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DEADLOCK MECHANISM FOR PANIC EXIT LOCK

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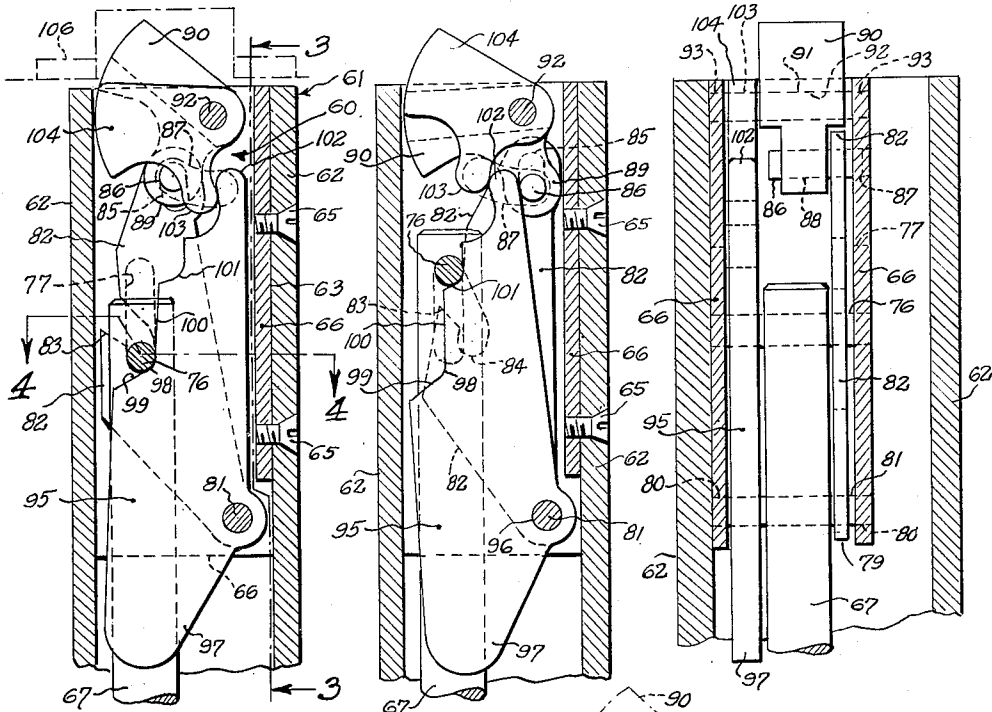


Fig. 1.

Fig. 2.

Fig. 3.

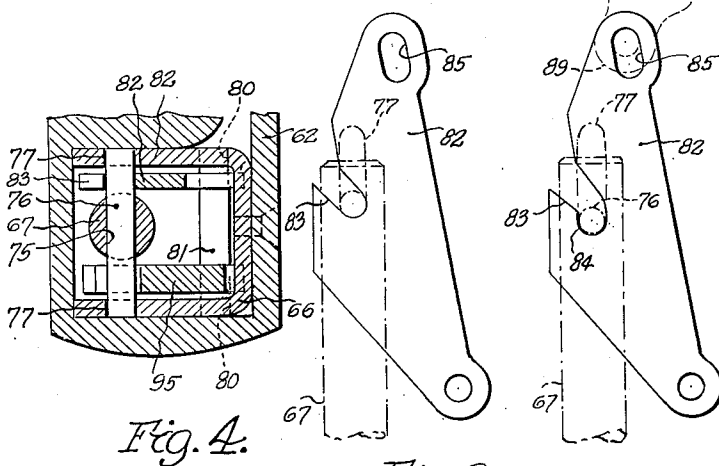


Fig. 4.

Fig. 6.

Fig. 5.

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DEADLOCK MECHANISM FOR PANIC EXIT LOCK

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1 Claim. (Cl. 292—92)

This invention relates to closure locks and, in particular, to panic exit locks for doors of public buildings or the like.

One object of this invention is to provide a deadlock device for a panic exit lock which prevents forcing of the lock by attempted prying the lock open by means of pressure applied to the bolt.

Another object is to provide a deadlock device for a panic exit lock wherein a recess is so placed in one of the bolt-actuating levers that it effectively prevents reversal of the bolt by application of force directed to the bolt, such as by burglar's tools.

Other objects and advantages of the invention will become apparent during the course of the following description of the accompanying drawing, wherein:

Figure 1 is a central vertical section through the upper portion of a hollow door equipped with one form of deadlock device and panic exit lock, with the door in section and with the lock keeper in dotted lines, the bolt being in its extended or locking position;

Figure 2 is a view similar to Figure 1, but with the bolt-operating mechanism in its unlocked position;

Figure 3 is a vertical section at right angles to Figure 1, taken along the line 3—3 therein;

Figure 4 is a substantially horizontal cross-section taken along the line 4—4 in Figure 1;

Figure 5 is a side elevation of an irreversible latch lever employed with the deadlock device of Figures 1 to 4 inclusive, with the operating rod in dotted lines; and

Figure 6 is a similar view of a reversible latch lever locking the deadlock device of the latch lever of Figure 5.

