front doors, 2¾ inches. Architects and builders are constantly attempting to make innovations, that is, introduce new features, novelties, new designs, etc., and recently it has become the vogue in certain types of buildings and other structures materially to increase the backset in door locks. In some instances this is carried to such an extreme as to position the spindle and knobs approximately at the center of a door.

In certain types of lock, for instance in the so-called mortise type, the latch bolt and the latch bolt actuating mechanism, to wit, the spindle, the rollback member, the knobs, etc., are carried by a single housing. To increase the backset in that type of lock it would be necessary to increase the length of the housing and of much of the mechanism within the housing—obviously, a very costly procedure. There is another type of door lock which is divided into two separate units, each enclosed in its own housing. These units are known as the latch bolt unit and the latch bolt actuating unit. In this type of lock, increase of the backset has been accomplished by lengthening the housing and contained mechanism of the latch bolt unit. This is also costly and is not very satisfactory, and it compels the lock manufacturer to furnish the latch bolt unit in varying lengths depending upon the backset desired.

Whether the housing and mechanism of the mortise type of lock is lengthened, or the latch bolt unit of the latter type of lock is lengthened, the cost to the lock manufacturer is excessive; and besides that, a considerable stock of locks of varying lengths must be carried to meet the specific measurements and lengths demanded by different architects and builders.

The object of the present invention is to improve locks of the two-unit type, that is, in which the lock mechanism consists of two separable units, to wit, a latch bolt unit and a latch bolt actuating unit; and particularly, to provide an intermediate or extension unit, insertable between the latch bolt unit and the latch bolt actuating unit, whereby any backset may be obtained without change or increase of the length of either of the first named units.

The invention is shown by way of illustration in the accompanying drawings, in which

Fig. 1 is a central longitudinal vertical section, taken through the type of lock heretofore referred to, which is known as a two-unit lock, the section showing the intermediate or extension unit in position between the aforementioned units;

Fig. 2 is a similar section showing the invention applied to a door lock employing a deadlocking latch or bolt;

Fig. 3 is a longitudinal horizontal section, taken at right angles to Fig. 1 or 2, of the extension or intermediate unit;

Fig. 4 is a perspective view of the retractor bar carried by the extension or intermediate unit;

Fig. 5 is a perspective view of the latch bolt actuating unit;

Fig. 6 is a perspective view of the extension or intermediate unit;

Fig. 7 is a perspective view of the latch bolt unit; and

Fig. 8 is a fragmentary perspective view of a door, showing the manner in which it is bored and otherwise prepared for the reception of the type of lock shown in Figs. 5, 6, and 7.

The type of door lock mechanism to which the present invention appears most readily applicable is the separable type, that is, a lock in which the latch bolt mechanism is contained in one housing or unit and the latch bolt actuating mechanism in another housing or unit, the two housings with their enclosed mechanism being separably insertable in a door when installing the lock. In order that the extension unit forming the subject matter of this application may be fully understood, a brief description of the latch bolt unit and the latch bolt actuating unit will be submitted.

The latch bolt unit (see Figs. 1 and 7) comprises a face plate 2 which is adapted to be secured to the outer edge 3 of a door A by means of screws 6. The face plate has an opening formed therein through which the latch bolt 7 extends in the usual manner. Secured to the rear side of the face plate is a cylindrical elongated housing 8; the rear or inner end of this housing is closed by an end plate 9, but this plate has an opening therein, which forms a guide and permits the inner end of a retractor bar 10 to extend therethrough. The forward end of the bar is secured to the latch bolt 7; hence when a

pull is exerted on the retractor bar the latch bolt will be retracted. Conversely, when a pull is not exerted, a spring 11 interposed between the latch bolt and the end plate 9 will maintain the latch bolt in extended position.

The latch bolt actuating unit is generally indicated at B (see Figs. 1 and 5). It comprises a housing 14, which is materially larger in diameter than the latch bolt housing. Extending through the housing and journaled therein is a spindle 15, and formed on the spindle is a rollback member 16, which imparts reciprocal movement to a retractor 17 when the spindle is rotated. The retractor is provided at its forward end with a pair of spaced fingers 18 which under normal conditions engage a pair of lugs 19 formed on the inner end of the retractor bar 10. This normal condition will exist as long as the standard backset, for instance 2½ inches, is employed, but where the backset is increased, engagement between the fingers 18 and the lugs 19 can obviously not be maintained, unless the latch bolt, retractor bar 10, and housing 8 are proportionately lengthened. This of course is not feasible from a manufacturing point of view, and is the main reason for providing an extension or intermediate unit, generally indicated at C, which may be interposed between the latch bolt unit and the latch bolt actuating unit.

