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ANTIPANIC DOOR FASTENER OPERATING MECHANISM

Filed Nov. 24, 1924

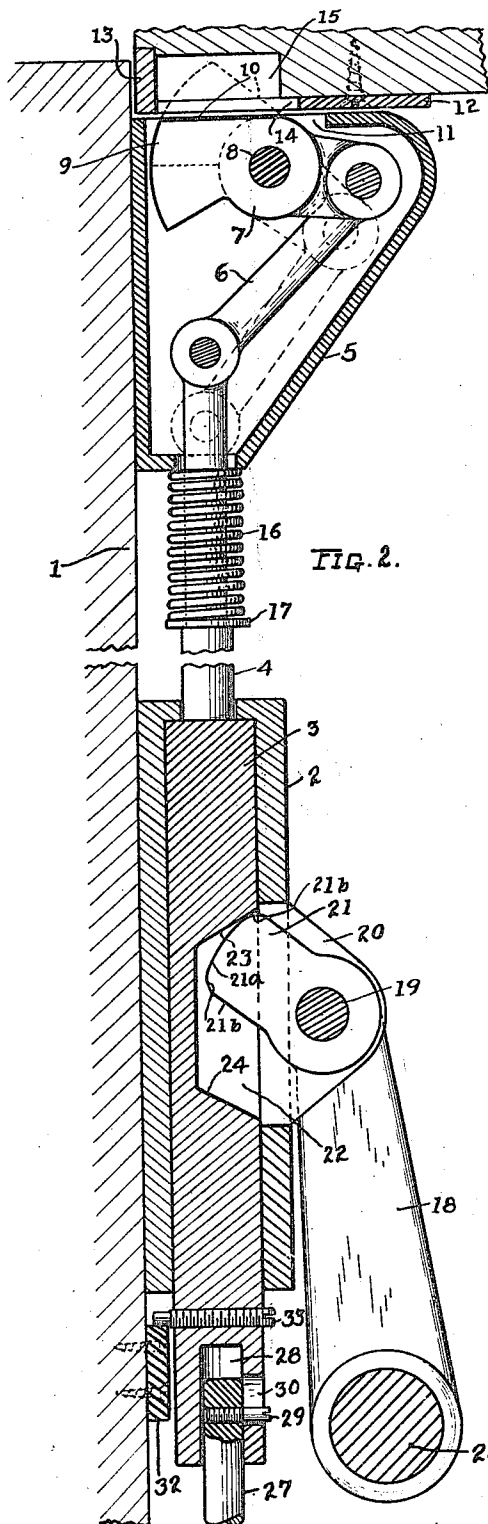


FIG. 2.

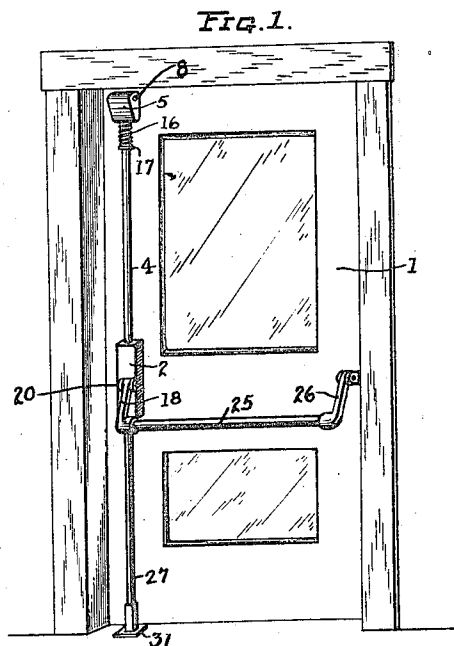


FIG. 1.

