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A. JACKSON ETAL

3,123,387

PANIC EXIT LOCK

Filed July 19, 1960

2 Sheets-Sheet 1

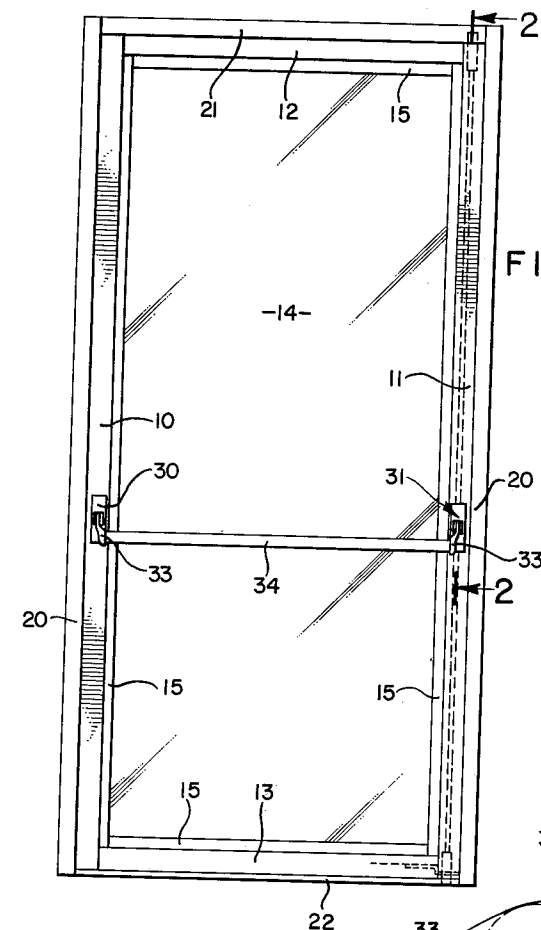


FIG. 1.

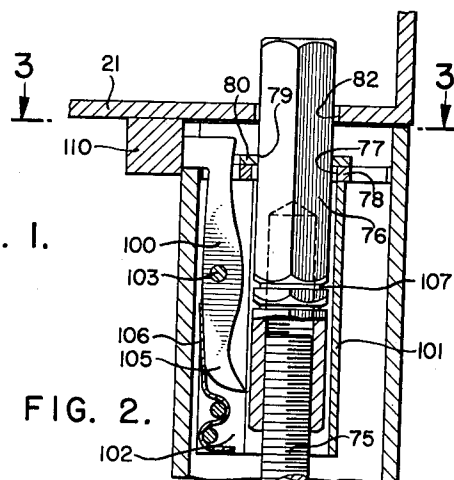


FIG. 2.

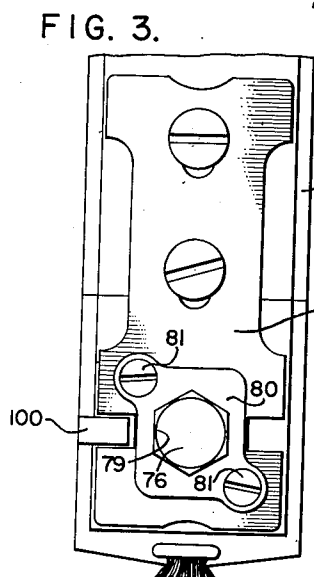


FIG. 3.

