No. 868,117. PATENTED OCT. 15, 1907.

A. S. OLNEY.

MOVABLE FIRE ESCAPE FOR BUILDINGS.

APPLICATION FILED NOV. 6, 1906.

3 SHEETS—SHEET 1.

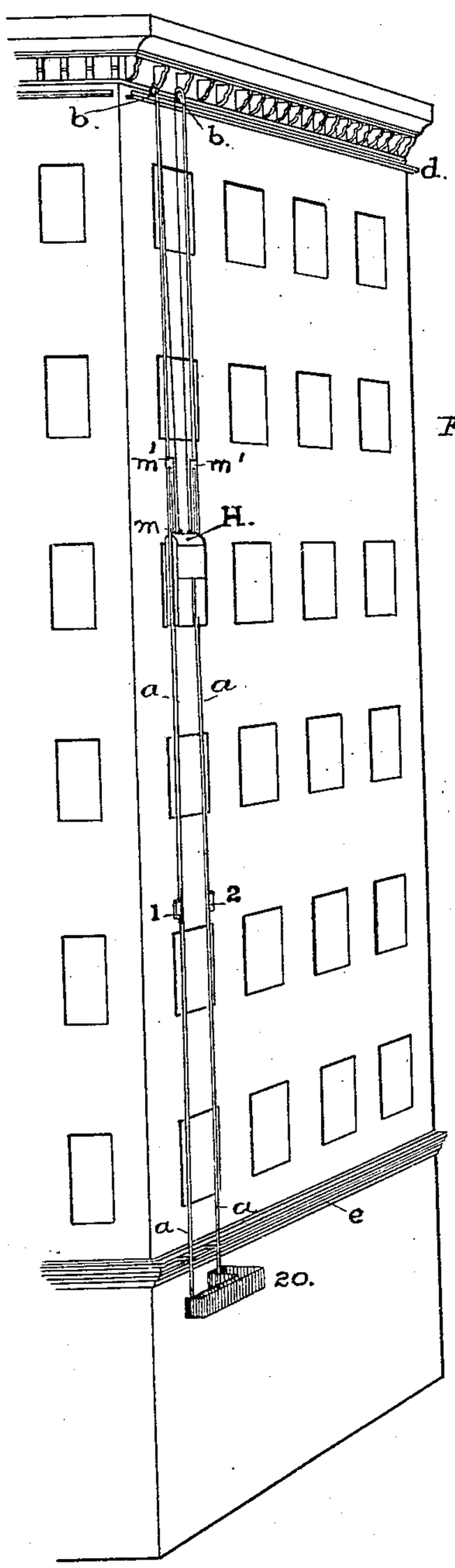

