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THUMB TURN DEVICE FOR CLOSURE LOCKS

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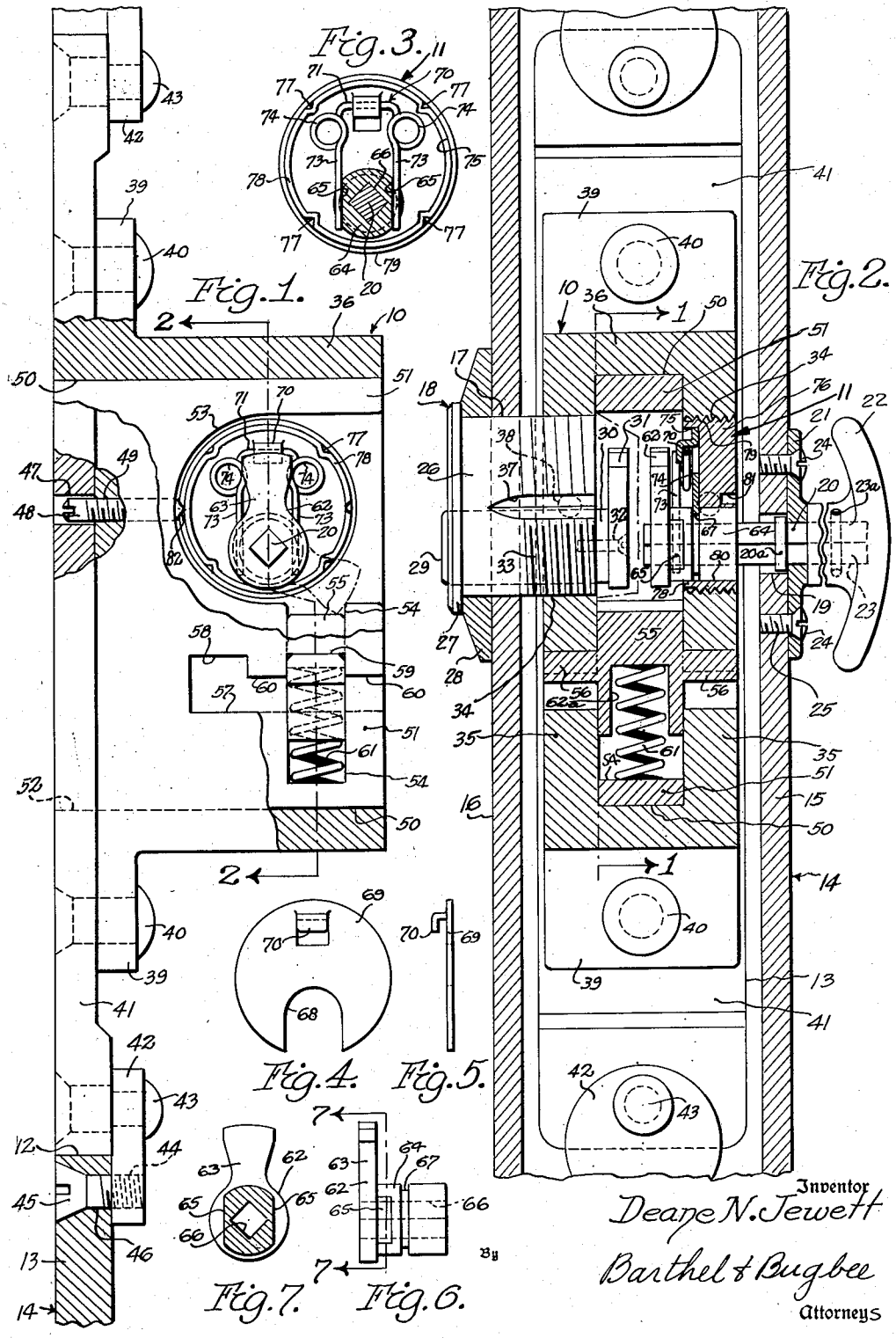


Fig. 3.

