E. A. FREED.

LOCKING MECHANISM FOR EMERGENCY EXIT DOORS.

APPLICATION FILED SEPT. 21, 1908.

992,554.

Patented May 16, 1911.

2 SHEETS—SHEET 1.

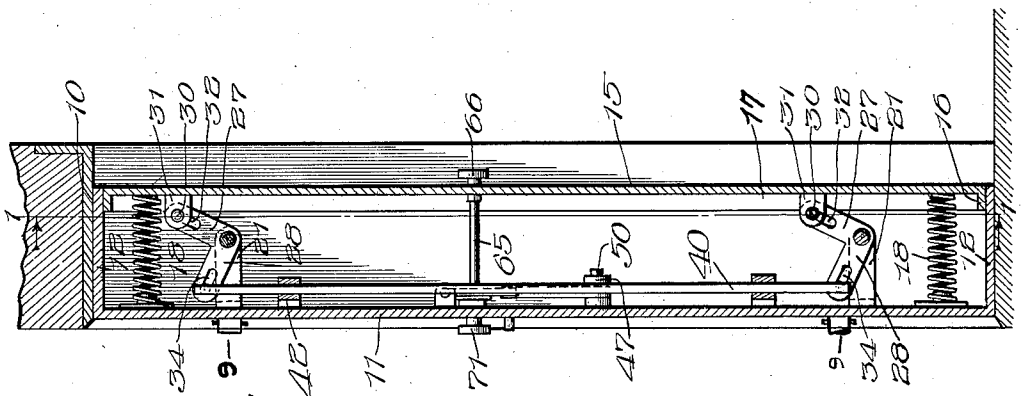

Fig. 2.

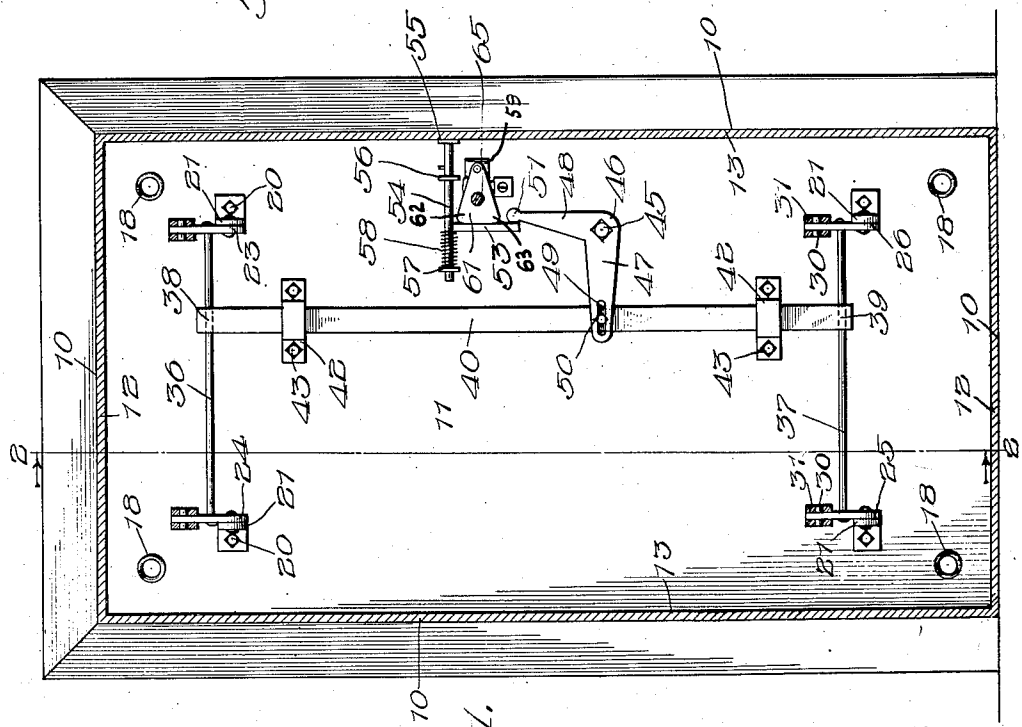

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 4.

