

(No Model.)

2 Sheets—Sheet 1.

W. W. LUMMUS.
FIRE ESCAPE.

No. 479,436.

Patented July 26, 1892.

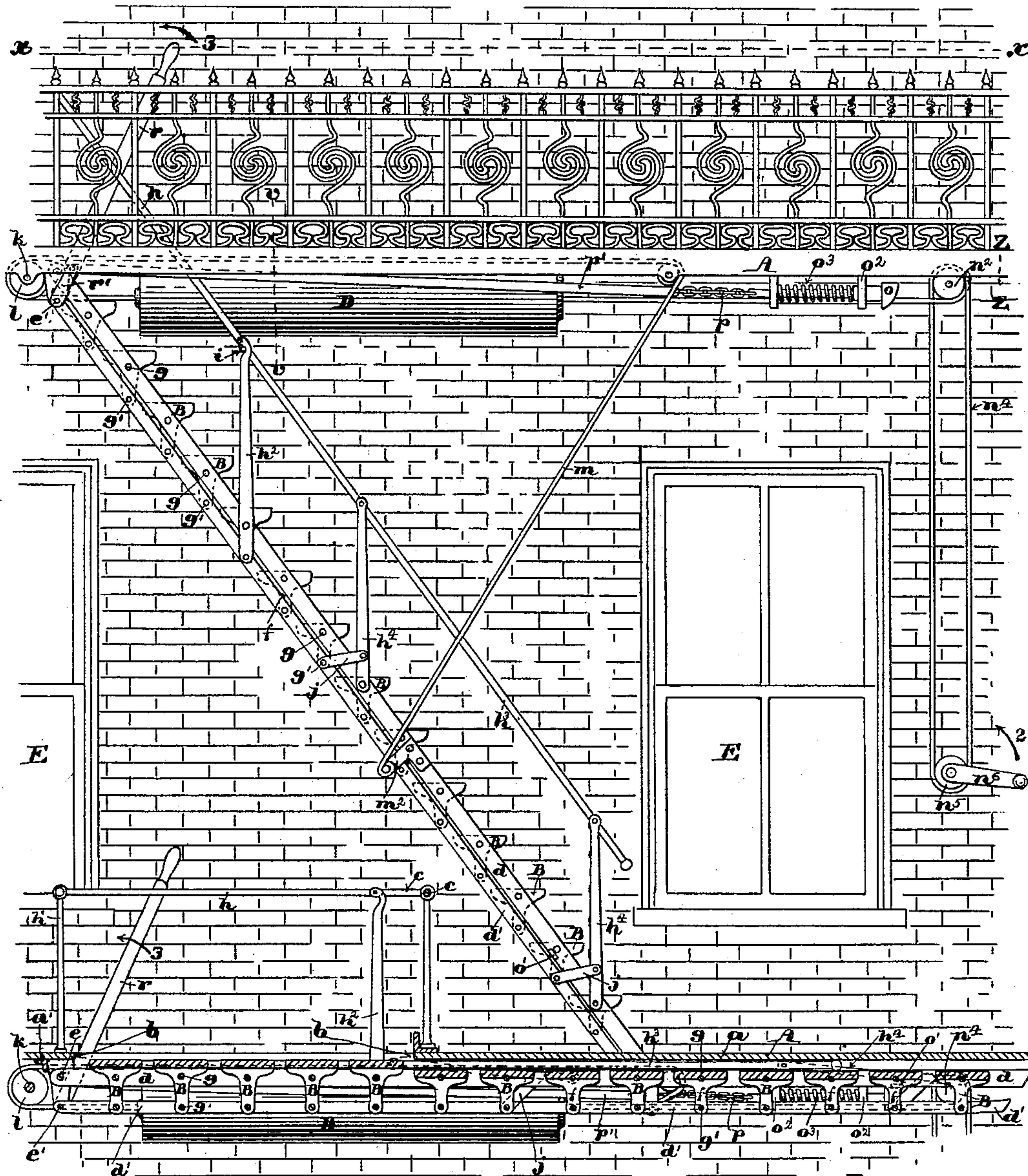


Fig. 1.

