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EMERGENCY EXIT DOOR LOCK.

APPLICATION FILED JUNE 8, 1908.

1,039,734.

Patented Oct. 1, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

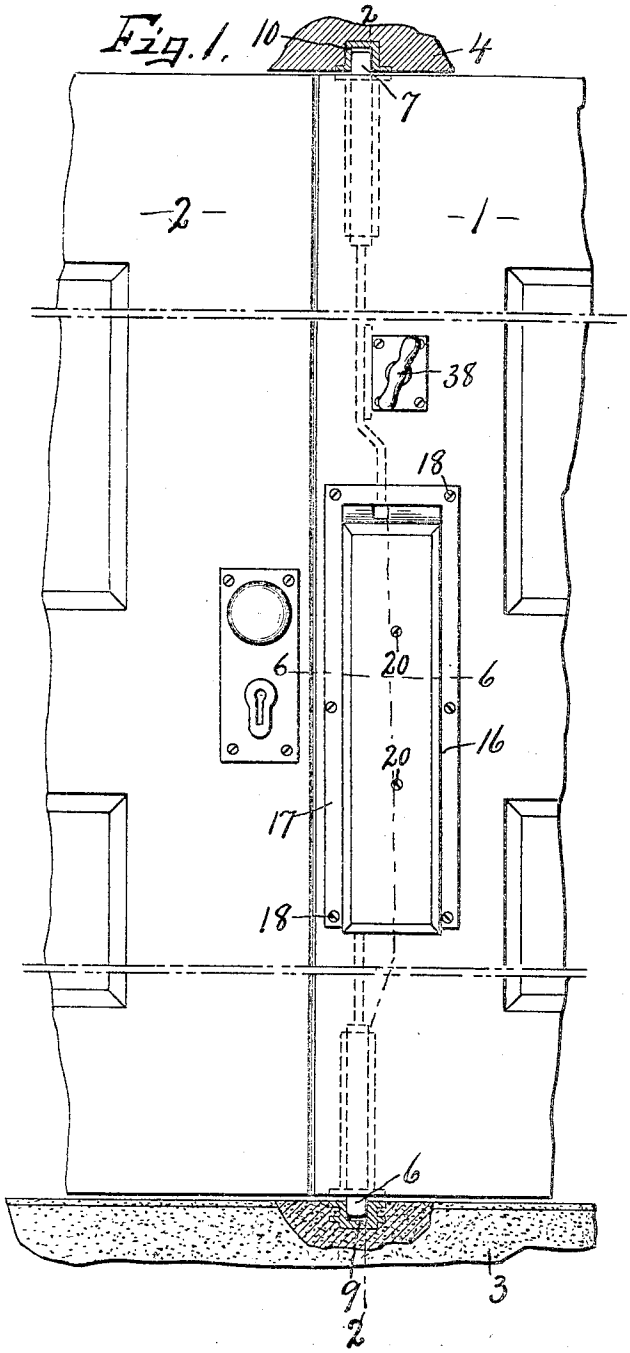
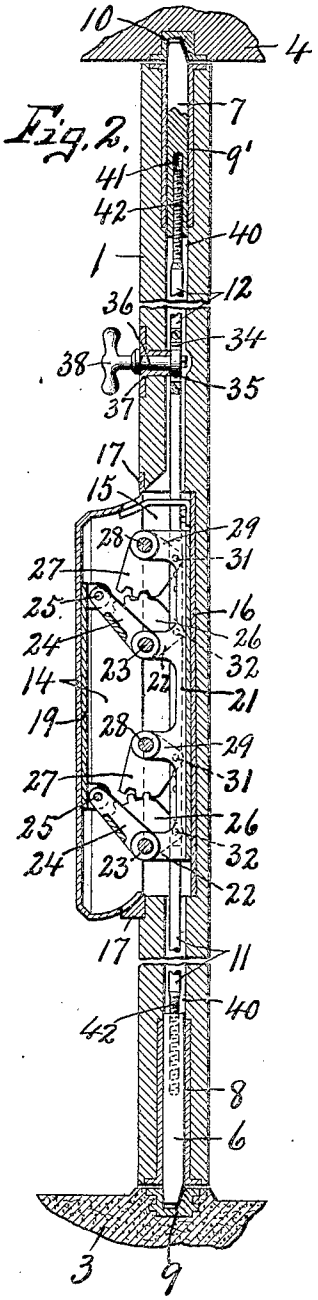


Fig. 2.