The extension or intermediate unit is best illustrated in Figs. 1 and 6. It comprises an elongated cylindrically-shaped housing 20 having the same diameter as the latch bolt housing 8. One end of the housing 20 is open, and is provided with a pair of in-turned lugs 21, while the other end is provided with a pair of outwardly-turned lugs 22. The end of the housing adjacent lugs 22 is closed by a disc 23. A second disc 24 is mounted within the housing, and this disc, together with the disc 23, serves as a support and guide for an extension retractor bar 25, which is best shown in Figs. 1, 3 and 4. The disc 24 is secured on the bar 25 intermediate its ends, and as this bar is slidably mounted within the housing, so is the disc 24. A spring 26 surrounds the bar, and is interposed between the discs 23 and 24, and as disc 23 is permanently secured in the housing, while the disc 24 and the bar to which it is secured are slidable, the spring tends to urge the bar in the direction of arrow *a* (see Fig. 1). Such movement is, however, limited, as stop-lugs 27 (see Fig. 3) are provided. The rear or inner ends of the extension retractor bar 25 extends through the disc 23 and is provided with a pair of lugs 19*a* substantially identical to the lugs 19 formed on the inner end of the bar 10, which, as previously stated, is the retractor bar whereby the latch bolt 7 is retracted. The opposite or forward end of the bar 25 is provided with a pair of fingers 18*a*, which serve the same function as the fingers 18 of the main retractor 17.

In actual practice, when a lock of this character is to be installed in a door, two holes must be drilled with a wood bit or similar tool. One hole (see Fig. 8) is bored transversely through the door, as indicated at 30, and receives the latch bolt actuating unit indicated at B. The other hole 31 is drilled through the edge of the door in a direction at right angles to the first hole, and this hole serves the function of receiving the intermediate unit C and the latch bolt unit shown in Fig. 7. The distance between the edge of the door and the center of the hole 30 depends upon the backset desired, and may in extreme instances be great enough to place the hole substantially in the center of the door. In this particular instance let it be assumed that a backset of six inches is desired. If that is the case, the extension or intermediate unit will have to be approximately 3½ inches long, as the normal backset is 2½ inches. If the backset on another door is to be eight inches, the extension unit will have to be 5½ inches long. These dimensions are merely submitted to bring out the fact that the length of the extension unit varies; that is, the manufacturer, instead of changing the standard dimensions of the latch bolt units, merely supplies extension units of varying lengths, and will under normal conditions have a sufficient number of different lengths on hand to take care of current demand.

When a door has been bored and the face countersunk for the reception of the face plate 2 of the latch bolt actuating unit, as clearly shown in Fig. 8, the installation of the lock will be accomplished as follows: The latch bolt unit 7 and the intermediate or extension unit shown in Fig. 6 are first connected end to end, that is, the adjoining ends shown in Figs. 6 and 7 are connected. This is accomplished by providing an opening 36 in the side and forward end of the intermediate unit C; through this opening lugs 19 formed on the inner end of the retractor bar 10 of the latch bolt unit are inserted, then by moving the latch bolt unit laterally with relation to the intermediate unit, or vice versa, the lugs will pass behind and under the fingers 18*a* formed on the forward end of the retractor bar 25. At the same time the in-turned lugs 21 formed at the forward end of the housing C of the intermediate unit will pass behind outwardly-turned lugs 21*a* formed on the inner end of the latch bolt unit, the interlock between the several lugs and fingers being clearly shown in Fig. 1. By this method of interlock the retractor bars 10 and 25 are connected, and so are the two housings of the respective units. With the two units thus connected, it is only necessary to insert them endwise through the opening 31 formed in the door, and then to secure the face plate by inserting the screws 6. When so inserted, the lugs 19*a* formed at the inner end of the retractor bar 25 will project a slight distance into the opening 30 formed in the door, and so will the out-turned lugs 22. Hence when the latch bolt actuating unit is inserted endwise through the opening 30, or in a direction transverse of the door, the fingers 18 of the main retractor will pass over the lugs 19*a* of the retractor bar 25 and engage the same. An interlock between the inner end of the housing 20 of the unit C and the housing 14 of the unit B will also be made, as an opening 37 is formed in the housing 14. This opening serves two functions: first, it permits the inner end of the retractor bar 25—or in other words, the lugs 19*a*—to extend into the housing 14, where they can be gripped or engaged by the fingers 18; secondly, the opening forms two opposed shoulders 22*a*, which engage the outwardly-turned lugs 22 formed on the inner end of the housing 20 of the intermediate unit. Thus an interlock is formed between the housings 14 and 20 at one end, and between the housings 20 and 8 at the opposite end. Also, an interlock is formed between the fingers 18 of the main retractor and the inner end of the retractor bar 25, and an interlock is likewise formed between the fingers 18*a* at the opposite end of the retractor bar 25 and the lugs 19 formed at the inner end of the main retractor bar 10 of the latch