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Attorney.

(No Model.)

2 Sheets—Sheet 2.

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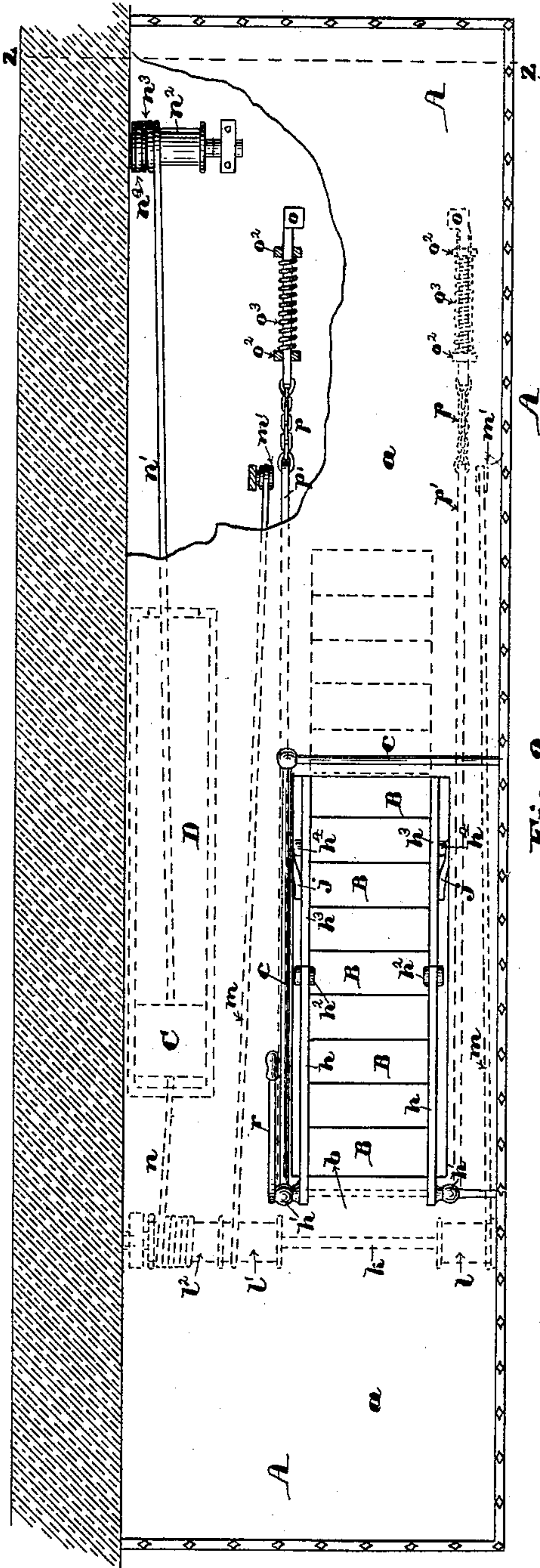


Fig. 2.

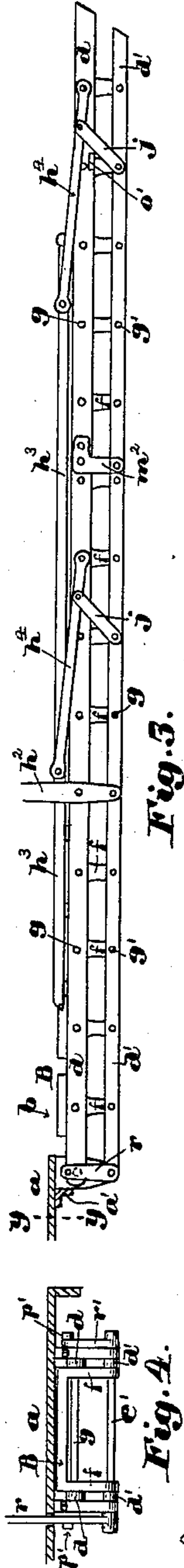


Fig. 3.

