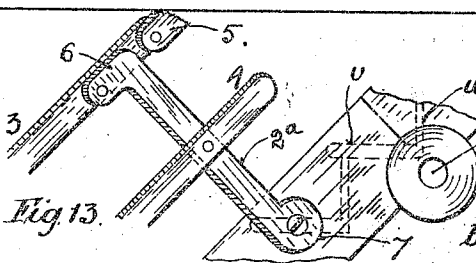
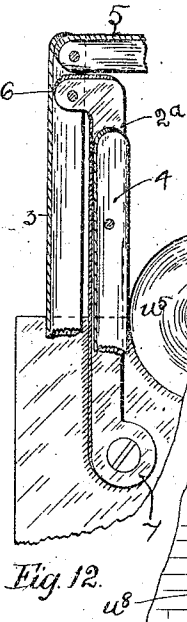
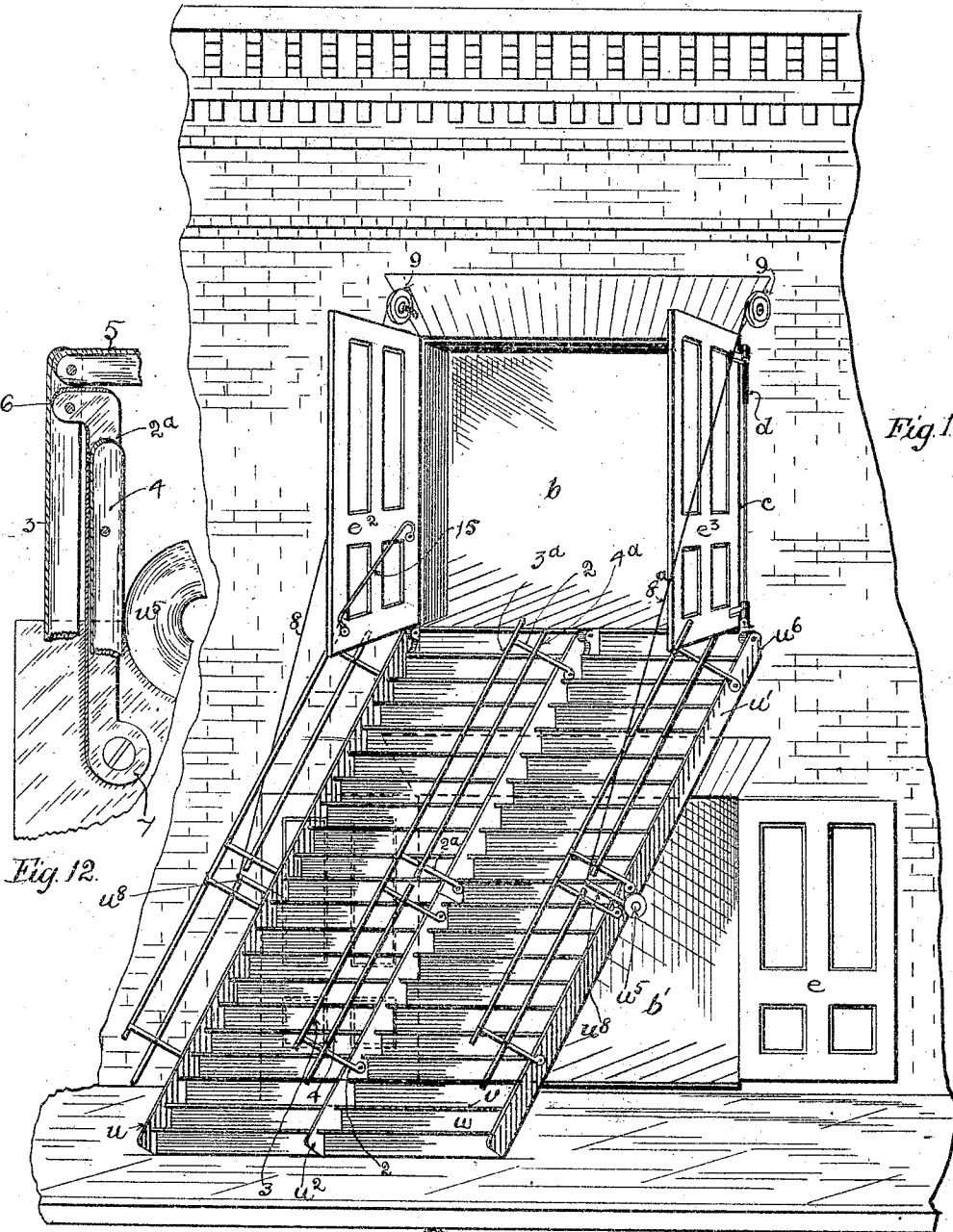


