Feb. 23, 1932. W. J. CARROLL 1,846,183

EMERGENCY EXIT LOCK

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Fig. 1.

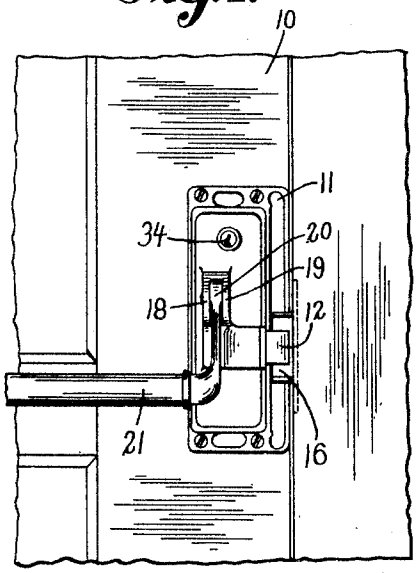


Fig. 2.

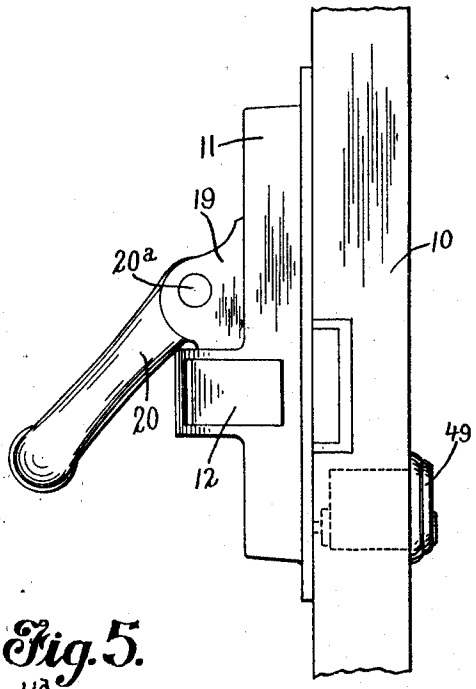


Fig. 3.

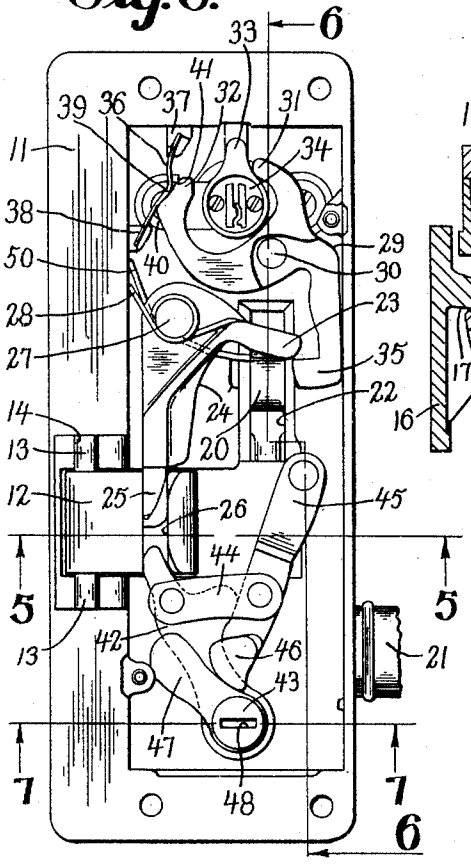
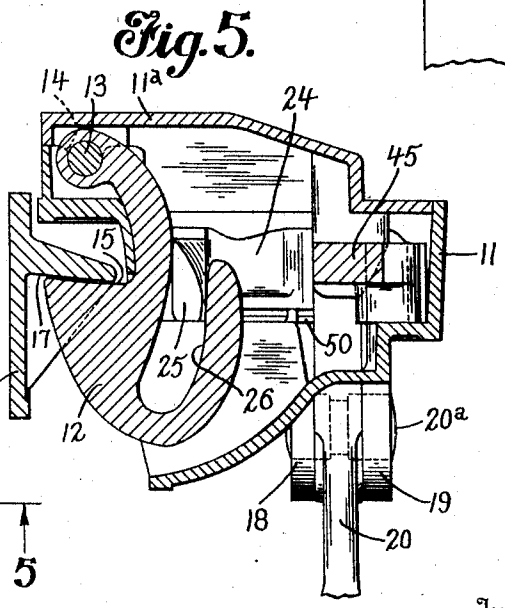


Fig. 5.



