Nov. 7, 1939. O. C. LARSON 2,178,666

DOOR LOCK

Filed July 21, 1937

Fig. 1.

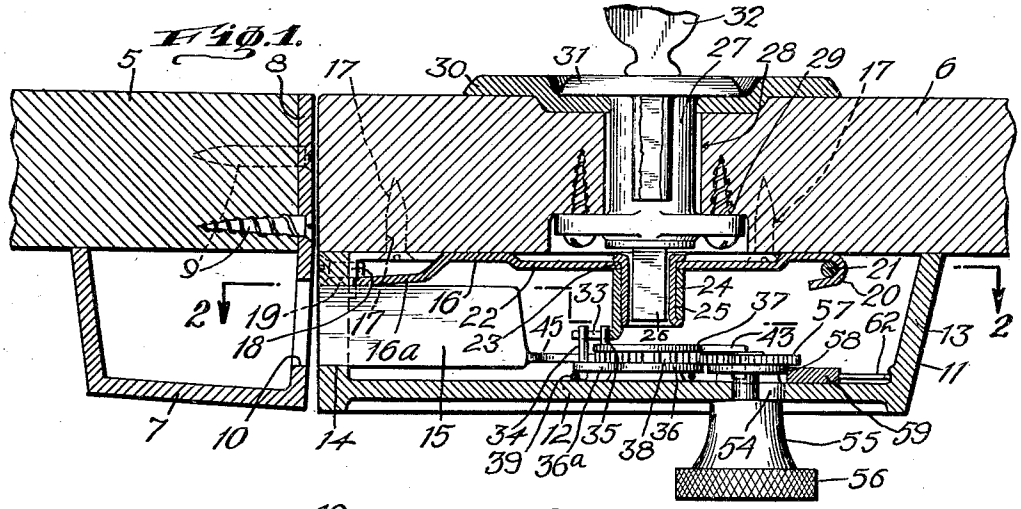


Fig. 2.

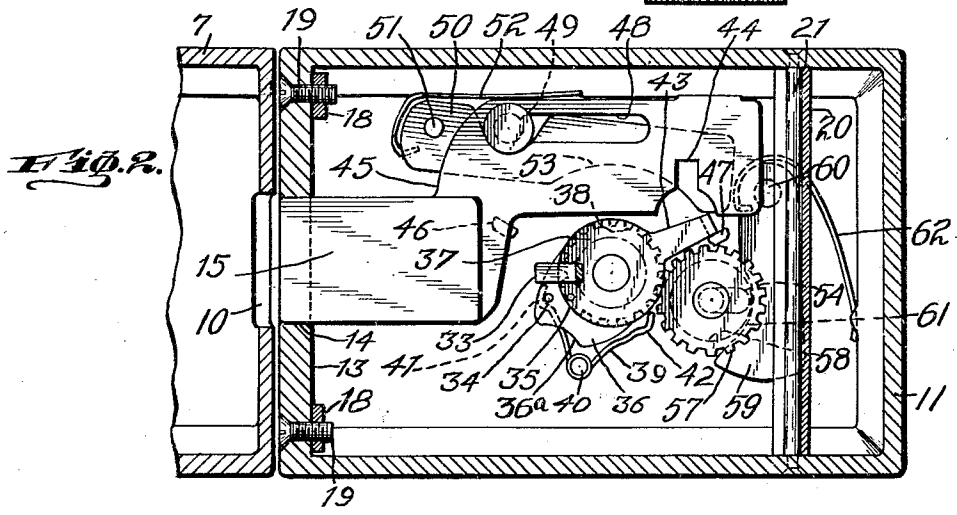
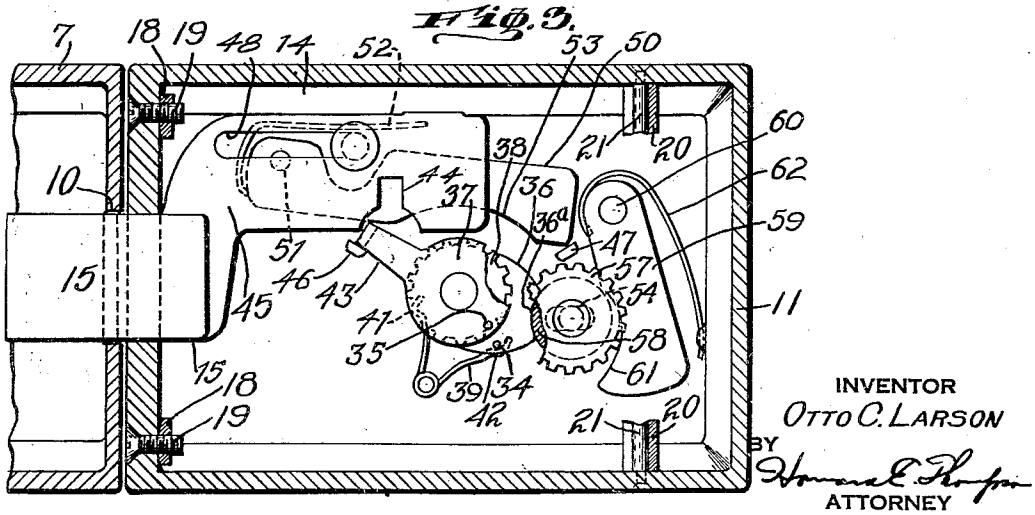