A. C. MOWREY.
 DROP STAIR FIRE ESCAPE.
 APPLICATION FILED OCT. 19, 1908.

937,710.

Patented Oct. 19, 1909.
 3 SHEETS—SHEET 1.



Witnesses:
 S. M. Philbrick
 Ralph R. Dunway

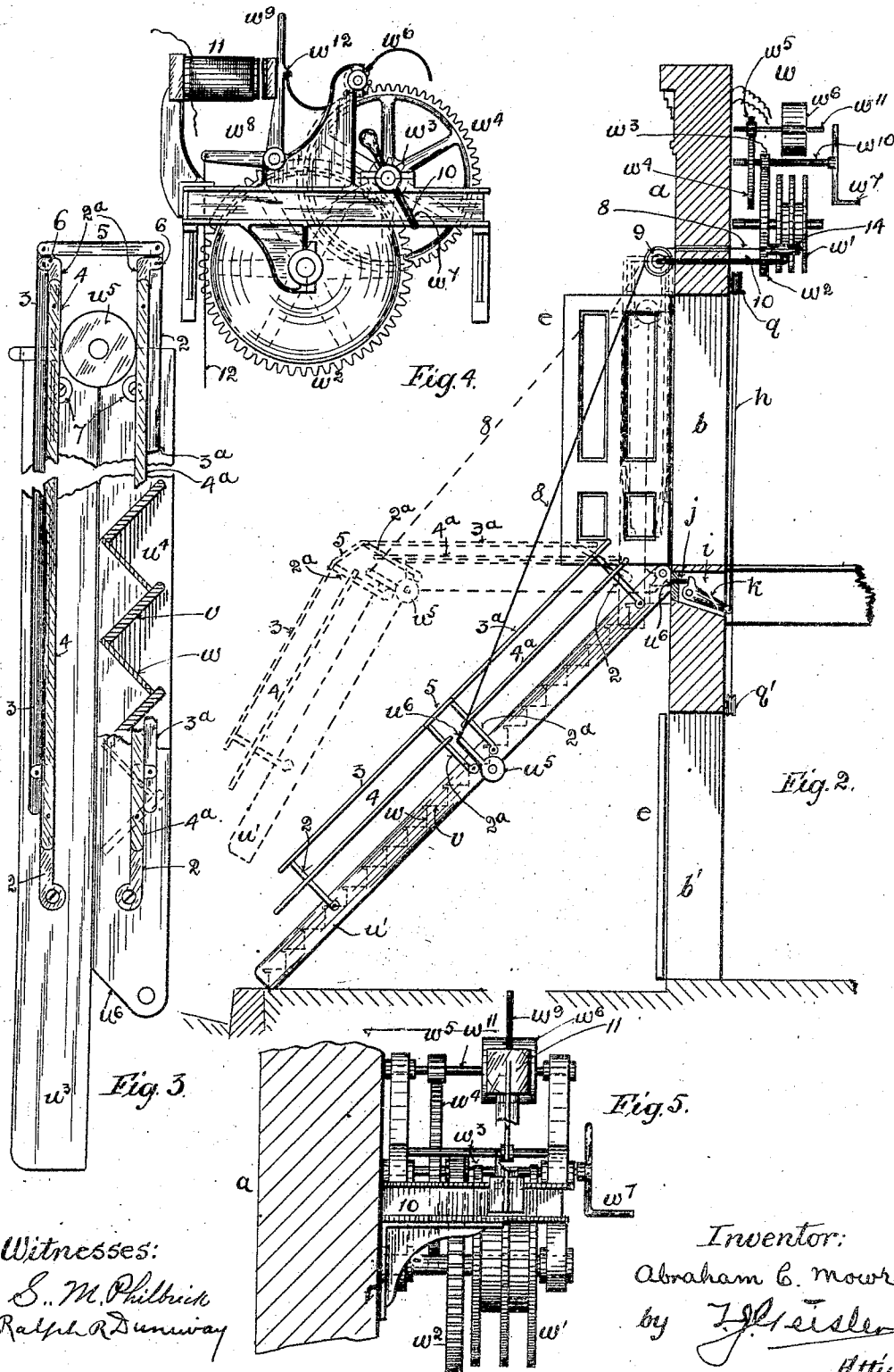
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3 SHEETS—SHEET 3.

