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2,805,091

PANIC LATCH

Filed Oct. 20, 1953

2 Sheets-Sheet 1

FIG. 1.

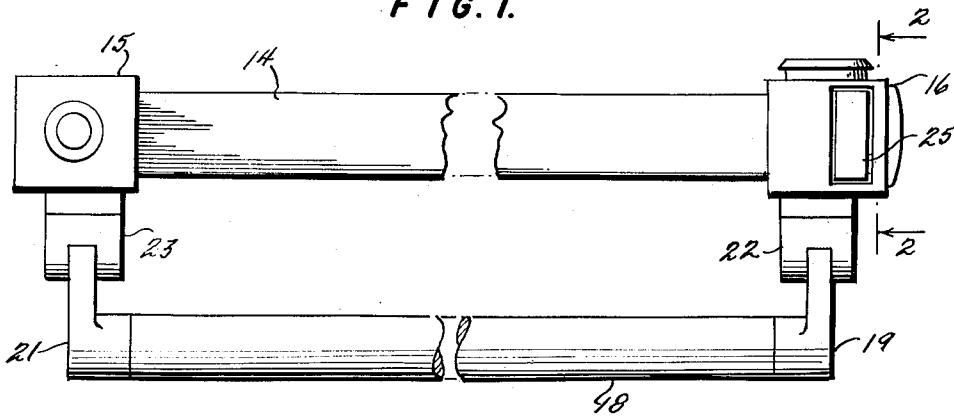
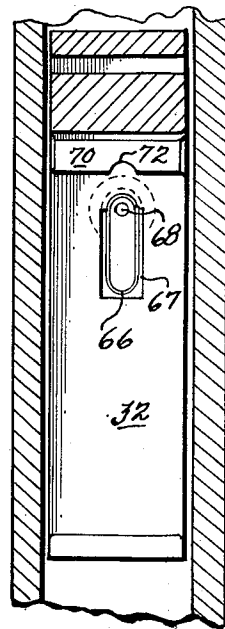


FIG. 6.



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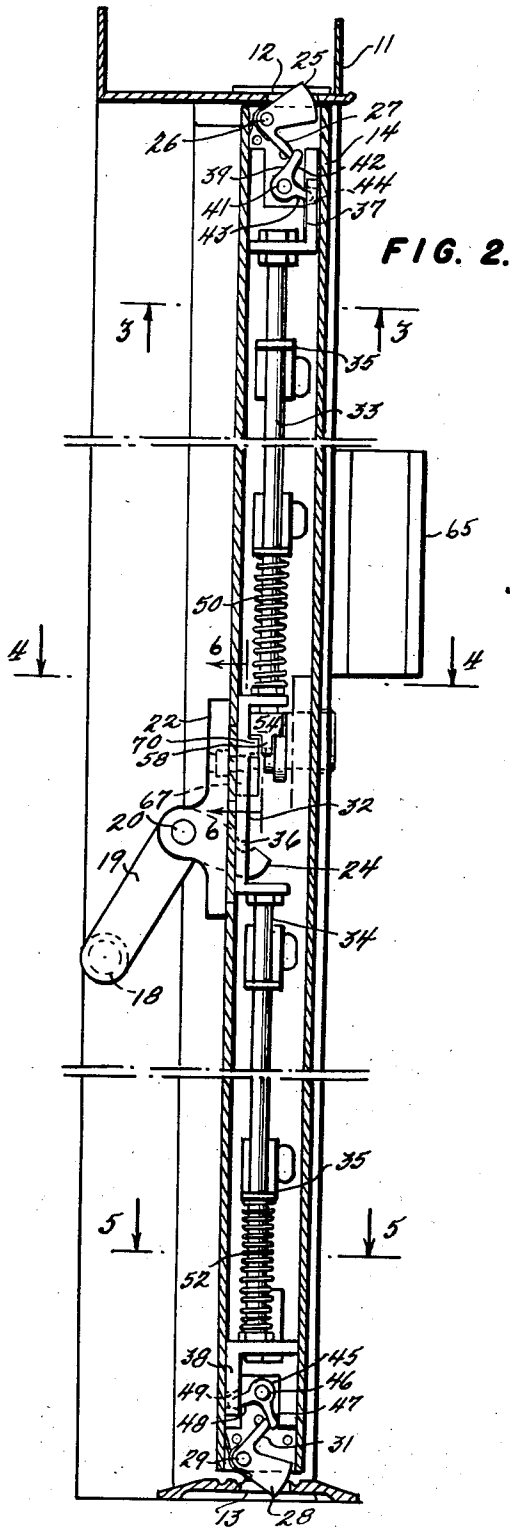


