Oct. 10, 1933. F. K. SOLLIDAY 1,929,658

LOCK

Filed Aug. 17, 1931

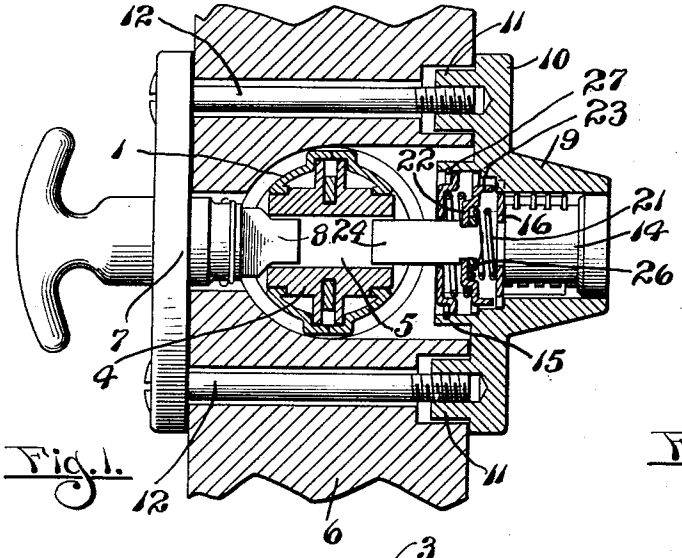


Fig. 1.

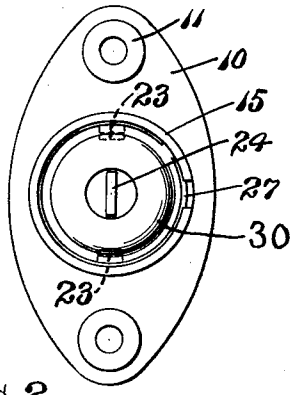


Fig. 2.

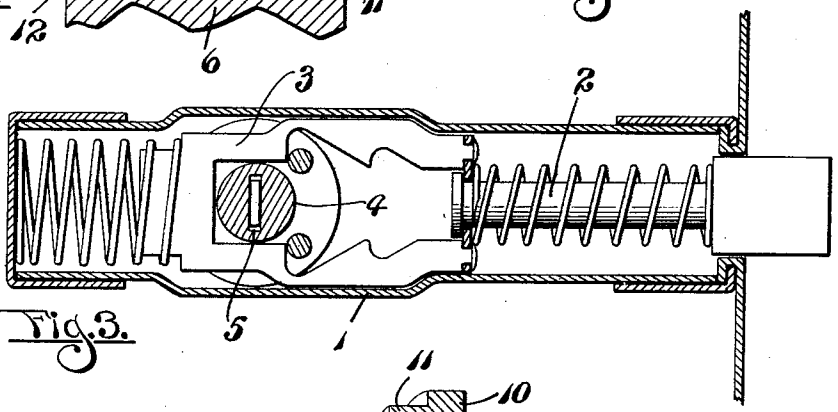


Fig. 3.

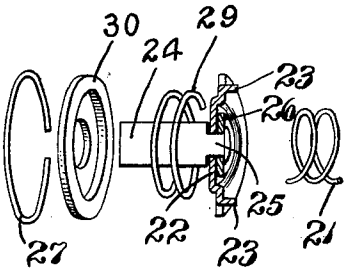
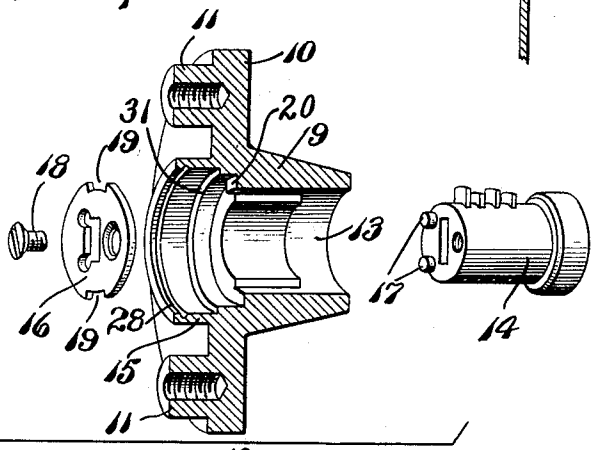


Fig. 4.



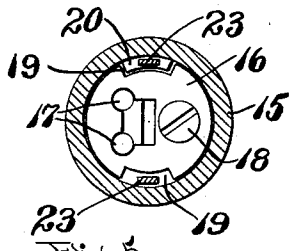


Fig. 5.

