

L. R. LOUGHBOROUGH.
FIRE ESCAPE DOOR.
APPLICATION FILED JUNE 11, 1908.

974,404.

Patented Nov. 1, 1910.

2 SHEETS—SHEET 2.

Fig. 3.

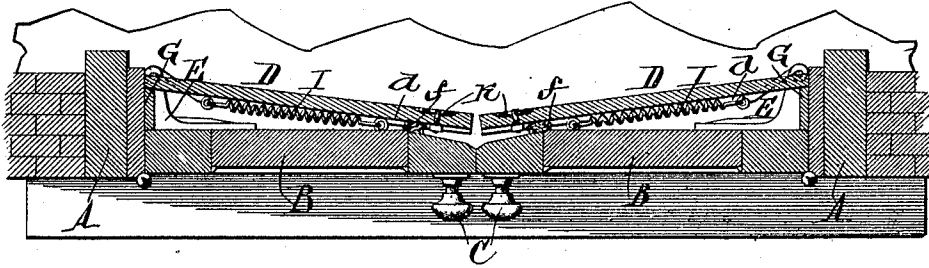


Fig. 4.

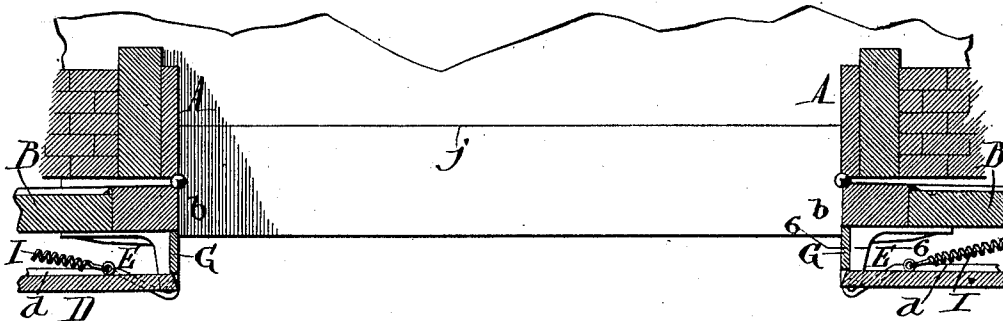


Fig. 5.

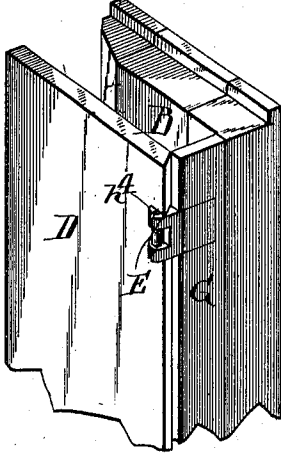


Fig. 6.

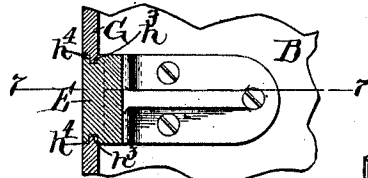


Fig. 7.

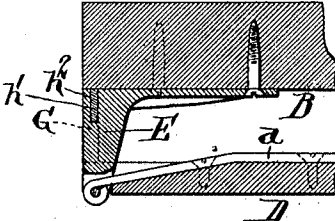


Fig. 9.

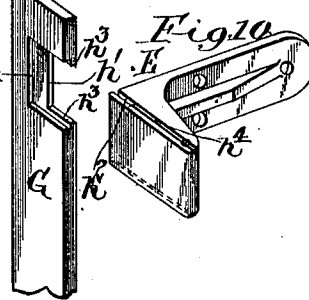
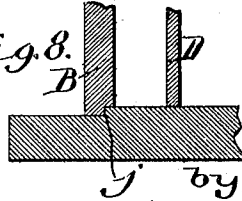


Fig. 10.

Fig. 8.



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UNITED STATES PATENT OFFICE.

LEROY R. LOUGHBOROUGH, OF ROCHESTER, NEW YORK.

FIRE-ESCAPE DOOR.