Hitherto, panic exit locks provided for emergency exit from public buildings or the like, while equipped with means for locking the bolts after hours, have been subject to the disadvantage that the locking bolt has been capable of being forced open by intruders. This has been accomplished because of the reversibility of the mechanism by pressure applied against the bolt by burglar's tools or other implements, such as a hacksaw blade or a wire coat hanger. The present invention provides a deadlock device for panic exit locks which positively prevents the bolt from being forced open by pressure applied directly against the bolt, thereby effectively barring intruders from gaining access to the interior of the building. This is accomplished by providing an offset recess or notch in the bolt-swinging lever so that the latter is prevented from swinging in response to the application of such backward pressure upon the bolt.

Referring to the drawing in detail, Figures 1 to 4 inclusive show a lock unit, generally designated 60, mounted in a door, generally designated 61, of hollow metal construction and having an outer stile 62 with an inner surface 63. Secured as at 65 to the inner wall 63 of the outer stile 62 is an upper bolt housing 66 of channel shape (Figure 4). Projecting into the space between the side walls of the housing 66 is the upper end of a bolt-operating rod 67, the lower

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end of which (not shown) is threaded so as to engage the panic lock operating mechanism of the panic exit lock. This last-mentioned operating mechanism is outside the scope of the present invention, and a suitable type of operating mechanism is disclosed and claimed in the co-pending application, Serial No. 340,432 of Jewett and Gesing, filed March 5, 1953, for Panic Exit Lock.

The upper end of the operating rod 67 is transversely bored (Figure 4) as at 75 to receive a cross pin 76, the opposite ends of which project outwardly beyond the operating rod 67. The opposite ends of the pin 76 are guided in aligned vertically-elongated slots 77 in the side walls of the channel-shaped housing 66 which, near their lower ends, are provided with aligned bores 80 in which the opposite ends of a pivot pin 81 are seated. Pivotaly mounted as at 79 (Figure 3) near one end of the pivot pin 81 is a bolt-swinging lever 82 of roughly triangular shape (Figures 1 and 2). The bolt-swinging lever 82 intermediate its upper and lower ends is provided with an upwardly-inclined camway 83 slidably receiving one end of the cross pin 76. The camway 83 at its inner end terminates in a deadlocking notch or recess 84 which is disposed with its sides in approximately the direction of reciprocation of the cross pin 76, hence at an obtuse angle to the camway 83 as a whole. As a consequence, when the bolt-operating rod 67 is reciprocated vertically by the usual operating mechanism (not shown), it swings the bolt-swinging lever 82 in one direction or the other around the pivot pin 81 by reason of its engagement with the camway 83, as explained more fully in connection with the statement of operation of the invention below.

The upper end of the bolt-swinging lever 82 is provided with a vertically-elongated slot 85 which is engaged by a pin 86 guided in an arcuate slot 87 in one of the side walls of the channel-shaped housing 66 (Figures 2 and 3). The pin 86 is seated in a bore 88 extending transversely through a boss 89 which projects downward from the lower side of a lock bolt 90 of bellcrank form. The lock bolt 90 is bored transversely as at 91 to receive a pivot pin 92, the opposite ends of which are mounted in aligned bores 93 in the opposite side walls of the channel-shaped housing 66. In this manner, as the bolt-operating rod 67 moves upward or downward, it acts through the leverage between the pin 76 in the camway 83 and the bolt-swinging lever 82 to swing the latter inward or outward around the pivot pin 81 and thus swing the lock bolt 90 upward into its locking position (Figure 1) or downward into its unlocked position (Figure 2).

In order to latch the lock bolt 90 in its retracted position so as to prevent scarring of the adjacent structure, such as the door frame, as the door 61 is swung open after being unlocked, the lock unit 60 is provided with a latch lever 95 (Figures 1 and 2) which, like the bolt-swinging lever 82, is roughly in the shape of a triangular plate, and is likewise bored as at 96 to pivotally receive the pivot pin 81. The lowermost portion 97 of the latch lever 95 extends downwardly below the bore 96, whereas the upper edge 98 thereof is provided with an inclined cam edge portion 99 above which is a vertical edge portion 100 leading to a notch 101 releasably receiving one end of the pin 76 carried by the bolt-operating rod 67. The extreme upper end 102 of the latch lever 95 (Figures 1 and 2) is rounded to engage the similarly-rounded projection 103 extending downwardly from the lower edge of a latch-releasing lever or pivoted dog 104 which is pivotally mounted as at 105 on the pivot pin 92. In its upper or locked position, the lock bolt 90 engages the recessed keeper or strike 106 (Figure 1) which is seated in and flush with the door frame head jamb.