Witnesses.

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Fig. 3.

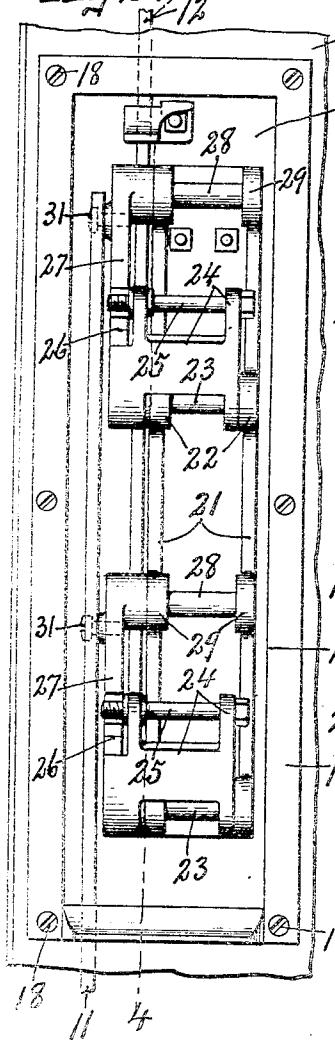


Fig. 4.

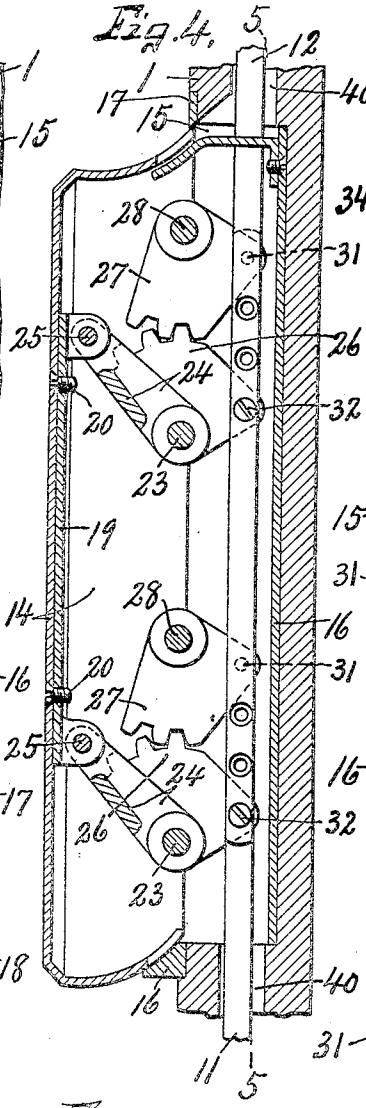


Fig. 5.