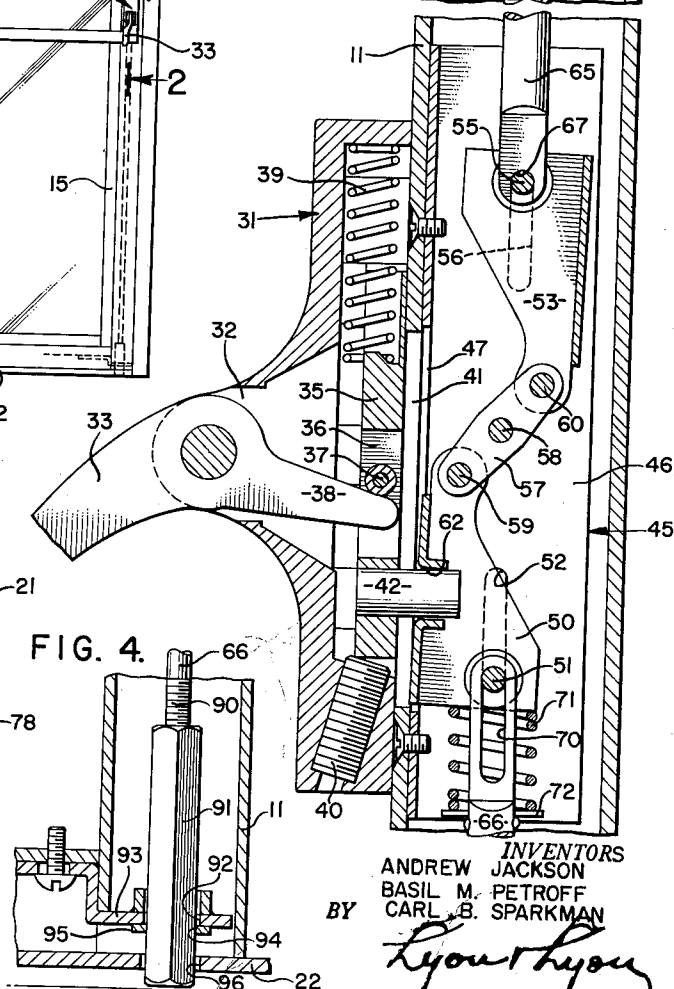


FIG. 4.

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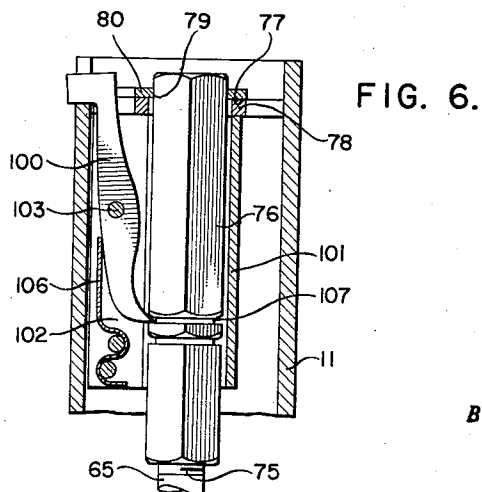
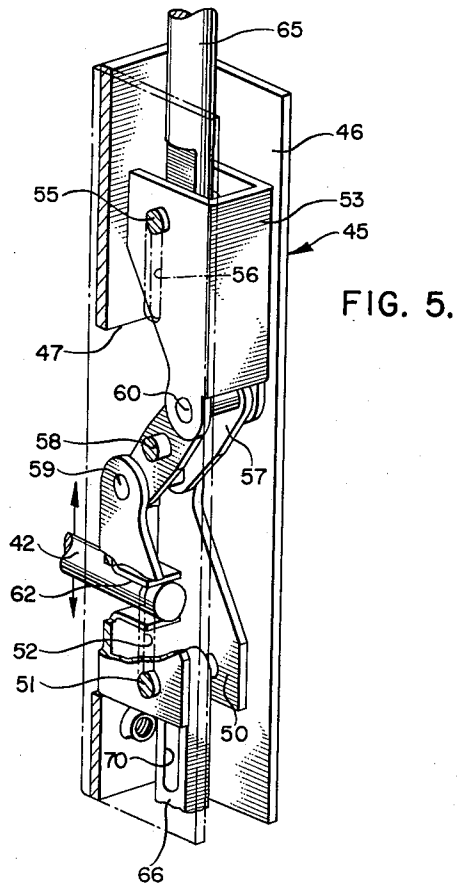
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2 Sheets-Sheet 2



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PANIC EXIT LOCK

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8 Claims. (Cl. 292—21)

This invention relates to doors and has particular reference to panic exit devices or locks for doors of public buildings.

A primary object of the present invention is to provide a novel panic exit lock assembly for use in doors of public buildings.

A further object of this invention is to provide a panic exit lock assembly wherein the panic bolt is adapted to be quickly and easily adjusted without removing the door from the frame.

Another object of this invention is to provide a panic exit lock mechanism wherein proper adjustment of the panic bolt is maintained under normal conditions of use.

Still a further object of the present invention is to provide a panic exit lock mechanism incorporating a novel actuator assembly for upper and lower panic bolts.