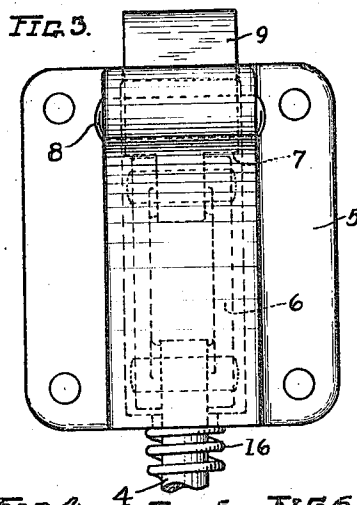
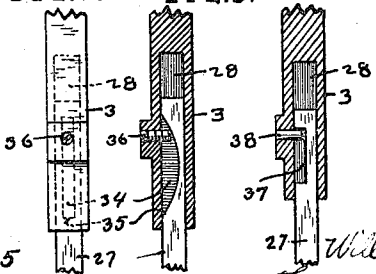


FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.



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ANTIPANIC DOOR-FASTENER-OPERATING MECHANISM.

Application filed November 24, 1924. Serial No. 751,847.

This invention relates to anti-panic door fastener operating mechanism such as used in connection with doors, more particularly exit doors from theatres, halls, schools and other public buildings.

In my co-pending application, Serial No. 683,537, filed December 31, 1923, I have disclosed means in connection with the fastener operating mechanism by which the operating mechanism may be positively held in a position in which the fasteners are released. The present invention has for an object to provide a restraining device for the operating mechanism which can be more quickly and easily adjusted to and from restraining position.

A further object is to provide an improved operating connection between the actuating lever and the fastener actuating slide by which the thrust of the lever is more effectively transmitted to the slide and there is less strain upon the slide engaging projection of the lever, and, in addition, to provide an action such that when the slide is held by the restraining means in fastener releasing position the operating lever will swing freely.

A further object is to provide latches at the top and bottom of the door so connected to the actuating slide that they are yieldingly held by gravity in projected strike engaging positions and may be released by a movement of the slide and, in addition, to provide a connection between the floor bolt or latch and the slide, such that failure of the floor bolt to drop into its keeper will not interfere with the movement of the latch at the top of the door into locking position and lifting of the floor bolt out of locking position will not release the latch at the top of the door.

With the above and other objects in view the invention may be said to comprise the devices illustrated in the accompanying drawings hereinafter described and particularly set forth in the appended claims, together with such variations and modifications thereof as will be apparent to one skilled in the art to which the invention pertains.

Reference should be had to the accompanying drawings forming a part of this specification in which Fig. 1 is a perspective view showing a door with the improved locking device applied thereto; Fig. 2 is a fragmentary vertical section showing the latch at the top of the door, the lock actuating slide and a

portion of the floor bolt; Fig. 3 is a detailed view showing the upper latch in front elevation; Figs. 4 and 5 are detail views showing a modification of the slip connection between the slide and floor bolt; Fig. 6 is a sectional detail view showing a further modification of the slip connection.

Referring to the accompanying drawings, a locking device embodying the present invention is shown applied to a swinging door 1, the locking device including locking elements engaging the sill and lintel and mounted on the door adjacent to the free edge thereof. Mounted on the inner face of the door adjacent to the edge opposite the hinges is attached a vertically disposed casing 2, in which is slidably mounted a vertical movable slide 3, to which the upper and lower latches are operatively connected. A rod 4 is rigidly secured to the upper end of the slide 3 and extends vertically along the face of the door into a latch casing 5, which is attached to the door adjacent to the upper edge thereof, the upper end of the rod 4 being connected by a link 6 to the outer end of the latch member 7, which is mounted intermediate its ends upon a horizontal pivot pin 8 so that vertical movement of the slide 3 and rod 4 causes the latch member 7 to be swung about its pivot. The inner end of the latch member 7, which extends inwardly toward the door from the pivot pin 8, is formed to provide a latching portion 9, which engages with a suitable keeper in the door casing to lock the door in closed position. When the rod 4 is in its lowermost position the upper or strike engaging edge 10 of the latch member is held in a position flush with the top surface of the latch casing 5, the top of the latch casing being provided with a slot 11, through which the latch member may be projected. Attached to the lintel there is a keeper in the form of an angle plate 12 one flange of which is secured to the underside of the lintel and the other flange 13 thereof extends vertically along the outer side of the lintel and forms a strike against which the latch member engages as the door is closed. Inwardly of the flange 13 the keeper is provided with a slot 14 which communicates with a recess 15 in the lintel into which the latch member is projected to lock the door in closed position. The weight of the slide 3 and rod 4 tends to hold the latch member in projected position, and, during the closing of the door, the edge

