

No. 637,475.

Patented Nov. 21, 1899.

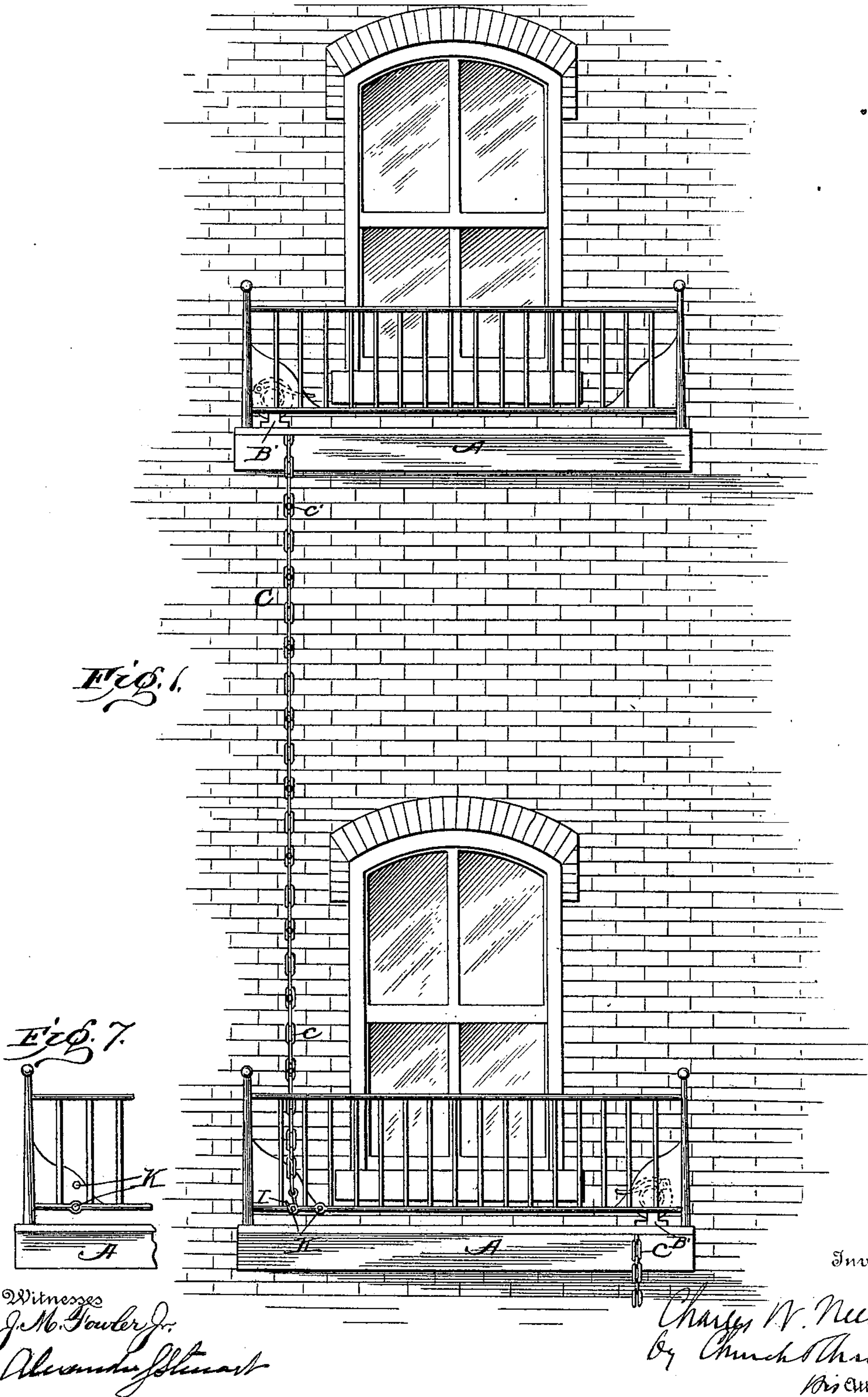
C. W. NEEDHAM.