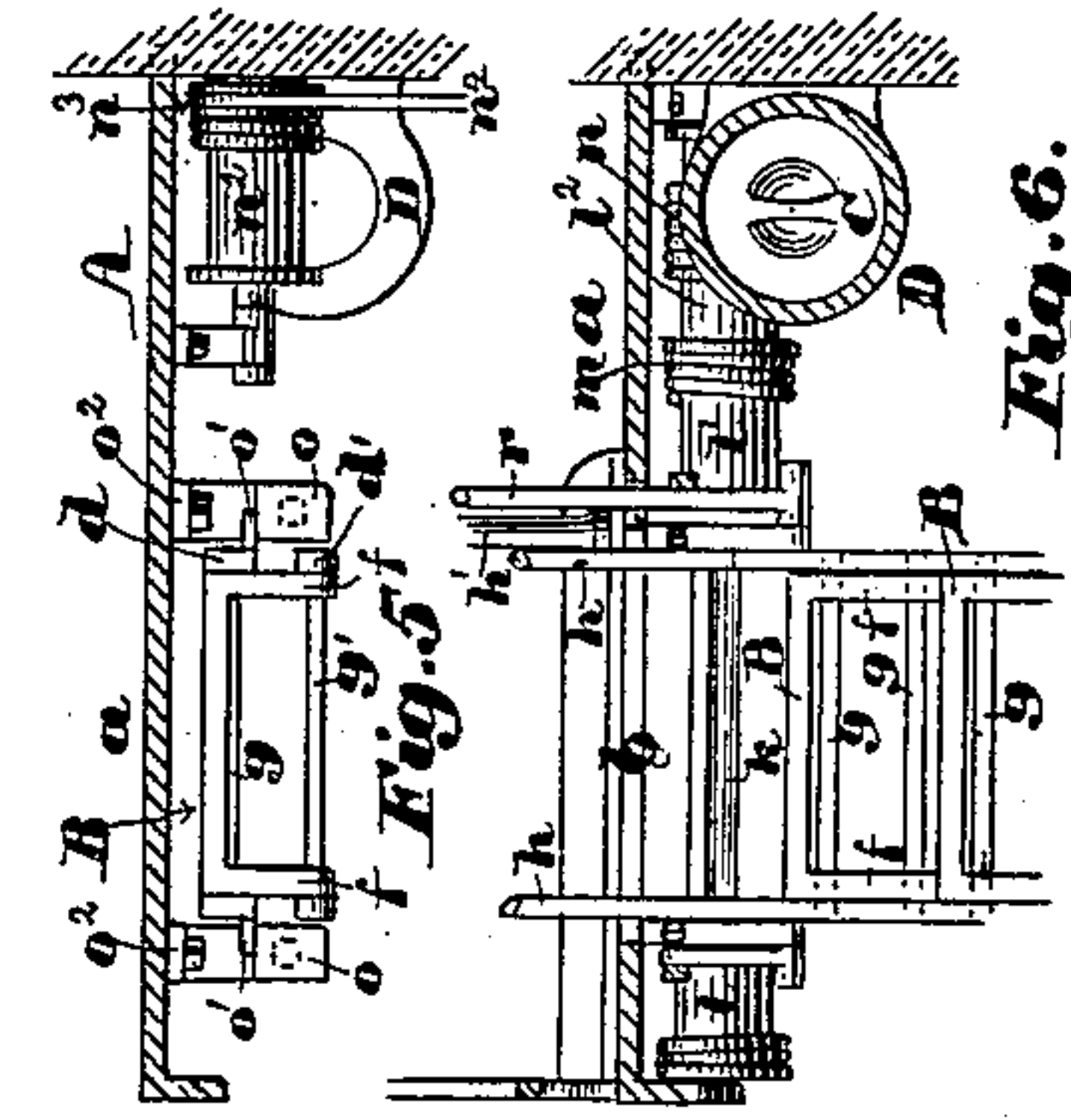


Fig. 5.

Fig. 6.