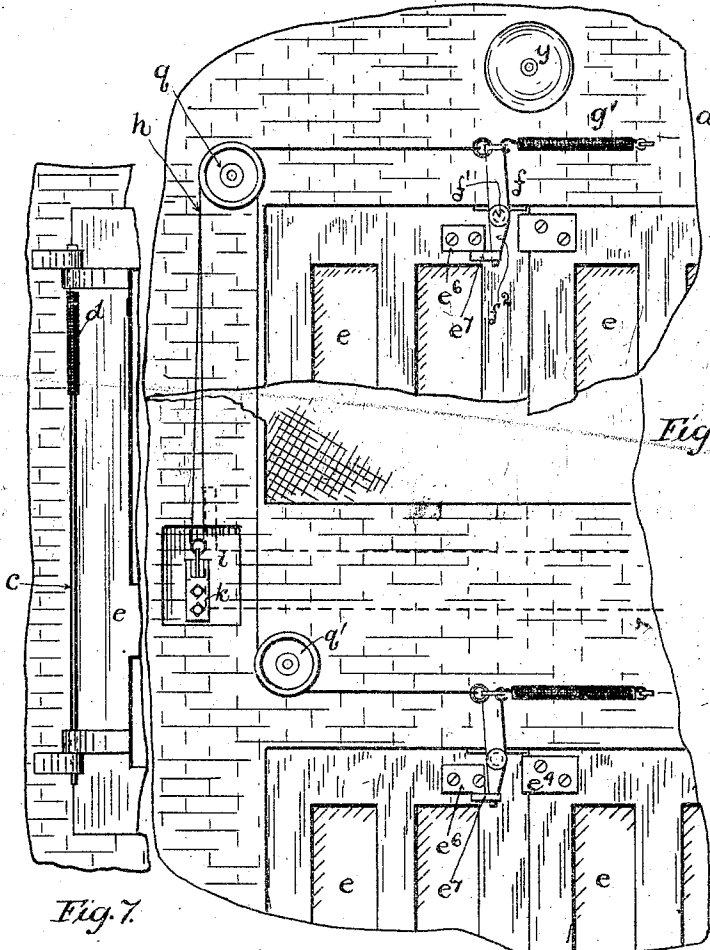


Fig. 7.