Other objects and advantages of this invention it is believed will be readily apparent from the following detailed description of a preferred embodiment thereof when read in connection with the accompanying drawings.

In the drawings:

FIGURE 1 is a front elevation of a door incorporating the device of the present invention.

FIGURE 2 is a sectional elevation taken substantially on the line 2—2 of FIGURE 1.

FIGURE 3 is a sectional view taken substantially on the line 3—3 of FIGURE 2.

FIGURE 4 is a fragmentary vertical sectional view on a reduced scale and taken in a plane parallel to the door glass, illustrating the lower portion of the lower panic bolt and related parts.

FIGURE 5 is a perspective view of the panic bolt actuator linkage assembly.

FIGURE 6 is a fragmentary sectional view, similar to FIGURE 2, but illustrating the bolt trigger in the engaged or cocked position.

Referring now to the drawings, the panic exit device of the present invention is embodied in an otherwise conventional door comprising a hinge stile 10, a lock stile 11, a header 12, a bottom rail 13 and a glass 14 secured to the named members by means of stop strips 15. The door is suitably hinged to a doorway comprising side frame members 20 and upper and lower frame members 21 and 22. The door shown is of hollow metal construction but the invention is also obviously applicable to doors of wood or other material where space is provided within the door stile for receiving the lock mechanism.

Mounted on the stiles 10 and 11 are housings 30 and 31 respectively, the housings having integral therewith bracket members 32 to each of which is pivotally connected a push bar arm 33, the push bar 34 being connected to and extending between the extremities of the arms 33.

The housing 31 is hollow and carried therein is a slide member 35 having a central slot 36 with a central pin 37 extending horizontally thereacross. The arm 33 which is pivoted to the housing 31 is provided with a cam member 38 extending into the slot 36 in contact with the underside of the pin 37. A spring 39 is positioned between the upper end portion of the slide member and the housing to normally maintain the slide member and its associated parts in the positions shown in FIGURE 2. A dog screw 40 is provided in the lower part of the housing 31

and is adapted to be moved into locking contact with the slide member to hold it in the "up" or lock open position.

The lock stile 11 is provided with a vertical slot 41 into which extends a pin 42 carried by the slide member 35. Secured to the inside of the lock stile 11 is a bolt actuating mechanism generally indicated 45, the mechanism including a U-shaped case member 46 having a slot 47 corresponding to the slot 41. Carried within the lower portion of the case is a U-shaped slide bar 50 provided at its lower end with a cross-pin 51 extending through parallel slots 52, one on each side of the case 46. A similar slide bar 53 is carried within the upper portion of the case, the member 53 being provided at its upper end with a cross-pin 55 extending through parallel slots 56, one on each side of the case 46. The slide bars are interconnected by means of a U-shaped lever 57 centrally pivoted to the case by means of a pin 58 and pivoted at each end to one of the slide bars by means of pins 59 and 60. The pin 42 on the slide member 35 extends through the slots 41 and 47 into an aperture 62 provided in the lower slide bar 50.

Upper and lower panic bolt rods 65 and 66 are operably connected to the mechanism 45. As shown best in FIGURE 2, the lower end of the bolt rod 65 is flattened and extends between the side panels of the slide bar 53, the flattened end of the bolt rod having an aperture 67 through which extends the pin 55. The upper end of the bolt rod 66 is similarly flattened and extends between the side panels of the slide bar 50, but here the flattened end is provided with a slot 70 through which the pin 51 extends. The lower bolt rod is resiliently maintained in the position shown in FIGURE 2 by means of a helical spring 71 extending between a washer 72 held on the bolt rod and the lower end of the slide bar 50.

The upper end of the bolt rod 65 is threaded as at 75 and threadedly received thereon is a non-circular cross-section, preferably hexagonal, bolt 76. This bolt extends through an oversize opening 77 in a plate 78 secured to the upper surface of the header 12, through a mating opening 79 in a wrench plate 80 secured to the plate 78 by means of screw members 81, and thence (when in the closed position) through an opening 82 in the upper doorway frame member 21.