FIRE ESCAPE.

(Application filed July 14, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Inventor

Charles W. Needham,  
by Church & Throckmold  
His Attorneys.

Witnesses  
J. M. Fowler Jr.  
Alexander Stewart

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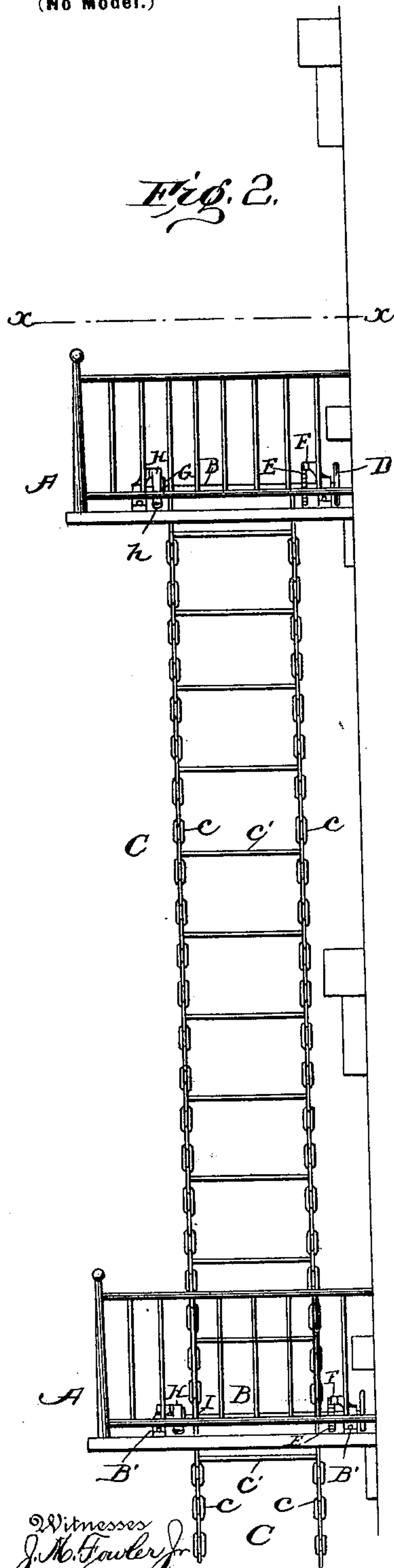
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