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Fig. 4.

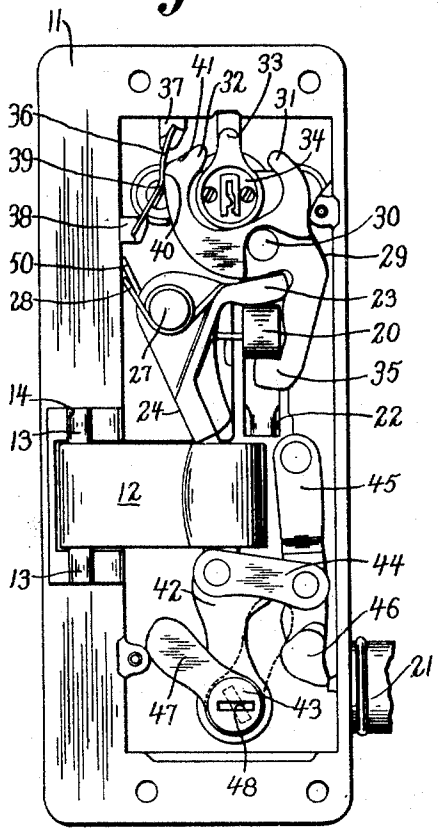


Fig. 6.

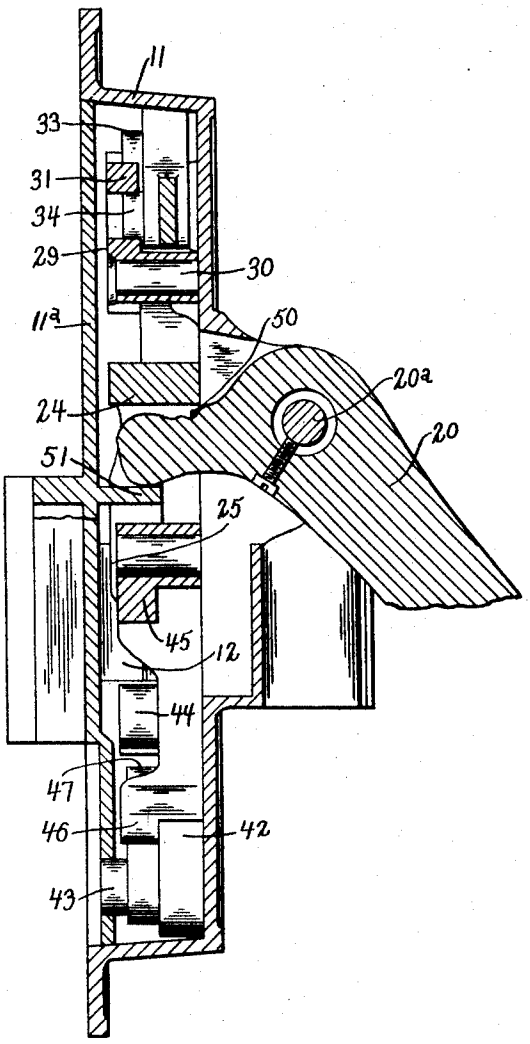
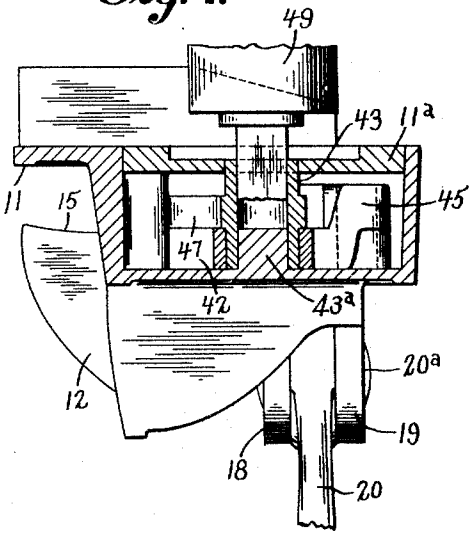


Fig. 7.



