March 6, 1962 D. E. COX ETAL 3,024,053

EMERGENCY DOOR LOCK

Filed Sept. 28, 1959 2 Sheets-Sheet 1

Fig. 1.

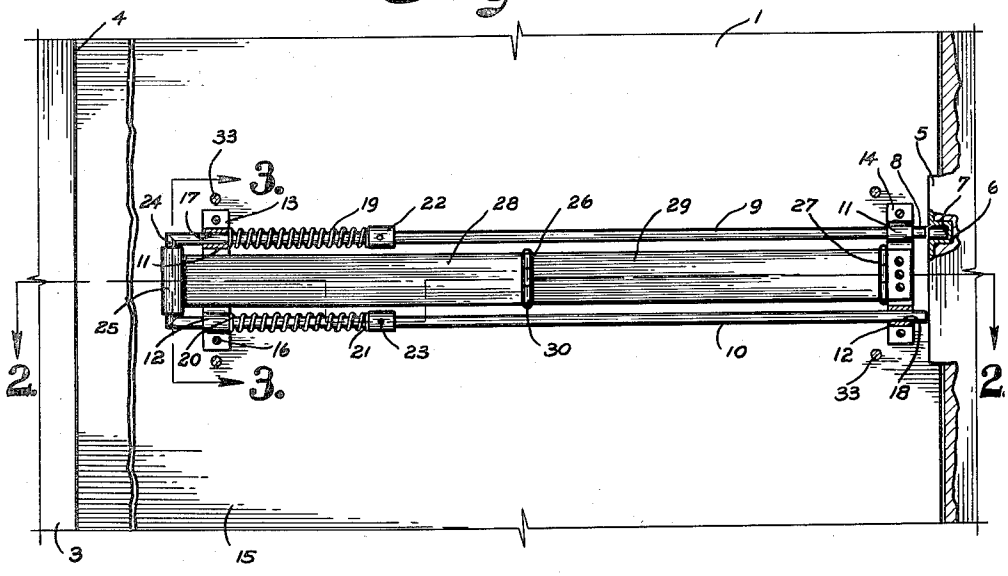
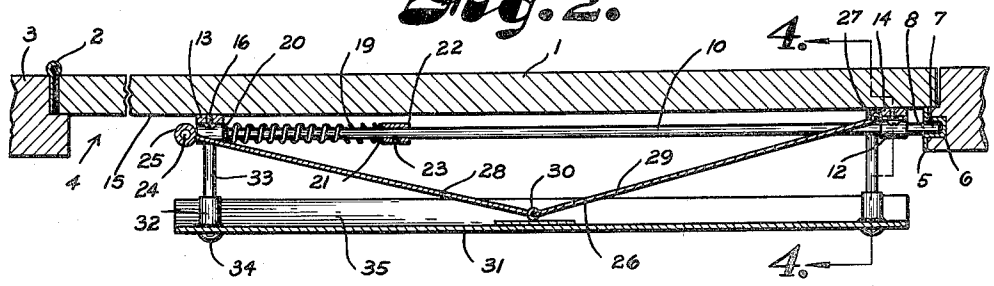


Fig. 2.



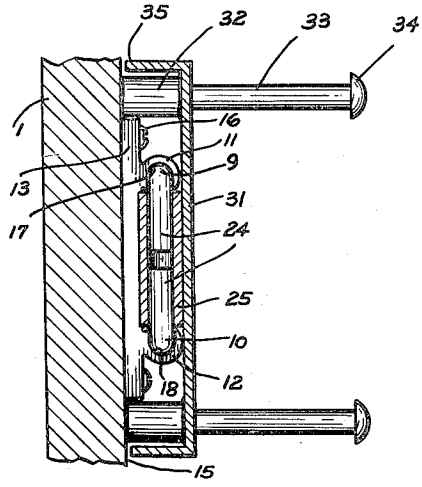


Fig. 3.

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Fig. 5.