Fig. 3.



INVENTOR
OTTO C. LARSON
BY
ATTORNEY

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DOOR LOCK

Otto C. Larson, Brooklyn, N. Y.

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8 Claims. (Cl. 70—129)

This invention relates to lock devices and particularly to devices of this class designed for use in connection with doors controlling admission to rooms, apartments, homes and like places; and the object of the invention is to provide a lock device having a key actuated mechanism which will move the lock bolt into closed position and render the lock otherwise inoperative from the inner side of the door so as to prevent the opening of the door from the room or compartment controlled by the door, in other words, when in locked position the door can only be opened by the insertion of the key from the outer side thereof; a further object being to provide a lock wherein the lock casing has all of its securing means concealed within the casing and boundary walls of the door and door frame so that the lock can not be tampered with from within a room or compartment; a further object being to provide a lock wherein the casing is secured to a mounting plate attached to one surface of the door in accomplishing the results and objects above stated; a still further object being to provide means actuated through the key cylinder or tumbler for throwing the usual bolt operating knob on the inner surface of the lock into an inoperative position when the bolt is moved to operative position by the key controlling said lock; and with these and other objects in view the invention consists in a device of the class and for the purpose specified which is simple in construction, efficient in use and which is constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a longitudinal sectional view through a lock made according to my invention and indicating the method of its use.

Fig. 2 is a partial section on the line 2—2 of Fig. 1, and,

Fig. 3 is a view similar to Fig. 2 showing the parts in a different position.

In Fig. 1 of the drawing, I have indicated at 5, a part of a door frame and at 6 a part of a door. At 7 is shown a bolt receiving keeper or housing including an attaching plate portion 8 which extends into the surface of the frame 5 and is mortised in said surface and secured thereto by screws 9. The plate 8 forms an extension of one wall of the housing 7 which wall is provided with a bolt receiving aperture 10 as in other lock devices.

A lock casing 11 is provided which consists of an outer wall 12 and side walls 13, one of which is provided with an aperture 14 through which the bolt 15 of the lock is free to pass. The casing 11 is mounted upon the inner surface of the door 6 by first securing to said surface a mounting plate 16 by means of a number of screws 17. One end of the plate 16 is provided at the corners thereof with outwardly projecting lugs 18 adapted to receive screws 19 passed through the wall 13 having the aperture 14 therein in securing the casing 11 in position. The other end of the plate 16 is curled to form a long hook-shaped portion 20 which is adapted to engage a pin 21 traversing the casing as clearly seen in Fig. 2 of the drawing. It will thus be seen that in attaching the casing 11 to the plate 16, the pin 21 is first placed under the hook 20, and the casing 11 moved to the right, after which the screws 19 are put in position to attach said casing.