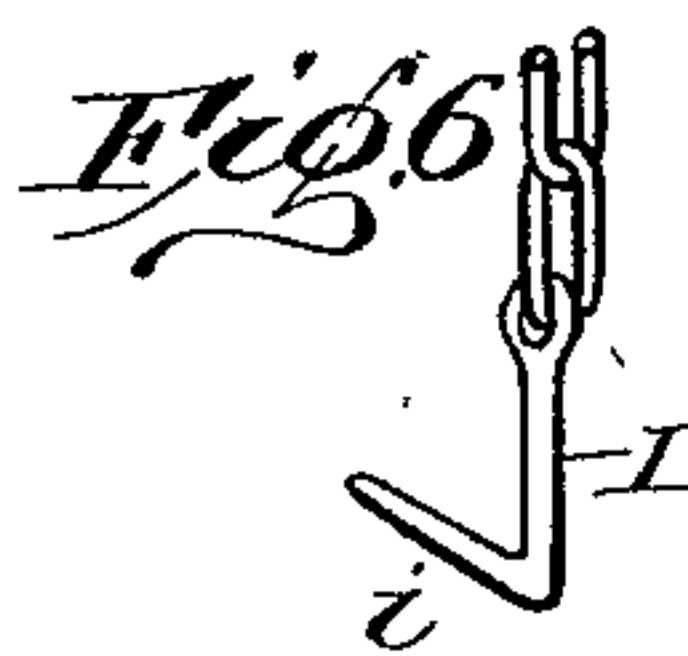
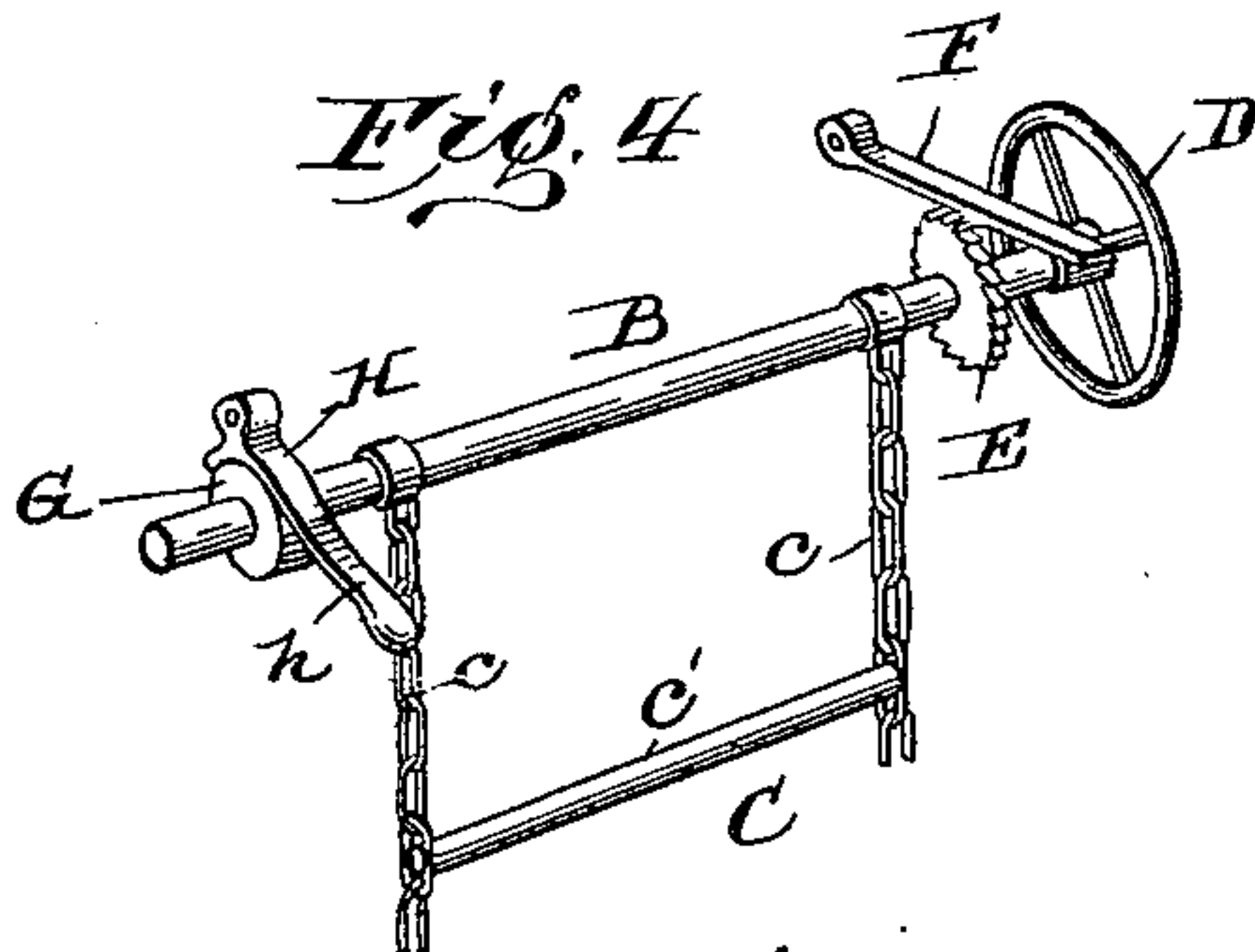
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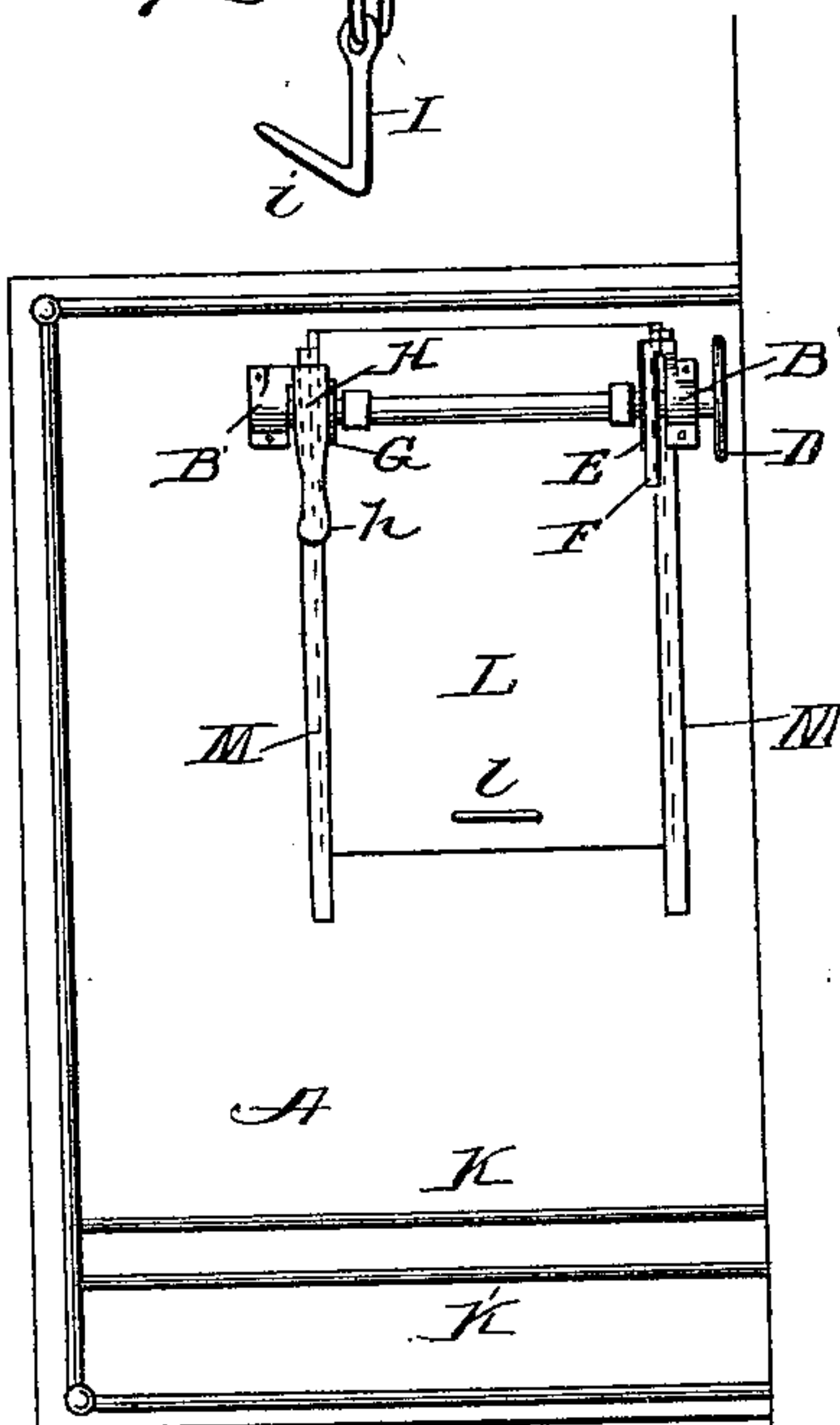
(No Model.)