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UNITED STATES PATENT OFFICE

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EMERGENCY EXIT LOCK

Application filed July 9, 1928. Serial No. 291,300.

This invention relates to emergency exit locks, or so-called panic bolt locks of the type which are applied to the doors of public buildings, such as schoolhouses, theaters, apartment houses, stores, and the like, for facilitating exit when a panic results from a fire, or other cause. The invention applies particular to a rim lock of the above character, although it will be apparent from the description of the invention that certain of the features thereof may be used in connection with other types of locks as well.

An object of the invention is to improve the construction of the operating elements of emergency exit locks, and to reduce the number of parts within these locks required to perform the desired functions.

Another object of the invention is to provide a lock of the above character in which there is no danger of the bolt becoming retracted, due to pressure exerted on the outside of the door to which the lock is applied.

A further object of the invention is to provide a lock of the above character in which the bolt may be locked in retracted position when desired.

A still further object of the invention is to provide a lock of the above character in which provision is made for retracting the bolt from the exterior of the door by means of a key or the like, and in which the retraction of the bolt may be accomplished without undue effort.

To these and other ends, the invention consists in the novel features and combination of parts to be hereinafter described and claimed.

In the drawings,

Fig. 1 is a fragmentary view of a door and door casing having an emergency exit lock according to my invention applied thereto;

Fig. 2 is an end view of the door, showing my lock mounted thereon;

Fig. 3 is a view of the lock with the cover removed to show the interior mechanism;

Fig. 4 is a view similar to Fig. 3, but showing the lock parts in a different position;

Fig. 5 is a sectional view along line 5—5 of Fig. 3;

Fig. 6 is a sectional view along line 6—6 of Fig. 3; and

Fig. 7 is a sectional view along line 7—7 of Fig. 3.

Referring to the drawings in which I have illustrated my invention by showing a preferred embodiment thereof, the reference numeral 10 indicates a door partly broken away and having mounted thereon a lock of the type known as a rim lock and provided with a case 11, secured by screws, or other suitable means, to a face of the door. While I prefer to carry out my invention in connection with rim locks, it will be understood that certain of the principles and novel features of the invention may be applied to other types of locks, which it is unnecessary to show or enumerate herein.

The lock is provided with a latch bolt 12, pivotally mounted on case 11 by means of stud 13, which is secured to bolt 12 and received in openings 14, being prevented from displacement therefrom by lock case cover 11^a. Bolt 12 is provided with a face 15, which when the door is closed and the bolt protracted, engages strike 16, the latter being mounted on an adjacent part of the jamb of the door. Preferably the stud 13 is mounted in lock case 11 in alignment with the direction of thrust of strike 16 on the bolt 12, in order to prevent any tendency of the bolt to rotate under the urge of the strike, while the strike engaging face 15 of bolt 12 and face 17 of strike 16 are arranged at an angle to the general plane of the door, as shown particularly in Fig. 5, in order to assist in overcoming any tendency on the part of the bolt to move towards retracted position under the urge of the strike, especially if the door is shaken.

On the exterior of lock case 11 are a pair of spaced lugs 18 and 19, between which an arm 20 of panic bar 21 is pivotally mounted on pin 20^a, arm 20 extending through opening 22 into the interior of case 11, where it is adapted to engage arm 23 of retracting lever 24, the latter having its opposite end 25 received in slot 26 in bolt 12. Retracting lever 24 is pivotally mounted on case 11, by means of stud 27, and normally urges the bolt 12

into protracted position by means of helical spring 28, the latter being wrapped around stud 27 and having one end in engagement with an interior part of the lock case, while the other end engages the arm 23.