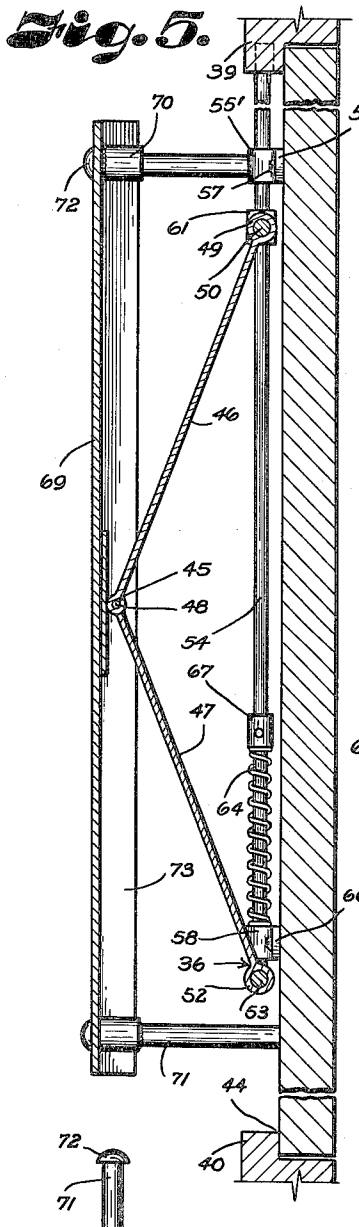


Fig. 4.

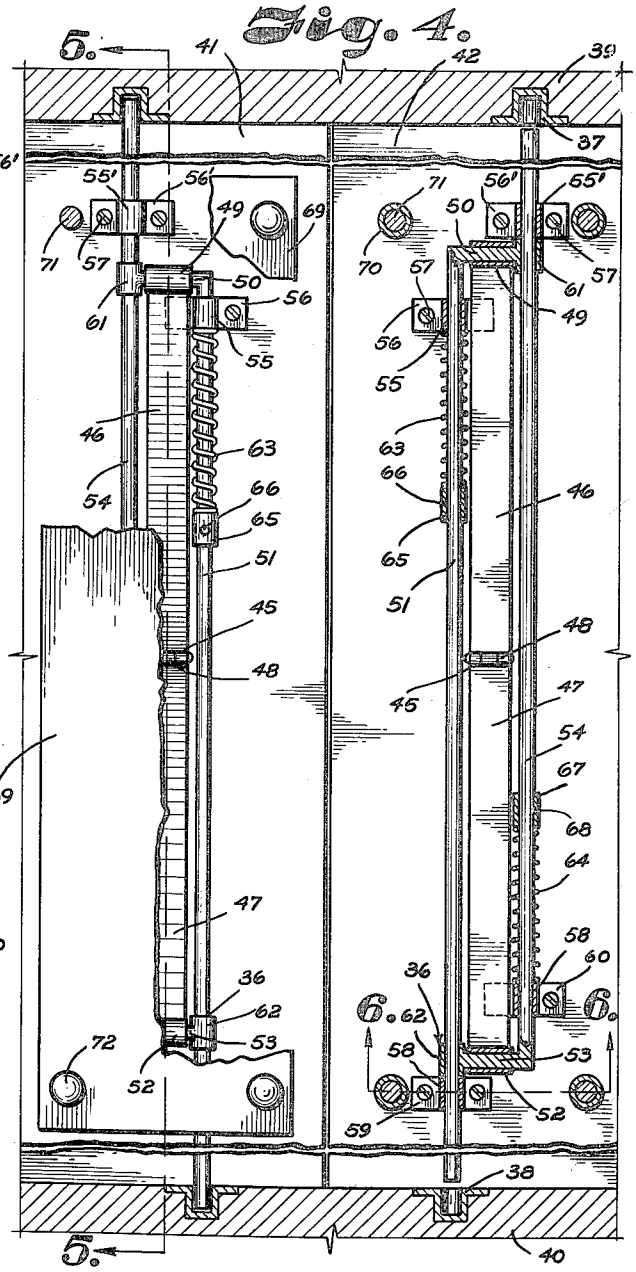
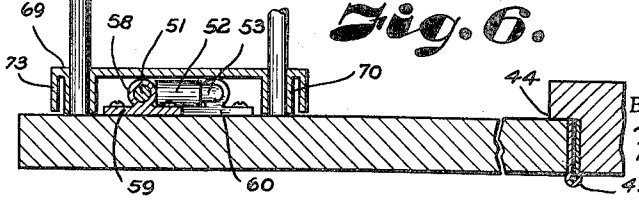


Fig. 6.