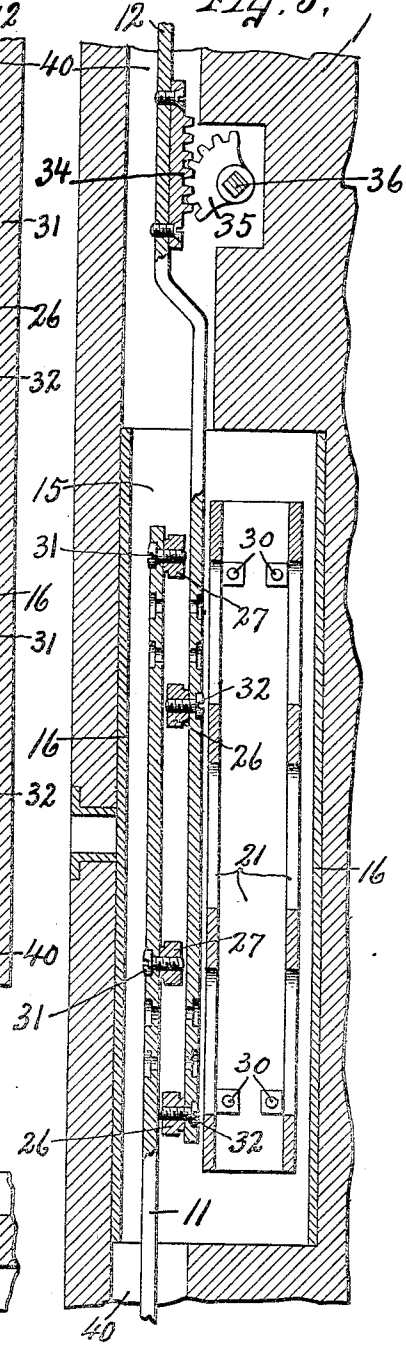
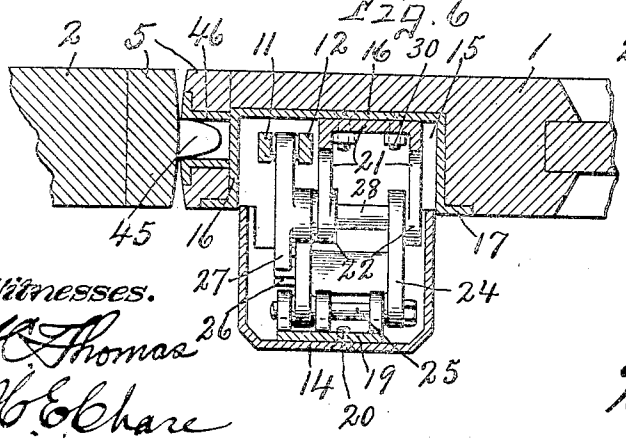


Fig. 6.



Witnesses.

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UNITED STATES PATENT OFFICE.

RALPH C. HANNUM, OF SYRACUSE, AND HENRY A. HANNUM, OF CAZENOVIA, NEW YORK; HELEN L. HANNUM AND LESLIE B. TILLOTSON ADMINISTRATORS OF SAID HENRY A. HANNUM, DECEASED.

EMERGENCY-EXIT-DOOR LOCK.

1,039,734. Specification of Letters Patent. Patented Oct. 1, 1912.

Application filed June 8, 1908. Serial No. 437,362.

To all whom it may concern:

Be it known that we, RALPH C. HANNUM and HENRY A. HANNUM, of Syracuse and Cazenovia, respectively, in the counties of Onondaga and Madison, respectively, in the State of New York, have invented new and useful Improvements in Emergency-Exit-Door Locks, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in emergency exit door locks and refers more particularly to an emergency lock release mechanism for single or double doors for schools and other private or public buildings where large numbers of people are accustomed to assemble.

The device is particularly useful in connection with outwardly swinging double doors which require some effective means for locking them at night and at other times when the building is not occupied and also to prevent undue swinging of the doors under wind pressure when the building is occupied and at the same time to permit the doors to be readily unlocked and opened by mere pressure upon the inside in case of fire or other emergency requiring the hasty exit of the occupants of the building.

The broad object of the present invention is to obviate as far as practicable serious injury to those attempting to escape by providing the inside of the door with a movable panel or pressure plate connected to the locking means and located in such relation to the floor that the voluntary or involuntary pressure of any person or assemblage of people against the panel will automatically release the locking bolt or members and cause the doors to open outwardly thereby avoiding undue congestion by permitting free exit of the people from the building as soon as they begin to press against the door in their effort to escape.

In the use of double swinging exit doors, it is customary to lock one of the doors to the sill or lintel and to provide separate means for locking the other door thereto.

One of the specific objects therefore, of this invention is to enable one of the doors when unlocked to be moved independently of the other to permit exit to and from the building.

A further object is to construct the lock of the independently movable door in such manner that in case it is locked, it will easily release itself from its keeper and permit both doors to swing outwardly as they are unlocked by pressure upon the movable panel.

A further object is to utilize the movable panel or pressure plate on the inner side of the door for concealing, and excluding dust and other foreign matter from the bolt operating mechanism which is actuated by said plate.

A still further object is to provide separate means whereby the locking bolt or bolts may be positively thrown to their locking positions and the pressure plate or panel returned to its normal or locking position.

Another object is to provide means whereby the locking bolts and their connections with the panel or pressure plate may be adjusted for different heights of doors or to conform to slight variations in the fittings or hangings of the same sized door.