974,404.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Application filed June 11, 1908. Serial No. 437,828.

To all whom it may concern:

Be it known that I, LEROY R. LOUGHBOROUGH, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Fire-Escape Doors, of which the following is a specification.

This invention relates to an emergency exit or fire-escape door intended more especially for schools, theaters and other buildings in which persons assemble in large numbers. Its chief object is the provision of a door which ordinarily cannot be opened or unlocked from the outside, but which can be unlocked and opened by a comparatively slight pressure against the inside thereof, thus affording a certain and reliable means of escape from the building in case of fire or panic.

Further objects of the invention are to provide an inexpensive door of this character which has no key-lock, which is free from complicated and confusing unlocking devices, and which, when opened, leaves the passageway free from obstructions liable to catch the clothing or retard exit through it.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a front elevation of a pair of doors equipped with the invention. Fig. 2 is a horizontal section, on an enlarged scale, in line 2—2, Fig. 1, showing the doors locked. Fig. 3 is a similar section showing the inner doors or braces deflected to the position in which they release the main or outer doors. Fig. 4 is a similar section, showing the doors fully opened. Fig. 5 is a fragmentary perspective view of one of the doors. Fig. 6 is a vertical section in line 6—6, Fig. 4. Fig. 7 is a horizontal section in line 7—7, Fig. 6. Fig. 8 is a vertical section in line 8—8, Fig. 1. Fig. 9 is a fragmentary perspective view of one of the filling strips. Fig. 10 is a perspective view of one of the brackets to which the inner doors are hinged.

Similar letters of reference indicate corresponding parts throughout the several views.

A indicates the door-case or frame and B, B a pair of main or outer doors of ordinary construction hinged to swing outward, as shown at *b*. These doors have no key-locks or locking bolts, but may have the customary outside-knobs C. Each of these

doors is provided on its inner side with a brace D, preferably in the form of an auxiliary or inner door of about the same dimensions as the corresponding outer door. These inner doors are capable of swinging toward and from the outer doors, and, in the construction shown in the drawings, are hinged at their outer edges to inward extensions or brackets E secured to the inner sides of the outer doors adjacent to their hinged edges. In the normal position of the inner doors, they stand in line with each other and their free inner edges meet or abut like those of the outer doors and are arranged substantially in line with the meeting edges of the latter. The inward movement of the inner doors beyond that position is limited by any suitable means. Flexible connections, such as chains *f* located near the meeting edges of the doors are preferably employed for this purpose, as shown.

The inner and outer doors are spaced a suitable distance apart to permit the inner doors to be deflected or swung outward out of line with each other, for unlocking the doors, as shown in Fig. 3. It is desirable to close the space between the hinged edges of the inner and outer doors, and this is preferably done by means of vertical filling strips G extending throughout the height of the doors and suitably secured thereto. In the preferred construction shown in the drawings, these filling strips abut against the inner sides of the outer doors and are provided with recesses *h* which receive the adjacent portions of the brackets, so that their faces are substantially flush with the filling strips. The strips are not entirely cut away within these recesses, but reduced vertical webs *h*¹ are left in their inner portions which fit into vertical slits or grooves *h*² formed in the brackets, as best shown in Fig. 7. The upper and lower edges of these recesses are formed with tongues *h*³ which interlock with horizontal grooves *h*⁴ formed in the upper and lower edges of the brackets, as seen in Fig. 6.

A spring I is interposed between the inner and outer door of each set to resist the outward movement of the inner doors by a blow against the outside of the outer doors in an attempt to displace or deflect the inner doors out of their locking position. In their preferred form, these springs are spiral and secured at their ends to the opposing sides

of the corresponding inner and outer doors, respectively. These springs are under tension when the doors are closed, and in order to have a constant tendency to swing the inner doors inwardly or toward their locking position, their points of attachment to the inner doors are on the front sides of straight lines passing through their points of attachment to the outer doors and the hinge-pintles of the inner doors, as shown in Fig. 2. As shown in Fig. 8, the sill of the door-frame is shouldered, as shown at *j*, to limit the inward movement of the outer doors, and the inner doors are short enough to clear said shoulder.