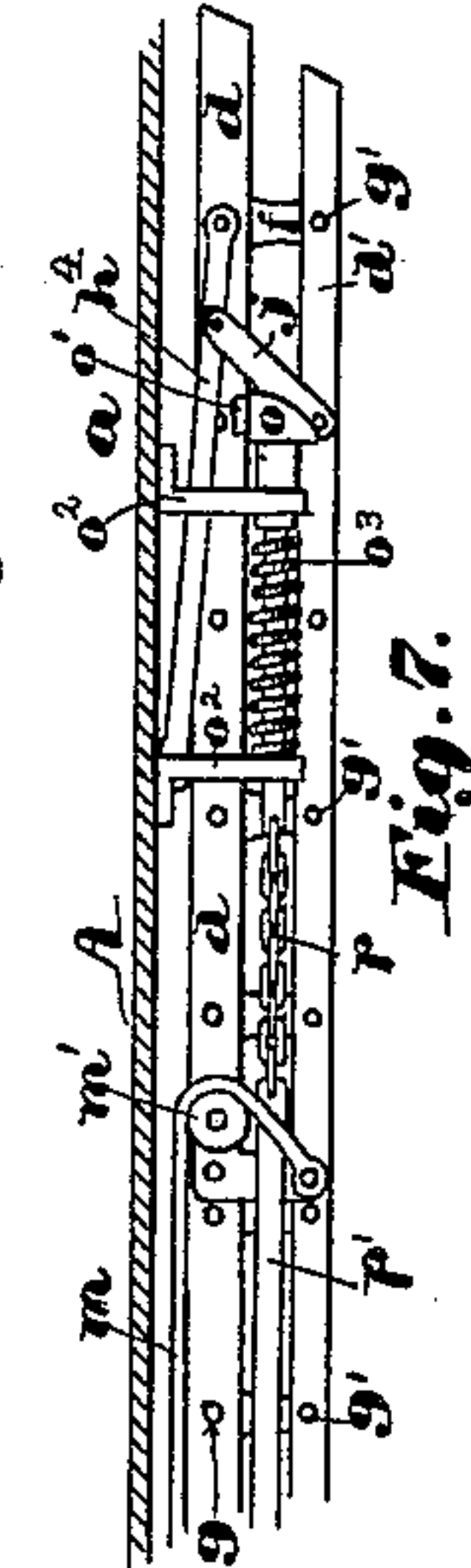


Fig. 7.

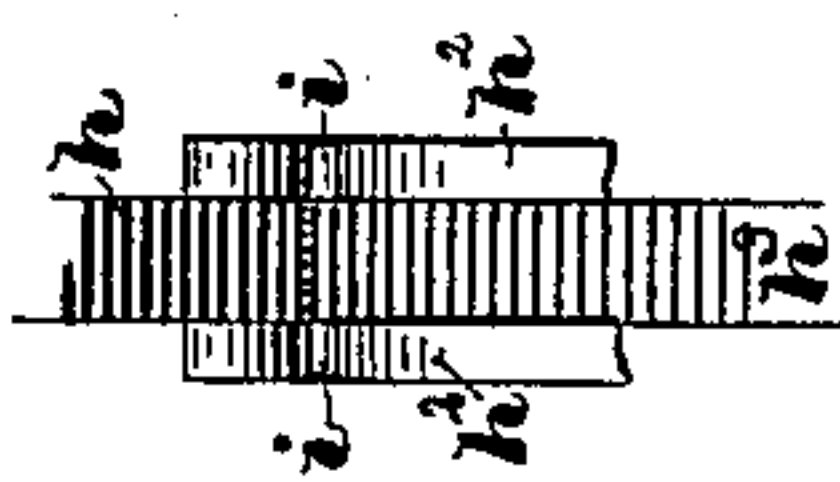


Fig. 8.

Fig. 9.

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UNITED STATES PATENT OFFICE.

WILLIAM W. LUMMUS, OF LYNN, MASSACHUSETTS.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 479,436, dated July 26, 1892.