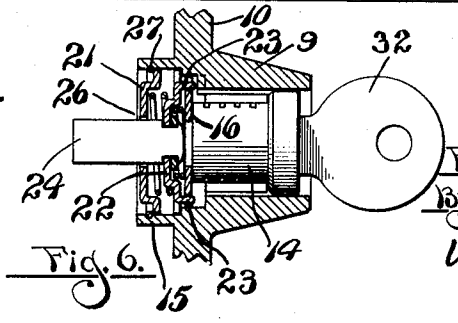


Fig. 6.

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UNITED STATES PATENT OFFICE

1,929,658

LOCK

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Application August 17, 1931. Serial No. 557,565

9 Claims. (Cl. 70—91)

This invention relates to a latch bolt key actuated operating means, being concerned particularly with a novel means for operating a latch bolt from the outer side of a door, incorporated with which is a lock cylinder, which must be key actuated and released by the key.

It is a primary object and purpose of the present invention to construct a key actuated operating device which may be applied to doors having different thicknesses, within a prescribed range, and also one which in itself automatically compensates for discrepancies in the work of carpenters or others installing the latch in the door, whereby a very practical, simple and durable construction is produced and one in which one size of operating device may be used for various thicknesses of doors.

A further object of the invention is to provide, in a device of this nature, means whereby the outside key operated member may be caused to operatively engage the latch bolt actuating means regardless of the rotative position to which it may have been turned by means of the inside operating device.

An understanding of the invention, whereby the objects and purposes stated may be attained, as well as many others not at this time stated, may be had from the following description, taken in connection with the accompanying drawing, in which,

Fig. 1 is a vertical transverse section through a door having a latch installed therein, the key actuated operating means for the latch bolt being shown in longitudinal section.

Fig. 2 is an inner side elevation of the key actuated operating means of my invention.

Fig. 3 is a longitudinal vertical section through one form of latch which may be operated thereby.

Fig. 4 is a perspective view, with some parts in section, showing the several elements of the key actuated bolt operating means unassembled.

Fig. 5 is a transverse vertical section through the device of my invention near the inner end portion thereof, and

Fig. 6 is a longitudinal vertical section through the device of my invention, showing the manner in which it is actuated by a key.

Like reference characters refer to like parts in the different figures of the drawing.

The latch bolt, which is to be operated by the device of my invention, may be any of several forms, one of which is shown in the drawing, particularly in Fig. 3. It includes an outer cylindrical housing 1, a U-shaped member 3 which is adapted to be moved to retract the bolt by a rotatable barrel 4 mounted across and horizontally in the housing 1. The barrel 4 preferably has a longitudinal slot therethrough of the rectangular shape shown. The specific character of the latch and of the bolt used therein is not material in the present invention as it may be of varied form; and whether of the spring latch type as shown or a sliding bolt without springs associated therewith is not of importance, so long as an operating barrel or equivalent, such as indicated at 4, having a properly shaped opening therethrough or at the end where the operating device is installed therewith, is used. The latch structure illustrated is not of my invention but is old and well known and has been built and sold for a considerable time as a product of the corporation to which I have transferred the present invention.

The latch bolt construction is designed to be mounted in a door 6 in a cylindrical opening bored therein horizontally from the free edge of the door; and transverse openings of proper size are bored in the sides of the door to communicate with the opening in which the latch is installed. At the inner side of the door a knob operated mechanism is mounted for moving the latch bolt manually. This mechanism is indicated as a whole at 7 and includes a loosely carried tongue 8 which extends into one end of the longitudinal opening 5 in the barrel 4. The knob operating mechanism indicated at 7 is the subject matter of my Patent No. 1,862,716, for Latch bolt operating means, issued June 14, 1932.

The device herein includes a relatively heavy housing 9 which has an outwardly extending flange 10 with lugs 11 projecting therefrom to enter recesses made in the outer side of the door. The lugs are interiorly bored and threaded and screws 12 pass through the inside bolt operating mechanism 7 and through the door and are threaded into said lugs whereby both the inside and the key actuated outside bolt operating mechanism are secured to the door and held in fixed relation thereto.

The housing 9 has a longitudinal cylindrical opening 13 therethrough in which a key operated lock cylinder 14 is positioned. The structure of the lock cylinder itself is not of concern in the invention and may be a stock article having a plurality of tumblers. At the inner side of the flange 10, which extends from the housing 9, and in axial alinement with said housing, is an integral annular flange 15, the construction of which at the inner sides thereof is best illustrated in Fig. 4. A circular plate 16 of flat metal is positioned at the inner end of the lock cylinder 14, located thereon

by spaced pins 17 extending from the inner end of the barrel and secured in place by a screw 18. The disk 16 at diametrically opposed sides is formed with notches or recesses 19 and the housing 9 at its inner end and around the opening 13 therethrough has an integrally projecting boss or lug 20 of a size slightly smaller than the size of the notches 19 whereby the disk 16, attached to the lock cylinder 14, in its outer position as shown in Fig. 1, is engaged with the lug 20 in either of two diametrically opposite rotative positions and the lock barrel held from rotation until it has been moved inwardly to a position shown in Fig. 6 in which the lug 20 is free of either of the notches 19 in the disk 16.