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EMERGENCY DOOR LOCK

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Filed Sept. 28, 1959, Ser. No. 842,747
2 Claims. (Cl. 292—21)

This invention relates to door locks, and more particularly to an emergency door latch or panic lock for use on emergency exit doors of buildings such as theaters, meeting halls and the like.

The principal objects of the present invention are to provide a door latch for outwardly opening doors which normally holds the door closed and locked against being opened from the outside of the building to prevent unauthorized entrance, yet it is quickly and easily moved to unlatched position from the inside of the building by pressure applied to releasing members thereof; to provide such a latch structure with springs biasing the latch to locked position; to provide such a latch with long releasing members extending along the inside of the door in a convenient position to be engaged by the person desiring to open the door; and to provide an emergency exit door latch that is simple in construction, inexpensive to manufacture, easy to install, and that will operate at all times even though subjected to adverse conditions such as rust, dirt and the like.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example certain embodiments of this invention.

FIG. 1 is a front elevation of a portion of the inner side of a door with a latch embodying the features of the invention applied thereto with portions broken away to better illustrate the structure thereof.

FIG. 2 is a horizontal sectional view through the door and latch on the line 2—2, FIG. 1.

FIG. 3 is a vertical sectional view through the door and latch on the line 3—3, FIG. 1.

FIG. 4 is a front elevation of a portion of the inner side of a pair of doors with a modified form of latch applied thereto and portions broken away to illustrate the structure thereof.

FIG. 5 is a vertical sectional view through the modified form of door and latch taken on the line 5—5, FIG. 4.

FIG. 6 is a horizontal view through the modified form of door and latch taken on the line 6—6, FIG. 4.

Referring more in detail to the drawings:

1 designates a door of ordinary construction carried on regular hinges 2 fastened to a door frame 3 for swingably mounting the door for movement to and from closing position of a door opening 4. The door frame at the side opposite the hinges 2 has a jamb 5 for engagement by the free edge of the door when in closed position. A keeper 6 is mounted on the door jamb 5 and is provided with spaced openings or recesses 7 for reception of ends 8 of elongate latch bolts 9 and 10, as later described.

In the structure illustrated in FIGS. 1 to 3 inclusive, the latch bolts 9 and 10 are long bar members and extend transversely of the door 1 and are slidably mounted in sleeve-like portions 11 and 12 respectively of bolt mounting plates 13 and 14. The plates 13 and 14 are suitably secured to the inner surface 15 of the door 1 by means of suitable fastening devices 16 such as screws or the like, the mounting plates 13 and 14 being spaced transversely of the door with their sleeve-like portions 11 and 12 spaced vertically relative to said door whereby the bores 17 and 18 of the sleeve-like portions 11 and 12 on the plate 13 are axially aligned with the bores of the sleeve-like portions 11 and 12 on the plate member 14, said bores also being in axial alignment with the openings 7 in the keeper 6 when the door is in closed position, the plate member 14 preferably being adjacent to the jamb 5 with a suitable clearance therebetween when the door is in closed position, as illustrated in FIGS. 1 and 2.

The bolts 9 and 10 are preferably elongate bars or rods extending a substantial distance across the width of the door 1 with their end portions slidably supported in the bores 17 and 18 of the sleeves of the plate members 13 and 14, and the end portions 8 of the locking bolts 9 and 10 are normally held in latched position in the recesses 7 by springs 19 sleeved on the bolts 9 and 10 and arranged to bias the bolts toward the keeper 6. In the illustrated structure, the springs 19 each have one end 20 engaged with the respective sleeve on the plate member 13 and the other ends 21 engaged with collars 22 sleeved on the bolts 9 and 10 and held in selected position for desired spring pressure by means of suitable fastening devices such as set screws 23. Bearing pins 24 are arranged on the ends of the bolts 9 and 10 remote from the ends 8 thereof, and when the ends 8 are engaged in the recesses 7 whereby the bolts are in latched position, the pins 24 are preferably adjacent to the plate 13 on the side thereof opposite the springs 19. The pins 24 extend from the respective bolts toward the other bolt and are in axial alignment and are pivotally mounted in a bearing member 25 on one end of an operating member 26, the other end portion of which is pivotally mounted at a point that is stationary relative to the door 1. In the illustrated structure, said other end is pivotally connected by a hinge joint 27 to the plate member 14. The mid-portion of the operating member 26 normally extends outwardly from the inner face of the door 1, and movement of said mid-portion toward said door moves the bearing member 25 and the bolts 9 and 10 connected therewith in a direction away from the keeper 6 to retract the bolt ends 8 from the openings or recesses 7 of the keeper. In the structure illustrated, the operating member 26 is preferably formed of links 28 and 29 having their adjacent ends hingedly connected as at 30 with the opposite end of the link 29 connected to the plate 14 by the hinge connection 27 and the other end of the link 28 having the bearing member 25 thereon.