When the doors are closed, as shown in Figs. 1 and 2, the inner doors or braces D stand in line with each other and substantially parallel with the closed outer doors and abut against each other. It is evident that in this position they effectually resist opening of the outer doors from the outside of the building, inasmuch as the brackets E which carry the inner doors must be free to move toward the meeting edges of the doors in order to permit the main or outer doors to swing outward on their hinges, but such movement is obviously blocked by the abutting inner doors, which practically form a toggle-like brace extending across the two outer doors. While the doors thus cannot be opened by a pull or otherwise from the outside, a comparatively slight outward pressure against the inner doors will deflect them out of line with each other, as shown in Fig. 3, thus unlocking the outer doors, which are thrown open by the continued pressure against the inner doors which strike the outer doors. It is therefore practically impossible for the doors to fail to open when pressure is exerted outward against them from the inside of the building permitting a speedy and unobstructed exit of the occupants of the building in case of a fire or other emergency.

The inner doors are free from knobs, levers or other parts liable to confuse persons seeking to escape, or to catch the clothing, and when the doors are open, the passageway is clear and free from obstructions of any kind.

Although the same result would obviously be attained if the inner doors or braces were smaller or extended across only a portion of the outer doors, yet it is desirable to extend them from the bottom upward a considerable distance, so as to present a large surface against which pressure may be exerted at any point throughout its height, to unlock and open the doors.

The doors are closed like ordinary hinged doors, and in order to enable them to be conveniently closed from the inside of the building, the inner doors may be provided with folding or disappearing handles or

rings $\frac{1}{2}$ of any suitable construction, so as not to project when not in use.

The springs I tend constantly to move the inner doors inward into their locking position, shown in Fig. 1, and therefore baffle any attempt to jar them into their unlocked position by a blow against the outer doors.

In opening the doors, it is desirable that the inner doors should be deflected or unlocked before any outward pressure is exerted against the outer doors. During the initial outward or unlocking movement of the inner doors, the springs I are extended and tend to pull the outer doors inward, thus permitting the inner doors to be deflected with little effort, which would not be the case if the arrangement were such that the outer doors would immediately receive the outward pressure exerted against the inner doors. Such outward pressure against the outer doors, by causing the brackets E to move toward each other, would obviously increase the transverse thrust upon the inner doors and require greater force to deflect them. In other words by this improved arrangement the outer doors remain closed during the releasing movement of the inner doors and are not opened until the inner doors come in contact therewith.

As shown in the drawings, the hinge-straps *d* of the inner doors preferably extend to the free edges of the latter, so that the opposing straps abut in the locked position of the doors. This construction insures the proper locking of the doors even if the doors themselves should warp or shrink.

Various changes and modifications may obviously be made in the form and details of the door without departing from the scope and spirit of the invention, and I do not therefore wish to be limited to the particular construction herein shown and described.

I claim as my invention:

1. The combination of a boltless door, and a locking brace therefor arranged to normally resist opening of the door from the outside and movable under outward pressure from the inside to a position to release the door, substantially as set forth.

2. The combination of a boltless outwardly-opening door, and a locking-brace carried by the door, the brace being arranged to normally resist opening of the door, but movable under outward pressure from the inside to a position to release the door, substantially as set forth.

3. The combination of a door, a swinging locking brace pivoted to the inner side of the door and movable toward and from the same, a part against which the free end of the brace abuts when in its normal position to resist opening of the door from the outside, and means for limiting the inward

movement of the brace, substantially as set forth.

4. The combination of a door, a swinging locking brace pivoted to the inner side of the door and movable toward and from the same, a part against which the free end of the brace abuts when in its normal position to resist opening of the door from the outside, and a flexible connection between the door and the brace for limiting the inward movement of the brace, substantially as set forth.

5. The combination of a door, a swinging locking brace pivoted to the inner side of the door and movable toward and from the same, a part against which the free end of the brace abuts when in its normal position to resist opening of the door from the outside, and a spring for resisting the outward movement of the brace, substantially as set forth.

