

(No Model.)

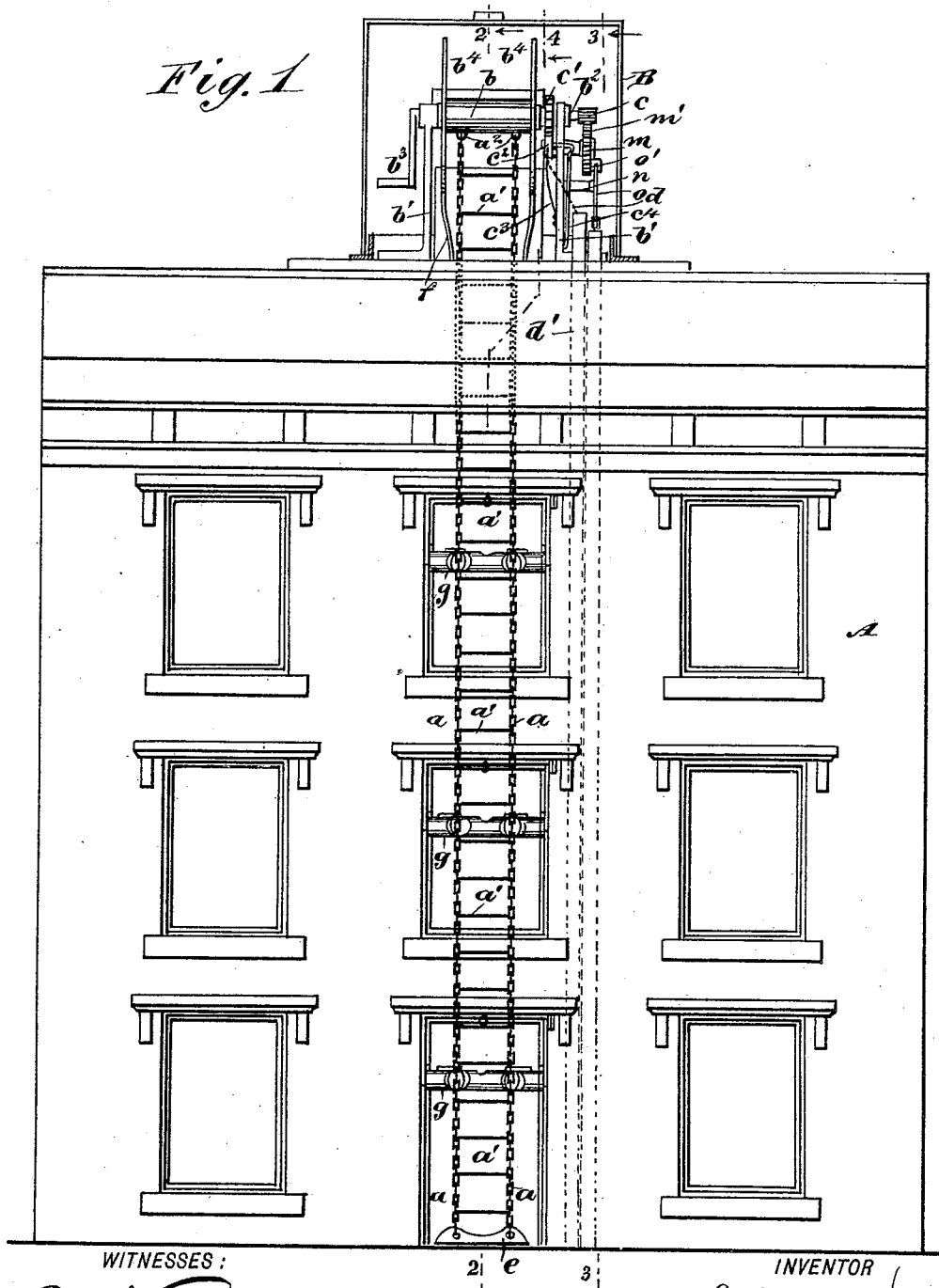
4 Sheets—Sheet 1.