The panic lock described up to this point furnishes a simple means for performing the usual functions of such locks, and the operation thereof will be readily understood but may be briefly described as follows:

When the door is shut, the latch bolt will be in the protracted position shown in Fig. 5 engaging the strike and holding the door closed. Upon pressing downwardly on the panic bar 21 the arm 20 is swung upwardly, striking the arm 23 and rotating the retracting lever 24 about the stud 27, whereupon the opposite end of the retracting lever engaged in slot 26 of bolt 12 cams or rotates the bolt 12, withdrawing the strike engaging face 15 of bolt 12 from engagement with the strike 16, whereupon the door may be swung outwardly.

In certain instances, it is desirable to lock the bolt in retracted position, and in the lock of the present invention a simple but efficient means to this end is provided.

Referring again to the drawings, and particularly to Figs. 3 and 4, the reference numeral 29 indicates a detent pivotally supported on the lock case 11 by means of stud 30 and having an upper bifurcated part providing spaced talons 31 and 32, between which is received a rollback 33 mounted on cylinder lock 34, which may be of any usual or preferred type. At the lower end of detent 29 is a detent lug 35 which, as shown in Fig. 4, may be inserted under arm 20 when the bolt 12 is retracted to lock the bolt in retracted position. A spring 36 is mounted in lock case 11, between lugs 37 and 38, spring 36 being provided with an outwardly bent or bulging part 39, adapted to engage shoulders 40 and 41 of detent 29 to secure the detent 29 in unlocked or locked position, as the case may be.

In order that the latch bolt 12 may be retracted from the exterior of the door, a swinging lever 42 is provided pivotally mounted on hollow spindle 43 in a lower part of the lock case, spindle 43 being mounted on stud 43a on lock case 11. Lever 42 has its outer end received in slot 26, and is connected, by means of link 44, to lever 45, which is provided with a lug 46, engaged by rollback lever 47 on spindle 43, the latter having an opening 48 therein, into which a key may be inserted from the exterior of the door, through cylinder lock 49. It is to be noted that the rollback lever 47, lever 45, link 44, and swinging lever 42 form a lever system in which a considerable angular movement on the part of rollback 47 results in a lesser angular movement on the part of lever 42, thus permitting the bolt 12 to be retracted with a reduced amount of effort.

A helical spring 50 mounted on stud 27 engages arm 20 and urges the latter downwardly against stop 51, and supports the weight of bar 21, thus relieving the retracting lever of the weight of bar 21.

From the above description of the nature of the invention and the preferred embodiment thereof, it will be readily seen that I have provided a relatively simple but efficient form of panic bolt lock in which the number of parts is reduced to a minimum and in which means is provided for retracting the bolt from either side of the door while, if desired, the bolt may be locked in retracted position.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all the details shown but is capable of modification and variation within the spirit of the invention and the scope of the appended claims.

What I claim is:

1. In a panic bolt lock, a lock case, a latch bolt pivotally mounted in said case, a retracting lever pivotally mounted in said case and having one end thereof engaging a part of the latch to retract the same, said bolt being provided with a slot into which the retracting lever may pass during the retracting movement, and a panic bar engaging the other end of said retracting lever.

2. In a panic bolt lock, a lock case, a latch bolt pivotally mounted in said case on a vertical axis, a retracting lever in operative engagement with said bolt, said lever being mounted on a horizontal pivot, and a panic bar for operating said lever, said latch bolt being provided with a slot into which the retracting lever may pass during the retracting movement.

3. In a panic bolt lock, a lock case, a latch bolt pivotally mounted therein, and a strike with which said latch bolt cooperates, said latch bolt being provided with a strike engaging face and said pivotal mounting being opposite said face and in alignment with the direction of thrust of said strike on said face, whereby any tendency of the latch to rotate about its pivotal mounting when urged against the strike is prevented.