Witnesses  
*J. M. Fowler Jr.*  
*Alexander Stewart.*



*Fig. 3.*



Inventor  
*Charles W. Needham,*  
By *Church & Church,*  
His Attorneys.



# UNITED STATES PATENT OFFICE.

CHARLES W. NEEDHAM, OF WASHINGTON, DISTRICT OF COLUMBIA.

## FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 637,475, dated November 21, 1899.

Application filed July 14, 1899. Serial No. 723,820. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES W. NEEDHAM, a citizen of the United States, residing at Washington, in the District of Columbia, have  
5 invented certain new and useful Improvements in Fire-Escapes; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being  
10 had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

In the accompanying drawings, Figure 1 is a front elevation of a building, showing the application of my invention thereto. Fig. 2  
15 is a side elevation of the same. Fig. 3 is a top plan view on the line  $x x$ , Fig. 2. Fig. 4 is a detail view showing the shaft on which the flexible ladder is designed to be wound and the means for rotating, locking, and braking the same. Fig. 5 is a perspective view of  
20 one of the rounds of the ladder. Fig. 6 is a detail view of one of the grapples or hooks at the lower end of the ladder. Fig. 7 shows a modified arrangement of the anchoring or  
25 holding bars with which the grappling-hooks cooperate.

Like letters of reference in the several figures indicate the same parts.

My invention has for its object to provide  
30 a fire-escape for buildings which while designed as a permanent attachment does not, especially when not actually in use, have the effect of disfiguring the building, as do most permanently-applied fire-escapes at present  
35 in vogue, and which, further, does not at ordinary times afford a means of ascent for thieves or other intruders, as do the usual exteriorly-applied fire-escapes.

The central idea of my invention is to provide  
40 on each floor of a building, beneath one or more of the windows thereof, a flexible fireproof ladder wound upon a rotatable shaft journaled in suitable bearings on an ornamental balcony, said shaft being provided  
45 with means for keeping it normally locked against rotation, with means for rotating it when desired, and with a braking appliance for regulating its speed in the unwinding of the ladder, the ladder being provided at its  
50 lower end with hooks or grapples adapted, when the ladder is unwound, to enable it to

drop to the floor below to engage with a suitable anchoring or holding bar or bars secured to the balcony of the floor below, the whole  
being so arranged as that in case of fire the  
55 occupant of an upper floor may step from the window of that floor onto the balcony thereunder, slide back or open a door in the floor of said balcony provided for the purpose, disengage the locking means from the shaft upon  
60 which the ladder is wound, turn said shaft so as to permit the ladder to descend to the floor below, and apply the braking device, so as to properly check the descent of the ladder.  
The hooks or grapples on the lower ends of  
65 the ladder are designed to strike and pass beneath the anchoring or holding bar of the balcony below as the ladder descends, and when the operator on the balcony above gives  
a slight backward rotation to his operating-  
70 shaft the hooks or grapples engage the anchoring or holding bar and the ladder is rendered taut and rigid, being held in that position by the locking appliance, which for  
that purpose is reengaged with the shaft. 75  
The balcony of each succeeding story is provided with a similar equipment, so that the descent may be made from story to story until the ground is reached.

To restore the appliance to original posi-  
80 tion after use, the hooks or grapples on the lower ends of the several ladders are disengaged from their anchoring or holding bars in order that the ladders may be wound up and secured and the openings in the floors of  
85 the balconies reclosed by their doors or slides.

All the operative parts of the appliance are adapted to be so covered by the ornamentation of the balconies as to be concealed  
from view, thus obviating the unsightly ef-  
90 fect so common in most appliances of this kind.

My invention is obviously susceptible of various embodiments, of which one form is shown in the accompanying drawings, where-  
95 in—

A represents a balcony; B, a shaft suitably journaled in bearings  $B' B'$ , carried by the balcony.

C is a flexible fireproof ladder consisting, 100 preferably, of the chains  $c c$ , connected at intervals by metal rounds  $c'$ . This ladder is



secured at its upper end to the shaft B in any suitable way, so as to be wound upon the shaft when the latter is rotated.

D is a hand-wheel, by means of which the shaft may be rotated to wind up the ladder thereupon.