Fig. 1

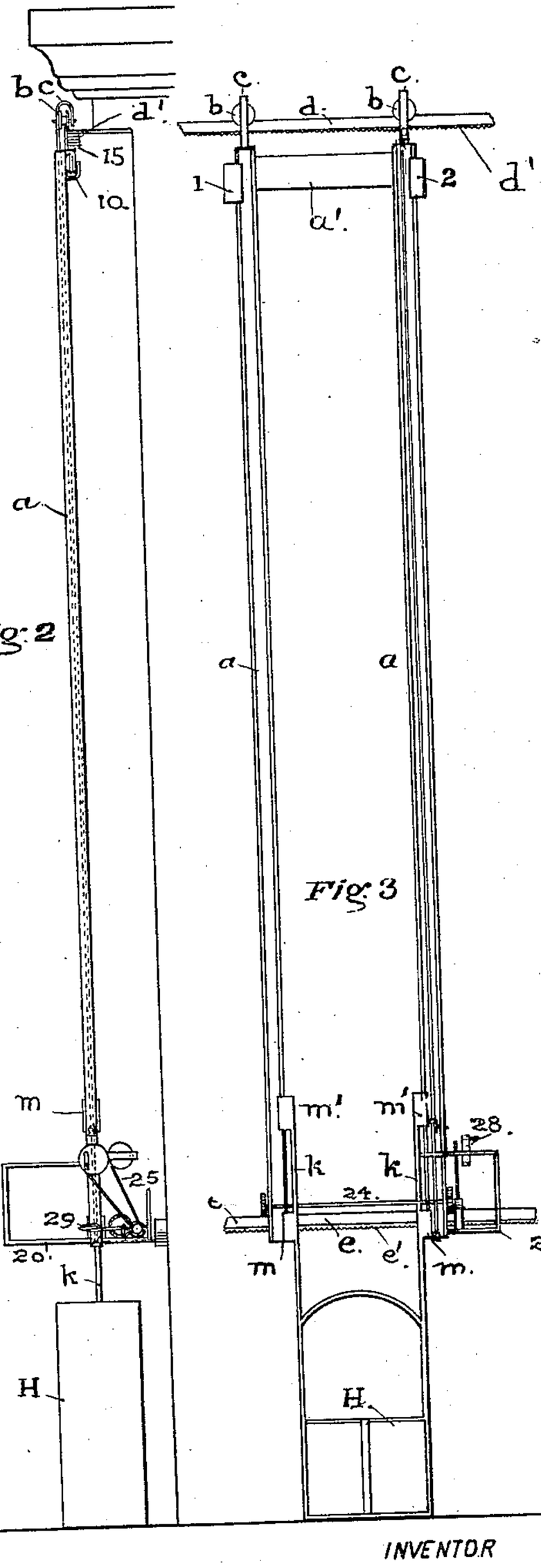

Fig. 2

Fig. 3

WITNESSES

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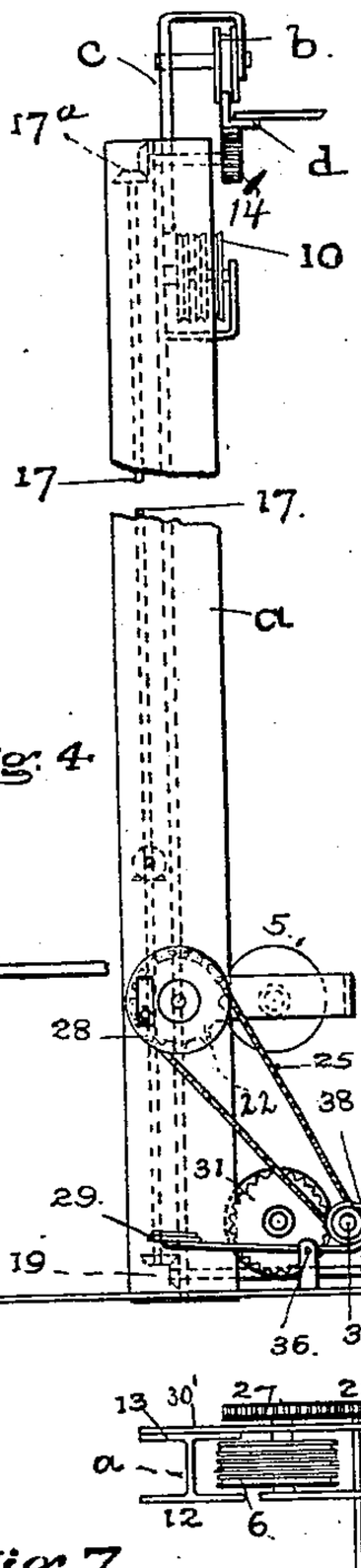

Fig. 4.