Fig. 1.

Fig. 2.

Fig. 4.

Fig. 5.

Fig. 7.

Fig. 6.

Inventor
Deane N. Jewett
By
Barthel & Bugbee
Attorneys

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THUMB TURN DEVICE FOR CLOSURE LOCKS

Deane N. Jewett, Detroit, Mich., assignor to Detroit Hardware Manufacturing Company, Detroit, Mich., a corporation of Michigan

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1 Claim. (Cl. 292—140)

1

This invention relates to closure locks, such as door locks, and in particular, to thumb turn attachments for operating such locks without keys.

Hitherto, where it has been desired to operate a closure lock, such as a door lock, from one side of the door without the necessity for a key, so-called thumb turn attachments have been provided. These thumb turn attachments have been designed to fit into the opening in the lock casing which is alternatively arranged to receive a key-actuated cylinder lock, such as on the inside of the door. Prior thumb turn attachments have been designed to slide into the opening and be secured by tabs, with lugs to prevent turning of the attachment in the opening, and with a screw to anchor the attachment in position. Such prior thumb turn attachments, however, have been inaccurate and have fitted loosely into the opening, due to the necessity of providing enough clearance for the lugs. Moreover, the insertion or removal of these prior attachments has been found difficult, due to the difficulty of getting the lugs into or out past the threads of the opening.

One object of the present invention is to provide a thumb turn device for closure locks which is provided with threads so as to be threaded into the threaded opening which alternatively receives a cylinder lock, means being provided to prevent the device from rotating when it has been once secured in its intended position.

Another object is to provide a thumb turn device for closure locks of the foregoing character wherein the lugs hitherto provided are completely eliminated, thereby enabling the device to be firmly and accurately secured in the opening without the looseness or wobbling characteristics of prior thumb turn devices.

Another object is to provide a thumb turn device for closure locks of the foregoing character wherein a simple yet positive spring-actuated mechanism is provided for urging the operating shaft of the device into a predetermined position so that the user by the sense of touch alone can readily determine when the operating cam of the device is in its withdrawn position, thereby insuring that the bolt of the lock is seated in its keeper.

In the drawings:

Figure 1 is a side elevation, partly in section along the line 1—1 in Figure 2, of a closure lock equipped with a thumb turn device according to one form of the present invention;

Figure 2 is a cross-section taken along the line 2—2 in Figure 1;

2

Figure 3 is a front elevation of the thumb turn device similar to that shown in Figure 1, but with the device removed from the lock and with the operating cam cut away;

Figure 4 is a front elevation of a spring mounting plate and cam retainer used in the thumb turn device of Figures 1 to 3 inclusive;

Figure 5 is a side elevation of the mounting plate shown in Figure 4;

Figure 6 is a side elevation of the operating cam used in the thumb turn device of Figures 1 to 3 inclusive; and

Figure 7 is a cross-section taken along the line 7—7 in Figure 6.

Referring to the drawings in detail, Figures 1 and 2 show a closure lock, such as a door lock, generally designated 10, equipped with one of the thumb turn devices of the present invention, generally designated 11. The door lock 10 is of any conventional and convenient type and its details are beyond the scope of the present invention. Such a door lock is disclosed and claimed in the co-pending Jewett application, Serial No. 114,422 filed September 7, 1949, for Closure Lock, hence a brief description thereof will suffice. The door lock 10 is designed to fit into an elongated aperture 12, such as a rectangular aperture, in the edge wall 13 of a door, generally designated 14. The door 14, only a fragment of which is shown in Figures 1 and 2, may be of a hollow metallic construction with opposite side walls 15 and 16 respectively (Figure 2). The side wall 16 is provided with a circular hole 17 for receiving a conventional cylinder lock, generally designated 18, whereas the opposite side wall 15 is provided with a smaller opening 19 for the passage of a squared shaft 20 journaled in a mounting plate or disc 21 and retained in position by an annular enlargement 20a. Mounted on the shaft 20 is a handle or knob 22 provided with a square shaft socket 23 in which the shaft 20 is secured as by the pin 23a. The mounting plate 21 is secured by screws 24 in threaded holes 25 in the door side wall 15 (Figure 2). The inner end of the square shaft 20 is secured to the thumb turn device in a manner described below.