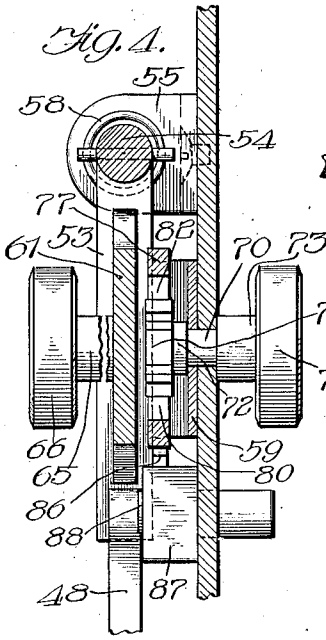


Fig. 5.

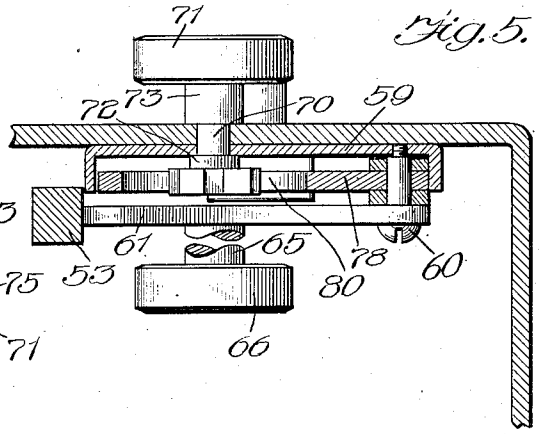


Fig. 3.

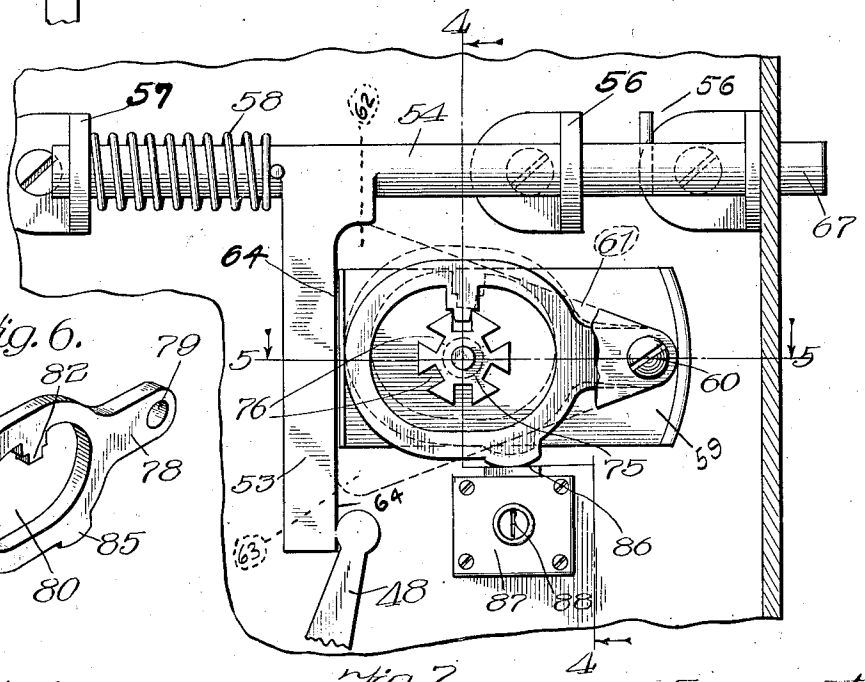
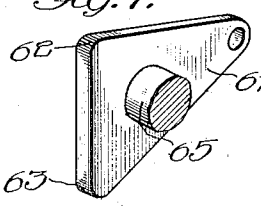


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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LOCKING MECHANISM FOR EMERGENCY-EXIT DOORS.