G. LOWENSTEIN.  
FIRE ESCAPE.

No. 500,018.

Patented June 20, 1893.

*Fig. 1*



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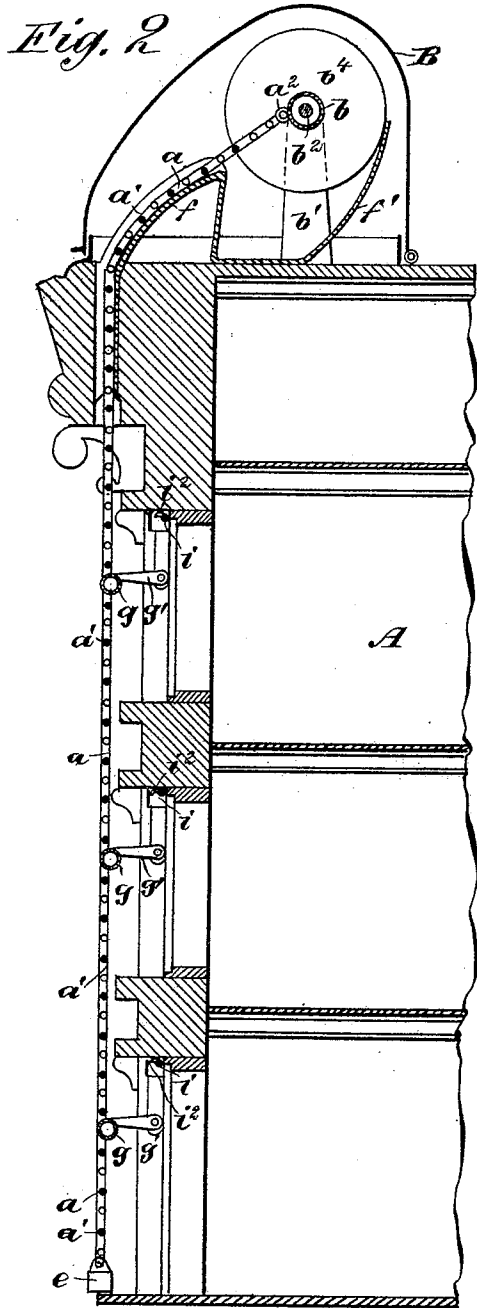
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G. LOWENSTEIN.  
FIRE ESCAPE.