The springs 19 in urging the bolts 9 and 10 into latched position also urge the links of the operating member into angular relation as illustrated in FIG. 2, and it is preferable that the bearing member 25 be positioned relative to the plate member 13 whereby it engages same to form a stop to limit the movement of the operating member and the bolts in the direction of latched position. It is preferable that the latch structure include a push bar or plate against which a person may exert pressure to operate the latch and open the door in case of an emergency. In the structure illustrated, the push bar 31 is arranged in parallel spaced relation to the inner face 15 of the door and has guide sleeves 32 slidably mounted on spaced guide rods 33 secured to the door 1 and extending inwardly therefrom substantially perpendicular to the face 15. The free ends of the guide rods 33 preferably have heads 34 which form stops to limit outward movement of the push plate or bar 31. In the illustrated structure, the push bar has upper and lower flanges 35 extending toward the door to partially enclose portions of the latch structure, said flanges terminating in spaced relation to the door whereby the push plate has the necessary movement toward and away from the door for effecting movement of the bolts 9 and 10 from unlatched to latched position.

With an emergency exit door latch assembled as illustrated and described, and with the door 1 in closed position, the springs 19 urge the bolts 9 and 10 into the

recesses 7 of the keeper to hold the latch in locked position. In the case of an emergency, a person desiring to open the door moves toward the door and applies force to the push plate 31 anywhere along the length thereof, moving same on the guides 33 toward the door 1. This moves the operating member 26, tending to straighten the relative positions of the links 28 and 29, and due to the fixed position of the hinge joint 27 such straightening of the operating member moves the bearing member 25 in a direction away from the keeper and thereby moves the bolts 9 and 10, compressing the springs 19 and retracting the ends 8 of the bolts 9 and 10 from the recesses 7 whereby the door 1 is free to swing outwardly to open position. When it is desired to close the door, the push bar 31 is pushed toward the door 1 to retract the bolts, and the door swung to closed position to align the bolts 9 and 10 with the recesses 7 of the keeper 6, and then the push bar is released whereby the springs 19 move the bolts into latched position and the operating member to the position illustrated in FIG. 2, whereby the structure is again in position to retain the door in locked position until such time as it is opened by pressure on the push bar.

In the form of the invention illustrated in FIGS. 4 to 6 inclusive, the emergency exit door latch 36 is arranged in vertical position whereby the bolts engage keepers 37 and 38 in headers 39 and sill 40 respectively, and is particularly adapted for latching doors 41 and 42 of a double door arrangement wherein two doors are swingably mounted by hinge means 43 and cooperate in closing the door opening 44. The latch 36 is the same for each door and, therefore, only one will be described in detail.

The operating member 45 includes links 46 and 47 arranged in end to end relation with their adjacent ends hingedly connected as at 48. The other end of the link 46 has a bearing member 49 rotatably mounted on a pin 50 at the upper end of a latch bolt 51, and the other or lower end of the link 47 has a bearing member 52 rotably mounted on a pin 53 of a latch bolt 54, said latch bolts 51 and 54 being arranged in parallel laterally spaced relation and upright or vertical relative to the door. The upper portions of the latch bolts 51 and 54 are slidably mounted in sleeves 55 and 55' of mounting plate members 56 and 56' respectively secured to the inner face of the door by suitable fastening devices 57 and in vertically spaced relation whereby said plates form stops to limit the movement of the bolts toward latched and unlatched positions. The lower portions of the latch bolts 51 and 54 are slidably mounted in sleeves 58 on mounting plates 59 and 60 having vertical spacing corresponding to the spacing of the plates 56 and 56' to serve as stops engaged by the bearing member 52 at the lower end of the operating member 45, as illustrated in FIG. 4.