992,554. Specification of Letters Patent. Patented May 16, 1911.

Application filed September 21, 1908. Serial No. 453,971.

To all whom it may concern:

Be it known that I, EDWARD A. FREED, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Locking Mechanism for Emergency-Exit Doors, of which the following is a specification.

The object of this invention is to provide a door for use at emergency exits as at the doors of theaters or other inclosures which is not ordinarily used by the public but is designed for the escape of people desiring to escape from an alarming cause occurring within the building or other inclosure.

The invention consists in mechanism capable of accomplishing this object which can be rendered either openable or locked upon one side of the door as that on the outside of the theater and which is always openable on the opposite side of the door as the inside of the theater by mere pressure of a person against any portion whatsoever of that surface of the door.

More in detail the invention consists in a hollow door made in the form of a shallow box having one wall toward the interior of the theater mounted in such a way that it is freely movable toward and from the center of the door box this in combination with mechanism inside the door box proper adapted to be engaged by persons on the inside side of the door for the purpose of operating the latch of the door.

The invention further consists in the combination with the foregoing of a lock by means of which the door may be locked so that it can not be opened from the non-movable side of the door box or the outside of the door this without rendering the door unopenable from the inside.

The invention also consists in specific details of construction which will be hereafter described and claimed.

Referring to the drawings, Figure 1 is a front sectional detail view of the door taken on the line 1—1 of Fig. 2, showing the interior operating mechanism of the door from a position just inside the movable wall of the door. Fig. 2 is a vertical sectional detail view on the line 2—2 of Fig. 1. Fig. 3 is an enlarged detail view of the bolt and lock mechanism of the door. Fig. 4 is a vertical sectional view on the line 4—4 of Fig. 3. Fig. 5 is a plan view of the lock on the line 5—5 of Fig. 3. Figs. 6 and 7 are detail views of parts of the lock which will be hereafter described.

Referring again to the drawings the numeral 10 indicates the four edges of the door frame opening in the wall of the theater within which the door fits and is hinged in the ordinary manner by hinges 9 as best seen in Fig. 2. The door proper consists of a box like structure comprising a flat plate 11 rigidly secured to top plates 12 and side plates 13. The hinges 9 are attached in one way or another to this member so that the door swings outward about one edge thereof or to the left in Fig. 2 that is to say the plate 11 forms the exterior wall of the door viz. that upon the outside of the theater or upon the side to which the door is to open in the event of emergency requiring its use. This door box 11, 12, 13 is of a sufficient depth to contain all of the door operating mechanism which will be hereafter described and its open side opposite to the plate 13 is closed by a movable plate 15 having inturned flanges 16 and 17 just fitting inside the walls 12 and 13 heretofore described with just sufficient clearance between said flanges and said walls so that this movable plate member 15 may freely move in and out of the box of the door proper. The entrance of this plate member into the interior of the door proper is resisted by compression springs 18 located adjacent to the four corners of the door and at such other convenient points between the two walls of the door as it may be found desirable to place them.

Rigidly secured to the plate 11 of the door by bolts, screws or other suitable mechanism 20 are four supports 21. Pivotally mounted upon each of these bearing supports 21 is a bell crank the four different bell cranks being designated by the numerals 23, 24, 25 and 26. These four bell cranks are all alike and each one has two arms 27 and 28. The outer end arm 27 of each one of these bell cranks is pivoted at 30 to a suitable lug 31 secured by any suitable means upon the inside of the movable plate member 15 of the door. Any slight play which may take place between the pivotal member 30 of each of these lugs 31 and the bell crank arm 27