10 of the latch member which is inclined upwardly and away from the door casing engages with the strike 13 causing the inner end of the latch member to be swung outwardly moving the bolt 4 and slide 3 sufficiently to permit the latch member to pass the strike 13. After passing the strike the weight of the parts causes the latch member to swing upwardly into the recess 15 to lock the door. While the latch member is connected to the actuating slide for gravity actuation, additional downward impetus may be imparted to the rod 4 and slide 3 by means of a compression coil spring 16 surrounding the rod 4 and interposed between the lower end of the latch casing 5 and a washer 17, which is retained upon a shoulder formed on the rod 4.

Means is provided for lifting the slide 3 to release the door and this means consists of a lever 18 mounted on a horizontal pivot 19 which is mounted in spaced ears 20 projecting outwardly from the outer wall of the casing 2, the lever 18 having a projection 21 extending through a slot in the casing and into an elongated vertically extending slot 22 formed in the slide 3. The end walls 23 and 24 of the slot 22 converge inwardly so that the end portion of the projection 21 has a cam action against the inclined faces 23 and 24 thereby exerting a greater thrust in an endwise direction upon the slide 3. The projection 21 is preferably formed with a rounded end portion 21^a and curved side portions 21^b merging into the rounded end portion, the portions 21^b being formed on an involute curve such that the projection rolls without slippage upon the inclined end wall of the slot during the major portion of the upward movement, the rounded end 21^a sliding upon the inclined wall during the final portion of the stroke whereby a greatly increased leverage is obtained. The latch releasing movement of the slide is in an upward direction and the lever 18 is so disposed that when it is pushed toward the door the slide will be moved upwardly to release the door. To provide for more convenient actuation of the lever a rod 25 is attached to the outer end of the lever 18 and extends across the door to an arm 26 which is pivoted to the door adjacent to the hinged edge thereof on a pivot coaxial with the pivot 19, the rod 25 forming a convenient handle for operating the fastener releasing mechanism.

A vertically disposed floor bolt 27 is suspended from the slide 3 and has its upper end fitting within a vertical bore 28 in the lower end of the slide. The floor bolt 27 has a limited vertical movement with respect to the slide, the movement being limited by a laterally projecting pin 29 carried by the upper end of the bolt and projecting through a vertically disposed slot 30 which is of sufficient length to permit the downward movement of

the slide 3 necessary to move the upper latch member 7 into locking position in case the bolt 27 should fail to drop into its keeper 31 in the door sill or floor. It sometimes happens that the floor bolt keeper becomes filled with dirt so that the floor bolt is prevented from moving to locking position. By reason of the connection above described this failure of the floor bolt to latch would not interfere with the locking of the door at the top or with the actuation of the releasing mechanism. Furthermore, the lifting of the floor bolt by inserting a thin tool beneath the door would not release the door since this movement of the floor bolt would have no effect upon the latch at the top of the door.