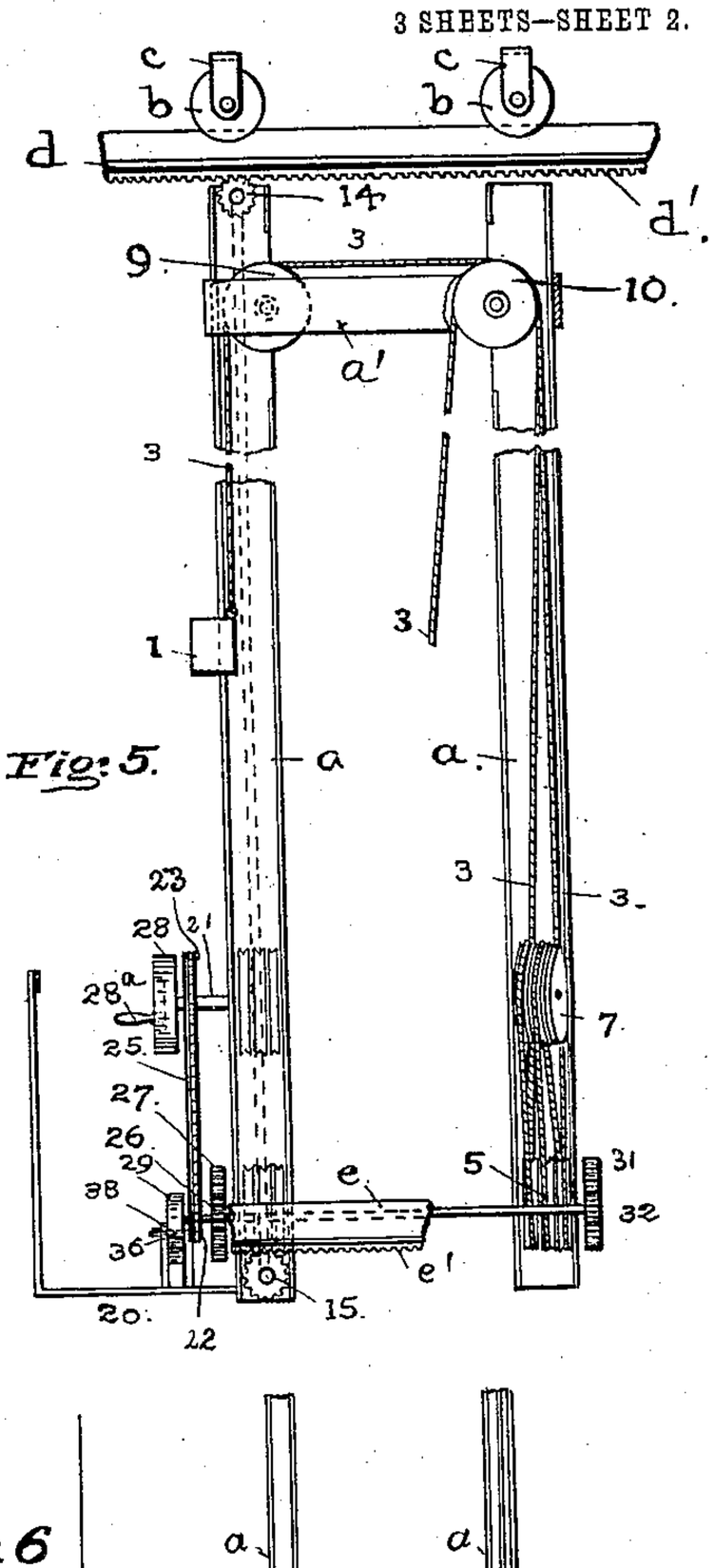

Fig. 5.