The pin 50 has a sleeve 61 on its free end slidably mounted on the latch bolt 54 below and adjacent to the plate 56', and the pin 53 on the latch bolt 54 has a sleeve member 62 slidably mounted on the latch bolt 51 above the plate 59 whereby the sleeve members 61 and 62 serve as guides to aid in supporting and maintaining alignment of the latch bolts 51 and 54 respectively. The latch bolts are urged into latching position by springs 63 and 64 sleeved on the latch bolts 51 and 54 respectively with the spring 63 having one end bearing on the sleeve 55 of the latch mounting plate 56, and the other end bearing against a collar 65 adjustably secured on the latch bolt 51 by suitable fastening devices such as set screws 66. One end of the spring 64 bears against the sleeve of the mounting plate 60 and the other end bears against a collar 67 adjustably secured on the latch bolt 54 by means of a suitable fastening device such as a set screw 68. The recesses in the keepers and the header and sill respectively are aligned with the latch bolts 54 and 51 when the door is in closed position, and the springs 63 and 64 urge the bolts into latching engagement with the respective keepers which movement also moves the links 46 and 47 of the operating member 45 into angular relation as illustrated in FIG. 5. It is preferable to have a push bar or plate 69 with guide sleeves 70 slidably mounted on guide pins 71 fixed in the door and extending perpendicularly therefrom with heads or stops 72 on the free ends of the guides to limit outward movement of the push plate relative to the door. The push plate preferably has side flanges 73 extending toward the door but spaced therefrom sufficiently to permit the full movement of the push plate in moving the operating member and latch bolts from latched to unlatched positions.

The operation of the structure illustrated in FIGS. 4 to 6 inclusive is substantially the same as the operation of the latch structure illustrated in FIGS. 1 to 3 inclusive in that when the door is in latched position movement of a plate 69 toward the door tends to move the links 46 and 47 into aligned position lengthening the distance between the bearing members 49 and 52 and thereby moving the latch bars or bolts 51 and 54 to retract the ends of same from the recesses in the keeper whereby the door may be swung to open position.

It is to be understood that while we have illustrated and described certain forms of our invention, it is not to be limited to the specific form or arrangement of parts herein described and shown except insofar as such limitations are included in the claims.

What we claim and desire to secure by Letters Patent is:

1. An emergency exit door lock comprising, a push plate movably mounted on a door for movement toward and away from the door inner surface, an operating member between the push plate and inner surface of the door and having a mid-portion and end portions extending therefrom, a pair of latch bolts arranged in laterally spaced relation and on opposite sides of the operating member, mounting plates fixed to the door adjacent opposite ends of the elongate latch bolts, means carried by the mounting plates slidably supporting the end portions of said latch bolts, bearing means on one end of the operating member hingedly connecting same to one of the latch bolts adjacent one end thereof, a second bearing means hingedly connecting the other end of said operating member to the opposite end of the other latch bolt with the mid-portion of the operating member normally spaced from the door, guide means on the latch bolts having sliding engagement with the other bolt to maintain alignment thereof, and spring means on the latch bolts and engaging certain mounting plate members to urge said bolts to locked position and the mid-portion of the operating member away from said door whereby movement of the push plate toward the door moves the mid-portion of the operating member toward aligned position to move the bolts to unlatched position.

2. An emergency exit door lock comprising, a push plate, means secured to a door and extending from the inner surface thereof to movably mount the push plate for movement toward and away from said inner surface of the door, an operating member between the push plate and inner surface of the door and including a pair of links hingedly connected at adjacent ends, a pair of latch bolts arranged in laterally spaced relation and on opposite sides of the operating member, mounting plates fixed to the door adjacent opposite ends of the elongate latch bolts, means carried by the mounting plates slidably supporting the end portions of said latch bolts, bearing means on one end of the operating member hingedly connecting same to one of the latch bolts adjacent one end thereof, a second bearing means hingedly connecting the other end of said operating member to the opposite end of the other latch bolt, guide means on the latch bolts having sliding engagement with the other bolt to maintain alignment thereof, and spring means on the latch bolts and engaging certain mounting plate members to urge said bolts to locked position and the hinged con-

nection of the links of the operating member away from said door whereby movement of the push plate toward the door moves the links of the operating members toward aligned position to move the bolts to unlatched position.

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