

March 7, 1944.

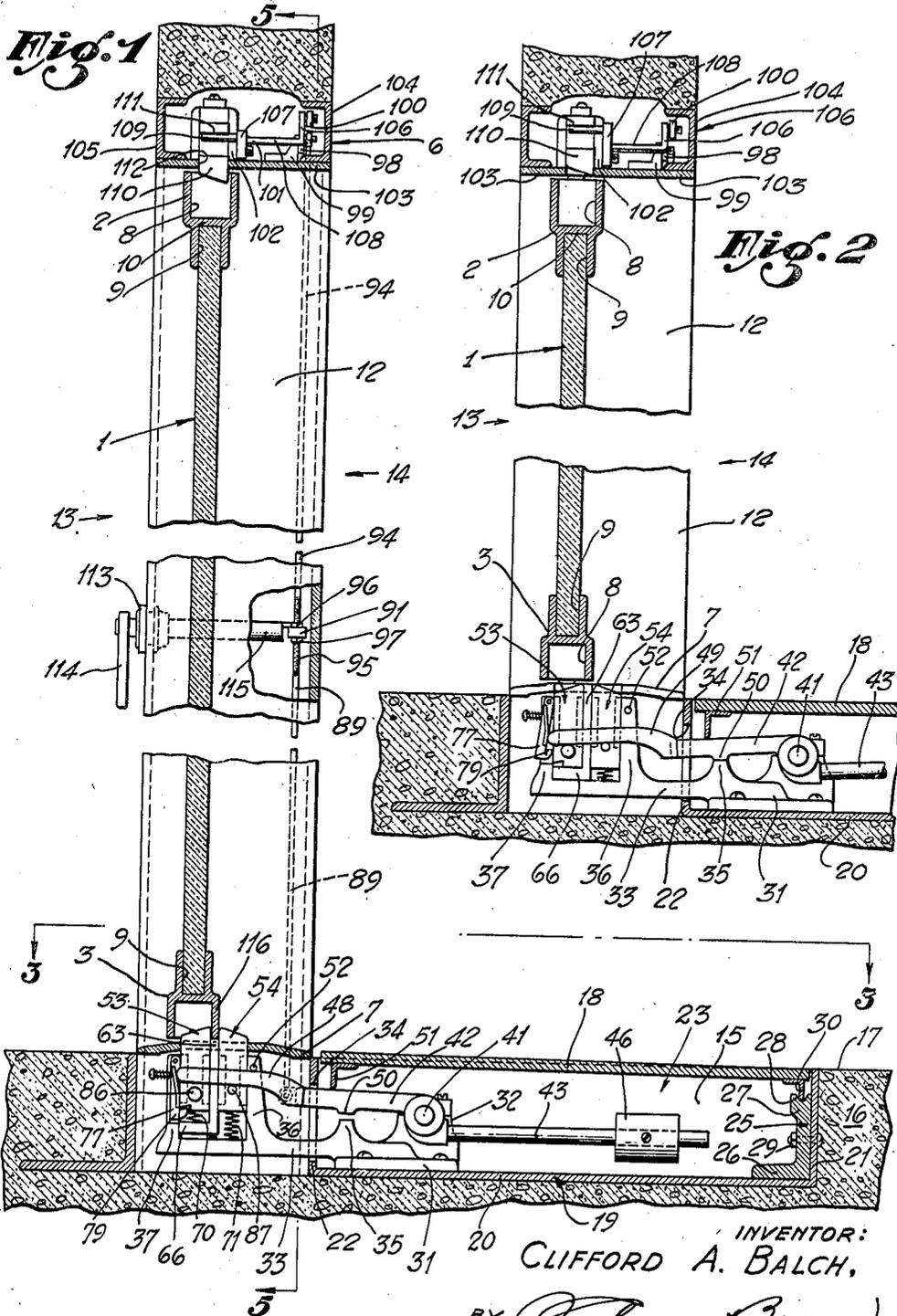
C. A. BALCH

2,343,519

EMERGENCY EXIT DOOR LOCK

Filed April 14, 1942

3 Sheets-Sheet 1



INVENTOR:
CLIFFORD A. BALCH,

BY *Galvin Brown*
ATTORNEY.