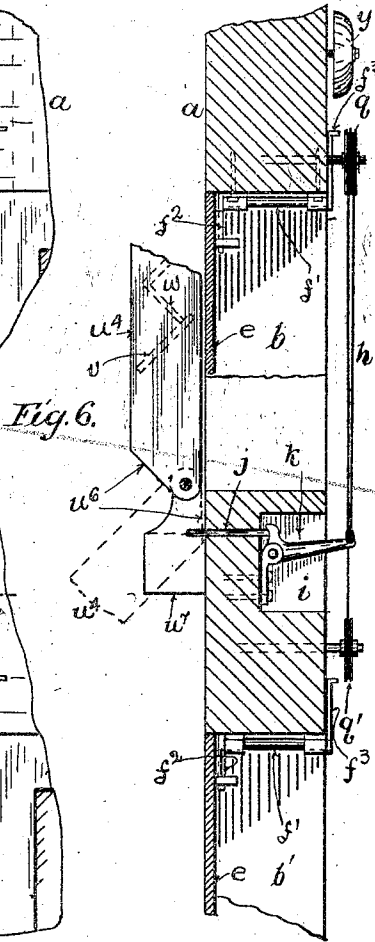


Fig. 6.

Fig. 8.

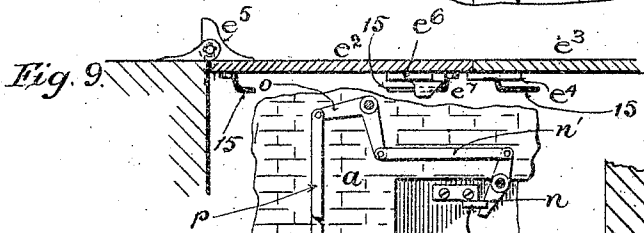


Fig. 9.

Fig. 10.

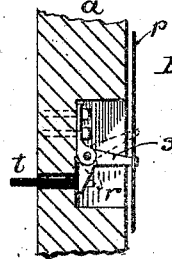


Fig. 11.

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UNITED STATES PATENT OFFICE.

ABRAHAM C. MOWREY, OF PORTLAND, OREGON.

DROP-STAIR FIRE-ESCAPE.

937,710.

Specification of Letters Patent. Patented Oct. 19, 1909.

Application filed October 19, 1908. Serial No. 458,530.

To all whom it may concern:

Be it known that I, ABRAHAM C. MOWREY, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented a new and useful Drop-Stair Fire-Escape, of which the following is a specification.

This invention has for its object to provide a fire escape which consists of a drop-stairway secured on the exterior of the building and normally supported uplifted, and doors leading out thereto which are normally closed, and cannot be opened until the stairway has been dropped and about reached the ground; whereupon the doors will be swung open automatically. The stairway is dropped by pushing the button of electro-magnetic means controlling the releasing devices, or by operating equivalent releasing devices; and the dropping of the stairway operates automatically the door-opening devices.

The advantages of my invention and the arrangements of its component parts will be readily understood from the detailed description thereof below given, and the accompanying drawings.

In the drawing Figure 1 shows, perspective, a portion of a building-front provided with my drop stairway; the stairway having been dropped, and the doors opened as would be done when my invention has been operated to provide an exit from an upper story to the street. Fig. 2 is a sectional detail showing my drop-stairway as dropped to the ground, and the doors opened. It also shows the stairway, in dotted outline, in its normal uplifted position, and in its intermediate position. This view further shows the means for lifting the stairway to its normal position, and for releasing the same, and opening the doors; Fig. 3 is a sectional detail on a larger scale, showing my stairway as arranged when uplifted into its normal position; Figs. 4 and 5 are respectively, in the order named, front and end elevations of the mechanism provided for winding up the cable or rope by which my stairway is supported in its normal uplifted positions, and show also the means for releasing the cable of the stairway, so that the latter may drop to the street by its own weight; Fig. 6 is an inner face elevation of broken-away parts of the outer wall of the building, showing the

means provided for locking the doors until automatically released by the dropping of my stairway; Fig. 7 is a corresponding detail, though on somewhat larger scale than Fig. 6, showing an outer-face view of one of the doors and spring controlled means whereby they are swung outward, when the lock thereof is unbolted; Fig. 8 is a sectional detail of a portion of a wall and door leading to my drop-stairway, and shows the arrangement of the means provided for automatically unlocking the door as soon as the drop-stairway has about reached the ground. Fig. 9 is a horizontal sectional-detail corresponding with Fig. 6 in scale and shows more particularly the arrangement of the means whereby the doors are locked until automatically released by the dropping of my stairway; Figs. 10 and 11 are sectional details illustrating substantially the same features as illustrated by Figs. 6 and 8, but showing a modified arrangement and construction of the means for automatically releasing the bolts of the doors by the dropping of my stairway; and Figs. 12 and 13 are details of construction of my stairway.