FIG. 5.

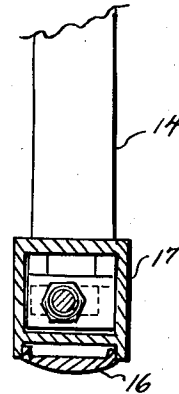


FIG. 3.

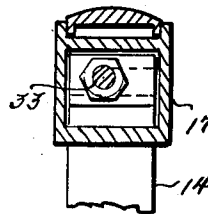
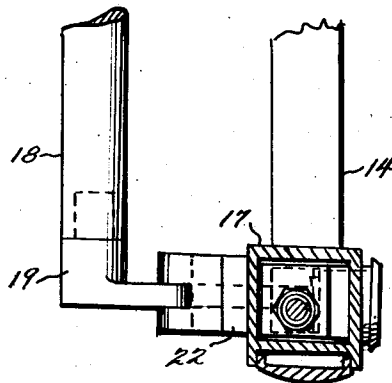


FIG. 4.



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PANIC LATCH

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3 Claims. (Cl. 292—21)

This invention relates to a latch actuating mechanism, and more particularly to a panic latch actuating mechanism for use in panic or emergency exit doors of theaters, public halls and the like.

In latch actuating mechanisms of the type used in panic or exit doors, it is the usual practice to provide an actuating lever or bar extending across the width of the door which, when depressed, operates a latch actuating mechanism to unlatch the door and permit it to swing outwardly. Heretofore, it has been the practice to use a positive linkage system mounted at the free or unhinged side of the door. Such a positive linkage system necessitates the use of a number of moving parts and is frequently of complicated structure and difficult to maintain in proper working condition. Often such actuating mechanisms have been made to depend upon the force of gravity acting upon the entire mechanism for returning the mechanism to the latched position. Inasmuch as there is a positive linkage between the parts of the actuating mechanism, jamming of any part is liable to prevent proper operation of such latching mechanisms. It is imperative in panic doors and the like that there be complete reliability of operation at all times and under all conditions.

Other latch actuating mechanisms of this type have replaced the positive linkage between the latch and the actuating mechanism with meshing gear segments, the latch members having gear segments formed thereon which mesh with a gear segment linked to the actuating rods.

In all such latch actuating mechanisms the necessarily complicated linkages have failed to give the ease and rapidity of operation which is an essential in this particular type of arrangement.

Accordingly, it is one object of this invention to provide a latch actuating mechanism for panic doors which operates smoothly and rapidly at all times with a minimum of effort on the part of the operator, and which is completely reliable in its operation.

It is another object of this invention to provide a latch actuating mechanism having a minimum of moving parts, thus greatly decreasing the likelihood of improper operation.

A further object of this invention is to provide a latch actuating mechanism wherein the moving parts are operatively engageable with each other but are not positively linked together, thus greatly simplifying repair and maintenance and replacement of parts.

A still further object of this invention is to provide a latch actuating mechanism for use with a panic latch having means for opening the panic door from the outside.

It is still a further object of this invention to provide a latch actuating mechanism having means for retaining the mechanism in its unlatched position.