Application filed July 19, 1890. Serial No. 359,292. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. LUMMUS, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Fire-Escapes, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to fire-escapes, and especially to that class of fire-escapes which are attached to the exterior of the walls of a building, has for its object the production of a fire-escape which when required for use shall extend from the upper story of the building or from any particular story to the ground, be perfectly safe even for women and children, and when not in use as a fire-escape shall not disfigure the building or be available as a means of aiding burglars to gain access to the building; and it consists in certain novel features of construction, arrangement, and combination of parts, which will be readily understood by reference to the description of the drawings and to the claims hereinafter given and in which my invention is clearly pointed out.

Figure 1 of the drawings is an elevation of a portion of the exterior wall of a building with my invention applied thereto, the stairs leading from the lower balcony to the ground being shown in their normal or raised position and in section, and the stairs leading from the lower balcony to the one next above being shown in their lowered position for use in case of fire. Fig. 2 represents a section through the wall of the building on line $x x$ on Fig. 1 and showing the upper balcony and the stairs leading therefrom in position for use as a fire-escape in plan. Fig. 3 is a side elevation of the stairs in their raised position with a portion of the hand-rail folded down upon the stringer, so that said stairs may be raised to a horizontal position close under the floor of the balcony. Fig. 4 is a section through the balcony-floor on line $y y$ on Fig. 3 and showing the stairs and the levers and rocker-shaft for unlocking the stairs in elevation. Fig. 5 is a transverse section of the balcony on line $z z$ on Figs. 1 and 2. Fig. 6 is a transverse section of the balcony on line $v v$ on Fig. 1. Fig. 7 is an elevation of a portion of the stairs in its raised and locked position, and Figs. 8 and 9 represent details

illustrating the connection of the upper and lower portions of the hand-rail on the stairs.

In the drawings, A A are balconies built upon the exterior of the building, one at each story, and made entirely of metal, so that they cannot be burned, and are provided with an inclosing guard-railing around their outer edge of sufficient height and strength to preclude the possibility of persons being crowded from said balconies in case of a panic. These balconies may be constructed in any desired manner consistent with proper strength and regard to safety and due provision for permitting the raising of the stairs to a horizontal position directly beneath the floor a of the balcony when not required for use as a fire-escape. The floor a has cut through it a rectangular opening b near its front side, which opening has a railing c along its inner side and across one end, as shown in Figs. 1, 2, and 6. At the end of the opening b , where there is no rail, there are secured to the under side of the floor a or to the beam a' , which supports said floor, two stands or hangers, to which are pivoted the stringers of a flight of stairs, each composed of two bars d and d' , which are secured to said stands or hangers by independent pivots arranged one directly over the other, as shown at e and e' in Figs. 1 and 3. Each of the bars d and d' is also pivoted to each tread B B of the stairs in such a manner that the upper surface of each tread remains at all times in a horizontal position whatever may be the angle at which the stringer-bars d and d' may be placed.

The treads B B are each provided with downwardly-projecting arms $f f$, one at each end, through which the pivots connecting the stringer-bars $d d'$ to said treads pass, as shown at $g g'$. When the stringer-bars d and d' are raised into a horizontal position, the arms $f f$ of the tread B will be at right angles to said bars, and the upper surfaces of a portion of the treads will be in close proximity to the under side of the floor a , while the upper surfaces of the remaining treads will be on a level, or nearly so, with the upper surface of said floor, said last-mentioned treads being pivoted to the stringer-bars at a greater distance from their upper surfaces than the others, as shown in Fig. 1.

A section of a hand-rail h is pivoted at one

end to the upper end of a standard h' , set in a fixed position on the landing at the head of the stairs, and at the other end to the upper end of the double or slotted standard h^2 , connected to the stairs by the same pivots which connect one of the treads B to the stringer-bars d and d' , so that said double standard h^2 will always maintain an upright or vertical position whatever may be the position of the stringer-bars d and d' . That portion of the hand-rail h^3 which extends from the foot of the stairs upward and which when the stairs are raised extends beneath the floor a of the balcony beyond the opening b is pivoted to the upper ends of two or more standards h^4 , which are pivoted to the upper stringer-bar d by the same pivots that connect said bar to two or more of the treads B, the upper end of said rail h^3 extending between the two parts of the double or slotted standard h^2 and provided at its extreme end with laterally-projecting pins or lugs i , which when the stairs are in the position shown in the upper part of Fig. 1 engage with the concave side of the bent upper portions of said double standard h^2 , as shown in Figs. 1, 8, and 9. The standards h^4 have each pivoted thereto a short distance above their pivotal connection to the stringer-bar d one end of a link j , the opposite end of which is pivoted to the stringer-bar d' by the same pivot that connects said bar to the tread B next above the one to which the lower end of said standard h^4 is pivoted, so that when the stairs are raised to a horizontal position the rail h^3 will be folded down upon the upper edge of the stringer-bar d , as shown in Fig. 3 and the lower part of Fig. 1.