The structure of the lower bolt rod 66 and its associated parts is generally the same. Thus, the lower end of the bolt rod 66 is threaded as at 90 and threadedly received thereon is a hexagonal cross-section bolt 91, the bolt extending through an oversize opening 92 in a plate 93 secured to the bottom surface of the bottom rail 13, through a mating hexagonal opening 94 in a wrench plate 95 secured to the underside of the plate 93, and thence (when in the closed position) through an opening 96 in the lower doorway frame member 22. It will be understood that the opening 96 may be provided in the floor of the building if desired.

Means are provided for locking the bolt rods 65 and 66 in the open position when the door itself is opened, and as shown in the drawings, these means may include a latching member 100. Integral with the plate 78 is a generally tubular extension member 101 which encases the lower portion of the bolt 76, the member 101 being provided with a longitudinal slot defined by a pair of parallel panel members 102. The member 100 is positioned between these panel members and pivoted thereto by means of a pin 103. The lower end of the member 100 is provided with a cam portion 105 which is urged into contact with the bolt 76 by means of a leaf spring 106, the cam portion being adapted to be inserted into a circumferential recess 107 provided in the bolt 76 as shown in FIGURE 6. The upper end of the member 100 is generally L-shaped and is adapted to contact a stop 110 on the underside of the frame member 21 to pivot

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the cam portion 105 out of the slot to the position of FIGURE 2 when the door is closed.

In operation, when the push bar 34 is pushed inwardly toward the door, the cam member 38 operates against the pin 37 to move the slide member 35 upwardly against the spring 39, moving the pin 42 in the same direction. This moves the slide bar 50 upwardly, pulling the lower bolt 91 out of the opening 96. At the same time, the lever 57 is pivoted in a clockwise direction as seen in FIGURE 2, moving the slide bar 53 downwardly, thus pulling the bolt 76 downwardly and clear of the opening 82. As soon as the bolts are cleared of the doorway frame openings, continued pressure on the push bar swings the door open, and the bolts are maintained in the open or retracted position by means of the engagement of the cam portion 105 in the recess 107. Upon closing of the door, the latch member strikes the stop 110, releasing the bolts and they are returned to the locked position of FIGURE 2 under the influence of the spring 39 by a sequence of mechanical motions which is just the opposite of those described above.

In the event that dirt or other foreign matter plugs up the opening 96, the bolt 76 will still assume the locked position upon closing of the door, but the bolt 91 will merely contact the foreign matter and then remain in that position, the bar 50 being free to move downward to the position of FIGURE 2 by reason of the slot 70 in the bolt rod 66 which, with the pin 51 forms a lost motion connection between the bar 50 and bolt rod 66.

It will be understood that if desired an external lock (not shown) may be applied to the outside of the locking stile. For example, a conventional lock cylinder provided with a cam adapted to engage and prevent movement of the mechanism 45 may be utilized.

It will be further understood to those skilled in the art that in addition to the rugged simplicity and compactness of construction provided by the present invention, the adjustable structure of the bolts is an extremely important feature. This makes possible extremely simple assembly of the doors at the building site without the necessity of tailoring the doors for variations in door frame sizes. The wrench plates 80 and 95 serve as guides for the bolts 76 and 91, respectively, as well as maintaining the desired adjustment of the effective length of the bolts under normal conditions of use and in the event that further adjustment of the bolt lengths is desired after final installation, this is readily accomplished without removal of the door merely by disengaging the screws 81, permitting use of the plate 80 as a wrench in changing the position of the bolt 76 on the bolt rod proper.

Having fully described our invention, it is to be understood that we do not wish to be limited to the details set forth, but our invention is of the full scope of the appended claims.

We claim:

1. In a panic exit lock for a door having a hollow lock stile, the combination of a bolt rod mounted in said lock stile for vertical movement therein with one end portion of said bolt rod extending adjacent an extremity of said lock stile, said end portion being provided with threads, a bolt threadedly connected to said end portion, said bolt having a non-circular cross section extending outwardly of said lock stile, a wrench plate operably connected to said lock stile, said plate having a non-circular opening therein, the said bolt extending through said opening in mating relationship therewith with a substantial portion of the non-circular cross-section of said bolt extending beyond said wrench plate in both directions, said wrench plate being releaseable from said lock stile for turning said bolt relative to said bolt rod for adjusting the distance said bolt protrudes from said lock stile.