Other objects and uses will be brought out in the following description.

In the drawings—Figure 1 is an inner face view of the meeting edges of a pair of ordinary swinging doors equipped with our improved locking and release mechanism. Fig. 2 is a transverse vertical sectional view taken on line 2—2, Fig. 1. Fig. 3 is an enlarged inner face view of the locking and release mechanism, the pressure plate or movable panel being removed to more clearly show the interior mechanism. Fig. 4 is an enlarged sectional view similar to Fig. 2 taken on line 4—4, Fig. 3. Fig. 5 is a sectional view taken on line 5—5, Fig. 4. Fig. 6 is an enlarged horizontal sectional view taken on line 6—6, Fig. 1.

In order to clearly demonstrate the practicability of this invention we have shown the meeting edges of a pair of ordinary swinging doors —1— and —2— as supported in any well known manner between a sill —3— and lintel —4—, said doors being provided at their meeting edges with the usual cap or finishing rails —5— having their meeting edges convex in cross section as best seen in Fig. 6. These doors are adapted to swing outwardly or inwardly and outwardly, the door —1— being provided with lower and upper locking bolts —6— and —7— which are angular or square in cross

section and are guided in similarly formed tubular metal bearings or guides —8— and adapted to enter suitable keepers —9— and —10— in the sill —3— and lintel —4— respectively, the outer faces of the locking ends of said bolts —6— and —7— being beveled to permit them to be more easily inserted into or removed from their respective keepers in locking and unlocking the door —1—. The bolts —6— and —7— are adjustably secured by screw threaded connections to vertically movable locking bars —11— and —12— which in turn are adjustably secured to suitable mechanism brought into action by a movable panel or pressure plate —14— on the inside of the door —1— whereby both of the locking bolts —7— and —6— may be simultaneously redrawn from their locking positions to release the door in a manner hereinafter described. This panel or pressure plate —14— may be of any suitable form or size and may be located in any position upon the inner face of the door where it would be most liable to be pressed against by any excited or panic stricken individual or assemblage of people in their effort to make a hasty exit from the building in case of fire or other emergency. As shown in the drawings, this panel —14— is normally raised and consists of a box like metal shell having its open side movable in a recess —15— in the inner side of the door and its outer face and sides substantially plane and adapted to fit closely in the recess —15— so as to exclude dust and prevent the entrance of wires or other tools or malicious interference with any of the inclosed working parts.

Fitted within the recess —15— is a box-like metal casing —16— having its open side facing the interior of the building and provided with a marginal flange —17— resting against the inner face of the door and secured thereto by suitable fastening means as screws —18—.

The movable panel —14— is supported directly upon a retaining plate —19— to which it is secured by suitable fastening means as screws —20—.

A bracket —21— is secured to the inner face of the metal housing —16— and is provided with inwardly projecting ears —22— in which are journaled lower and upper rock shafts —23— having upwardly and inwardly projecting crank arms —24— which are connected to the lower and upper ends of the plate —19— by suitable pivotal pins —25—.

Rigidly secured to the rock shafts —23— are toothed segments —26— which mesh with superposed segments —27—, the latter being rigidly secured to suitable rock shafts —28—. These rock shafts —28— are also supported upon inwardly projecting ears —29— on the brackets —21— directly above their corresponding rock shafts —23— so that the rock shafts —23— and —28— are mounted in rigid bearings which in turn are rigidly secured to the door through the medium of the bracket —21—, the latter being secured to the housing —16— by means of screws —30—.

The crank arms —24— which support the movable panel or pressure plate —14— through the medium of the bracket or plate —19— are disposed in an inwardly and upwardly inclined plane and being pivotally mounted upon the bracket —21— in the manner described, and together with said pressure plate or panel —14— are movable upwardly and outwardly into the recess 15 under any comparatively light or heavy pressure which may be brought to bear against such panel by the voluntary or involuntary act of the individual or assemblage of people in their effort to escape from the interior of the buildings thereby rocking the toothed segments —26— and transmitting similar rocking movement to the toothed segments —27— which intermesh with the segments —26—.