A coiled compression spring 21 of light strength is located against the inner side of the disk 16 and bears thereagainst at one end. At the other and inner end of the spring a plate 22 is located which, at diametrically opposite points, has tongues 23 struck therefrom in a direction to extend toward the disk 16. A flat member 24 has a reduced neck 25 passing through the plate 22 and is headed over a washer 26 so as to connect the member 24 with the plate 22. The connection is a loose one, thus permitting the member 24 to have a considerable degree of swiveling movement.

A spring 29, having slightly more compression than the spring 21, surrounds the flat member 24 and engages the side of the plate 22 opposite the spring 21 and is held in place by a cover 30 which is provided with a central opening through which the flat member 24 extends. The cover 30 is held in place by a split spring ring 27 which lies in an annular groove 28 at the inner side and near the inner end of the flange 15.

The member 24 inserts into the adjacent end of the opening 5 through the barrel 4 whereby, when turned, it will rotate said barrel to retract or extend the latch bolt 2 and the member 24 is longitudinally slidable in the opening 5 whereby the plate 22 to which it is connected may be moved in a direction longitudinal with its axis. The spring 29 normally thrusts the plate 22 against the shoulder 31 on which it may freely rotate and the spring 21 normally moves the disk 16 and the key operated lock cylinder 14, to which it is connected, in an outward direction and when said lock cylinder 14 and the disk 16 are in position where the lug 20 will enter one of the notches 19, the disk 16 is out of engagement with the tongues 23.

With the parts in the positions shown in Fig. 1 the plate 22 and the disk 16 are free of each other and the latch bolt may be operated from the inner side of the door by turning the knob operating mechanism 7 whereupon the member 24 and the plate 22 to which it is attached will rotate idly and without effect upon the key operated lock cylinder 14.

In order to turn the bolt from the outer side of the door, a key 32 is inserted into the lock cylinder 14 which, by virtue of the construction of the lock parts therein, retracts the tumblers in the conventional manner and permits the lock cylinder to be rotated. Pressure in an inward direction causes the lock cylinder and the disk 16 to move inwardly disengaging the lug 20 from one of the notches 19 and entering the tongues 23 on the plate 22 with said notches 19 thus locking the disk 16 and the plate 22 together whereupon rotation of the lock cylinder by means of the key will cause rotation of said plate 22 and the flat member 24 which imparts like rotation to the barrel 4 to actuate the latch bolt 2.

Movement of the lock cylinder is intended only to retract the latch bolt or in other words, to unlatch the door since the latch bolt is automatically extended to latch the door when the operating means is released by means of springs forming a part of its structure. Therefore, when the lock cylinder is rotated to either of its diametrically opposite positions in which a notch 19 is opposite the lug 20 and allowed to be moved outwardly by the spring 21 to disengage the tongues 23 from said notches 19 the latch bolt will be automatically extended.

It may be readily seen that certain parts of the mechanism, including the plate 22, may be turned by the inner knob operating mechanism 7 and inadvertently left in a position where the tongues 23 will not lie opposite the notches 19 and under such conditions, when the disk 16 is moved inwardly with the lock cylinder 14 to operate the latch from the outside the tongues 23 will be engaged by the unnotched portion of the disk 16 which will cause the plate 22 to move inwardly compressing the spring 29. This movement may be sufficient to release the lug 20 from a notch 19 and to permit the lock cylinder 14 and disk 16 to be rotated to a position where the tongues 23 will enter the notches 19, the spring 29 moving the plate 22 outwardly to cause such engagement, and then the disk 16 and the plate 22 will be properly locked together so that operation of the latch bolt may be performed by rotation of the lock cylinder 14.

The construction described is of a thoroughly practical nature and has proved very successful in practice. The swiveling attachment of the member 24 permits it to enter the opening 5 in the bolt operating barrel 4 from several angles, thereby obviating binding and defects in operation of the latch bolt through inaccuracies in installation. The member 24 is comparatively long whereby it may enter the opening 5 to a greater or less extent to actuate the bolt installed on doors having different thicknesses. The extent to which the member 24 enters the opening 5 is not of great importance so long as it enters far enough to make a proper engagement. With a thinner door than that shown in Fig. 1 it enters farther into the opening 5, and with a thicker door it does not enter as far. This permits the use of one size of key actuated bolt operating mechanism in accordance with my invention for several different thicknesses of doors.