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3 Sheets-Sheet 2

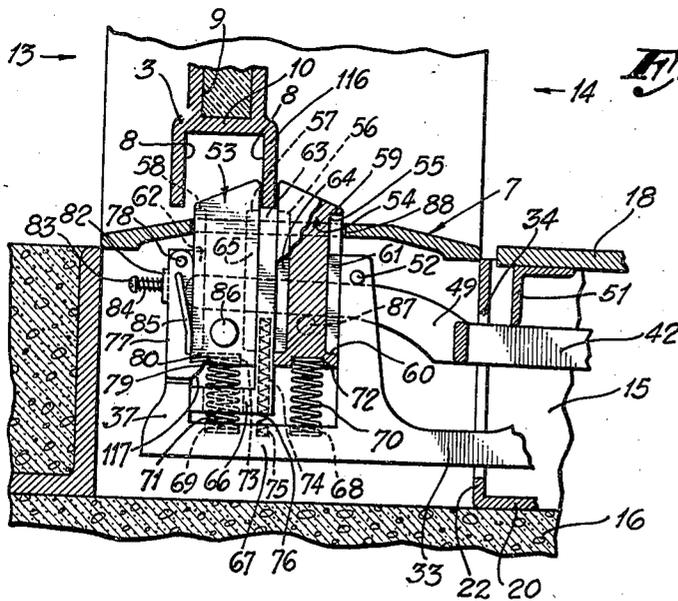
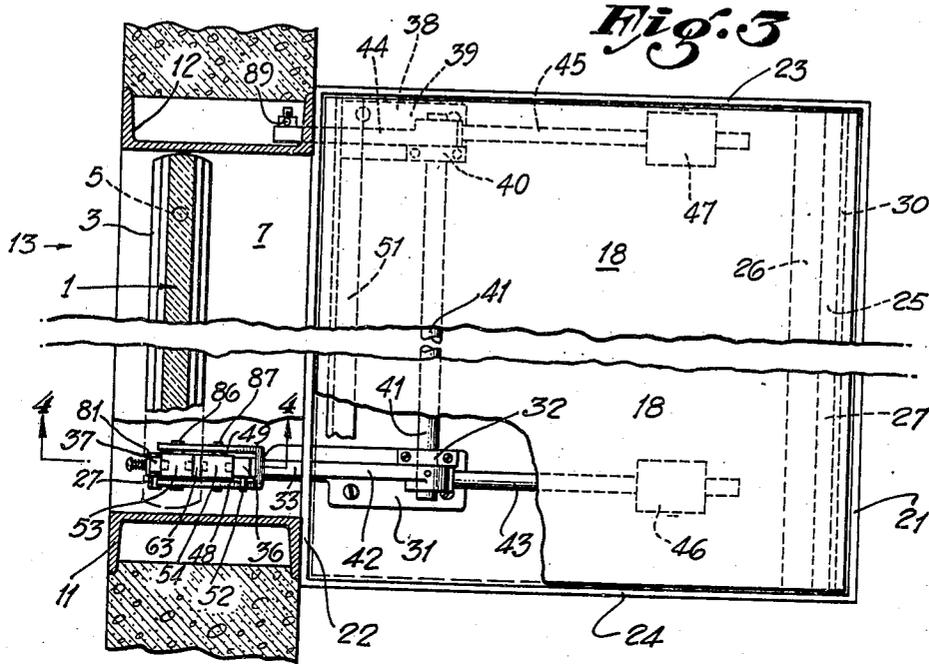


Fig. 4

INVENTOR:
CLIFFORD A. BALCH,
BY *Galvin Brown*
ATTORNEY.

March 7, 1944.