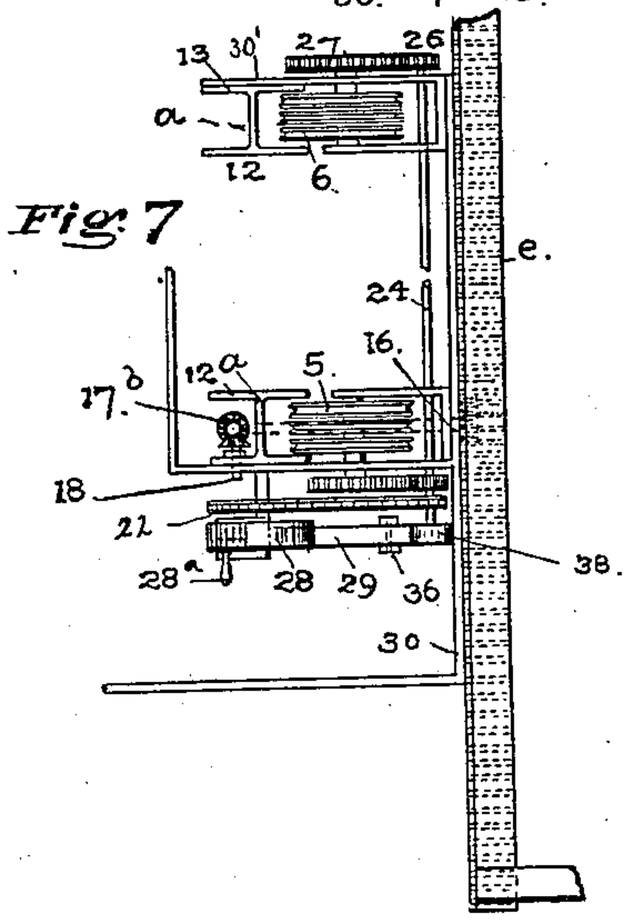

Fig. 7

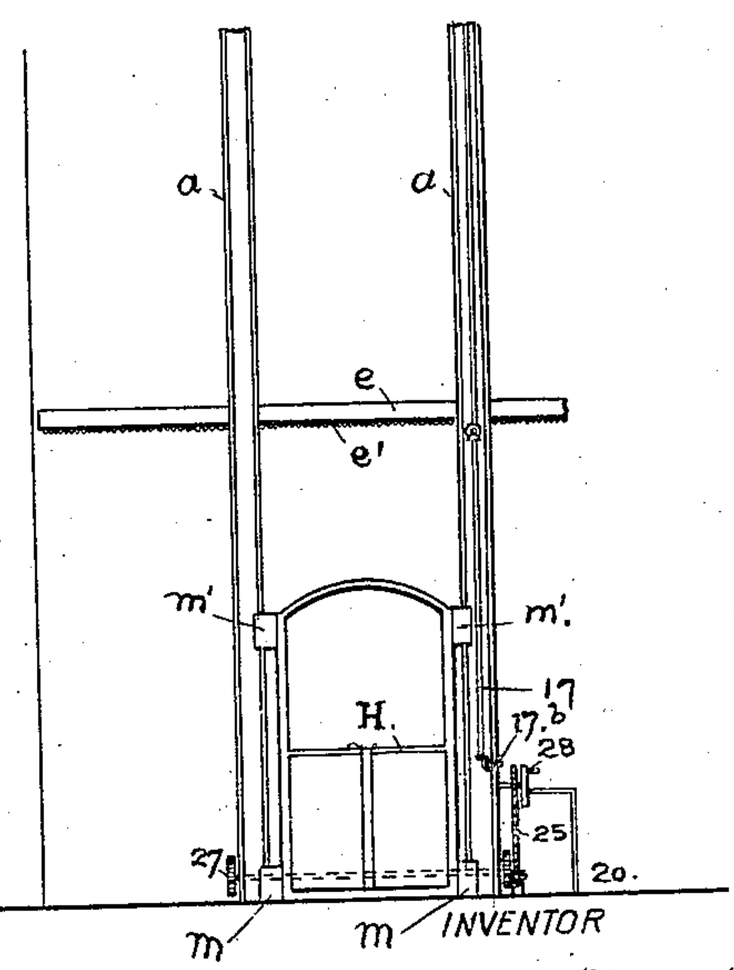

Fig. 6

WITNESSES

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3 SHEETS—SHEET 3.