Referring now to the letters as designating the parts: It is necessary in the first place to state that the outer wall *a* of the building is provided with doorways *b-b'* leading to the street; the latter representing the ground floor, and the former the first story. My invention may be practically applied as an emergency exit to the second, third and fourth stories. The doors *e* are so hinged as to swing outward. Each of the doors consists of two members respectively *e*²—*e*³ controlled by the well known rod and coil spring *c, d*, as illustrated in Fig. 7, or other suitable door-spring adapted to open the door when unrestrained. One of the abutting inner edges of the two door members, *e*² and *e*³ is provided with the usual lap-piece *e*⁴, and each of the door-members is provided with a stop *e*⁵.

*e*⁶ is a catch having a lip *e*⁷ which is engaged by a lever *f* controlled by a spring *g* and by a cable *h* connecting with a bell-crank *i* bearing against a pin *j*, the arrangement of which details are readily understood by having reference to Figs. 2, 6 and 8. Thus, the two door-members are locked by the lap-piece *e*⁴ on the door-member *e*³ holding the door-member *e*², and the catch *e*⁶ being engaged by the lever *f*. The lever *f* is necessarily

arranged as shown in Fig. 8, consisting of a hinged central-member f' and arms f^2, f^3 . The means provided for locking and automatically opening the doors of the several floors are all the same in arrangement. Where only two stories or floors are to be provided with my drop-stair fire escape, the lock-releasing mechanism could be connected as illustrated in the drawings; but where a third and fourth story would have to be taken care of, each of the third and fourth stories would have an independent exterior drop-stairway, and the arrangement of the door-locking and releasing mechanism would be substantially the same as illustrated and described.

The bell-crank k shown in Figs. 2, 6 and 8 is preferably housed in a recess i therefor made in the wall of the building, so as not to project too far beyond the face of the wall. $q-q'$ are pulleys over which the cable k runs.

The modified construction of my door-locking and releasing mechanism, illustrated in Figs. 10 and 11 represents door-members l, l' corresponding with e^2 of the other views. n is a catch; n' a pivoted lever, connected by link n' with bell-crank o to a rod p , the lower end of which is connected by a bell-crank o' to a link n^2 connected with a lever n^3 , arranged to normally lock the doors as mentioned.

In the recess r of the wall (Figs. 10 and 11) is pivoted a bell-crank s which is connected with the rod p , and bears against a pin t arranged similarly to the pin j above described. In either case the door-lock-releasing mechanism is operated by the heel u^6 of one of the stair stringers bearing against the pin j (or t) when the stairway is dropped.

The construction of my folding stairway is more clearly shown in Figs. 2, 3, 12 and 13, in connection with Fig. 1. The same is preferably built of metal, and comprises stringers u, u' at the two sides and a central stringer u^2 ; for, since my stairway is to provide an exit for emergencies, I deem it preferable to build the same of sufficient width to afford ample room for four columns of descending people. The central stringers u^2 , besides providing an additional stiffening medium for the center of the stairway, also enables me to provide a central hand-rail 3^b . Thus, each of the four columns of descending people is provided with a hand-rail, and hand-rails are essential to prevent the people from falling or being thrown down by the crash of persons behind them, under exciting conditions.