C. A. BALCH

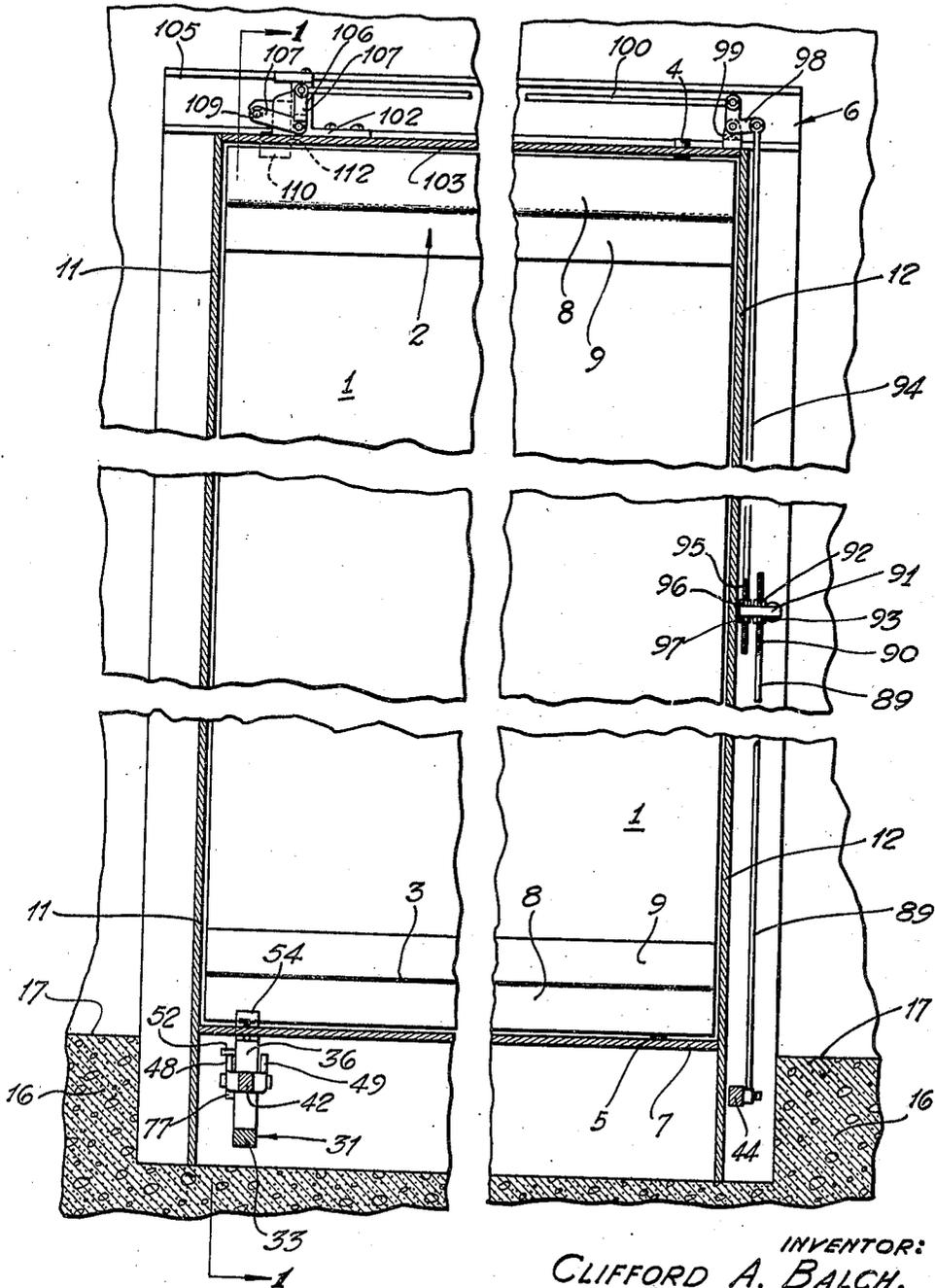
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3 Sheets-Sheet 3

Fig. 5



INVENTOR:
CLIFFORD A. BALCH,
BY *John A. Crown*
ATTORNEY.