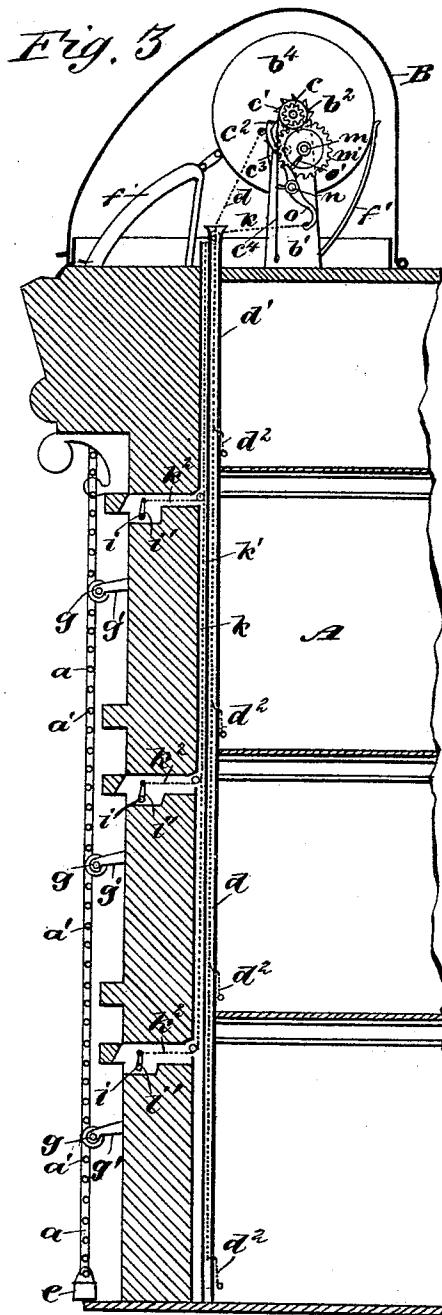
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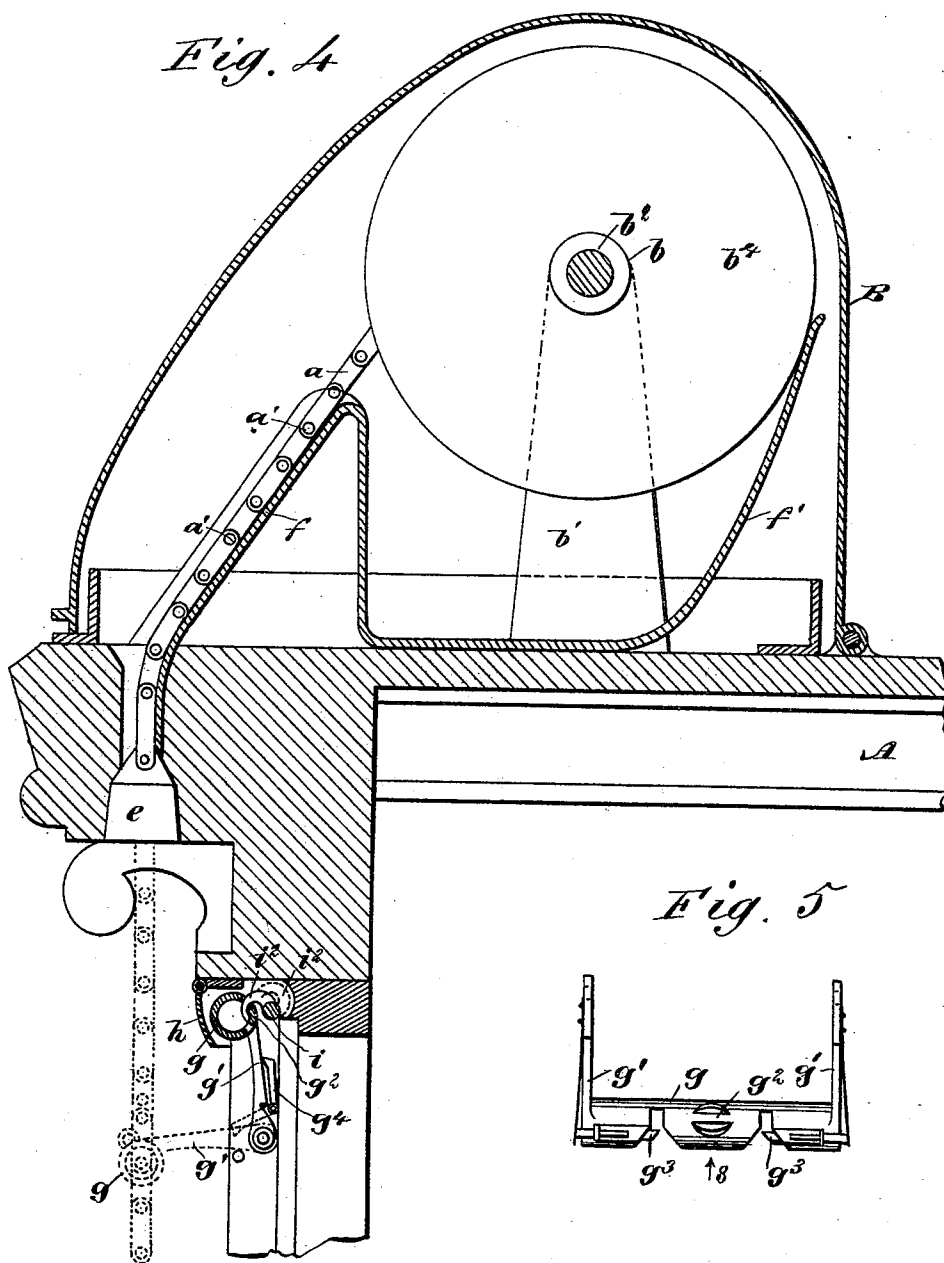
(No Model.)