A central portion of the plate 16 is offset as seen at 22 and is provided with an aperture 23 over which is rotatably mounted a sleeve 24. Secured within the sleeve 24 is a thimble-shaped bushing 25, the end wall of which is provided with an angular aperture for receiving the angular shank 26 of a cylinder lock mechanism 27, the latter being secured in an aperture 28 formed in the door by means indicated at 29 in the usual manner. The cylinder 27 is mounted in the usual finishing plate 30 arranged on the outer surface of the door and in which the flanged outer end 31 of the lock is mounted. At 32 I have indicated part of a key for actuating the lock mechanism. While a conventional tumbler lock is shown, it will be apparent that my invention is adaptable for use in conjunction with any kind or class of key lock mechanisms.

The sleeve 24 is provided at its outer end with an offset arm 33 which is adapted to operate upon two pins 34 and 35; the pin 34 being secured to a cam disc 36 whereas the pin 35 is secured to a stop disc 37 fixedly secured to one side of a gear 38. A spring 39 is arranged upon a pin 40 and the end portions 41 and 42 of said spring are hook-shaped in form and adapted to cooperate with the pin 34 when the cam disc 36 is in its different positions to temporarily retain said disc against displacement, especially in the conventional movement of the bolt 15 independent of the lock mechanism 27.

The disc 37 is provided with a hook-shaped arm 43 which cooperates with the apertured section

44 of the guide plate 45 for the bolt 15, and also in conjunction with end stops 46 and 47. The plate 45 is provided with an elongated aperture 48 through which a screw or guide pin 49 passes in the inward and outward movement of the bolt 15. A spring actuated arm 50 is pivoted on the inner surface of the front wall 12 as seen at 51, the spring for actuating said arm being indicated at 52. The arm is provided with an arc-shaped recess 53 over which the arm 43 is adapted to pass when the arm 43 swings from the position shown in Fig. 2 into the position shown in Fig. 3, in which last named position the arm 43 is beyond the recess 53 and the arm 50 is retaining the arm 43 in connection with the stop 46, and the arm 43 is also in engagement with one wall of the aperture 44 to prevent inward movement of the bolt 15. Mounted in an elongated slot 54 in the wall 12 of the casing 11 is a shank or stem 55 of a knob 56. Secured to the shank 55 within the casing is a gear 57 which is movable into and out of mesh with the gear 38. On the gear 57 is a collar 58 in conjunction with which the cam disc 36 operates and the movement of the knob 56 and the gear 57 thereof into or out of mesh position with the gear 38 as seen in Fig. 3 of the drawing. A spring actuated lever 59 is pivoted to the wall 12 as seen at 60, said lever having a rounded or arc-shaped seating edge 61 which also cooperates with the collar 58, and the spring 62 of said lever normally urges the knob 56 and gear 57 in the direction of the gear 38 as well as to hold the parts in the position shown in Fig. 3 with the collar 58 in a recess 36a in the cam 36.

In assembling the lock upon the door, it will be understood that the aperture 28 is first properly located in the door, and then the lock cylinder 27 is mounted in position, after which the mounting plate 16 is secured in position upon the inner surface of the door 6, thereafter the casing 11 with all of the parts assembled therein is secured to the plate 16 in the manner previously stated, and assuming that the housing 7 has been secured in position, the lock is now ready for use.

In the normal use of the lock, the parts will assume the position shown in Figs. 1 and 2, in which position the bolt 15 may be moved outwardly and inwardly by simply rotating the knob 56 in the required direction. In this operation the arm 43 is moved from the position shown in Fig. 2 to the position shown in Fig. 3 and vice versa.