UNITED STATES PATENT OFFICE

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EMERGENCY EXIT DOOR LOCK

Clifford A. Balch, Los Angeles, Calif.

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5 Claims. (Cl. 292—21)

This invention relates to emergency exit door locks.

The present invention contemplates the provision of locking mechanism for a swing door and wherein, when the door is approached from inside the building, the depression of a certain member unlocks the door. Approach to the door exterior thereof does not unlock the door, the door requiring either a key to operate the locking mechanism, or some form of combination release.

The door release mechanism of the invention is of use in theatres, and in other public buildings where, in case of fire, instant exit outside of the building is afforded.

The invention has for an object the provision of an emergency exit door lock which is fool proof in construction, of minimum parts, inexpensive in cost of manufacture, easily installed, parts not subject to breakage under ordinary use, and which is generally superior to devices for this purpose now known to the inventor.

A further object of the invention is the provision of an emergency door lock which may be installed with any type of door, whether hinged or pivoted, and regardless of the number of doors, whether single or in pairs.

Another object is the provision of an emergency door lock which may be locked exterior the door and yet not interfere with the release of the lock from the interior of the door if an emergency arises.

With respect to the last named object, the mechanism for releasing the door lock is so constructed and arranged that depression of a platform occasioned by walking thereover is sufficient to release the lock from the inside of the door without in any manner interfering with the locked condition of said door occasioned by locking the same from the exterior thereof. In other words, after the lock has been released by depression of the platform, closing of the door again restores its locked condition so far as the exterior of the door is concerned, with the result that unauthorized entrance through said door and into the building is prevented.

Another object is the provision of novel means operating in conjunction with the lock bolt to prevent unauthorized retraction of said bolt by the insertion of any instrumentality beneath the edge of the door for the purpose of retracting the bolt.

With the above mentioned and other objects in view, the invention consists in the novel and useful provision, formation, construction, association, and relative arrangement of parts, mem-

bers and features, all as shown in certain embodiments in the accompanying drawings, described generally, and more specifically pointed out in the claims.

In the drawings:

Figure 1 is a sectional view on the line 1—1 of Figure 5,

Figure 2 is a fragmentary detail similar to Figure 1, showing certain of the mechanism in changed position,

Figure 3 is a sectional view on the line 3—3 of Figure 1,

Figure 4 is a fragmentary sectional view on the line 4—4 of Figure 3, and,

Figure 5 is a sectional view on the line 5—5 of Figure 1.

Referring now to the drawings, I have shown at 1 a door which may be constructed in any manner, although in the present instance, the said door is of glass and provided at the top and bottom thereof with members 2 and 3. These members in turn are arranged to carry upper and lower pivots or trunnions 4 and 5, which in turn are fitted within journals carried by the head jamb 6 and the sill or threshold 7. In this manner, the said door may swing in two directions. The door may be otherwise mounted, as is self-evident, and I do not confine myself to a glass door. The members 2 and 3 carried by the door are identical in construction and include double channel portions 8 and 9 provided with an intermediate base piece 10. A portion of the door is confined within the channel portion 9, while the other channel portion 8, is adapted to be engaged, either as to a leg thereof or within the channel, by a bolt or latch of some character, to be described.

As is customary practice, the door is within a door frame, which includes the jambs 11 and 12, as well as the head jamb 6 and the threshold or sill 7.