Beneath the floor a of the balcony A is mounted in suitable bearings the shaft k in near proximity to the head of the stairs, upon which are secured three drums l , l' , and l^2 . (Shown in full lines in Figs. 1 and 6 and in dotted lines in Fig. 2.) To each of the drums l and l' is connected one end of a wire rope or chain m , which, after passing over a sheave m' , has its other end secured to a bracket m^2 , attached to and projecting from a stringer-bar of the stairs, as shown in Figs. 1 and 7. The drum l^2 has secured thereto one end of a wire rope or chain n , the other end of which is attached to one side of the piston C, fitted to and movable in the cylinder D, supported beneath the floor a in any convenient and suitable manner, the opposite side of said piston having attached thereto the wire rope or chain n' , which extends to and has its other end connected to the drum n^2 , mounted in suitable bearings beneath the floor a at or near the right-hand end of the balcony, as shown in Figs. 1, 2, and 5. The drum n^2 has connected thereto a sheave or sprocket-wheel n^3 , from which the endless wire rope or chain n^4 leads to and partly around the sheave or sprocket-wheel n^5 , having secured thereto the crank n^6 and located at a convenient height to be operated by a person standing on the balcony A.

The right-hand end of the cylinder D is entirely open, or nearly so, while the other end is closed, except a hole in the center of its head for the passage of the rope or chain n and to permit the escape of the air, which fills said cylinder between the piston C and said cylinder-head, when said piston is moved toward said cylinder-head by the descent of the movable end of the stairs at a sufficiently-slow rate of speed to prevent the foot of the stairs striking the balcony-floor with too great a force, the air in said cylinder acting as a cushion to retard the descent of the stairs.

When the stairs are in the position shown in the upper part of Fig. 1 and it is desired to raise them to a horizontal position, as shown in the lower part of said figure and in Figs. 3 and 7, the operator turns the crank n^6 in the direction indicated by the arrow 2, when the rope or chain n' will be wound upon the drum n^2 , the piston C will be moved toward the open end of the cylinder D, and the ropes or chains m will be wound upon the drums l and l' and lower end of the stairs will be raised until the stringer-bars d and d' assume horizontal positions, during which the upper surfaces of the stair-treads maintain their horizontal position, as shown. When the stairs have been raised to the position shown in the lower portion of Fig. 1 and in Figs. 3 and 7, the spring-operated catches o engage with the lugs o' , projecting from a stringer-bar, as shown in Figs. 1, 3, and 7. The catches or locking-bolts o are mounted in bearings in the pendent stands o^2 and are surrounded by the springs o^3 , so arranged as to tend to move said bolts toward the right of Figs. 1 and 7, and are connected by means of a short chain p and a rod p' to the levers r and r' , firmly secured upon a rocker-shaft, which is a continuation of the post e' , as shown in Figs. 1 and 4.

The lever r is made of sufficient length to project above the rail around the stairway-opening in the floor in a convenient position to serve as a hand-lever for rocking the shaft e' and retracting the catch-bolts o when it is desired to drop the movable end of the stairs upon the balcony below.

In most cases the cylinder D will preferably be placed inside the building, as will also the drums l^2 and n^2 , the sheaves or sprocket-wheels n^3 and n^5 , rope or chain n^4 , and crank n^6 ; but they may be inside or outside, as may be most convenient, or as may be preferred, without affecting the principles of my invention.