The cylinder lock 18, which occupies the opposite hole 17 in the door side wall 16 (Figure 2) is of a conventional pattern well-known to locksmiths and available in the open market. For the purposes of the present invention, it may be described as consisting of a cylindrical body 26 having a face 27 of slightly enlarged diameter backed up by a beveled escutcheon plate or disc 28. The face 27 is provided with a key receiving

portion 29 containing the usual keyhole or key recess (not shown). This recess opens into the interior of the cylindrical body 26, which is hollow and which contains mechanism, such as tumblers, for selectively locking and unlocking a rotary shaft 30 (Figure 2) carrying a bolt operating cam 31 secured thereto by the fastener 32. The cam 31 is of approximately the same shape as the cam subsequently to be described in connection with the thumb turn device 11. The exterior of the cylindrical body 26 is provided with threads 33 by which it may be threaded into the correspondingly threaded opening 34 in the side wall 35 of the door lock case 36, axial grooves or notches 37 being provided for the reception of anchoring set screws 28 similar to the anchoring set screws subsequently to be described in connection with the thumb turn device 11.

The lock case 36 is a hollow box-like structure having oppositely projecting tabs 39 (Figure 1) by which it is secured, as at 40, to the lock front plate 41. The plate 41 is of a length and width adapted to fit snugly into the aperture 12 in the door edge wall 13, and carries rotatable eccentric discs 42 pivotally mounted thereon as at 43 to swing upward or downward and provided with screw holes 44 for receiving anchoring screws 45 threaded through screw holes 46 in the door edge wall 13. The front plate 41 is provided with a pair of access holes 47 (one only being shown in Figure 1) through which headless pointed set screws 48 are inserted and threaded through aligned threaded holes 49 in the lock case 36 to engage one of the notches 37 in the cylinder lock body 26 and also to engage a corresponding notch in the thumb turn attachment 11, as described below.

The lock case 36 is provided with a bore 50 of rectangular cross-section adapted to slidably receive a lock bolt 51 of similar rectangular cross-section. The bore 50 is aligned with a corresponding hole 52 (Figure 1) through which the bolt 51 reciprocates to enter and leave its keeper (not shown). The bolt 51 is provided with a U-shaped cutaway portion 53 from which a slot 54 extends downward. The slot 54 contains a vertically slidable tumbler pin or detent member 55 having wings 56 extending laterally in opposite directions into slots 57 in the opposite side walls 35 of the lock case 36. The slots 57 are provided with spaced pockets or notches 58 and 59 separated by downwardly projecting barriers 60 over which the wings 56 must pass in order to move from one pocket 59 to the other pocket 58 as the bolt 51 is being advanced or retracted. This mechanism prevents the bolt 51 from being reciprocated by a screw driver or other instrument inserted in the crack of the door, and the member 55 is constantly urged upward by a compression spring 61 having its lower portion engaging the bottom of the slot 54 and its upper end engaging the bottom of an inverted socket 62*a* on the lower side of the member 55.