4 Sheets—Sheet 3.

G. LOWENSTEIN.  
FIRE ESCAPE.

No. 500,018.

Patented June 20, 1893.



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4 Sheets—Sheet 4.

G. LOWENSTEIN.  
FIRE ESCAPE.

No. 500,018.

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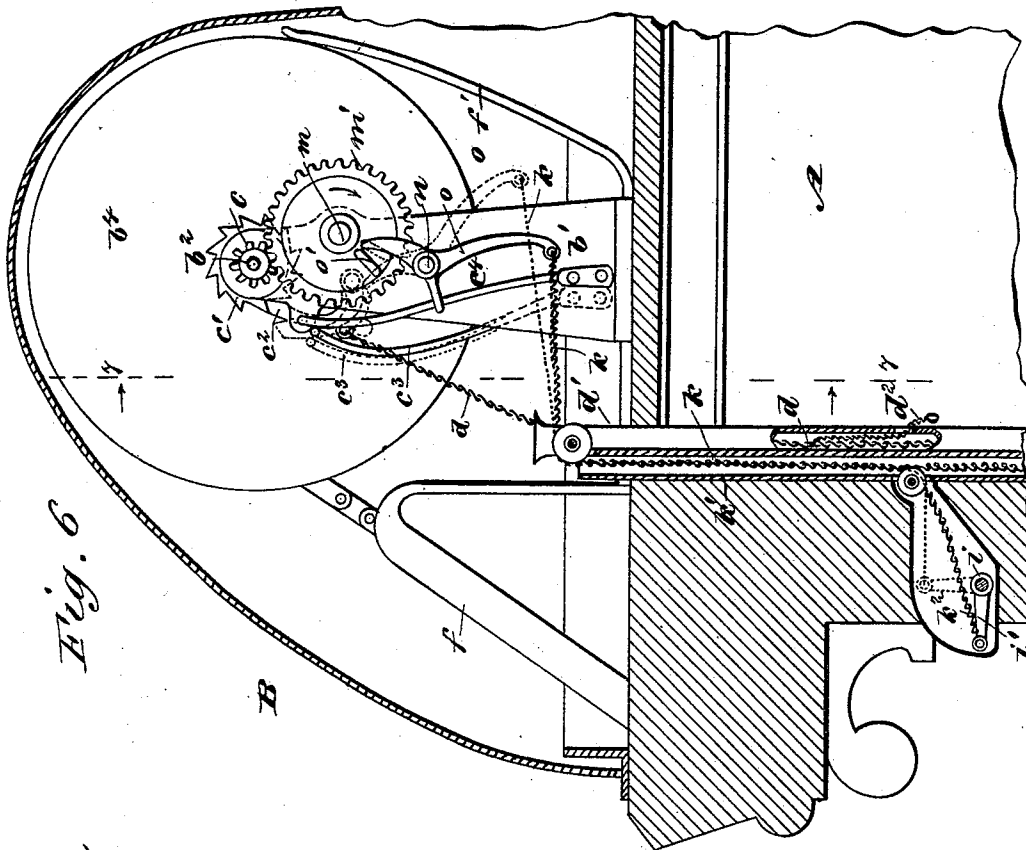