4. In a panic bolt lock, a latch bolt, means for retracting said latch bolt, and a strike with which said bolt cooperates to maintain a door or the like in closed position, said strike and latch being provided with cooperating faces to secure the door against opening and said faces being arranged to tend to urge the bolt towards protracted position if the door is vibrated.

5. In a panic bolt lock, a latch bolt, means for retracting said latch bolt, and a strike with which said bolt cooperates to maintain

a door or the like in closed position, said strike and latch being provided with cooperating faces to secure the door against opening and said faces sloping forwardly and outwardly in the direction of movement of the door in opening and tending to urge the bolt towards protracted position if the door is vibrated.

6. In a panic bolt lock, a latch bolt, a lock case, means for retracting said latch bolt, and a strike with which said bolt cooperates to maintain a door or the like in closed position, said lock case having a part extending beyond the edge of the door and overlapping the strike, and said latch bolt being pivotally mounted in said extending part, said strike and latch being provided with cooperating faces opposite said pivotal mounting to secure the door against opening and said faces being arranged to urge the bolt towards protracted position if the door is vibrated.

7. In a panic bolt lock, a lock case, a latch bolt in said case, a panic bar having a part extending into said case, interconnecting means between said part and bolt whereby said bolt may be retracted by said bar, and means in said case for locking said bolt in retracted position, said interconnecting means comprising a member pivoted in the lock case on a horizontal pivot.

8. In a panic bolt lock, a latch bolt, a panic bar, interconnecting means between said bar and bolt whereby said bolt may be retracted by said bar, and means for locking said bar in bolt retracted position, said last named means comprising a key controlled detent for engaging said panic bar when in bolt retracted position, said key controlled detent being held against operation by said panic bar until said latch is fully retracted.

9. In a panic bolt lock, a lock case, a latch bolt, in said case, a retracting lever for said latch bolt, a panic bar, said lever having one end in operative engagement with the bolt and the other end in engagement with said panic bar, and means for locking said retracting lever in bolt retracted position, said last named means comprising a detent mounted in the lock case, and key controlled means for operating said detent.

10. In a panic bolt lock, a lock case, a latch bolt in said case, a panic bar, a retracting lever pivotally mounted in said case and having one end in operative engagement with the bolt and the other end in engagement with a part of said panic bar, a detent for locking said bolt in retracted position, said detent including a pair of spaced talons, and a key controlled rollback received between said talons.

11. In a panic bolt lock mounted on a door or the like, a lock case, a latch bolt in said case, a panic bar for retracting said bolt from the interior of the door, and means for retracting the bolt from the exterior of the door, said last named means including a retracting lever and a rollback mounted with their axes in alignment and a power amplifying connection between said lever and said rollback.

12. In a panic bolt lock mounted on a door, or the like, a lock case, a latch bolt in said case, a panic bar for retracting said bolt from the interior of the door, means for retracting the bolt from the exterior of the door, said last named means including a pair of levers pivotally mounted in said lock case, a link connecting said levers intermediate the ends thereof, the end of one lever remote from its pivot being in operative engagement with the latch and a rollback engaging the end of the other lever.

13. In a panic bolt lock mounted on a door or the like, a lock case, a latch bolt in said case, a panic bar for retracting the bolt from the interior of the door, and means for retracting said bolt from the exterior of the door, said last named means including a pivoted lever in operative engagement with the bolt, a second pivoted lever, a link connecting said levers, said link being mounted on said levers between the ends thereof, and means operable from the exterior of the door adapted to engage the end of the second pivoted lever remote from the pivot thereof to actuate the lach bolt.