In accomplishing these objects I provide a latch actuating mechanism for use in panic doors which is contained in a casing received in the free end of the door

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and which is actuated by pressure on a bar extending across the width of the door. Vertically movable actuating rods contained in the casing are operatively engaged by this bar and are moved toward the unlatched position when the bar is depressed. Individual latches are pivotally mounted at the upper and lower ends of the casing, these latches being engageable with slots provided in the door frame adjacent the latches. A pivotally mounted lever, such as a bell crank lever, is disposed adjacent each latch, each lever being positively engaged by one of the actuating rods during the upward movement of the rod toward the unlatched position. The bell crank levers are thereby caused to pivot about their respective pivot points, and an arm of each bell crank lever engages an arm of its corresponding latch and pivots the latch out of engagement with its socket in the door frame.

Further objects and advantages of the invention will become apparent from the following description taken in conjunction with the drawings in which:

Fig. 1 is a plan view of a panic door embodying the present invention;

Fig. 2 is an elevation view of the panic door taken along the line 2—2 of Fig. 1 and showing the actuating mechanism which constitutes this invention;

Fig. 3 is a view taken along the line 3—3 of Fig. 2;

Fig. 4 is a view taken along the line 4—4 of Fig. 2;

Fig. 5 is a view taken along the line 5—5 of Fig. 2;

Fig. 6 is a view taken along the line 6—6 of Fig. 2.

Referring now to the drawings and more particularly to Figs. 1—5, there is shown a door frame 11 having latch-accommodating slots 12 and 13 in the upper and lower transverse portions of the frame. Door 14 having a pivoted end 15 and a free end 16 is pivotally mounted within the door frame 11 and is free to swing outwardly with respect thereto. In the embodiment shown in the drawings the door and door frame are both made of metal; however, it will be understood that both the door and the frame may be of any suitable construction and material adequate to accommodate the latch actuating mechanism of the invention.

At the free end 16 of the door 14 there is formed a hollow casing 17 for the accommodation of the latch actuating mechanism. At one side of the door and across the width thereof extends a horizontal actuating bar 18 which is supported at the free end of the door by actuating lever 19 and at the pivoted end of the door by idler lever 21. Levers 19 and 21 are pivotally mounted in yokes 22 and 23 which are rigidly mounted on the door slightly below the midpoint of the height thereof so that actuating arm 18 is readily accessible to the operator. Actuating lever 19 has an actuating arm 24 integral therewith and extending into the casing 17, as best seen in Fig. 2, for operative engagement with the actuating mechanism in a manner which will be explained hereinafter. In the embodiment shown actuating arm 24 is substantially perpendicular to the lever 19.

At the upper end of casing 17 a latch 25 is pivotally mounted by means of a pin 26 so that it is free to move into and out of the casing for disengagement or engagement with upper slot 12 in the door frame. Latch 25 has an arm 27 extending downwardly from the pivot 26, as best seen in Fig. 2. In a like manner at the lower end of casing 17 a latch 28 is pivotally mounted by means of pin 29 so that it is free to move into and out of the casing for disengagement or engagement with lower slot 13 in the door frame. Latch 28 has an arm 31 extending upwardly from the pivot 29. Both latches 25 and 28 are spring-biased into a normally latched position.

The latch actuating mechanism for controlling movement of latches 25 and 28 upon operation of the actuating bar 18 comprises a C-yoke 32 which is rigidly attached

to upper and lower actuating rods 33 and 34, C-yoke 32 being disposed substantially midway of the vertical height of the door. Brackets 35, 35 are mounted within the casing and act to restrain movement of rods 33 and 34 in any direction except the vertical. Inasmuch as rods 33 and 34 are rigidly attached to C-yoke 32, yoke 32 is likewise restrained from movement in any direction except the vertical. Yoke 32 is slidably movable in a vertical direction with respect to the wall of the casing adjacent mounting yoke 22. Slot 36 in the lower portion of yoke 32 accommodates actuating arm 24, as best seen in Fig. 2, so that movement of arm 24 about pivot point 20 causes movement of yoke 32 in a vertical direction.