6. The combination of a door, a swinging locking brace pivoted to the inner side of the door and movable toward and from the same, a part against which the free end of the brace abuts when in its normal position to resist opening of the door from the outside, means for limiting the inward movement of the brace, and a spring for resisting the outward movement of the brace, substantially as set forth.

7. The combination of a door, a swinging locking brace pivoted to the inner side of the door and movable toward and from the same, a part against which the free end of the brace abuts when in its normal position to resist opening of the door from the outside, and an extensible spring attached at its ends to said brace and the door, substantially as set forth.

8. The combination of a door, a horizontally-swinging locking brace pivoted at its outer end to the inner side of the door and movable toward and from the same, a part against which the free end of the brace abuts when in its normal position, and a spiral spring attached at one end to the door and having its other end attached to said brace on the outer side of a line passing through the pivot of the brace and the first-named attaching-point of the spring, substantially as set forth.

9. The combination of a door, a locking brace mounted on the inner side of the door and movable toward and from the same, a part against which the inner edge of the brace normally abuts to resist opening of the door from the outside, and means cooperating with the brace for exerting an inward pull on the door during the releasing movement of the brace.

10. The combination of a door, a swinging locking brace pivoted to the inner side thereof and movable toward and from the same, a part against which the free inner

end of the brace normally abuts to resist opening of the door from the outside, and means controlled by the brace for exerting an inward pull on the door during the deflection of the brace.

11. The combination of a hinged door provided on its inner side near its hinged edge with a bracket, a horizontally-swinging locking brace hinged at its outer edge to said bracket, and a part against which the free end of the brace abuts when in its normal position, substantially as set forth.

12. The combination of a hinged main door, a locking-brace in the form of an inner door pivoted to the inner side of the main door, and a part against which the free edge of the brace abuts when in its normal position, to resist opening of the main door from the outside, said brace being movable under outward pressure from the inside to a position to release the main door, substantially as set forth.

13. The combination of a pair of hinged doors, cooperating locking braces hinged at their outer ends to the inner sides of the doors, and extensible springs connecting the doors and braces for resisting the outward movement of the braces and exerting an inward pull on the outer doors.

14. The combination of a pair of hinged doors, cooperating locking braces hinged at their outer ends to the inner sides of the doors, and normally abutting against each other, means for limiting the inward movement of the braces, and extensible springs connecting the doors and braces.

15. The combination of a pair of hinged doors, brackets secured to the inner sides of the doors near their hinged edges, cooperating horizontally-swinging locking braces pivoted at their outer edges to said brackets, the meeting edges of the braces being substantially in line with the meeting edges of the doors, flexible connections between said braces and the doors, and springs connecting the braces with the respective doors, substantially as set forth.

16. The combination of a main hinged door, a horizontally-swinging locking brace in the form of an inner door hinge to the inner side of the main door and spaced therefrom, an upright filling strip closing the space between the outer edges of said brace and the main door, and a part against which the inner edge of the brace abuts when in its normal position, substantially as set forth.

17. The combination of a hinged door, a bracket secured to the inner side of the door adjacent to its hinged edge and having a vertical slit, a locking brace in the form of an inner door hinged to said bracket, a vertical filling strip arranged in the slit of the bracket and closing the space between the outer edges of the door and said brace, and

a part against which the inner edge of said
brace abuts when in its normal position, sub-
stantially as set forth.

18. The combination of a hinged door, a
5 bracket secured to the inner side of the door
adjacent to its hinged edge and having a
vertical slit in its inner face and horizontal
grooves in its top and bottom, a locking
brace in the form of an inner door hinged
10 to said bracket, a vertical filling strip having
a recess which receives the bracket, said re-

cess containing a web fitted in the slit of the
bracket and provided at its upper and lower
edges with tongues which engage said
grooves, substantially as set forth.

Witness my hand this 8th day of June, 15
1908.

LEROY R. LOUGHBOROUGH.

Witnesses:

JOHN H. AYAK,
R. EDWARD GASKIN.