Each of the stair stringers is made of two pieces u^3, u^4 , hinged together at u^5 as shown. Between the pieces u^3 and u^4 of the stringers are built the treads v and risers w . To each stair stringer are pivoted a number of

posts, $2, 2^a, 2^b$, and to the latter are pivoted the hand rails $3, 3^a$, and bars $4, 4^a$. The inner ends of the hand-rails $3, 3^a$ are connected by links 5 , and the outer ends of the hand rail members $3, 3^a$ are connected to the posts $2, 2^b$ as illustrated in Figs. 12 and 13; that is to say, the posts $2, 2^a, 2^b$ are made with integral pivot-heads $6, 7$, at their extremities, the rail-members $3, 3^a, 4, 4^a$ are pivoted to opposite faces of the posts, and the links 5 are pivoted on the same sides or faces as the rail-members $4, 4^a$, which arrangement is required to enable the folding of the parts, as illustrated, when the stairway is placed in its uplifted position. At the joints u^5 the members u^3, u^4 of the exterior stair-stringers are bolted arms u^6 , which are connected to cables $8, 8^a$ running over pulleys 9 and winding on the hoisting mechanism w . Larger-scale details of the hoisting mechanism are shown in Figs. 4 and 5. It consists of drum w' journaled in a supporting frame 10 . On the axle drum w' is rigidly mounted a gear w^2 meshing with a pinion w^3 on the axle w^{10} of gear w^4 , meshing with a pinion w^5 on the axle w^{11} of a fan w^6 . w' is a crank-handle on the projecting end of the axle w^{10} . w^8 is a dog, provided with a lug w^{12} adapted to engage with one wing or member of the fan w^6 . The dog w^8 is provided with a plate or armature w^9 opposite an electro-magnet 11 , which is connected with a suitable battery and contact-means, such as a push button, which details are not shown because readily understood.

To the lower end of the horizontal member of the dog w^8 is connected a cord or rod 12 . Thus, the dog w^8 may be operated to release the stairway in one of two ways; either by pulling on the cord or rod 12 , or by placing the electro-magnet 11 in circuit.

The interior ends of the hoisting cables $8, 8^a$ are led over laterally arranged pulleys 14 leading said ends to the drum of the hoisting mechanism. To place my drop-stairs into its normal uplifted position the crank w^7 is operated to wind up the cables $8, 8^a$ on the drum w' . The cable-wind on the drum is omitted in the drawings for the sake of clearness. In the winding of the cable on the drum w' the fan w^6 is rotated and operates as a pawl.

In the case of a theater, the electric button could be located on the stage, so that the moment the emergency arises the stairway may be dropped and the doors opened leading out to the same. If, however, the emergency is discovered in the first place by people near my drop-stair exits my device will be operated by pulling on the cord or rod 12 .

The necessity for so arranging my devices that the doors controlling the emergency exits are locked until the stairway has nearly reached the ground is self evident. Not

until the moment referred to can the doors be opened by the application of ordinary force. Warning notices, of course, should be posted near the doors cautioning the people, in proximity thereto, not to bear against the doors, but keep away therefrom until the automatic opening occurs, which, as mentioned, is caused by the operation of the stairway dropping to the ground, and occurs at the instant the stairway has about touched the ground. This action requires only a very short interval of time, after the stairway has been released.

It may be expedient to connect an electric or other alarm-gong *y* with the door releasing mechanism. The details of said connection are unimportant, but the same should be so arranged that the moment the stairway-dropping and door-releasing devices are set into operation the alarm is sounded.

During the operation of the stairway controlling-devices to drop the latter, the fan *w*⁶ operates as a retarding medium, sufficiently retarding the dropping of the stairway to prevent the lower end thereof striking the ground with such force as to break the structure. The drop-stairway is hinged to exterior brackets *w*⁷.

The inner faces of the two door-members are provided with hand rails *15* arranged to lead to the hand-rails of the stairway.

The hand-rails *15* provide means for closing the doors again when my drop-stairway has been operated for testing the same, as naturally should be done from time to time, to see that it is in order.

The doors *e*, under such circumstances may be re-locked as soon as the drop-stairway has been lifted a sufficient degree to take the heel *w*⁶ off the pin *j*.