2. The combination of claim 1 wherein a latch member is pivotally connected to said lock stile and adapted

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to contact said bolt to latch said bolt and bolt rod in a predetermined position.

3. The combination of claim 2 wherein said bolt is provided with a circumferential recess, said latch member is provided with a cam portion, and including a spring member urging said cam portion into contact with said bolt, said cam portion being adapted to be inserted into said recess when said bolt is in said predetermined position.

4. In a panic exit lock for a door having a hollow lock stile, said door being adapted to be mounted in a door frame having upper and lower openings above and below said lock stile, the combination of an upper bolt and an upper bolt rod mounted in said lock stile for vertical movement therein from a locked position wherein the upper end portion of said bolt extends into locking relationship in said upper opening to an unlocked position wherein said end portion is withdrawn from said upper opening, said upper bolt having a non-circular cross section and being threadedly connected to said upper bolt rod, an upper wrench plate having a non-circular opening therein for receiving said non-circular cross-section of said bolt, said wrench plate being releaseably mounted on said lock stile, a lower bolt and a lower bolt rod mounted in said lock stile for vertical movement therein from a locked position wherein the lower end portion of said bolt extends into locking relationship in said lower opening to an unlocked position wherein said lower end portion is withdrawn from said lower opening, said lower bolt having a non-circular cross section and being threadedly connected to said lower bolt rod, a lower wrench plate having a non-circular opening therein for receiving said non-circular cross-section of said lower bolt, said wrench plate being releaseably mounted on said lock stile, said upper and lower wrench plates each being releaseable from said lock stile for turning said upper and lower bolts, respectively, relative to the threadedly connected bolt rod for adjusting the distance each said bolt protrudes from said lock stile, each of said bolts having a substantial portion of the non-circular cross-section extending in both directions beyond the said wrench plate associated with that bolt, and means operable externally of said lock stile for moving said bolts within said lock stile.

5. The combination of claim 4 wherein said means includes an actuating mechanism mounted within said stile and operably connected to said upper and lower bolt rods for simultaneous movement thereof.

6. In a panic exit lock for a door having a hollow lock stile, said door being adapted to be mounted in a door frame having upper and lower openings above and below said lock stile, the combination of: an upper bolt and an upper bolt rod mounted in said lock stile for vertical movement therein from a locked position wherein the upper end portion of said bolt extends into locking relationship in said upper opening to an unlocked position wherein said end portion is withdrawn from said upper opening, said upper bolt having a non-circular cross-section and being threadedly connected to said upper bolt rod, an upper wrenchplate having a non-circular opening therein for receiving said non-circular cross-section of said bolt, said wrench plate being releaseably mounted on said lock stile, a lower bolt and a lower bolt rod mounted in said lock stile for vertical movement therein from a locked position wherein the lower end portion of said bolt extends into locking relationship in said lower opening to an unlocked position wherein said lower end portion is withdrawn from said lower opening, said lower bolt having a non-circular cross-section and being threadedly connected to said lower bolt rod, a lower wrench plate having a non-circular opening therein for receiving said non-circular cross-section of said lower bolt, said wrench plate being releaseably mounted on said lock stile, said upper and lower wrench plates each being releaseable from said lock stile

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for turning said upper and lower bolts, respectively, relative to the threadedly connected bolt rod for adjusting the distance each thread bolt protrudes from said lock stile; means operable externally of said lock stile for moving said bolts within said lock stile, said means including an actuating mechanism mounted within said stile; said actuating mechanism including a case, a lower slide bar, an upper slide bar, and a link member; said lower slide bar operably connected to said case for vertical movement therein, the lower portion of said slide bar being operably connected to the upper end of said lower bolt rod, said upper slide bar operably connected to said case for vertical movement therein, the upper portion of said upper slide bar being operably connected to the lower end of said upper bolt rod, and said link member centrally pivotally connected to said case, one end of said link member being pivotally connected to the upper portion of said lower slide bar and the other end of said link member being pivotally connected to the lower portion of said upper slide bar.

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7. The combination of claim 6 wherein said means includes a pin extending through a slot in said lock stile into operative connection with one of said slide bars.

8. The combination of claim 6 wherein a latch member is operably connected to said lock stile for movement to a position to latch said upper bolt in a selected position.

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