

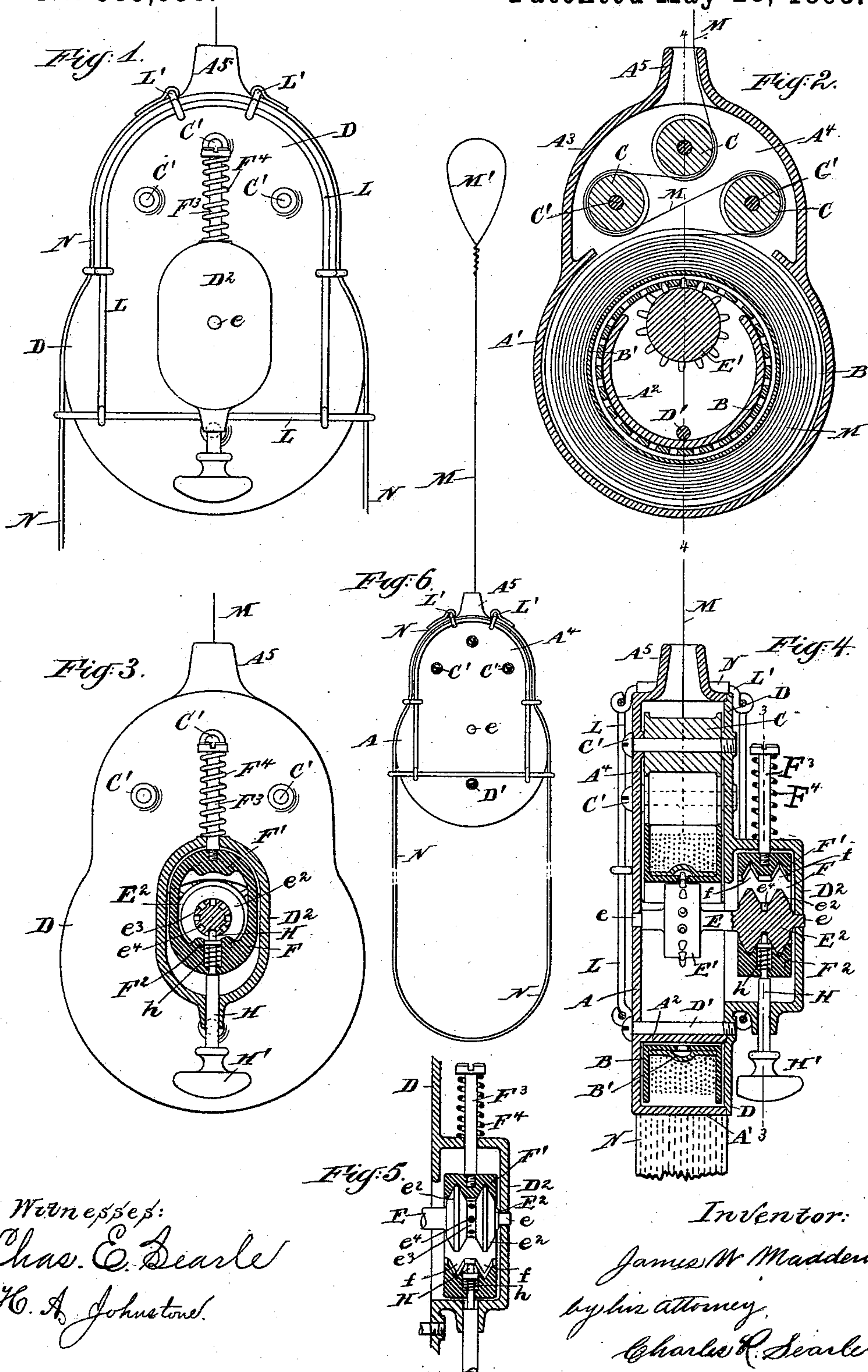
(No Model.)

2 Sheets—Sheet 1.

J. W. MADDEN.  
FIRE ESCAPE.

No. 539,958.