Specifically, this invention has to do with mechanism for locking the door closed, both exteriorly thereof and interiorly, in such a manner that the door may be automatically unlocked when any one approaches the door at the inner side thereof. Referring to Figure 1, it is assumed that the exterior of the door is indicated at 13 and the interior at 14. The interior of the door faces within a room, hallway, alcove, aisle, or other structure, and there is provided on the interior and adjacent the threshold 7 a well 15 formed in the flooring 16. In the present instance, the drawings depict a concrete flooring, although it is obvious that ordinary wood construction may be

resorted to, in which instance, the well would be included between the floor stringers. The floor surface is indicated at 17, and the approach to the sill or threshold 7 from the level of the floor surface 17 to the rear 14 of the door is over a platform 18, which platform overlies the well 15. In the present instance, a pan 19 is fitted within the well and includes a base member 20 provided with end members 21, 22, and sides 23, 24. Secured to the end 21 is a member 25, constituting a fulcrum for one end of the platform 18. This member 25 has its base portion 26 adapted to rest upon the inner surface of the base 20 of the pan and an upright piece or prop 27 formed with a V-shaped groove 28. The upright piece or prop is secured to the end 21 by means of a nut-bolt arrangement 29. The member 25 is of extended length and lies between the sides 23 and 24, as indicated by dotted lines in Figure 3. The lever for the fulcrum constitutes the member 30 secured beneath the platform 18 and adjacent the end wall 21. Member 30 may be an angle iron with one of its legs within the V-groove 28 of the prop 27. The end of the platform adjacent the pan end 22 is adapted to swing out of and within the confines of the well. However, in so swinging, certain mechanism of the invention is adapted to be actuated. This mechanism constitutes lock members actuated by movement of the platform in a downward direction.

Secured to the base 20 is a casting 31 provided with a journal block 32. The casting also includes an extension 33 passed through an interrupted or slotted portion 34 of the end wall 22. This extension includes a bumper or limiting stop member 35 for certain lever mechanism, to be detailed, and a spaced pair of guides 36 and 37. Upon reference to Figure 3, it will be observed that the casting 31 is adjacent the side 24 of the pan and spaced directly opposite said casting, and adjacent the side 23 of the pan is a casting 38, including a base 39 adapted to be secured to the base 20 in any suitable manner. Casting 38 is provided with a journal block 40 in alignment with the journal block 32. A shaft 41 is carried between the journals of the two journal blocks, with ends of said shaft extended beyond the journal blocks. This shaft at one end has secured thereto levers 42 and 43, and the opposite end of the shaft has secured thereto levers 44 and 45. Levers 43 and 45 carry adjustable weights 46 and 47. The lever 42 extends through the slot 34, and is received beneath the sill or threshold 7. The portion of the lever beneath the threshold is forked or bifurcated, the furcations being indicated as 48 and 49. Said furcations transversely straddle opposite sides of the guides 36 and 37. The lever is provided with a stop 50, which cooperates with stop 35 to limit downward swing of the lever. Transversely spanning the free end of the platform 18 and beneath the same is an angle member 51, a leg of which engages the top of levers 42 and 44. The weights 46 and 47 are so adjusted on the levers 43 and 45 as to normally swing the platform about its fulcrum point, as shown in Figure 1. This swinging movement of the levers is limited by one or more pins, one of which is shown at 52 and carried by the guide 36.

The locking mechanism per se includes a pair of bolts 53 and 54 which are slotted along their longitudinal edges at 55, 56, 57 and 58. The slots aforesaid, however, terminate between the head and base of said bolts, as indicated generally for

both said bolts at 59 and 60. The guides 36 and 37 are provided with tongues 61 and 62 received in the slots 55 and 58. Adapted for placement between the two bolts and spacing the two bolts apart is means 63 comprising a bar provided with tongues 64 and 65 disposed on opposite surfaces of said bar, the said tongues received in grooves 56 and 57. This bar is provided with a transverse ring 66 disposed between the base 60 of bolt 53, and the extension 33 at the portion 67. Extension 33 is bored at 68 and 69 to receive ends of coil springs 70 and 71. The bases of the bolts are likewise bored at 72 and 73 to accommodate the upper ends of said springs, the springs normally urging the bolts upwardly, said upward movement being limited by the tongues 61 and 62, reaching the excursion of the slots 55 and 58, as see Figure 4. The coil spring 71 is passed through the ring 66. The bar 63 is bored at 74 as is likewise the part 67 of the extension 33 at 75, to accommodate therebetween a coil spring 76. This coil spring normally urges the bar upwardly between the two bolts 53 and 54.