It will of course be understood that in the above operation, the gear 57 is in constant mesh with the gear 38. In the above operation, the door 6 may be opened and closed at will from the interior of the room or compartment, admission to which is controlled by the door, and if the bolt 15 is in locked position, the same may be opened by the insertion of the key 32 into the lock cylinder 27. In this operation the rotation of the crank arm 33 will pick up the pin 35 which would then be in the position shown in Fig. 2.

When it is desired to lock the door 6 so that the door cannot be opened from within the room or compartment through the medium of the knob 56, the key may be employed to operate the cylinder 27 to rotate the crank arm 33 in such manner as to pick up both of the pins 34, 35 and move them from the position shown in Fig. 2 to the position shown in Fig. 3, which operation causes the cam 36 to be rotated. This cam engages the collar 58 and moves the knob 56 together with the gear 57 to the right, or into the position shown in Fig. 3. In this position, it will appear that the rotation of the knob 56 will accomplish no result, in that the gear 57 is free. It will thus be seen that anyone entering the room or compartment through a window or other source of entrance can not leave the room or compartment through the door, as no means is available to actuate the bolt 15, and the casing 11 cannot be disassembled from the door by any accessible screws.

At this time, it is also well to mention that if a panel is removed from the door in the endeavor to gain access to the door for the purpose of opening the door from the inner side, the result would again be useless for the reasons above stated. The only possible way of opening the door would be by the insertion of a proper key into the lock to reverse the rotation of the cylinder 27 which will cause the crank arm 33 to travel through a complete arc engaging the other sides of the pins 34 and 35 to move them from the position shown in Fig. 3 back to the position shown in Fig. 2. From this position the movement of the bolt into locked position by the key will necessitate rotating the crank arm 33 to bring it back to the position shown in Fig. 2 before it can again re-engage the pins 34 and 35.

It will appear from a consideration of Fig. 1 of the drawing that a spring tongue 19a is formed from the plate 16 and operates upon the bolt 15 to tensionally support the bolt in its several positions.

It will be understood that my invention is not necessarily limited to the specific details of construction in the several parts of the lock as herein illustrated; the broad feature of the invention residing in the provision of independent manual and key actuated means for operating the lock bolt in such a way as to accomplish the results and aims as clearly set forth.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A lock of the class described comprising a casing, a lock bolt movable into and out of said casing, a rotary bolt operating member, means upon the inner side surface of a door controlled by said lock for rotating said bolt operating member to move the bolt into operative and inoperative position, key actuated means accessible from the outer surface of the door for rotating said bolt operating member to move said bolt into operative and inoperative position, and means for moving said first named means into inoperative position when the key actuated means is operated to move the bolt into operative position.

2. A lock of the class described comprising a casing, a lock bolt movable into and out of said casing, a rotary bolt operating member, means upon the inner side surface of a door controlled by said lock for rotating said bolt operating member to move the bolt into operative and inoperative position, key actuated means accessible from the outer surface of the door for rotating said bolt operating member to move said bolt into operative and inoperative position, means for moving said first named means into inoperative position when the key actuated means is operated to move the bolt into operative position, means on said bolt operating member for moving the bolt into inoperative position by the key actuated means regardless of which of said first and second named means are employed in moving said bolt into operative position.

3. A lock of the class described comprising a lock casing, a bolt normally supported within

the casing in inoperative position and adapted to be projected through one wall of the casing when moved into operative position, a bolt actuating member freely rotatable in said casing, a knob slidably mounted on the inner surface of the lock casing and on the inner surface of the door controlled by the lock, adapted in one position thereof to engage the bolt actuating member and to move said bolt into operative and inoperative positions, a key actuated mechanism accessible from the outer surface of said door and extending into said casing, means actuated by said mechanism engaging said member to move the bolt in operative and inoperative positions independent of the position of said knob, and an element arranged in juxtaposition to said member and cooperating with said knob and key actuated mechanism whereby said knob is moved into inoperative position with respect to said member when said bolt is moved into operative position by said key actuated mechanism.