Fig. 6

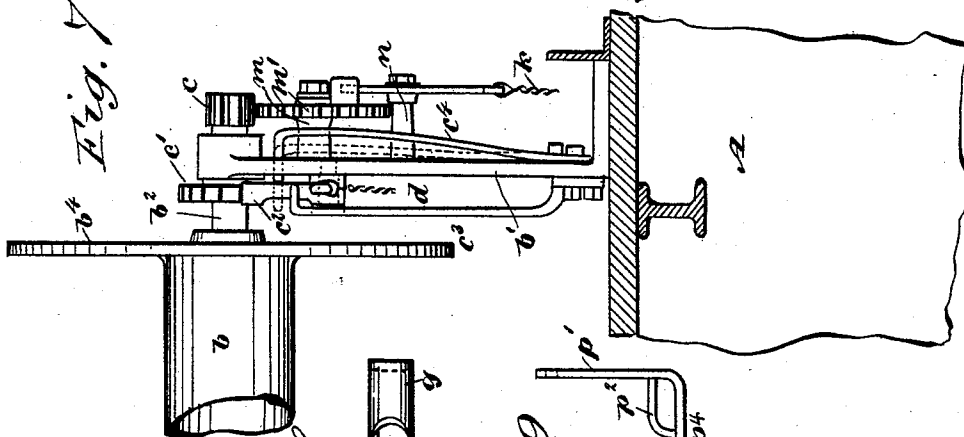


Fig. 7

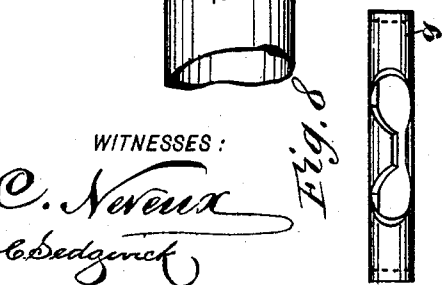


Fig. 8

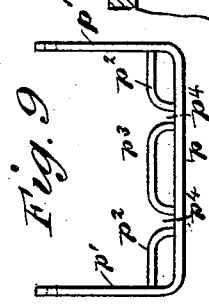


Fig. 9

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# UNITED STATES PATENT OFFICE.

GOTHARD LOWENSTEIN, OF BROOKLYN, NEW YORK.

## FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 500,018, dated June 20, 1893.

Application filed June 17, 1892. Serial No. 437,010. (No model.)

*To all whom it may concern:*

Be it known that I, GOTHARD LOWENSTEIN, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Fire-Escape, of which the following is a full, clear, and exact description.

The objects of this invention are, to provide a fire escape of the flexible ladder type, which will be convenient in service, safe to use, have means for housing the ladder wrapped on a drum on a building, and that will be adapted to fall in a vertical plane into position before the windows of the building, when released by manipulating a connection between the drum and a tripping chain in any of the rooms to be protected by the fire escape.

To these ends, my invention consists in the construction and combination of parts, as is hereinafter described.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation of a building with the improvement in place thereon and adjusted for service. Fig. 2 is a side view, broken and in section, of a building with the fire escape on it adjusted for use, the section being indicated by the line 2—2 in Fig. 1. Fig. 3 is a side view, broken and in section, of a building having the improved fire escape on it, adjusted for service, the line of section being shown at 3—3 in Fig. 1. Fig. 4 is an enlarged side view, broken and in section, of the upper part of a building, and the improved fire escape, the section being taken on the line 2—2 in Fig. 1. Fig. 5 is a detached view of a detail of construction that is part of the improvement. Fig. 6 is an enlarged side view, broken and in section, of the upper part of a building, and the fire escape partly in section taken on the line 3—3 in Fig. 1. Fig. 7 is a front view, broken and in section, of the upper part of a building, and part of the fire escape thereon, having other parts removed and broken away, the line of section being indicated at 7—7 in Fig. 6. Fig. 8 is a detached front side view of the device shown in Fig. 5, opposite the arrow 8, in said figure;

and Fig. 9 is a detached view of a modified form of the detail of construction shown in Fig. 5.

The improved fire escape consists of a flexible ladder, made preferably of two chains *a*, having a length which is proportioned to the height of the building whereon the improvement is placed, and transversely and at proper distances apart, a series of similar metal rungs *a'*, are secured by their ends to the ladder sides *a*, retaining the latter properly separated and parallel.