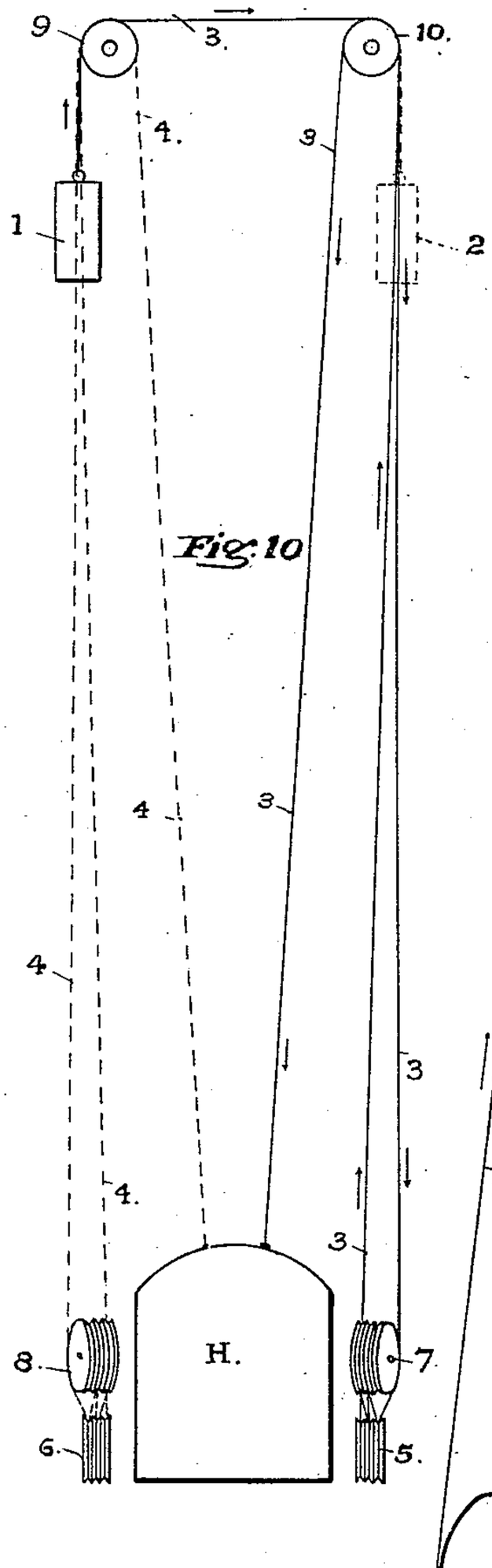


Fig. 10

Fig. 11

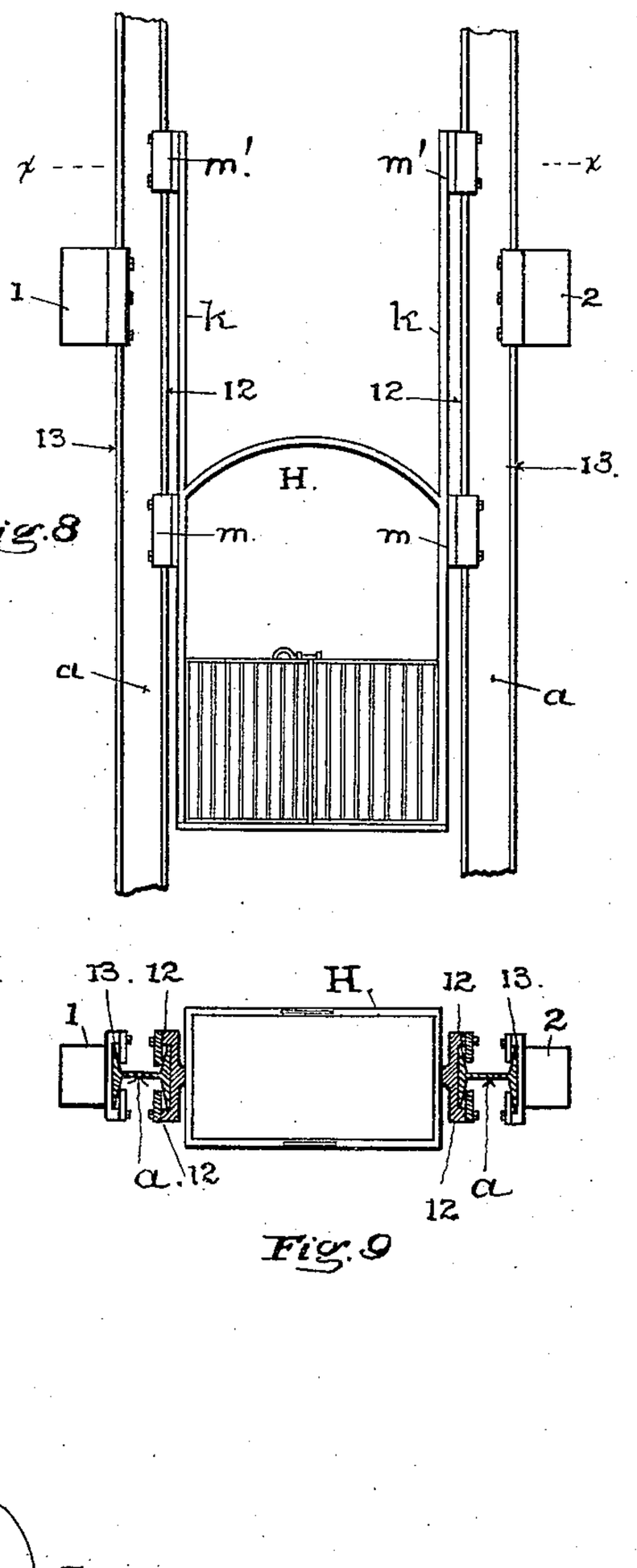
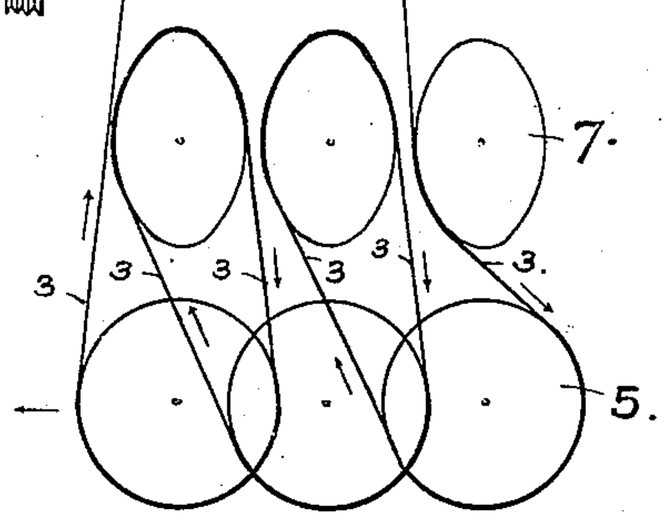


Fig. 8

Fig. 9



WITNESSES

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UNITED STATES PATENT OFFICE.

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MOVABLE FIRE-ESCAPE FOR BUILDINGS.

No. 868,117. Specification of Letters Patent. Patented Oct. 15, 1907.

Application filed November 6, 1906. Serial No. 342,186.