At the upper end of rod 33 is mounted a drag angle 37, and at the lower end of rod 34 is mounted a drag angle 38. Mounted within the casing below latch 25 is a bell crank lever 39 which is pivoted on a pin 41. Bell crank lever 39 has a long arm 42 which engages arm 27 of latch 25, and a short arm 43 which extends into a hole or slot 44 in drag angle 37. In a like manner at the lower end of the casing 17 a bell crank lever 45 is pivoted on pin 46. Bell crank lever 45 has a long arm 47 which engages arm 31 of latch 28 and a short arm 48 which projects into a hole or slot 49 in drag angle 38.

When actuating bar 18 is depressed, it pivots about pivot point 20 and actuating arm 24 is pivoted in a counterclockwise direction as viewed in Fig. 2. Arm 24 bears against the upper end of slot 36 in yoke 32 and moves yoke 32 upwardly. This upward movement of yoke 32 causes upward movement of rods 33 and 34 and consequently of drag angles 37 and 38. Drag angle 37 operatively engages upper bell crank lever 39 and pivots the bell crank lever in a counterclockwise direction due to the projection of arm 43 of the bell crank lever into the hole or slot 44 of the drag angle. Arm 42 of bell crank lever 39 bears against arm 27 of latch 25, and pivots latch 25 in a clockwise direction, out of engagement with slot 12. Simultaneously, drag angle 38, at the lower end of the latching mechanism, through operative engagement with bell crank lever 45, pivots lever 45 in a clockwise direction as viewed in Fig. 2 causing arm 47 of crank lever 45 to pivotally move latch 28 in a counterclockwise direction out of engagement with slot 13. Since latches 25 and 28 are disengaged from their respective slots 12 and 13, door 14 is now free to swing with respect to door frame 11.

The unlatching mechanism is normally urged to a downward position by the combined effects of gravity and springs 50 and 52. Spring 50 is positioned between the uppermost surface of the C-yoke 32 and the lower surface of the guide 35 disposed nearest to that surface. Spring 52 is positioned between the uppermost surface of the lower drag angle 38 and the lowermost surface of the guide 35 disposed nearest that surface. It can be seen that both springs 50 and 52 cooperate with the force of gravity to normally urge the operating mechanism, including the C-yoke 32, the rods 33 and 34 and the drag angles 37 and 38, in a downward direction, permitting the latches 25 and 28 to assume a normally latched position.

As long as pressure is maintained on the operating handle 18 to move the lever 24 in a counterclockwise direction about its pivot point 20, the latch actuating mechanism is maintained in an actuated position to thereby move the latches 25 and 28 to unlatched position. However, as soon as force is released from handle 18, the springs 50 and 52, in cooperation with the force of gravity, force the latch actuating mechanism in a downward direction to the position shown in Fig. 2 which permits the spring-biased latches 25 and 28 to return to their normally latched position, in which they engage the respective slots 12 and 13.

A suitably constructed key operated cam mechanism is provided to permit the latch actuating mechanism to

be moved to an unlatched position from the outside of the door. An exemplary construction of this nature is illustrated at 54 in Fig. 2.

Still another feature of the construction is an arrangement which permits the latch actuating mechanism, including the yoke 32, the rods 33 and 34, and the drag angles 37 and 38 to be maintained continuously in an elevated position to thereby maintain the latches 25 and 28 disengaged from their respective slots 12 and 13. To accomplish this objective, a "dogging-down" cam 66, mounted on a shaft 68, is provided, as will best be seen in Fig. 6. The cam 66 is operable from the inside surface of the door by means of a wrench, such as an Allen wrench, and the cam is engageable with an abutment 70 which extends laterally from the upper portion of the C-yoke 32 to cam the yoke 32 in an upward direction. When rotated 180 degrees from the position shown in Figs. 2 and 6, the outer end of the cam 66 engages the notch 72 in the abutment 70 in such manner as to maintain the C-yoke in an elevated position. The yoke 32 is slotted at 67 to permit the yoke to move upwardly with respect to the shaft 68 of cam 66. The bell cranks 39 and 45 are actuated in the same manner as though the lever 19 were manually pushed downwardly to move the latches 25 and 28 to unlatched position. When the cam 66 engages the notch 72, the latch actuating mechanism is maintained in its elevated position for as long as desired until the cam is rotated away from the position in which it engages the notch 72 of the abutment 70. This provides a convenient means for maintaining the latches 25 and 28 in an unlatched condition for any desired length of time.