Upon the top of a building A, whereon the fire escape is to be placed, a drum *b*, is rotatably supported by two spaced upright standards *b'*, which have a loose engagement at their upper ends, with the journal shaft *b<sup>2</sup>*, of the drum, a crank handle *b<sup>3</sup>*, on one end of said shaft affording means to rotate the drum and wrap up the ladder, which is affixed at its upper end thereto as shown at *a<sup>2</sup>*, in Figs. 1 and 2. The end portion of the drum shaft *b<sup>2</sup>* which is opposite to that whereon the crank handle *b<sup>3</sup>* is affixed, projects beyond the supporting standard at that end of the drum, sufficiently to receive a pinion *c*, which is secured upon it; and between the standard and drum a ratchet wheel *c'*, is affixed on the shaft, the teeth of which hook toward the front of the building on the top side of the wheel, so that a pawl *c<sup>2</sup>*, that is pivoted to the inner side of the standard *b'*, near its front edge will be adapted to interlock with the teeth of the wheel, and prevent its rotation in a direction that would unwrap the ladder. The pawl *c<sup>2</sup>*, has a draft chain or wire cord *d*, attached to it above its pivot support, said chain being outwardly and downwardly extended preferably through a guide tube *d'*, that extends from above the roof down through all the rooms of the building along or near their front wall and at a proper point in each room a perforation is made in the tube *d'*, to allow a pull piece *d<sup>2</sup>*, to project through and be adapted for manipulation. It is evident that sudden draft strain applied at any point in the length of the chain *d*, will trip the pawl *c<sup>2</sup>*, and allow the wrapped ladder *a*, *a'*, to descend, a weight *e*, affixed to the lower end of the ladder in-

5 suring a speedy travel of the same downwardly, and serving to keep it stretched. The pawl  $c^2$ , is normally pressed into engagement with the teeth of the ratchet wheel  $c'$ , by a finger spring  $c^3$ , the lower end of which is attached to a standard  $b'$ , near its base. Upon the same standard a spring  $c^4$ , is secured, which projects upwardly on the side of the standard nearest to the pinion  $c$ , and has its upper portion bent toward the pawl that it engages with after passing through a hole in the standard  $b'$ . When the pawl  $c^2$ , is in meshed engagement with the wheel  $c'$ , the end of the spring  $c^4$ , will rest upon the side of the pawl and not interfere with its action. Should the latter be retracted from the ratchet wheel by draft strain put upon the chain  $d$ , the outward movement of the pawl will permit the bent end portion of the spring  $c^4$ , to project through the standard  $b'$ , and engage the inner surface of the pawl so as to prevent its contact with the wheel  $c'$ .

15 There is by preference a hood B, provided to cover the drum  $b$ , the hood having a hinge at its rear lower edge which will allow the hood to be thrown back from over the drum. The drum is provided with a circular flange  $b^4$  at each end to retain the wrapped ladder in proper alignment with a guide trough  $f$ , that is seated on the building, and bends forwardly and downwardly to deliver the ladder at a proper distance from the front of a tier of windows, when the ladder is unwrapped by gravity and slides upon the trough as indicated by Figs. 2 and 4. An integral portion of the guide trough  $f$ , is projected rearwardly and upwardly as a spring, which part  $f'$  bears upon the flanges  $b^4$ , so as to retain the drum  $b$ , from too free a rotation.

20 It is desirable to hold the ladder  $a$ ,  $a'$ , projected away from the windows before which it is pendent when in service, so that persons using it may traverse its length upon the side nearest to the windows from which they may escape in case of fire. To this end a folding prop piece is by preference employed for each window. As shown detached in Figs. 5 and 8, the prop-piece consists of a hollow rung  $g$  having arms  $g'$ , of proper length projected from its ends in the same direction and parallel with each other. The ends of the arms  $g'$ , on each prop piece are pivoted oppositely upon the sides of the window frame at a proper distance from the window sill so that the rung  $g$ , may be folded upwardly and be housed behind a pendent flap  $h$ , at the top of the window frame, or when lowered project outwardly and engage the side chains  $a$ , of the ladder, as represented in Figs. 2, 3 and 4.

25 Mechanism is provided to lock the prop rungs  $g$ , in a nearly upright position, so projected outwardly that when released they will all simultaneously fall into horizontal planes; such an adjustment being effected at the time the ladder is released and falls into a pendent condition, or immediately after the ladder

has become entirely unwrapped and hangs in front of the tier of windows it is to provide an escape from.