The lower locking rod —11— is pivotally but eccentrically connected to the toothed segments —27— by pivotal pins or bolts —31— while the upper locking rod —12— is eccentrically connected to the toothed segment —26— by pivotal pins or bolts —32—, said pivotal pins or bolts being substantially equi-distant from and at the outside of the swing axes of their respective toothed members to which they are pivoted thereby bringing the locking bolts side by side widthwise of the door —1— but spaced apart a sufficient distance from each other to prevent friction between them, said bars being pivoted to opposite faces of their respective toothed members to afford ample clearance in their movement without interfering one with the other.

The toothed members —26— and —27— of each coacting pair are of substantially the same pitch and mesh with each other substantially midway between their respective axes and it is, therefore, evident that as they are oscillated or rocked back and forth by the inward and outward movement of the panel —14—, the locking bars —11— and —12— and their bolts —6— and —7— are moved simultaneously in opposite directions; that is when the panel —14— is moved inwardly the locking bolts —6— and —7— are unlocked or withdrawn from their keepers —9— and —10— while on the other hand when the panel is moved in the opposite direction, the bolts —6— and —7— are locked or thrown into engagement with said keepers.

As previously stated, the panel —14— is made in the form of a box or open sided housing having its open side facing

the door and fitting snugly within the fixed housing —16— with just sufficient clearance to permit it to be operated easily and still preventng the entrance of dust or malicious interference with the interior mechanism by wires or any other tool. The panel —14— is, therefore, surrounded with an inwardly projecting marginal flange, the inner edges of which normally rest within the open side of the housing —16—; sufficient clearance being left within said housing to permit the panel to be folded or rocked upwardly and inwardly until its outer face is nearly flush with the outer face of the door, such movement being sufficient to withdraw the locking bolts —6— and —7— clear from their respective keepers —9— and —10— and within the lower and upper edges of the door, thereby permitting a free opening of the door under pressure from the inner side.

In order that the door may be positively locked when closed one of the locking bars as —12— is provided with a toothed rack —34— located some distance above the panel —14— and engaged by a pinion —35— which is secured to a rock-shaft —36—, the latter being journaled in a suitable bearing —37— and projecting through the inner side of the door where it is provided with a hand piece —38—. This hand piece —38— is located within easy reaching distance from the floor and together with the pinion —35— and rack —34— affords a convenient means for locking the door —1— in its closed position by simply turning the hand piece —38— in one direction, locking motion being imparted to the lower locking bolt —6— through the medium of the intermeshing toothed segments —26— and —27—. When the locking bolts are drawn to their locked position by means of the hand piece —38—, the panel —14— is simultaneously thrown inwardly so that its inner face projects some distance from the inner face of the door where it is ready for action in unlocking or releasing the doors by pressure against the same from the inside.

As shown in the drawings, the locking bolts —6— and —7— and connecting rods —11—and —12— together with the movable panel —14— and connections between said panel and bars —11— and —12— are located near the meeting edge of the door —1— sufficiently low down to be engaged by any individual or collection of persons in their effort to escape from the building and in order that these parts may be easily and economically installed, the rods —11— and —12— are let into lengthwise grooves —40— in the meeting edge of the door just inside of the cap or strips —5— which serves to close the adjacent open side of the groove and affords a finish for the meeting edge of the door.

The mechanism which we have thus far described is applicable for any outwardly swinging single or double doors and in order that it may be applied to doors of various sizes or height, portions of the rods —11— and —12— connected to the toothed segments —26— and —27— are provided with a plurality of apertures for receiving the pins —31— and —32— while the locking bolts —6— and —7— may be similarly extended or shortened by simply screwing or unscrewing them upon the ends of the locking bars —11— and —12—, such bolts being provided with threaded sockets —41— for receiving threaded portions —42— of said locking bars —11— and —12—.

When outwardly swinging double doors are used, the hereinbefore described locking mechanism is mounted upon one of the doors while the other door is locked to the first named door by means of a locking bolt —45— which enters a keeper —46— in the meeting edge of said first named door, the inner and outer faces of the locking end of the bolt —45— being rounded or beveled to allow it to release itself from its keeper when the door —1— is unlocked by pressure upon the panel so that when the door —1— is released, the door —2— will be similarly released, both doors being forced outwardly to afford ample opening for the escape of the occupants of the building in case of fire or other emergency requiring a free exit.