To all whom it may concern:

Be it known that I, ALONZO S. OLNEY, a citizen of the United States, and a resident of Berkeley, in the county of Alameda and State of California, have invented an Improved Movable Fire-Escape for Buildings, of which the following is a specification.

My invention has for its object chiefly to provide a movable fire-escape of novel construction as a substitute for, and an improvement in several respects upon, the stationary balcony and ladder construction of fire-escape placed on the front of many buildings at the present time to provide an escape from the upper stories to the ground, in case of fire.

A further object of my invention is to provide a novel hoisting mechanism or apparatus, for operating a vertically movable cage or platform by gravity, whereby it is caused to ascend when empty, and to descend by the weight of the load; means being provided in connection with the said mechanism for controlling the cage from the ground or from a stationary platform.

A further object of the invention is to provide mechanism for applying power to the cage for raising it with its load from a lower to a higher story, or for drawing it down when empty.

To these ends and objects chiefly my invention comprises a novel construction and combination of a horizontal rail fixed across the front of the building, upright guides suspended from the rail on wheels and capable of being moved along the rail from one point to another transversely of the building, a cage or platform arranged to travel upward and downward in the guides, means for balancing the cage whereby it is caused to travel upward when empty and to descend when loaded, and a brake-device for controlling the cage.

The invention embraces further, an improved hoisting-mechanism combined with the cage for raising the cage by power when it is loaded and for bringing it down from one story to another when empty, in opposition to the other means that operates the cage by gravity.

The invention embraces further, certain combination and arrangement of hoisting ropes, pulleys, counterweights and a brake-device for operating and controlling the cage.

The invention embraces further, certain novel parts and combination of parts and mechanism, producing an improved movable fire-escape for the front of a building, all as hereinafter described and pointed out in the claims at the end of this specification.

The nature of my said improvements and the manner in which I proceed to construct, apply and carry out the same in the production of a movable fire-escape are explained at length in the following description,—reference being had therein to the accompanying drawings forming part thereof.

Figure 1 of the drawings is a perspective view of a fire-escape embodying my invention, and showing the same placed on the front of a building. Fig. 2 is a side-elevation of the apparatus seen in Fig. 1. Fig. 3 is a front-elevation. Fig. 4 is a side view, on an enlarged scale, of the upright stationary guides, portions of the horizontal rails from which the guides are suspended in front of the windows, and the mechanism for raising and lowering the cage and for moving it transversely on the supporting rails. Fig. 5 is a rear view of the parts shown in Fig. 4. Fig. 6 is a front-elevation of a cage or movable platform, without extensions of the slides that confine the cage in place between the stationary guides. Fig. 7 is a sectional view of the hoisting and controlling mechanism seen at the bottom of Figs. 4 and 5. Fig. 8 is a view of a cage provided with extensions of the slides. This construction is used when the fixed guides end at the second story. Fig. 9 is a horizontal cross-section through the line *x*—*x*, Fig. 8. Figs. 10 and 11 are diagrams repre enting the plan or scheme for laying and connecting the ropes and counterweights to operate the cage by gravity and also by hand-power. In Fig. 10 is shown the mode of carrying and returning the ropes around the sheaves at top and bottom of the runway; and in Fig. 11 the scheme of sheaves and rope for one side of the cage.

A novel feature of a fire-escape embodying my invention consists in suspending and supporting from a track formed of stationary rails fixed on the front of the building, a pair of upright bars capable of confining and guiding a vertically movable cage or platform, and in combining with these guides and the platform a hoisting-mechanism for raising and lowering the cage, and a means for moving the upright guides on the stationary supporting rails from point to point transversely of the building, to place the cage in operative position at any story and at any given one of the windows in that story.

The upright bars *a*—*a* are best formed of I-bars or light beams having two flanges 12—13 united by a web, so that the flanges 12 on the inner sides form guides for the cage H, and the flanges 13 on the outer sides are guides for the weights 1—2 by which the cage is balanced. The guides *a* are tied and held rigidly by lateral braces *a'* parallel with each other, and at a proper distance apart, for the cage to run smoothly between them; and they are suspended from a fixed rail *d* extending horizontally across the front of the building above the windows of the top story. Another rail *e* situated near the lower end of this runway contributes to the steadiness of the guides *a* in shifting or moving them along the front of the building on the rails. The guides are suspended from the top rail by hangers *c* carrying flanged wheels *b*.