4. A lock of the class described comprising a lock casing, a bolt normally supported within the casing in inoperative position and adapted to be projected through one wall of the casing when moved into operative position, a bolt actuating member freely rotatable in said casing, a knob slidably mounted on the inner surface of the lock casing and on the inner surface of the door controlled by the lock, adapted in one position thereof to engage the bolt actuating member and to move said bolt into operative and inoperative positions, a key actuated mechanism accessible from the outer surface of said door and extending into said casing, means actuated by said mechanism engaging said member to move the bolt in operative and inoperative positions independent of the position of said knob, an element arranged in juxtaposition to said member and cooperating with said knob and key actuated mechanism whereby said knob is moved into inoperative position with respect to said member when said bolt is moved into operative position by said key actuated mechanism, said element comprising a cam, and tensional means for retaining said cam in its several positions.

5. A lock of the class described comprising a lock casing, a bolt normally supported within the casing in inoperative position and adapted to be projected through one wall of the casing when moved into operative position, a bolt actuating member freely rotatable in said casing, a knob slidably mounted on the inner surface of the lock casing and on the inner surface of the door controlled by the lock, adapted in one position thereof to engage the bolt actuating member and to move said bolt into operative and inoperative positions, a key actuated mechanism accessible from the outer surface of said door and extending into said casing, means actuated by said mechanism engaging said member to move the bolt in operative and inoperative positions independent of the position of said knob, an element arranged in juxtaposition to said member and cooperating with said knob and key actuated mechanism whereby said knob is moved into inoperative position with respect to said member when said bolt is moved into operative position by said key actuated mechanism, said element comprising a cam, tensional means for retaining said cam in its several positions, and tensional means for normally retaining said knob in engagement with said member or cam.

6. A lock of the class described comprising a casing closed at the outer and side walls thereof and open on the inner surface of the casing, one side wall having a bolt aperture therein, a bolt slidably engaging the inner surface of the front wall and movable through the opening in said side wall of the casing, a knob rotatably mounted in the front wall of the casing and slidable transversely of its axis into operative and inoperative positions, a gear carried by said knob within the casing, a bolt operating element freely rotatable in the casing and having a gear adapted to register with the gear of said knob when the knob is in operative position whereby said bolt may be operated through said knob, key actuated means extending into the casing and adapted to cooperate with said element to actuate said bolt, and means controlled by said key actuated means for disengaging said knob and bolt operating element when the bolt is moved into operative position by said key actuated means.

7. A lock of the class described comprising a casing closed at the outer and side walls thereof and open on the inner surface of the casing, one side wall having a bolt aperture therein, a bolt slidably engaging the inner surface of the front wall and movable through the opening in said side wall of the casing, a knob rotatably and slidably mounted in the front wall of the casing, a gear carried by said knob within the casing, a bolt operating element freely rotatable in the casing and having a gear adapted to register with the gear of said knob when the knob is in one position whereby said bolt may be operated through said knob, key actuated means extending into the casing and adapted to cooperate with said element to actuate said bolt, and means involving a cam arranged adjacent said element and adapted to be actuated by said last named means to automatically move said knob and the gear thereof into inoperative position with respect to said element when the bolt is moved into operative position by said key actuated means.

8. A lock of the class described comprising a lock casing, a bolt normally supported within the casing in inoperative position and adapted to be projected through one wall of the casing when moved into operative position, a bolt actuating member freely rotatable in said casing, a knob rotatably mounted in said lock casing and at the inner surface of the door controlled by said lock, said knob being slidable transversely of its axis and having means adapted in one position thereof to operatively engage the bolt actuating member for controlling movement of said bolt, a key actuated mechanism accessible from the outer surface of said door and extending into said casing, means actuated by said mechanism engaging said member to move the bolt into operative and inoperative positions, and other means actuated by said mechanism to simultaneously move said knob into inoperative and operative positions respectively.

OTTO C. LARSON.