Secured to the member 37 is a hook latch 77, this hook latch being pivotally secured at 78 to member 37 with the hook portion 79 disposed beneath the base 60 of bolt 53, the base to this end being notched at 80. This hook latch is substantially U-shaped at 81 (see Figure 3) and embraces three sides of the member 37. This construction gives stability to the latch. Passed through one wall 82 of the U-shaped portion 81 is a pin 83, the pin being secured to the upright 37. Surrounding the pin and included between the part 82 and the head of said pin is a coil spring 84. This coil spring normally urges the latch in one direction, to-wit, to cause the hook end to engage the notch 80 of the bolt 53. The side of the hook latch carries a cam member 85 constituting a strip of metal diagonally carried on the side of the latch and in a position to be engaged by the outermost rounded end of the furcation 48. As the lever 42 is depressed, the end of the furcation slides along the surface of the cam and swings the latch to disengage the hook from beneath the bolt 53. Both bolts 53 and 54 carry pins 86 and 87 passed transversely through the bolts, with ends thereof extending beyond opposite side surfaces, as see Figure 3. The furcations 48 and 49 are adapted to engage these pins, the pin 87 being at a greater distance above the base of its bolt than the pin 86 for the bolt 53. This construction is necessary, due to the fact that the furcations normally engage the pin 87 first, to move said bolt downwardly while the furcation 48 moves the latch from engagement with the base of bolt 53 prior to engagement with the pin 86 so that this bolt is freed before attempting to move the same downwardly.

The threshold 7 is slotted at 88 to permit passage of the bolts 53 and 54 and bar 63 there-through.

Secured to the lever 44 is one end of a rod 89. This rod is screw-threaded at 90 and is passed through an offset lever 91, being adjustably secured to said lever by means of nuts 92 and 93, threaded to said rod and positioned on opposite sides of said lever. This construction allows for adjustability of the rod. Also secured to the lever 91 is a rod 94, screw-threaded at 95, and held to said lever by means of nuts 96 and 97, positioned on opposite sides of the lever. The rod 94 is pivotally secured to one end of a bell crank 98, the bell crank being intermediately pivotally

secured to a bracket 99 positioned in the head jamb 6. The opposite end of the bell crank has pivotally secured thereto a link 100, the link being pivotally secured to one lever of a bell crank 101. The bell crank 101 is pivotally secured to a bracket 102 carried in the head jamb 6 and particularly the transverse finish piece or trim 103, which extends between the head jamb members 104 and 105. The bell crank 101 has one arm 106 offset or spaced relative to its other arm 107 through the medium of a transverse piece 108, as shown in Figure 2. The arm 107 is provided with a transverse pin 109. The bracket 102 is provided with a guide casing for a slide bolt 110, the said bolt being transversely slotted at 111 to receive the pin 109. The member 103 is slotted at 112 to permit passage of the head of the bolt therethrough and for reception in the channel 3, as see Figure 1.

Exterior the door and confined in the jamb 12 is a lock mechanism 113. This may be a permutation lock, key lock, or otherwise, and includes a handle 114 adapted to be hand-manipulated to rotate member 115 when the lock is open and in turn move both links or rods 89 and 94 through the medium of lever 91 to lock the door closed or to throw the lock by moving the upper and lower bolts 110, 53 and 54.

The operation, uses and advantages of the invention are as follows:

Viewing the arrangement of the mechanism, together with the door as depicted in Figure 1, one leg 116 of channel member 3 lies between the two bolts 53 and 54 and depresses the bar 63 to such position that the ring or annulus 66 is out of engagement with the inclined or rounded edge 117 of the hook 79 of latch 77. It is evident that the bolt 54 acts as a stop and the bolt 53 as the latching element. The bolt has the usual beveled edge to permit ready retraction of the bolt when the channel member 3 swings there-against. I first assume that the door is locked closed so that the handle 114 cannot be moved externally of said door. Upon approaching the door from the inward side thereof, to-wit, 14, and stepping upon the platform 18, the platform will be swung downwardly so that the member 51 attached beneath the platform at its front edge will depress the two levers 42 and 44.