In the operation of the invention, with the parts in the positions shown in Figure 1, and the building closed to the public, the lock bolt 90 is swung upward into its re-

spective keeper 106 by the weight of the rod 67 and its connected operating mechanism, in response to the force of gravity. An authorized person seeking to unlock the door 61 inserts the proper key in the door cylinder lock (not shown), and as a result of turning the key the consequent rotation of the cylinder lock cam or arm through its associated mechanism moves the operating rod 67 upward. The consequent upward motion of the cross pin 76 on the operating rod 67 causes the cross pin 76 to exert a camming action on the sides of the upwardly-inclined camway 83 in the bolt-swinging lever 82, moving the pin 76 upward out of the deadlocking recess or notch 84 and thereafter swinging the bolt-operating lever 82 in a clockwise direction around its pivot pin 81 from the locked position (Figure 1) to the unlocked position (Figure 2).

As a consequence, the engagement of the elongated slot 85 in the upper end of the bolt-swinging lever 82 with the end of the pin 86 mounted in the depending boss 89 in the lock bolt 90 swings the lock bolt 90 downwardly around its pivot pin 92 in a counterclockwise direction from the position shown in Figure 1 to that shown in Figure 2. This action withdraws the lock bolt 90 from its keeper 106 and unlocks the door 61.

Meanwhile, as the cross pin 76 in the upper end of the upper bolt-operating rod 67 moves upward past the vertical edge portion 100 of the latch lever 95 to the top thereof, it permits the latch lever 95 to swing downward by gravity in a counterclockwise direction around its pivot pin 81 as the cross pin comes opposite the notch 101 in the lever 95 (Figure 2). As a result of this motion, the upper end 102 of the latch lever 95 pushes to the left the projection 103 depending from the latch releasing lever or dog 104, swinging the latter upward in a clockwise direction around its pivot pin 92 from the position shown in Figure 1 to that shown in Figure 2 as the door 61 is swung open. Thus, even when the operator removes his key from the door cylinder lock which actuates the operating rod 67 after performing the unlocking operation, the operating rod 67 will be held in its raised position by the engagement of the cross pin 76 with the notch 101 of the latch lever 95. This action prevents the scarring of the door frame by the bolt 90 as the door 61 is swung open by the operator.

After the operator has passed through the doorway and the door 61 is again swung into its closed position, either by the operator or by a conventional door closer, the latch-releasing lever 104 engages the keeper 106 and is pushed downward thereby in a counterclockwise direction from the position of Figure 2 to the position of Figure 1. This action causes the projection 103 to swing the upper end 102 of the latching lever 95 to the right, rotating it in a clockwise direction around its pivot pin 81 and thereby withdrawing the notch 101 from beneath the cross pin 76 on the operating rod 67.

When the operating rod 67 has been thus released, it drops downward, and at the same time its cross pin 76 engages the edges of the upwardly-inclined camway 83 of the bolt-swinging lever 82 with a camming action so as to swing the lever 82 in a counterclockwise direction around its pivot 81. The consequent engagement of the elongated slot 85 of the lever 82 with the pin 86 on the

bolt projection 89 swings the lock bolt 90 upward in a clockwise direction around its pivot pin 92 and engages it with its keeper 106, relocking the door 61 in its closed position.

If a fire or other emergency occurs inside the building while the door 61 is locked, a person seeking to unlock the door from the inside merely needs to lean against the usual panic bar (not shown), thereby raising the operating rod 67 to retract the lock bolt 90 in the manner described above in connection with key-actuation of the invention.

If, however, an intruder seeks to gain admission to the building by inserting a prying implement in the crack between the upper edge of the door 61 and the keeper 106 and then exerts a downward force upon the lock bolt 90, the lever 82 is nevertheless prevented from swinging backward to shift the bolt-operating rod 67 and permit the latching lever 95 to swing aside by reason of the engagement of the cross pin 76 with the deadlocking recess or notch 84 in the lower end of the camway 83. If the recess 84 is omitted, as in the construction shown in Figure 6, such reverse swinging can take place and the lock bolt 90 can be forcibly moved downward to unlock the door. The construction of the present invention, by seating the cross pin 76 temporarily in the recess 84 thus positively prevents unauthorized backward motion of the bolt unlocking mechanism and consequently prevents the forcing open of the bolt 90.

What I claim is:

A burglar-resisting door lock engageable with a keeper on the door frame above a swinging door, said lock comprising a lock housing adapted to be mounted at the upper edge of the door opposite the keeper and having spaced parallel opposite walls, upper and lower pivot elements mounted remote from one another between said housing walls in spaced parallel relationship, a lock bolt of bellcrank form pivotally mounted on said upper pivot element and having a locking arm swingable into and out of said housing into and out of locking engagement with said keeper and also having an actuating arm disposed approximately at right angles to said locking arm, an operating rod reciprocally mounted in said housing and having a contact pin disposed transversely thereto, guide means restricting said rod to reciprocation along a substantially fixed axis of reciprocation, and an upwardly-extending lever pivotally mounted on said lower pivot element in swingable connection with said actuating arm, said lever having an elongated cam slot disposed between said lower pivot element and the connection of said lever with said actuating arm in obliquely-extending relationship to the axis of reciprocation of said rod and also having a deadlocking notch extending obliquely from said cam slot in a direction parallel to the axis of reciprocation of said rod, said contact pin slidably engaging said cam slot and deadlocking notch.

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