Patented May 28, 1895.



Witnesses:  
Chas. E. Searle  
H. A. Johnston.

Inventor:  
James W. Madden,  
by his attorney,  
Charles E. Searle.

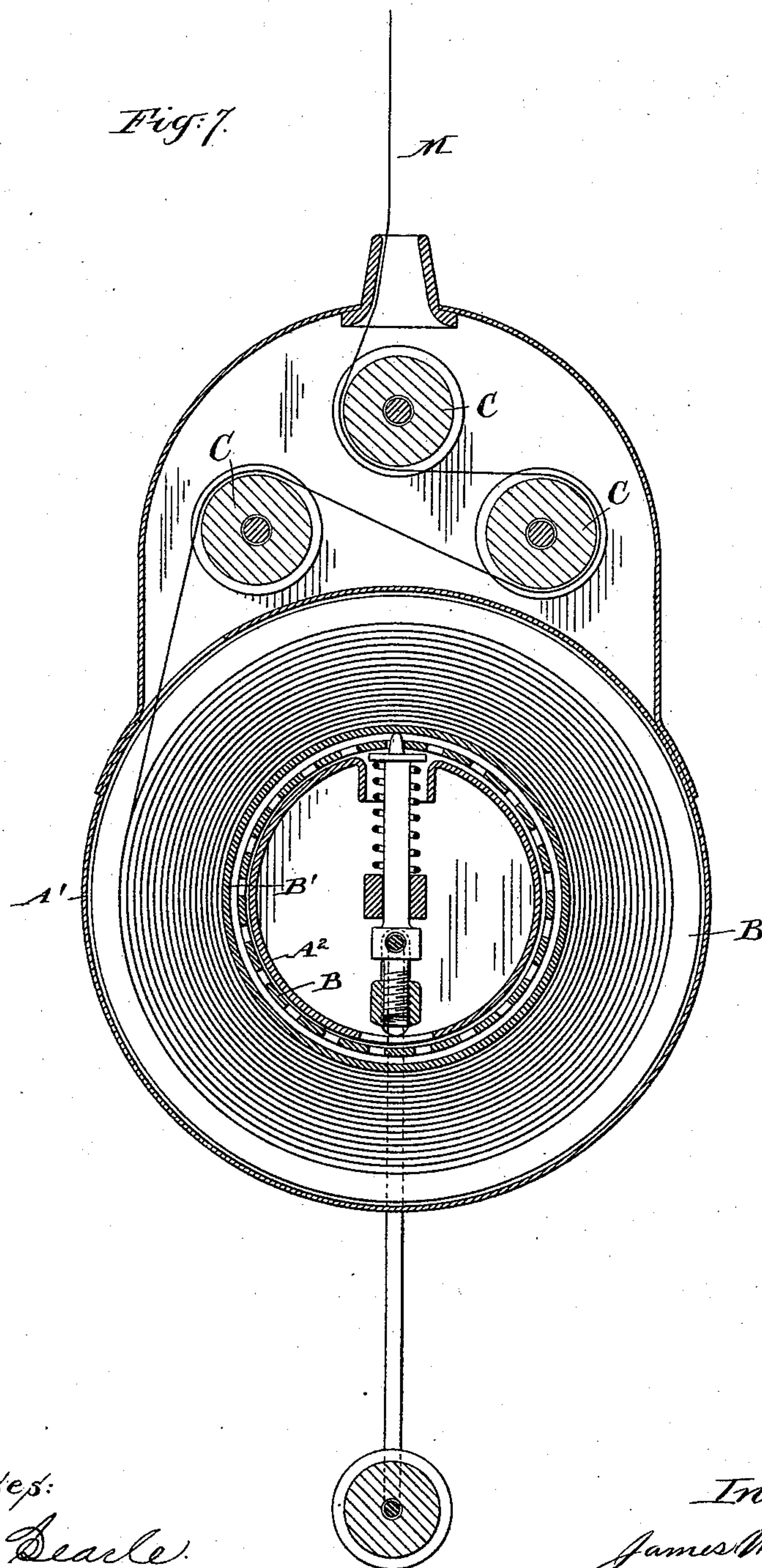
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# UNITED STATES PATENT OFFICE.