proper may be allowed for by slots 32 if desired. Each bell crank arm 28 has at its extremity a similar slot 34. The slots 34 on the bell cranks 23 and 24 are entered by the horizontal rod 36 extending between said bell cranks and the same slots on the bell cranks 25 and 26 are entered by another rod 37. As shown the two rods 36 and 37 are parallel to each other. These two rods 36 and 37 are rigidly connected at 38 and 39 by any suitable mechanism to a vertically movable rod or bar 40 held in movable position upon the interior face of member 11 by means of strips 42 and bolts 43 or any other suitable means. Pivotally mounted upon a suitable bearing member 45 located at one side of this rod 40 is a bell crank 46 having two arms 47 and 48, the former carrying a slot 49 through which is placed a bolt or pin 50 rigidly attached to the rod 40. The opposite end of the bell crank 48 carries a knob or other suitable finishing 51 adapted to engage the depending arm 53 rigidly attached to the bolt 54 which locks the door by engaging one of the edges 10 of the door frame at 55. This latch 54 is slidably mounted in suitable bearings 56 and 57 and is normally spring pressed into locked position by the spring 58. Rigidly mounted upon a pin 60 located upon the plate 59 is a triangular lever member 61 best seen in Figs. 3 and 7 having angular corners 62 and 63 adapted to engage portions of the face 64 of the member 53.

Rigidly connected to this plate 61 by any suitable means is a shaft 65 journaled in wall 15 of the door while permitting movement of the door wall lengthwise thereof. This shaft carries at its outer end a handle 66 which is located on the outside of wall 15 or on the inside of the theater and any one on that side of the door desiring to open the door by turning this handle 66 can always do so, the plate 59 rotating about shaft 70 in unison with the member 61 and the corners 62 and 63 of the plate 61 bearing against the member 53 and moving that member with the attached bolt 54 to the left in Fig. 3 thereby unlatching the extreme end 67 of the bolt from the edge of the door frame 10, and this action will take place no matter in which direction the user attempts to rotate the knob 66.

Journaled in the opposite or stationary wall 11 of the door proper and in the central axis of the shaft 65 is another shaft 70 carrying on the outside of the door a knob 71. The plate 59 heretofore referred to is rotatable on this shaft. This shaft 70 is held against longitudinal movement by the enlarged portions 72 and 73. On the inner end of this shaft 70 and adjacent to but not in contact with plate 61 is a disk 75 having cut in its circumference a plurality of notches 76. In the same plane as this disk 75 and inclosing it is a loop shaped head 77, of lever member 78 pivoted at 79 to the pin 60 heretofore described. This loop member 77 has an opening 80 through it within which the disk member 75 is located. On one side of the member 77 and within the opening 80 is a depending tooth or lug 82 of such a size and shape that it will fit in any one of the notches 76 heretofore described and the size of the opening 80 is such that when the loop 77 is raised to its highest or dotted line position of Fig. 3 the disk 75 is free to rotate without engaging the tooth 82 and that when the member 77 is moved downward to full line position of Fig. 3 the tooth 82 does engage any notch which happens to be in front of it and therefore non-operatively connects the shaft 70 to this lever 78. The result of this construction is that when the dog 82 engages the disk 75 the person turning the handle 71 can manipulate the lock latch point 67 exactly in the same manner as a person on the inside of the door does by the use of the handle 66 but when the member 78 is raised so that the tooth 82 does not engage the notches 76 the handle 71 can be rotated around and around in either direction without in any way affecting the operating lever 61. On the under side of this member 77 is a lug 85 which bears against the bolt 86 of an ordinary lock 87 having a key hole 88. This lock mechanism is so arranged with reference to this lug 85 that when the bolt 86 has been turned by means of a key inserted in the hole 88 to outward or as shown upward thrown position it lifts the member 77 to the highest position as above described in which the knob 71 may be rotated freely in either direction or in other words the door is locked so that a person on the outside of a door can not by the use of the knob 71 open it. When by use of the key the bolt 86 is thrown to unlocked position or lowered thereby allowing the lever 78 to drop to full line position the tooth 82 does engage the disk 75 and the door is unlocked that is to say the person on the outside of the door may by the use of the handle 71 open the door.