The locking device mentioned consists of a rock shaft  $i$  for each window, located transversely in a box formed at the top of the window casement, and loosely supported so that these shafts may be rocked together by an upward pull upon a chain  $k$ , or similar flexible attachment, that is connected to the free ends of crank arms  $i'$ , one of the latter named being secured upon a corresponding end of each rock-shaft  $i$ , as represented in Figs. 3 and 6.

The prop rungs  $g$ , are notched at such points as will allow the notched portions to embrace the chains  $a$ , that are the sides of the ladder, such a connection of parts being effected when the rungs fall from an elevated position outwardly and downwardly as before mentioned.

At the center of each tubular rung  $g$ , a catch-bar  $g^2$ , is formed in it by cutting away the wall of the rung at two opposite points leaving the bar between them.

On each rock shaft  $i$ , a curved catch hook  $i^2$ , is formed that is adapted to interlock with the catch bar  $g^2$ , of a hollow rung  $g$ , and retain the latter in elevated adjustment as shown in Fig. 4.

There is a journal stud  $m$ , projected from the side of the standard  $b'$ , nearest to the pinion  $c$ , which stud rotatably supports the gear wheel  $m'$ , that is meshed with the pinion; such a proportion being had with regard to the diameters and number of teeth in the wheel and pinion, length of the ladder, and diameter of the drum which receives the latter, that when the ladder is released by draft on the chain  $d$ , and descends to the ground, or base line of the house, the gear wheel  $m'$  will make a single revolution. Upon the standard  $b'$ , below the journal stud  $m$ , an arm  $n$ , is outwardly projected in a parallel plane with said stud, and serves as a pivot support for a weighty tripping arm  $o$ . The upper end portion of the tripping arm lies in the path of an abutment ear  $o'$  on the side of the gear wheel  $m'$ , so that the arm will be vibrated by an impinge of the ear upon its upper end, at each revolution of the wheel named.

The draft chain  $k$ , before mentioned, is preferably incased in a tube  $k'$ , and extends above the building roof so as to have its end attached to the lower end of the tripping arm  $o$ , there being lateral flexible branches  $k^2$ , projected from this draft chain toward the crank arms  $i'$ , and connected therewith; and for the proper operation of the device it is essential that the arms  $i'$  should be upright or nearly so, when the hooks  $i^2$  are interlocked with the prop-rungs  $g$ .

Preferably the tubular prop rungs are provided with spring pressed slide bolts  $g^3$ , which will be automatically locked upon the

chains *a*, that are the ladder sides, when said ladder is lowered, and thus prevent the ladder from displacement when all parts of the fire escape are in condition for use.

5 The several prop pieces *g*, have their limbs *g'*, notched, on the side nearest to the window casements when said props are in an upright position, and locking dogs *g<sup>4</sup>* are pivoted by one end on the sides of the casements so as  
10 to drop and interlock with the notches in the limbs when the latter assume a nearly horizontal position, as indicated in Fig. 4, by dotted lines; full lines showing the dogs held up by the limbs when the prop pieces are vertically adjusted.

15 In Fig. 9, a modified form of the prop pieces is shown, each consisting of a bar of metal bent to produce a rung *p*, and two parallel limbs *p'*, on said rung, the limbs being secured on the window casement to project outwardly. On the inner side of the rung *p*, bent pieces *p<sup>2</sup>*, are secured by one end, their other ends engaging the limbs *p'*, and between these pieces a loop *p<sup>3</sup>* is affixed leaving  
20 spaces *p<sup>4</sup>*, which will embrace the ladder sides *a*, when these are in lowered adjustment, said props being at such points on the casements as will best sustain the ladder when in use.

30 To prepare the device for use, the ladder is wrapped upon the drum *b*, and so held by the ratchet wheel and its pawl, and the prop pieces *g* with their limbs *g'*, are folded upwardly and locked in such a position by the hooks *i<sup>2</sup>*  
35 on the rock shafts *i*.