When the stairs are raised to the horizontal positions shown in the drawings, they are firmly locked in such position and a portion of the treads fill or nearly fill the opening in the floor of the balcony, so that the entire area of the balcony is available as standing room whenever desired for the ordinary purposes of a balcony, and when a fire occurs in the building and escape by the stairs or elevator within the building is cut off the first person

who reaches the balcony through either of the windows E E moves the lever *r* in the direction indicated by the arrow 3, which withdraws the catch-bolts *o o* from engagement with the lugs *o' o'*, when the movable end of the stairs will begin to descend by the force of gravity until the free end of the stringers rest upon the balcony below, to which the person escaping descends and operates the lever *r* on that balcony in the same manner and with the same result as above described, and so continues till he reaches the ground, upon which the foot of the last flight of stairs rests when dropped to the inclined position.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, in a fire-escape, of a balcony attached to and projecting from the wall of a building and provided with an opening in its floor, a flight of stairs composed of two stringers, each comprising two parallel independent bars placed one above the other and each attached at one end by independent pivots to the under side of said balcony, said pivots being arranged in the same vertical plane, a series of treads, each connected at each end by independent pivots in the same vertical plane to two stringer-bars, a hand-rail-supporting standard erected in a fixed position on the balcony-floor at the head of the stairway-opening, a second rail-supporting standard pivoted by two independent pivots in the same vertical plane to the two bars of a stringer, and a hand-rail pivoted to the upper ends of said standards, all so constructed and arranged that said hand-rail will at all times be maintained in a position parallel to and at a suitable distance from the stair-stringers to serve as a hand-rail, whatever may be the position of said stringers.

2. The combination, in a fire-escape, of a balcony attached to and projecting from the wall of a building and provided with a stairway-opening in its floor, a flight of stairs comprising four stringer-bars, two at each side of the stairs, the bars of each pair being arranged one above the other and pivoted at one end by independent pivots in the same vertical plane to the under side of the balcony, and a series of treads, each connected at each end by independent pivots in the same vertical plane to two of said stringer-bars, two standards pivoted by a single pivot to the upper of said stringer-bars, two links, each pivoted at one end to one of said standards and at its other end to the lower stringer-bar, and a hand-rail pivoted to the upper ends of both of said standards, all so constructed and arranged that when the stair-

stringers are raised into a horizontal position the hand-rail will be folded down upon the upper stringer-bar, substantially as described.

3. In combination with a balcony attached to and projecting from the wall of a building and having a stairway-opening through its floor, a flight of stairs having its side stringers, each composed of two parallel bars arranged one above the other and connected at one end by independent pivots in the same vertical plane to the under side of said balcony and each of its treads connected to the two bars of its stringer by independent pivots in the same vertical plane, a fixed standard at the head of said stairs, a double or slotted standard pivoted to the two bars of a stringer by independent pivots in the same vertical plane and having its upper end bent to form a recess in its upstairs side, a section of a hand-rail pivoted to said fixed and double or slotted standards, a section of a hand-rail pivoted to two other standards, the lower ends of which are connected by a single pivot each to the upper bar of a stringer, the upper end of said rail extending between the two parts of the double or slotted standard and being provided with lateral projections to engage the recessed sides of said double or slotted standard, and two links, each pivoted at one end to one of said singly-pivoted standards and at its other end to the lower stringer-bar, substantially as described.

4. The combination, in a fire-escape, of a balcony attached to and projecting from the wall of a building and provided with a stairway-opening in its floor, a flight of stairs pivoted at one end to the under side of said balcony, a system of drums, ropes, or chains and sheaves or sprocket-wheels for raising the movable end of said stairway to a horizontal position beneath said balcony, an automatic locking device for holding said stairs in said horizontal position, a lever and connections for retracting said locking device to release said stairs and permit the same to drop to the proper inclined position for use, and an air-cylinder and its piston constructed and adapted to serve as an air-cushion to retard the descent of said stairs, substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 18th day of July, A. D. 1890.

WM. W. LUMMUS.

Witnesses:

N. C. LOMBARD,
H. F. PURINTON.