I claim:

1. The combination with a building having an outwardly swinging door in its exterior walls, and means adapted to open said door when released, of a stairway pivoted exterior of the building under said door, said stairway consisting of hinged portions arranged to fold together when the stairway is lifted, jointed hand-rails on the stairway and adapted to fold therewith, cables attached to the stairway and means to which the opposite ends of the cables are attached, which means are adapted to permit the cables to gradually lower the stairway, and means for arresting said stairway lowering devices.

2. The combination with a building having an outwardly swinging door in its exterior walls, and means adapted to open said door when released, of a stairway pivoted exterior of the building under said door, said stairway consisting of hinged portions arranged to fold together when the stairway is lifted, jointed hand-rails on the stairway and adapted to fold therewith, cables at-

tached to the stairway and means to which the opposite ends of the cables are attached, which means are adapted to permit the cables to gradually lower the stairway, means for arresting said stairway lowering devices, and a lock for the door, and mechanism connected therewith, operated by the drop of the stairway, to release the lock.

3. The combination with a building having an outwardly swinging door in its exterior walls, and means adapted to open said door when released, of a stairway pivoted exterior of the building under said door, said stairway consisting of hinged portions arranged to fold together when the stairway is lifted, jointed hand-rails on the stairway and adapted to fold therewith, a windlass, and cables suspending the stairway from the windlass, means for normally arresting the windlass, means for controlling the speed of the windlass when released, and a lock for the door, and mechanism connected therewith, operated by the drop of the stairway, to release the lock.

4. The combination with a building having an outwardly swinging door in its exterior walls, and means adapted to open said door when released, of a stairway pivoted exterior of the building under said door, said stairway consisting of hinged portions arranged to fold together when the stairway is lifted, jointed hand-rails on the stairway and adapted to fold therewith, a windlass, and cables suspending the stairway from the windlass, means for normally arresting the windlass, a fan for controlling the speed of the windlass when released, and a lock for the door, and mechanism connected therewith, operated by the drop of the stairway, to release the lock.

5. The combination with a building having an outwardly swinging door in its exterior walls, and means adapted to open said door when released, of a stairway pivoted exterior of the building under said door, said stairway consisting of hinged portions arranged to fold together when the stairway is lifted, hand-rails on said stairway consisting of posts pivoted to the stair-stringers of each stair-portion, a windlass, and cables suspending the stairway from the windlass, and means for arresting said stairway lowering devices.

6. The combination with a building having an outwardly swinging door in its exterior walls, and means adapted to open said door when released, of a stairway pivoted exterior of the building under said door, said stairway consisting of hinged portions arranged to fold together when the stairway is lifted, hand-rails on said stairway consisting of posts pivoted to the stair-stringers of each stair-portion, a windlass, and cables suspending the stairway from the windlass, means for arresting said stairway lowering

devices, and a lock for the door, and mechanism connected therewith, operated by the drop of the stairway, to release the lock.

7. The combination of a support, a jointed
5 stairway hinged to said support, said stairway consisting of hinged portions arranged to fold together when said stairway is lifted, jointed hand-rails on the stairway and adapted to fold therewith, cables attached
10 to the stairway and means to which the opposite ends of the cables are attached, which means are adapted to permit the cables to gradually lower the stairway, and means for arresting said stairway lowering devices.
- 15 8. The combination of a support, a jointed stairway hinged to said support, said stairway consisting of hinged portions arranged to fold together when said stairway is lifted, jointed hand-rails on the stairway and
20 adapted to fold therewith, a windlass, and

cables suspending the stairway from the windlass, means for normally arresting the windlass, and a fan for controlling the speed of the windlass when released.

9. The combination of a support, a jointed
25 stairway hinged to said support, said stairway consisting of hinged portions arranged to fold together when said stairway is lifted, hand-rails on said stairway consisting of posts pivoted to the stair-stringers of each
30 stair-portion, a windlass, and cables suspending the stairway from the windlass, means for normally arresting the windlass, and a fan for controlling the speed of the windlass when released.

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