If it is necessary to put the fire escape ladder in service, it is only needed to pull any one of the pull pieces *d<sup>2</sup>*, of the chain *d*, which will release the pawl of the ratchet wheel that  
40 controls the drum *b*, and thus permit the ladder *a*, *a'*, to descend rapidly, and when it reaches the ground the impact of the ear *o'*, on the wheel *m'*, upon the upper end of the arm *o*, will vibrate said arm rearwardly at  
45 the lower end, and produce draft strain through the chain *k* upon the arms *v'*, and rock the shaft *i* and hooks *i<sup>2</sup>*, so as to release the prop rungs *g*, which will fall outwardly and downwardly, and interlock with the sides  
50 *a*, of the ladder as before explained, thus rendering the ladder stable, and affording a safe means for the descent of persons from any window before which the ladder is pendent.

It will be seen, that when the ladder is  
55 wrapped upon the drum *b*, and the prop pieces *g*, folded upwardly and concealed behind the pendent flaps *h*, there will be nothing unsightly exposed; while all parts of the fire escape are ready for instant adjustment for  
60 service by simply drawing upon the chain *d*, in any room of a building through which said chain passes.

Having thus described my invention, what I claim as new, and desire to secure by Letters  
65 Patent, is—

1. In a fire escape, the combination, with a

flanged drum rotatable on a building, a flexible ladder secured to the drum and wrapped thereon, and a locking device for the ladder adapted to release it when manipulated from  
70 within the building, of a series of pivoted prop-pieces for the ladder, each composed of a hollow shaft and two arms thereon, a journaled rock shaft above each hollow shaft and having a hook adapted to interlock with an  
75 integral bar of said hollow shaft when the prop pieces are folded upwardly, locking dogs that fall and engage shoulders on the arms of the prop-pieces when these arms are horizontal, and flexible connections pendent within  
80 the building, that are attached by branches to the locking devices, and by manipulation control the adjustment of said devices, substantially as described.

2. In a fire escape, the combination with a  
85 drum rotatably supported on a building, a flexible ladder on the drum, a device which holds the ladder wrapped on the drum until said device is manipulated from within the building, of a series of upwardly folding prop-  
90 pieces each comprising two arms and a cross bar, a rock shaft for each prop-piece rotatable on the building wall near to the prop-piece, a hook on each rock shaft removably engaging an adjacent cross-bar of a prop-piece to  
95 hold the prop-piece elevated, and means to rock the rock shafts all at the same time releasing all the prop-pieces to fall outwardly and engage the ladder automatically upon descent of said ladder, substantially as de-  
100 scribed.

3. In a fire escape, the combination with a rotatable drum on a building, a flexible ladder on the drum adapted to unroll and hang  
105 pendent before a tier of windows in the building, and a device which retains the ladder wrapped on the drum until said device is manipulated from a room of the building, of a series of similar prop-pieces each having  
110 two arms joined by a transverse rung and pivoted to fall outward and support the pendent ladder, and a locking device for each prop-piece consisting of a rotatable rock shaft, a catch hook thereon, an arm on the rock  
115 shaft, and a flexible connection from said arm extending through an aperture in the building wall engaging the ladder controlling device to simultaneously release the hooks of the rock shafts from the prop-pieces at the moment the ladder is finally unwrapped, sub-  
120 stantially as described.

4. In a fire-escape, a device for retaining a pendent flexible ladder wrapped on a drum and permitting of the release of said ladder when said device is manipulated, consisting  
125 of a ratchet wheel on the shaft of the drum that supports the ladder, a pivotally supported pawl for the ratchet wheel, a spring pressing the pawl toward the ratchet wheel, a laterally pressing spring on the support for  
130 the drum, adapted to hold the pawl retracted when draft strain is applied thereto, and a

pendent flexible connection engaging the pawl to permit of its retraction, substantially as described.

5 In a fire-escape having a flexible ladder adapted to hang pendent on a building, series of prop pieces for the flexible ladder, each being grooved to receive the sides of

said ladder, and spring pressed latch bolts for the prop pieces, adapted to engage the sides of said ladder, substantially as set forth.

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Witnesses:

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F. W. HANAFORD.