A fixed rack d^1 on the rail *d* and a spur wheel 14 geared into an upright shaft 17 by beveled wheels 17^a furnish a simple means for moving the guides *a*—*a* on the rails *d;* the movement being more readily effected,

especially on a tall building, by providing a second rack e^1 on the lower rail and connecting with the same upright shaft 17 by beveled-wheels 19 a spur wheel 15 on a counter-shaft 16. Power to turn the shaft 17 is applied through the medium of a short counter-shaft 18 geared into the shaft 17 by beveled gears, and provided with a square end to receive a hand-crank. The shaft 18 is located on one side within convenient reach of an operator standing on the stationary platform 20 so as to be readily operated from that point. The cage and its supports are thus shifted along the rails and placed at any required point for operation, without loss of time.

On the lower ends of the guides a skeleton frame composed principally of a back-rail 30 bearing against the stationary rail e, and side-bars 30^1 to which the flanged guides a are joined at the bottom, furnishes a support and bearings for the pulleys and gears of the hoisting-mechanism which constitutes a further novel feature of the invention. In one application of a fire-escape of my construction provision is made for running the cage down to the first or ground floor by extending the guides a all the way down to the ground, and placing the hoisting mechanism and brake at or near the ground; whereas, in another application the guides stop at the second story, but the cage has the full length run down to the ground. In the last mentioned arrangement a platform 20 on one side affords a standpoint from which to control the cage; but the frame-work is open at the bottom to let the cage run down to the ground floor. The slides m—m, m^1—m^1 that take on the flanges 12 are placed on extension-bars k, as seen in Figs. 3 and 8, instead of being fixed directly on the body of the cage, as in Fig. 6. The slides m^1—m^1, fitting over the outer flanges prevent the cage from leaving the guides, thus insuring safety in moving up and down under considerable rate of speed. The use of two sets of these slides secures steadiness in the travel of the cage while in motion.

The novel features relating to the raising and lowering of the cage consists in counter-balancing the cage by two weights 1—2 fitted to travel on the outside flanges 13 of the upright guides, and a system of ropes and sheaves set at top and bottom of the guides in such manner that the counter-weights will raise the cage when it is empty and will allow it to descend by gravity when it is loaded, the rate of movement in both cases being always under complete control. In addition to these movements as produced by the counter-weights and the loaded cage, provision is made for raising the cage by power whenever it may be required to raise a load, or for bringing the cage down from an upper to a lower story without a load. Under either of the above conditions the counter-weights being heavier than the empty cage will cause it to ascend, when allowed to do so; and it will be necessary to apply power to the cage in either case. For that purpose a shaft 24 geared into the sheave 5 on one side and into the corresponding sheave 6 on the opposite side by spur wheels and pinions 26—27, 31—32, is connected with a counter shaft 21 by sprocket wheels 22—23, and a chain belt 25. The shaft 21 is provided with a hand crank 28^a for turning it. The cage can thus be raised or lowered by working the crank, when the conditions under which the apparatus is being operated change the relation of the counter-weight to the cage, so that the latter being heavier than the counter-weights will not ascend of itself; or being lighter than the weights, it will not descend except by the application of power.

The novel feature in the hoisting and controlling mechanism, consists in employing two sets of multiple sheaves or pulley blocks on opposite sides of the runway, and two separate ropes or cables; and in so arranging the counter-weights with relation to the connecting ropes and the cage that each rope being attached by one end to the cage, is carried up to the top sheave of the set on one side of the runway, and after being turned and carried down to the lower sheave of the set on the same side, it is bent and returned in an alternate manner around the lower sheaves, and is thence carried upward and over the sheaves at the top and across to the opposite side of the runway, where it is finally secured to the counter-weight on that side. The manner of laying and carrying the two ropes will be readily understood by referring to the two diagrams Figs. 10 and 11, in which the relative position of the cage, H, the two counter-weights 1—2 and the sheaves 5—7, 6—8 and 9—10 is illustrated.

In the diagram Fig. 11 the sheaves 5 and 7 are separated and are indicated as lying in a common plane for more clearly tracing the lay of the rope 3; whereas in Fig. 10 the sheaves are shown with each set on its proper axis. The sheaves 7 and 8 are set at an angle with relation to the sheaves 5—6 beneath, for the purpose of retaining the turns of the rope properly in the grooves.