What we claim is:

1. In combination with a door having a recess in its inner face, a locking bolt for the door, and means for unlocking said bolt including a panel movable in said recess, and mechanism for holding the panel in a plane parallel with said face while in any of its adjusted positions.

2. In combination with a door having a recess in its inner face, locking bolts for the door, and means for unlocking said bolts including a panel movable in said recess, and mechanism for holding the panel in a plane parallel with said face while in any of its adjusted positions, and separate means for locking the bolts and thereby restoring the panel to its outward position.

3. In combination with a door, oppositely movable locking bolts on the door, means for unlocking the bolts including a movable panel and rock arms pivoted to the door and to said panel and holding the latter parallel with the door, and means for moving the bolts to their locking positions and for moving the panel to its outer position.

4. In combination with a swinging door having a recess in its inner face, a locking bolt on the door, a movable box panel having its open side guided in said recess, movable means on the door for holding the panel in planes parallel with the inner face of the door, and connections between said movable

means and bolt for unlocking the latter as the panel is moved toward the door.

5. In combination with a swinging door having a recess in its inner face, locking bolts on the door, a movable box panel having its open side guided in said recess, movable means on the door for holding the panel in planes parallel with the inner face of the door, and connections between said movable means and bolts for unlocking the latter as the panel is moved toward the door, and means for moving the bolts to their locking positions and for moving the panel to its outer position.

6. In combination with a door, a locking member for the door, a sliding bar connected with the locking member, a pair of intermeshing toothed segments, one of which is pivotally connected to said bar at one side of its axis, a panel movable to and from the inner side of the door, and means actuated by the movement of the panel toward the door for actuating one of the two said segments and thereby moving the locking member from its locking position.

7. In an emergency exit door lock, a pair of sliding locking bolts, intermeshing toothed segments, each eccentrically connected to one of said bolts, a panel movable to and from the inner side of the door, and connections between said panel and one of the toothed segments whereby the movement of the panel toward the door operates said segments to unlock both of the bolts.

8. In combination with a pair of swinging doors locking means for one of the doors, releasing means for said locking means including a panel movable toward and from the inner side of said one of doors, an additional locking bolt for locking the other door to the meeting edge of the first named door, said additional locking member having the inner and outer faces of its locking end beveled to permit both doors to swing open when the first named door is released.

9. A door locking and releasing mechanism comprising a plurality of rock arms pivotally mounted upon the door, one above the other, a panel pivotally mounted upon said rock arms and movable therewith toward and from the inner face of the door, a locking bolt for said door, and means actuated by one of said rock arms as the panel is moved toward the door for unlocking said bolt.

10. In an emergency exit door lock, a plurality of rock arms mounted upon the door one above the other, a panel pivotally mounted upon said rock arms and movable to and from the door, a pair of toothed segments intermeshing with each other and actuated by one of the rock arms, a locking bolt connected to one of the said segments, a second locking bolt connected to the other segment, said segments operating to unlock their respective bolts as the panel is moved toward the door.

11. In an emergency exit door lock, a plurality of rock arms mounted upon the door one above the other, toothed segments each co-axial with and connected to one of the rock arms, a locking bolt connected to said segments, a presser plate pivotally connected to the rock arms and movable to and from the inner side of the door, additional toothed segments intermeshing with the first named segments, and an additional locking bolt eccentrically connected to the last named segments, said segments being operable by pressure upon the plate toward the door to unlock the bolts.

12. In an emergency exit door lock, a plurality of rock arms mounted upon the door one above the other, toothed segments each co-axial with and connected to one of the rock arms, a locking bolt connected to said segments, a presser plate pivotally connected to the rock arms and movable to and from the inner side of the door, additional toothed segments intermeshing with the first named segments, and an additional locking bolt eccentrically connected to the last named segments, said segments being operable by pressure upon the plate toward the door to unlock the bolts, and separate means for restoring the lock releasing mechanism to its normal position.

In witness whereof we have hereunto set our hands this 2nd day of June 1908.

RALPH C. HANNUM.
HENRY A. HANNUM.

Witnesses:
H. E. CHASE,
CAROLINE MCCORMACK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."