JAMES WHEATON MADDEN, OF BROOKLYN, ASSIGNOR TO HIMSELF, AND  
FRANK M. RANDALL, OF NEW YORK, N. Y.

## FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 539,958, dated May 28, 1895.

Application filed February 15, 1895. Serial No. 538,485. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES WHEATON MADDEN, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Fire-Escapes, of which the following is a specification.

The invention relates to portable fire-escapes mainly intended to be carried in the pocket or hand-bag of the traveler ready for immediate use, when required, by attachment to the fixed work in the room, or to any article of furniture sufficiently large and heavy to sustain the weight of the person while being lowered from the window.

It consists of a coil of wire wound upon an annular grooved ring inclosed in a casing provided with friction sheaves around which the wire is led as it unwinds, and also with releasing and stopping mechanism, and an additional friction device controlled by the person supported in a loop of webbing attached to a wire frame inclosing the casing, while making the descent. The grooved ring is provided with internal gear meshing into a toothed pinion, having a flanged wheel mounted on the pinion shaft inclosed in a vertically sliding yoke equipped with V-shaped surfaces matching to the wheel, and with a spring-dog engaging in one of the several radial holes drilled therein. The grooved ring is guided in a corresponding annular portion of the casing, and is released or stopped, and its rapidity of rotation controlled by increasing or relaxing the pull upon a knob attached to the sliding yoke.

The accompanying drawings form a part of this specification.

Figure 1 is a side elevation. Fig. 2 is a vertical section. Fig. 3 is a side elevation, partly in vertical section, on the line 3 3 in Fig. 4. Fig. 4 is a vertical section on the line 4 4 in Fig. 2. Fig. 5 is a similar view of a portion, and Fig. 6 is a side elevation on a smaller scale. It shows the reverse side to that in Figs. 1 and 3.

Similar letters of reference indicate corresponding parts in all the figures.

A is the casing of cast metal, and A' an exterior flange and A<sup>2</sup> an interior flange, each a nearly complete circle, the space between

forming a way for an annular grooved ring B mounted therein with liberty to rotate, and carrying a coil of light steel wire M. The flange A<sup>3</sup> is a continuation of the flange A' around an extension A<sup>4</sup> of the casing, in which is mounted three friction sheaves C around which the wire M passes before leaving the casing through the tubular guide A<sup>5</sup>.

D is a cover-plate matching over the casing, and secured in place by screw-bolts C' forming centers for the sheaves C, and by an additional bolt D' in the lower portion of the casing.

The grooved ring B is rectangular in cross-section, and is provided with a series of small radial holes drilled equi-distant from each other on the center line, adapted to mesh with the pinion E' on a shaft E extending through the interior of the ring, and having bearings e in the casing A and in the extension D<sup>2</sup> of the cover. The points of the teeth on the pinion extend quite through the metal of the ring, but are protected from the coil of wire M by a strip B' laid in the groove, and having an arched portion B<sup>2</sup> into which the teeth may protrude.

E<sup>2</sup> is a wheel or friction-roller having two angular flanges e<sup>2</sup>, e<sup>2</sup>, with a plane cylindrical portion e<sup>3</sup> between them, provided with a series of radial holes e<sup>4</sup>.

The wheel E<sup>2</sup> is inclosed in a yoke F, provided in its interior with swells F', F<sup>2</sup>, at the top and bottom, each having two V-grooves f, f, matching the contour of the angular flanges e<sup>2</sup>, e<sup>2</sup>, on the wheel. The yoke is guided with liberty to move up and down to the required extent in the extension D<sup>2</sup> on the cover by a guide rod F<sup>3</sup> extending upward, and forming an abutment for a helical spring F<sup>4</sup> tending to lift the yoke and its attachments. In the lower portion of the yoke is a dog H engaging normally in one of the series of holes e<sup>4</sup>, and subject to the force of a light lifting spring h surrounding the dog in a hole drilled in the yoke. The dog H extends downward through the portion D<sup>2</sup> of the cover and terminates in a knob H' of such size and shape as to be easily grasped and pulled upon by the person using the apparatus.