E is a ratchet-wheel secured to the shaft, and F is a pivoted pawl for engagement therewith, the function of these parts being to lock the shaft, and consequently the ladder, at any desired point. Also secured to the shaft B is a friction-drum G, with which is adapted to cooperate a friction-shoe H, having a handle *h*, all as shown in Fig. 4.

On the outer or lower end of the ladder I secure hooks or grapples I, such as shown in Fig. 6. The lower face of each of these hooks is made oblique or beveled, as shown at *i*. This is done to enable the hooks when they descend to strike one or the other of the anchoring or holding bars and to be by their said beveled surfaces *i* deflected laterally, and thus direct them on the proper side of the bar to insure their engagement therewith when they pass below said bar, and the ladder is raised by the rewinding of the slack portion of it on the shaft by the backward rotation of the hand-wheel D. The anchoring or holding bars K may be arranged side by side horizontally, as shown in Fig. 3, or side by side vertically, as shown in Fig. 7.

L represents the door covering the opening in the platform of the balcony, the same being shown in this instance as consisting of a sliding door guided on suitable ways M M, arranged on the floor of the platform and provided with a handle *l* to facilitate the opening and closing of it.

It will be understood from what has been said that the openings in all the balconies are normally closed by their respective doors and that the ladders are all wound up on their respective shafts B and are locked in this position by the engagement of the pawls F with their respective ratchet-wheels E. Should a person on an upper floor desire to descend to a lower floor or to the ground by means of these appliances, he has simply to raise a window above the balcony on that floor, step down onto the balcony, draw open the sliding door L thereon, throw back the pawl F, so as to free it from the ratchet E, and then turn the shaft B slightly by means of the hand-wheel D or by the direct application of force to the wound-up ladder, so as to cause the ladder to unwind and to descend to the floor below, such descent being checked, if necessary, by manipulating the brake-lever *h*, so as to cause its shoe H to bear with the proper degree of pressure upon the friction-drum G. As the hooks or grapples I encounter the anchoring-bar K on the balcony below they are

deflected to one side, so as to cause the hooks to properly pass beneath said anchoring-bar. The operator then gives a backward rotation to the shaft B by the hand-wheel D until the ladder is made taut, at which point the pawl F is dropped back into engagement with the ratchet-wheel E, so as to maintain the ladder in taut condition and permit a safe descent to the balcony of the floor below.

It will be noted that the openings in the successive balconies are not opposite each other, but are arranged alternately at opposite ends, and, furthermore, that the ladders are likewise alternated. The effect of this arrangement is to inspire confidence in timid users, who, while perhaps willing to descend to a platform but a story below, might not dare to undertake a descent from a high elevation down an apparently uninterrupted ladder-way to the ground through fear of becoming dizzy and falling. Moreover, the ladder and opening of each balcony being at opposite ends thereof the liability of interference between the person arriving from above and one about to descend below is very much decreased.

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

1. In a fire-escape appliance, the combination of a flexible ladder, hooks or grapples secured to the lower end of the ladder and provided with beveled or inclined under surfaces, and anchoring or holding bars located in the path of the descending ladder, with which said hooks are adapted to automatically engage; substantially as described.

2. In a fire-escape, the combination with a flexible ladder having hooks or grapples on the lower end of the same, anchoring or holding bars located in the path of the descending ladder with which said hooks are adapted to automatically engage, and means for tightening the ladder; substantially as described.

3. In a fire-escape, the combination of the following instrumentalities, to wit, a series of balconies located one over the other and each having a floor-opening, a series of winding-shafts, one journaled on each balcony, in proximity to the floor-opening therein, flexible ladders one carried by each shaft and adapted to extend to the next lower balcony, hooks or grapples on the free ends of the ladders, and anchoring or holding bars with which the hooks or grapples automatically engage when the ladders are extended, whereby a person may operate a ladder from each balcony to descend; substantially as set forth.

CHARLES W. NEEDHAM.

Witnesses:

GRACE A. SEWELL,

CHARLES RAY DEAN.