Depression of said levers is limited by the stops 35 and 50 and corresponding stops carried by the member 33 and lever 44. Movement of the lever 42 downwardly will cause movement of the stop bolt 54 due to the forked or bifurcated end of said lever 42 engaging the pin 87 and as said lever continues to move downwardly, the hook latch is swung out of position from beneath the bolt 53 by the end of the furcation 48 engaging the cam member 85 prior to engagement by the furcations with the pin 86. Upon engagement of the furcations with said pin 86, there will be downward movement of the bolt 53 to release the leg 116 of the channel member 3. Downward movement of the bolts 53 and 54 compresses springs 70 and 71. The position of the bolts when retracted beneath the threshold 7 is illustrated in Figure 2. Movement of the lever 44 downwardly pulls the links or rods 89 and 94 to swing the lever 91 downwardly without, however, disturbing the lock 113.

This downward movement will rotate the bell crank 98 in a clockwise direction and likewise rotate the bell crank 101 clockwise, due to link connection 100 between bell cranks 98 and 101. This movement will cause the pin 109 to engage

the upper wall bounding the slot 111 in the upper bolt 110 and raise the same from the position shown in Figure 1 to that shown in Figure 2, that is to say, out of the channel 2. Thus, the door is released and may be swung outwardly or inwardly. However, the movement would be outwardly under the present operation.

If we now assume that the platform is in the position shown in Figure 1, and the door locked, the door bolts may be released upon proper operation of the lock 113 and movement of the handle 114 to rotate shaft 115 and cause downward movement of lever 91, which will again rotate the bell cranks 98 and 101 in a clockwise direction, and depress lever 44, and due to rotation of said latter lever, the shaft 41 will be rotated to move the arm or lever 42 downwardly, which will retract bolts 53 and 54 from the position of Figure 1 to that of Figure 2.

While I have shown counter-balance weights 46 and 47, it is obvious that I may utilize any other means, such as springs, to maintain the levers 42 and 44 so positioned as to raise the forward end of the platform when the platform is not sustaining a load.

If we assume that some unauthorized person desires to open the door 1 without engaging the lock 113 and attempts to pry some instrument between the lower edge of the channel member 3 and the bolt 53, no movement of the bolt 53 will occur due to the locking thereof against movement by the hook catch 77. It is not until lever 42 is depressed so as to cam the hook catch from beneath the base of bolt 53 that necessary operations result to release the bolts from keeper engagement, the keepers being the channel members 2 and 3.

It is evident that a door may be locked closed without the use of stiles to hold the door, in that the single bolt at the top of the door engages the channel member, and a leg of the channel member 3 at the bottom of the door is positioned between the two bolts.

If the door 1 is open and no load is upon the platform 18, the lower bolts may rise through the threshold and the upper bolt may be positioned downward, as shown in Figure 1. In this case, the spring 76 will urge the bar 63 upwardly so that an edge of the ring 66 will engage the curved or beveled edge 79 of the hook latch and move the same from beneath the bolt 53. Thus, when the door is swung closed, the bolt 54 will remain in its upward position, to-wit, above the surface of the threshold, the leg of the channel member depressing the bolt 53. Thus, the bolt 54 acts as a stop member to stop movement of the door and the bolt 53 acts as the latch for the door. When a leg of the channel member is received between said bolts, the bar 63 is depressed so that the ring is out of engagement with the hook latch whereupon, under influence of the spring 84, the hook latch will again be positioned so that the hook end 79 thereof is within notch 80. So far as relationship between the upper and lower bolts is concerned, it is evident that both the bolts 53 and 110 enter the channel members 2 and 3. It is further evident that both bolts have tapered ends so as to readily cam the bolts within their respective housings as the door is closed and still permit the bolts to again drop into proper position to latch the door closed.