It is sometimes desirable that the doors be permitted to swing freely without latching in order to prevent unnecessary wear upon the latches and latch operating mechanism and to permit more convenient access to and from a room of a building. To this end means is provided for locking the latch actuating slide in a position such that both of the latches are held in retracted position. For retaining the slide 3 in its uppermost position a stop plate 32 is attached to the inner side of the door immediately below the casing 2 and the slide is provided adjacent its lower end with a set screw 33 extending therethrough. When the slide is in its uppermost position the set screw 33 may be screwed inwardly toward the door to project the inner end thereof over the upper edge of the stop plate 32 so that the weight of the slide will be supported upon a stop plate 32 and downward movement thereof prevented. The slot 22 in the slide 3 into which the projection 21 of the lever extends is of such length and so positioned that when the slide is held by the set screw 33 in its uppermost position the lever 18 is free to swing as far as permitted by the abutments of the casing 2 in either direction so that actuation of the lever when the fastener actuating mechanism is held in releasing position cannot cause injury to any part of the fastener mechanism.

In Figs. 5 and 6 a modification of the slip connection between the slide 3 and floor bolt 27 is shown. In this modification the upper end of the bolt 27 fits in the bore 28 and the portion thereof which fits within the bore is provided with an elongated longitudinally extending slot 34 which has an arcuate bottom 35, the slot 34 being formed by a circular milling cutter or saw. An adjustable pin 36 carried by the slide 3 projects into the slot 34 within the bore 28 and by adjusting the pin 36 in and out the pin may be positioned to engage different parts of the arcuate bottom 35 of the slot, thereby permitting the bolt to have greater or less play in the slide to meet the requirements of a particular installation.

Fig. 7 shows a modified form of connection in which the bolt is provided with an elongated

gated slot 37 which is engaged by a pin 38 fixed to the slide and projecting into the bore 28.

Having described my invention, I claim:

5 1. A lock actuating device comprising a casing, a fastener operating slide movable in the casing, means carried by the casing for actuating the slide in a direction to release the fastener, a stop member carried by the slide and adjustable transversely with respect
10 thereto, and a relatively fixed stop member with which said adjustable stop member may be engaged when the slide is in fastener releasing position to lock the slide against
15 movement away from fastener releasing position.

2. A lock actuating device comprising a casing, a fastener operating slide movably mounted in the casing, means carried by the casing for actuating the slide in a direction
20 to release the fastener, a transversely disposed set screw carried by the slide, and a relatively fixed stop member with which said set screw may be engaged when the slide is
25 in fastener releasing position to hold the slide against movement away from fastener releasing position.

3. A lock actuating device comprising a casing, a fastener operating slide mounted in
30 said casing, said slide having a longitudinally extending slot, a lever pivoted upon the outer wall of the casing and having a projection extending into said slot, said projection being engageable with an end wall of the
35 slot to shift the slide to fastener releasing position, and means for holding the slide in fastener releasing position, said slot permitting free pivotal movement of the lever when the slide is so held.

4. A lock actuating device comprising a casing, a fastener actuating slide in said casing, said slide having a longitudinally extending slot with an outwardly inclined end wall, and a lever pivoted to the outer wall of the casing, said lever having a projection
45 extending inwardly from the pivot into said slot, the end of said projection having a cam action against the inclined end wall of the slot to shift the slide to fastener releasing position.

5. The combination with a door, of a fastener mechanism carried thereby comprising a casing, a vertically movable slide in said casing, a latch adjacent the top of the door, operatively connected to said slide, and a bolt
50 depending from said slide, said bolt having a limited sliding movement in said slide.

6. The combination with a door, of a fastener mechanism comprising a casing, a vertically movable slide in the casing, means carried by the casing for lifting the slide, a bolt
60 depending from the slide, and a connection between the bolt and slide permitting vertical play between the bolt and slide, said connection having a part adjustable to vary the
65 amount of play between the slide and bolt.

7. The combination with a door, of a fastener mechanism comprising a casing, a vertically movable slide in the casing, means carried by the casing for lifting the slide, and a
70 bolt depending from the slide and having a pin and slot connection with the slide, the slot being of varying depth and the pin being adjustable whereby the extent of movement of the pin in the slot may be varied.

75 In testimony whereof, I hereunto affix my signature.

WILLIAM B. BOLLES.