The mechanism is thoroughly operative under all conditions and particularly when the latch bolt has been inadvertently turned to an unusual position whereupon the means previously described permits interengagement between the disk 16 and the tongues 23 on the plate 22 regardless of the rotative position to which the plate 22 may have been turned.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. Key actuated means for operating a latch bolt comprising, a housing member adapted to be secured against a side of a door, a lock rotatably and slidably mounted in said housing, a detachable notched disk secured to the inner end of the lock, an engaging member rotatably mounted in said housing in axial alinement with the lock, spring means normally separating the lock and engaging member, and means on said engaging member cooperating with a notch of said disk to connect the lock and engaging mem-

ber together on moving the lock inwardly against said spring means.

2. A construction containing the elements in combination defined in claim 1, said housing having a boss adapted to enter said notch when the lock is in outer position, thereby preventing rotative movement of the lock until the same is moved inwardly and holding the lock at its inner position when moved thereto and rotated to carry the notch in the disk away from said boss.

3. A construction containing the elements in combination defined in claim 1, said engaging member comprising, a circular plate, a tongue struck from said plate toward the disk, said disk having a notch at an edge thereof, and a flat metal member loosely attached to and projecting from the disk inwardly, as and for the purposes described.

4. Latch bolt operating means comprising, a housing, an operating member rotatably and slidably mounted in said housing, an engaging member rotatably and slidably mounted in the housing in alinement with said operating member, means fastened to said engaging member and adapted for connection with a latch bolt to actuate the same, interengaging means on said operating member and said engaging member respectively, means to limit the movement of the engaging member in a direction toward said operating member, spring means normally thrusting said engaging member toward said operating member, spring means normally separating said engaging member and said operating member and yieldably holding them in position where said interengaging means are disconnected.

5. Latch bolt operating means comprising, a housing, an operating member rotatably and slidably mounted in said housing, an engaging member rotatably and slidably mounted in the housing in alinement with said operating member, means fastened to said engaging member and adapted for connection with a latch bolt to actuate the same, interengaging means on said operating member and said engaging member respectively, means to limit the movement of the engaging member in a direction toward said operating member, spring means normally thrusting said engaging member toward said operating member, spring means normally separating said engaging member and said operating member and yieldably holding them in position where said interengaging means are disconnected, and means to prevent rotation of said operating means when in outer position and to permit rotation thereof when the operating means is moved inwardly toward said engaging member.

6. In combination, a housing, an operating member revolubly and slidably mounted therein, an engaging member revolubly and slidably mounted in the housing in alinement with said operating member, a latch bolt mechanism including a revoluble barrel mounted in alinement with the said operating member, said barrel having an axial opening of irregular cross section therethrough, a member fixed to said engaging member and extending into said opening in the barrel, said member being adapted to slide in said opening but of such cross section as to prevent rotation with respect thereto, spring means located between the operating member and the engaging member and tending to maintain them in spaced apart position whereby rotation of the operating member does not cause rotation of the engaging member, clutching means between the operating member and the engaging member, said clutching means becoming operative upon movement of these members a predetermined distance toward one another, and yielding means for permitting movement of the operating member and the engaging member when they are in clutched position for the purpose described.

7. In combination, a housing, an operating member revolubly and slidably mounted therein, an engaging member revolubly and slidably mounted in the housing in alinement with said operating member, a latch bolt mechanism including a revoluble barrel mounted in alinement with the said operating member, said barrel having an axial opening of irregular cross section therethrough, a member fixed to said engaging member and extending into said opening in the barrel, said member being adapted to slide in said opening but of such cross section as to prevent rotation with respect thereto, spring means located between the operating member and the engaging member and tending to maintain them in spaced apart position whereby rotation of the operating member does not cause rotation of the engaging member, clutching means between the operating member and the engaging member, said clutching means becoming operative upon movement of these members a predetermined distance toward one another, a coiled spring surrounding the said fixed member and abutting against the said engaging means at one end, and a disk having an opening through which the said fixed member passes, means for fastening the disk to the housing, said other end of the coiled spring bearing against the disk.

8. Key actuated means for operating a latch bolt comprising, a housing member adapted to be secured against a side of a door, a lock rotatably and slidably mounted in said housing, a detachable notched disk secured to the inner end of the lock, an engaging member, means for detachably mounting said engaging member for revoluble movement in said housing, spring means normally separating the lock and engaging member, and means on said engaging member cooperating with a notch of said disk to connect the lock and engaging member together on moving the lock inwardly against said spring means.

9. In combination, a housing, an operating member revolubly and slidably mounted therein, an engaging member rotatably and slidably mounted in the housing in alinement with the operating member, spring means urging said engaging member towards the operating member, stop means for preventing the engagement between the operating member and the engaging member due to the pressure exerted by the said spring means, and additional spring means located between the operating member and the engaging member, said last mentioned spring means being of lesser strength than the first mentioned spring means for the purpose described.

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