14. In panic bolt lock, a lock case, a latch bolt in said case, said bolt being provided with a slot therein, a retracting lever having one end received in said slot, a panic bar in operative engagement with the other end of said lever, a second retracting lever having an end thereof received in said slot, means on the opposite side of said lock case from the panic bar for actuating said second named retracting lever, and means for locking said latch bolt in retracted position.

15. In a panic bolt lock, a lock case, a latch bolt in said case, said bolt being provided with a slot therein, a retracting lever having one end received in said slot, a panic bar in operative engagement with the other end of said lever, a second retracting lever having an end thereof received in said slot, means on the opposite side of said lock case from the panic bar for actuating said second named retracting lever, and means for locking said latch bolt in retracted position, said last named means including key operable mechanism on the same side of the lock case as the panic bar.

16. In a panic bolt lock, a lock case, a latch bolt mounted on a vertical pivot in the lock case, said bolt being provided with a slot, a pair of horizontally pivoted levers each having one end received in the slot, a panic bar for operating one of said levers, and key controlled means for operating the other of said levers.

17. In a panic bolt lock for a door, a lock

case, a latch bolt pivotally mounted therein, a panic bar for retracting said bolt, and a strike cooperating with said bolt to hold the door in closed position, said latch having a strike engaging face facing the pivotal mounting and said strike being received between said face and said pivotal mounting.

18. In a panic bolt lock for a door, a lock case, a latch bolt, a panic bar for retracting said latch bolt, and a strike cooperating with said latch bolt to hold the door in closed position, said lock case having a part which extends beyond the edge of the door and overlaps the strike, said latch bolt being pivotally mounted in said extending part.

19. In a panic bolt lock for a door, a lock case, a latch bolt pivotally mounted therein, a panic bar for retracting said bolt, and a strike, said latch bolt having a face cooperating with the strike to hold the door in closed position, said face facing the latch pivot and a latch retracting face on said latch remote from the pivot beyond said cooperating face.

20. In a panic bolt lock for a door, a lock case, a latch bolt, a panic bar for retracting said latch bolt, and a strike, said lock case having a part extending beyond the edge of the door and overlapping the strike, said latch bolt being pivotally mounted in said extending part and having a face cooperating with the strike to hold the door in closed position, said cooperating face facing the latch pivot, and a latch retracting face on said latch remote from the pivot beyond said cooperating face.

21. In a panic bolt lock for a door or the like, a latch case, a latch bolt in said case, a panic bar for retracting said bolt from the interior of the door, and means for retracting the bolt from the exterior of the door, said last named means including a retracting lever and a rollback, and a power amplifying connection between said lever and rollback, said power amplifying connection including a third lever pivotally mounted on the lock case.

22. In a panic bolt lock, a lock case, a latch bolt, a retracting and protracting lever in engagement with said bolt, a panic bar for actuating said lever to retract the bolt, and resilient means cooperating with said lever to protract the bolt.

23. In a panic bolt lock, a lock case, a latch bolt in said case, said bolt being provided with a camming slot, a lever having one end received in said slot and cooperating with said bolt to retract and protract the same, and a panic bar in operative engagement with the other end of said lever.

24. In a panic bolt lock for a door or the like, a lock case, a latch bolt in said case, a lever for retracting said latch bolt, a panic bar having an end thereof extending into the lock case, said end at one side thereof engaging said lever, and means engaging the opposite side of the end to hold the panic bar in latch retracted position.

25. In a panic bolt lock for a door or the like, a lock case, a slotted latch bolt mounted in said case, a pair of levers each having an end thereof received in the slot in the bolt, means for actuating one of said levers from the exterior of the door, means for actuating the other of said levers from the interior of the door, and means cooperating with one of said levers for locking the latch in retracted position.

26. In a panic bolt lock, a lock case, a latch bolt in said lock case, a retracting lever engaging said bolt to retract the same, a panic bar engaging said lever to operate the same, and means in said lock case insertable under said bar for locking said lever in bolt retracted position.

In witness whereof, I have hereunto set my hand, this 5 day of July, 1928.

WILLIAM J. CARROLL.