The invention is not limited to glass doors provided with top and bottom channel members, or to any particular type of door, as it may be wood

or metal; or to any particular number of doors, as it is evident that a single platform may release many locks of the character described for several doors.

It is evident that I might interconnect the various links or rods 89 and 94 to the lever 42 in place of the lever 44, thus dispensing with said lever. However, for nicety of balance, the arrangement shown in the drawings has been found efficient.

In an authorized person operates the lock 113 and swings the handle 114 to depress the bolts 53, 54 and 110, the door may be swung inwardly in place of outwardly. The person desiring to close the door is positioned upon the platform, which holds the various bolts retracted so that the door may again assume the position shown in Figure 1. If, however, the door should be moved without the operator thereof standing on the platform, one leg of the channel 3 would depress the bolt 54 downwardly so that a channel leg would be received in the space included between the two bolts were it not for the fact that the upper channel would engage the bolt 112 and prevent this from occurring. Thus, a person attempting to close the door would be advised of the fact that the lock should be operated to retract the bolts and this could be readily accomplished by standing on the platform so that when the door is moved properly to a closed position, the lock bolts will engage the channel members, as shown in Figure 1. Ordinary door closers may be utilized with a door of this character, and further, the door need not be pivoted as shown in Figure 5, but may be hinged in the usual manner.

I claim:

1. The combination with a swinging door, of a well member at one side of said door, a platform overlying said well member, means for fulcruming the platform at one end thereof, the opposite end being free to move; a lever, means for mounting the same within said well member and beneath the platform, the free end of said platform engaging said lever, means normally tending to rotate said lever and lift the free end of said platform, a bolt engageable with said door and with said lever, and a hook latch provided with a cam normally positioned beneath said bolt to hold said bolt in door engagement, the said lever engageable with said cam to move said hook lever from beneath said bolt when said platform is depressed, whereby the bolt may be moved from door engagement.

2. The combination with a swinging door, of a pair of bolt members normally urged into door

engagement to hold the door locked, a hook latch engageable beneath one of said bolts to prevent movement thereof in one direction, and a latch release positioned between said bolts and engageable with said hook latch to move said hook latch from bolt engagement.

3. A combination with a swinging door, of a pair of spaced apart bolt members between which an edge of the door is adapted to be received to hold the door locked, a hook latch engageable beneath one of said bolt members to prevent movement thereof in one direction, and a swinging lever for engagement with said hook latch to move said hook latch from beneath said bolt member and to thereafter move both said bolt members to release the door.

4. A combination with a swinging door, of a pair of spaced apart bolt members normally urged into door engagement to hold the door locked, the said door when locked having an edge portion positioned between the pair of bolt members; a hook latch engageable beneath one of said bolt members to prevent movement thereof in one direction, said hook latch provided with a cam, a swinging lever for engagement with said cam to move said hook latch from beneath said bolt, the swinging lever constructed and arranged to move both said bolts to release the door, and a member positioned between the bolt members and having a portion for engagement with the hook latch for maintaining said hook latch out of engagement with its bolt member when the bolts are released from door engagement.

5. A combination with a swinging door, of a pair of bolt members between which a portion of the door is received for holding the door locked; resilient means for normally urging the bolt members into door engagement; a hook latch engageable beneath one of said bolt members to prevent movement of said bolt from door engagement, a swinging lever for engagement with said hook latch to release the same from bolt engagement and permit movement of both bolts in one direction to release the door; a member positioned between the said bolts and resilient means for urging said member in one direction to bring the member into hook latch engagement and to maintain said hook latch from engagement with one of the bolts, moving the door for reception between the pair of bolt members, depressing said last named member to release the hook latch and again permit the hook latch to engage beneath one of the bolt members.

CLIFFORD A. BALCH.