From the cage H the rope 3 is carried upward to the top of the runway, where it is laid in one groove of the sheave 10, and is brought down along the guide a to the drum 5 at the bottom. Being laid in the first one of the sheaves 7, it is laid in and carried around the first groove of the sheave 5, and thence up and around the second groove; and so on, alternately up and down, until the rope is laid in the last groove of the drum 5. From that point the rope 3 is returned upward to the sheave 10 where it is laid in the middle groove and is carried across to the opposite sheave 9, whence the rope is turned downward and is attached to the counter-weight. In corresponding manner the rope 4 is laid and returned over and around the sheaves 6—8 and 9, to connect the cage with the counter-weight 2. It will be understood that the bottom-sheaves 5 and 6 are each a multiple groove drum on a single axis, but the top sheaves 9—10 and the angularly set sheaves 7—8 are each composed of separate sheaves loose on a common axle. A cage suspended by these means will carry a full load without danger of the ropes slipping. Power can also be applied to move the cage whenever it may be desired to raise a load from a lower to a higher story, as well as to bring the empty cage down from a higher to a lower position to take a load. These movements which necessarily take place contrary to the action of the counter-weights, are readily effected from the stationary platform 20, when such a platform is provided, or from the ground when there is no platform, by using the hand-crank 28^a already described.

The speed of the cage during its descending and ascending movements is governed by applying a friction-brake to the shaft 24 that is geared into the

sheaves 5—6. A brake of any well known construction can be applied to the shaft 24 for that purpose. The preferred construction, which I have represented in Figs. 4, 5 and 7 consists of a foot-lever 29 having a fulcrum 36 in a fixed bracket, and a friction-wheel 37 fast on the shaft 24. To the end of the lever 29 one end of a friction-strap 38 is attached, and being carried around the wheel 37 the strap is made fast to a fixed point behind the wheel. On depressing the outer end of the foot-lever the strap is drawn tightly around the wheel, and the resulting friction is varied in proportion to the pressure exerted upon the lever. This furnishes a ready means of stopping the cage at any point or points in its descent as well of regulating the speed of the loaded cage.

The stationary platform 20 situated at the foot of the runway affords room for an operator at one side of the guides, when such a platform is provided; while from its elevated position above the ground-floor the hoisting crank and other controlling means are not so readily accessible from the street as to be tampered with.

The cage H may be of any well known construction, comprising either a simple platform with standing sides, or a more complete receptacle similar to an elevator cage.

I claim—

1. In a fire escape, the combination of a fixed rail provided with a rack on the front of a building, flanged upright guides suspended from said rail, a vertical shaft protected by the flanges of said guides, gearing interposed between the upper end of the shaft and the rack on the fixed rail, a cage movable up and down in said guides, a set of counterweights for the cage, means for connecting the weights with the cage, and means for turning the vertical shaft to move the guides and cage along said fixed rail.

2. In a fire escape for a building a vertical runway comprising flanged guides suspended from the top of the building and capable of being moved transversely across the face of the building to occupy different positions thereon, a movable cage confined by and adapted to move up and down in said guides, and means for supporting and operating said cage, including counterweights confined and movable on said guides, a set of sheaves at the top of the guides, a set of sheaves at the bottom, a rope separately connecting each counterweight with the cage and secured to the top of the cage, the said ropes being carried from the top of the cage upward to the top sheaves, thence downward to and around the sheaves at the bottom and finally upward to the top sheaves and across the runway to connect with the counterweights on opposite sides thereof, and a brake device adapted to control the speed of the cage.

3. In a movable fire-escape for a building, a horizontal rail fixed to a building a vertical runway for a cage suspended from the said fixed rail and capable of being adjusted as to position transversely of the building, a cage movable up and down in said runway, means for operating the cage comprising counterweights movable in opposite directions to the cage and normally overbalancing it when empty, ropes connecting the cage with the weight, a platform located above the ground fixed to said runway and movable therewith, means for applying power to the ropes for raising the cage when loaded and for drawing it down when empty, and means for transversely moving the runway, cage and platform located on said platform.

4. The combination of fixed guides, a cage movable up and down therein, sheaves at the top of the guides on opposite sides thereof, a set of sheaves at the bottom on each side, a counterweight confined on and adapted to travel on each guide, a rope separately connecting each counterweight with the cage, the said ropes being carried from the cage upward to the top sheaves, thence downward to and around the sheaves at the bottom, and finally upward to the top sheaves and across the guides to connect with the counterweights on opposite sides thereof, and a means for applying power to the ropes to operate the cage.

5. In a fire escape, the combination of a pair of uprights, each comprising an I-beam, adapted to form guides or slideways, means for suspending the uprights from the upper portion of a building, a cage slidable on the inner flanges of the I-beams, and counterweights slidable on the outer flanges of the I-beams.

In witness that I claim the foregoing I have hereunto signed my name in the presence of two witnesses.

ALONZO S. OLNEY.

Witnesses:
EDWARD E. OSBORN,
J. B. HOPKINS.