The tumbler pin or detent member 55 is actuated either by the key-operated cam 31 of the cylinder lock 13 or by the knob-operated cam 62 of the thumb turn device 11. The cam 62 consists of an arm 63 of roughly keyhole shape outline Figures 1 and 7) carrying a central hub 64 in the form of a boss of generally circular cross-section with flattened parallel side portions 65 and with a bore 66 of square cross-section adapted to receive the inner end portion of the squared shaft 20. The hub 64 is provided with an annular groove 67 (Figure 6) adapted to receive the edges of the U-shaped notch 68 formed in the lower edge of the spring mounting plate 69 of the thumb turn device 11. The latter is provided with an anchoring tab 70 which is struck up therefrom for the purpose of anchoring the bridge portion 71 of a spectacle-shaped or U-shaped spring 72 (Figure 3) having opposite parallel arms 73 adapted to engage the flattened side portions 65. Spring loops 74 are interposed between the arms 73 and bridge portion 71 of the U-shaped spring 72 to increase the resilience thereof.

The spring mounting plate 69 is of circular outline and is seated in a recess 75 likewise of circular cross-section in a case 76 of cylindrical form. The mounting plate 69 is secured within the recess 75 by being staked therein, as at 77 (Figure 3). The staked portions 77 are formed by indenting the edge wall 78 of the recess 75 by a suitable tool, thereby accurately positioning the assembly of the mounting plate 69 and U-shaped spring 72 in position within the recess 75.

The outer surface of the case 76 is threaded as at 79 to enter the correspondingly threaded opening 34 in the side wall 35 of the case 36 (Figure 2), similar to the opening 34 occupied by the threaded body 26 of the cylinder lock 13. The case 76 is provided with a hole or bore 80 in which the hub 64 of the cam 63 is journaled. Diametral slots or recesses 81 are provided in the case 76 for receiving a spanner by which the thumb turn device 11 is threaded into the opening 34. The periphery of the body 76 is provided at intervals with notches 82 (Figure 1) for receiving the pointed ends of the set screws 48, to prevent rotation of the thumb turn device 11 after it has been once properly located in the opening 34.

In the operation of the invention, let it be assumed that the thumb turn device 11 has been threaded into the opening 34 and connected to the squared shaft 20 in the manner shown in Figure 2. As a consequence, when the operator grasps the knob or handle 22 in his fingers and rotates it, the consequent rotation of the squared shaft 20 swings the cam 62 downward into the notch 54 and into engagement with the upper end of the tumbler pin or detent member 55, as shown by the dotted lines in Figure 1. The continued rotation or swinging of the cam 62 in a clockwise direction forces the tumbler pin 55 downward, so that the wings 56 move out of the pockets or notches 59. At the same time, the subsequent engagement of the cam 62 with the forward side wall of the notch 54 reciprocates the bolt 51 to the left, moving it outward through the hole 52 in the front plate 41 as the wings 56 move over the barriers 60 into the notches 58 (Figure 1).

With the wings 56 now seated in the notches 58, the bolt 51 is prevented from being pried open by the use of a screw driver in the door crack. Consequently, only the insertion of a key in the cylinder lock portion 29 so as to operate the cam 31, or the opposite rotation of the handle 22 to swing the cam 62 in a counterclockwise direction will retract the bolt 51 and unlock the door. As the cam 62 is swung upward into the position shown in Figures 1 and 2, the spring arms 73 come to rest against the flat portions 65 of the cam hub 64, notifying the operator through his sense of touch that the cam 62 is in a vertical position with the bolt 51 either

fully extended or fully retracted, as the case may be.

In the drawings, the cams **31** and **62** have been shown as of a single end type. It will be obvious, however, that the arms **63** of the cam **62** may extend in opposite directions from the hub **64** so as to form a double-ended cam, if desired.

What I claim is:

A thumb turn device adapted to fit into the circular threaded cylinder lock opening in the housing of a closure lock for actuating the lock bolt without a key, said device comprising a disc having a circular periphery with external threads thereon corresponding to the threads of said opening and adapted to be threaded therein, said disc having a shaft bearing therein, a rotatable shaft rotatably mounted in said bearing, a thumb knob secured to the outer portion of said shaft, and a bolt-operating cam including an arm mounted on the inner portion of said shaft remote from said thumb knob and operatively engageable with said lock bolt in response to the rotation of said rotatable shaft.

DEANE N. JEWETT.

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