It can be seen that this invention provides a panic latch actuating mechanism which is simple in construction and completely reliable in operation. The mechanism has a minimum of moving parts, and the operating relation between the operating mechanism and the latches is so simple that it decreases the chances of improper operation and simplifies the repair and maintenance of the mechanism. Furthermore, there is provided in cooperation with the latch actuating mechanism a construction which permits the latches to be moved to unlatched position from outside the door. Means are also provided for maintaining the latches in unlatched condition for any desired length of time by means of a wrench-operated dogging-down cam which is operated from inside the door. The mechanism is so constructed that the actuating, dogging-down and unlocking mechanisms are concentrated at or near the vertical center line of the assembly, and so that the weight of all the vertically moving parts tends to latch the door, thereby augmenting the effect of the springs 50 and 52.

While there has been shown and described a particular embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications can be made therein without departing from the invention, and therefore it is aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim as my invention is:

1. In combination with a door mounted for swinging movement about a vertical pivot and having upper and lower horizontal edges and a vertical outer edge extending between said upper and lower edges, a panic latch assembly comprising retractable latch members normally projecting from the upper and lower edges of the door adjacent to said vertical outer door edge, spring means biasing said latch members toward their respective normal projecting positions, the upper latch member being mounted for pivotal movement about a horizontal pivot located downwardly from the upper door edge and nearer to the inner side of the door than to the outer side of the door and the lower latch member being mounted for pivotal movement about a horizontal axis located upwardly from the lower door edge and nearer to the inner side of the door than

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to the outer side of the door, a projection on said upper latch member extending downwardly from said upper latch member toward the outer side of the door, a projection on said lower latch member extending upwardly from said lower latch member toward the outer side of the door, a movable pusher abutting against the downwardly extending projection of said upper latch member and movable against said projection to pivot said latch member toward the inner side of the door to retract the latch member, a movable pusher member abutting against the upwardly extending projection of the lower latch member and movable against said projection to pivot said lower latch member toward the inner side of the door to retract said lower latch member, and an actuating rod assembly supported by said door for upward and downward movement with respect to said vertical outer door edge, said rod assembly including means at the upper and lower ends thereof engaging said pushers to move both of said pushers to retract both of said latch members when said rod assembly is moved upwardly, each latch member being pivotally movable toward the inner side of said door against the action of said spring means and independently of the pusher associated therewith and away from contact with said pusher whereby, when said door swings inwardly, each latch member may be depressed to a retracted position without lifting said rod assembly upwardly, a biasing spring engaging said rod assembly to bias said rod assembly downwardly to normally maintain said pushers in a position where they do not retract said latch members,

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and means connected to said rod assembly to move said rod assembly upwardly against the force exerted by said biasing spring.

2. A panic latch assembly according to claim 1 wherein each pusher is a pivotally mounted bell crank having one arm abutting against the latch projecting associated therewith and another arm engaged by the rod assembly means associated therewith, said bell crank being mounted for pivotal movement in a direction such that said bell crank arm abutting said latch projection can push said latch projection toward the inner side of said door to retract the latch.

3. A panic latch assembly according to claim 2 wherein each bell crank arm engaged by the rod assembly means associated therewith is loosely received within a horizontal opening in a vertical member forming a part of said rod assembly means.

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