In the operation of the door it is set up and mounted as shown and under ordinary circumstances it is used by the operator turning the handle 66 or 71 as the case may be to operate the latch. When however any emergency exists for opening the door quickly or by a person who does not see or does not have time to turn the handle 66 on the inside of the door the slightest pressure on any part of the plate 15 of the door moves that plate inward against the action of the springs 12 and thereby rotates the bell cranks connected to that door in counterclockwise direction as seen in Fig. 2 which rotation moves the bar 40 as seen in Fig. 1 downward. This gives the bell crank

46 a counterclockwise direction with the result that the knob 51 moves to the left in Fig. 1 and carries the member 53 and attached latchbolt 54 to the left in Fig. 1 thus instantly unlocking the door. By the use of this construction it is not necessary for the audience in the theater desiring to use the door to touch any particular part of the door in order to unlatch it and escape. Also by this construction it is possible to lock the door so that it can not be opened from the outside but it is impossible to lock it so that it cannot be opened as above described from the inside.

It hardly needs to be stated that the end 67 of the locking bolt 54 is preferably made beveled (not shown) so that the door may latch itself when swung shut, exactly as ordinary doors in every day use do.

Having described the invention, what I claim as new, and desire to secure by Letters Patent, is:

1. In a device of the class described in combination with a door frame, a door hinged thereto comprising a hollow box like member open on one side over substantially the whole opening in the door frame, a plate closing said entire opening in said door so mounted as to be movable toward and from the interior of the door member while always substantially parallel with the opposite side thereof, a latch for the door and mechanism mounted within the box and behind said plate adapted to be actuated by pressure upon said movable plate or cover of the door box to unlatch the latch of said door for the purposes described.

2. A door of the class described, a latch for the door, means for operating the latch from either side of the door, means for locking one of said means without locking the other and mechanism operatable by pressure on the unlocked side of the door for releasing said latch irrespective of whether said operating mechanism for the opposite side is locked or unlocked.

3. A door of the class described, a latch for the door, knob operatable means for operating the latch from either side of the door, means for locking one of said knob operatable means without locking the other and an independent mechanism operatable by pressure on the unlocked side of the door for releasing said latch irrespective of whether the knob mechanism on the opposite side of the door is locked or not.

4. In a device of the class described, the combination of a door, a latch member for the door, a shaft journaled in one side of the door, a non-circular member carried by the shaft in engagement with the latch, a shaft journaled in the opposite side of the door and means for detachably connecting the second shaft to the non-circular member.

5. In a device of the class described the combination of a door, a latch member for the door, a shaft journaled in one side of the door, a non-circular member carried by the shaft in engagement with the latch, a shaft journaled in the opposite side of the door, a lever member pivotally mounted at one side of the second shaft upon the non-circular member and means for detachably connecting said lever to the second shaft for the purposes set forth.

6. In a device of the class described the combination of a door, a latch member for the door, a shaft journaled in one side of the door, a non-circular member carried by the shaft in engagement with the latch, a shaft journaled in the opposite side of the door, a lever member pivotally mounted at one side of the second shaft upon the non-circular member, a disk upon the second shaft and means for detachably selectively securing said lever to said disk for the purposes set forth.

7. In a device of the class described the combination of a door, a latch member for the door, a shaft journaled in one side of the door, a non-circular member carried by the shaft in engagement with the latch, a shaft journaled in the opposite side of the door, a lever member pivotally mounted at one side of the second shaft upon the non-circular member, a disk upon the second shaft and means for detachably selectively securing said lever to said disk and means for locking said shaft and lever in separated position for the purposes set forth.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

EDWARD A. FREED.

Witnesses:
DWIGHT B. CHEEVER,
C. J. CHRISTOFFEL.