bolt unit. Hence, when the spindle is rotated, the rollback member 16 will engage the inner face of the retractor 17, forcing this to move inwardly between guides 17a formed within the housing 14, and against the tension of a spring 17b. During such inward movement of the retractor 17, fingers 18 engage the lugs 19a of the retractor bar 25. The fingers 18a at the opposite end of the retractor bar engage the lugs 19 of the retractor bar 10, and both bars will thus move in unison in an inward direction with the retractor 17, and thus cause retraction of the latch bolt 7. On the other hand, when the spindle is released, spring 17b will force the retractor 17 in a forward or outward direction. The springs 26 and 11 will at the same time force the retractor bars 25 and 10 in an outward direction, and the latch bolt 7 will accordingly be projected. In other words, a backset of any distance desired may be obtained, without in any way altering the construction and operation of the two standard units employed, to wit, the latch bolt actuating unit and the latch bolt unit, as intermediate units of any desired length may be furnished whereby a connection is made between the retractor 17 and the retractor bar 10.

In Fig. 1, the extension unit is illustrated in connection with an ordinary door latch. The extension is, however, equally applicable to so-called "deadlocking" door bolts or latches, as illustrated in Fig. 2. In this type of latch, there is a floating cam plate 40, which is retracted in unison with the main retractor bar, indicated at 41, when the main latch bolt 7a is retracted by means of the retractor bar 25 and the main retractor 17. This floating cam plate must remain stationary and in the position shown in Fig. 2 when the latch bolt 7a and the deadlocking bolt 7b are depressed, as for instance when a door is slammed or closed, as it is only in this position that the deadlocking of the latch bolt 7a can be effected. If the latch bolt 7a should be depressed while the door is closed, by means of a jimmy or like tool, it would be possible for the cam plate to move with it, due to friction between the cam plate and the retractor bar 41; and if this happened, the deadlocking mechanism would fail, and the door would be opened. Such movement of the cam plate is, however, prevented in the present instance, as spring 26 holds the retractor bar 25 in the full-line position shown in Fig. 2. In this position, fingers 18a engage shoulders 46 on the cam plate, and thus secure it against movement when the latch bolt 7a is depressed either by closing of the door or when an attempt is made to depress it by a jimmy or similar tool. The use of the spring 26 is accordingly important, as it prevents floating of the cam plate except at the times when it should float. If it were not for this factor, the spring 26 could be entirely eliminated, as the tension of the latch bolt projecting spring, for instance the one shown at 11 in Fig. 1, is more than sufficient to actuate not only the main latch bolt 7 or 7a, but also to restore the retractor bar 25 to normal position after actuation.

While certain features of my invention have been more or less specifically described and illustrated, I wish it understood that changes may be restored to within the scope of the appended claims, and that the materials and finish of the parts employed may be according to the wishes of the manufacturer or to varying conditions of use.

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

1. An extension unit of the character described comprising a tubular housing, a bar slidably mounted therein, a pair of spaced hook-shaped lugs on one end of the bar and bent at right angles thereto, a pair of lugs formed on the opposite end of the bar and on opposite sides thereof, a spring surrounding the bar and urging the bar to move in one direction, and means for limiting the movement of the bar in that direction.

2. An extension unit of the character described comprising a tubular housing, a bar slidably mounted therein, a pair of spaced hook-shaped lugs on one end of the bar and bent at right angles thereto, a pair of lugs formed on the opposite end of the bar and on opposite sides thereof, a collar on the bar, a spring surrounding the bar and interposed between the collar and one end of the tubular housing, and stop means with which the collar engages.

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