L is a light frame of stout wire inclosing the casing and cover, provided with cross-bars



on each side of the guide  $A^5$ , to which are attached the ends of a loop  $N$  of webbing, or other material, of sufficient length to encircle the person seated thereon and allow him to easily grasp the knob  $H'$  with one hand while partially supporting his weight by holding the casing and frame with the other.

The apparatus is used as follows: The loop  $M'$  of the wire  $M$  is made fast to a hook fixed in the window-casing, or to any convenient projection, or an article of furniture placed near the window of such size and strength as to form a reliable support. The person climbs over the window-sill, seats himself in the loop and allows his weight to be sustained by the wire. A slight pull on the knob  $H'$  overcomes the resistance of the spring  $h$ , withdrawing the dog  $H$ , and allows the wheel  $E^2$  to revolve. The weight of the person unwinds the wire  $M$ , revolving the ring  $B$ . A too rapid descent is prevented by the friction of the wires around the sheaves  $C$ , and the friction of the lower portion  $F^2$  of the yoke upon the wheel  $E^2$ . If, however, this is not sufficient, a strong pull on the knob  $H'$  will overcome the resistance of the spring  $F^4$  and bring the upper portion  $F'$  of the yoke into frictional contact with the wheel  $E^2$ , as shown in Fig. 5. Thus conditioned, the additional friction will depend upon the excess of pull on the yoke over the lifting force of the spring  $F^4$ , which excess may be varied at the will of the person until the descent is accomplished. If, for any reason, the person wishes to stop, it may be done by simply relaxing the pull on the knob  $H'$ , allowing the yoke to rise into contact with the wheel  $E^2$ , and the dog  $H$  to be forced into engagement with one of the holes  $e^4$  in the portion  $e^3$  of the wheel, preventing its revolution, and through the pinion  $E'$  holding the ring  $B$  against revolving. By holding the yoke in an intermediate position, out of contact with the wheel, the descent will be restrained only by the friction of the wire  $M$  around the sheaves  $C$ , and will then depend upon the weight of the person. The apparatus should be previously adjusted approximately to the weight of the person using it by passing the wire a greater or less number of times around the sheaves  $C$  so that the descent will be rapid when conditioned as above, but will be easily checked by the additional friction on the wheel  $E^2$ .

By reason of the qualities of strength and lightness possessed by aluminum, I prefer to use that metal for the casing and main portions of my apparatus. The wire  $M$  should be of steel of small gage, but of sufficient strength to support the weight. My experiments indicate that a ring of the proportions shown, of five inches outside diameter, will carry more than one hundred feet of wire strong enough to safely sustain a weight of five hundred pounds.

The apparatus is small, and may be carried in an ordinary coat pocket, and is intended to be carried in the personal baggage of trav-

eling salesmen and others who are exposed to danger from fire.

The frame  $L$ , having the cross-bars  $L'$  to which the ends of the loop  $N$  are fastened, makes a strong but separable connection between the webbing and casing, and allows the latter to be carried independently, if desired; and also serves to distribute the weight of the load and insures that the casing shall not be turned or displaced while in use.

Modifications may be made in the forms and proportions without departing from the principle of the invention. Instead of aluminum other metals may be employed, if preferred. The ring  $B$  may be made with internal gear teeth to engage with the pinion  $E'$  instead of using the form of gearing shown, dispensing with the strip  $B'$ . A greater or less number of friction sheaves  $C$  may be employed.

Fig. 7 shows a form of the invention in which the spring-dog is mounted in a guide within the inner flange, and engages with one of a series of holes drilled in the internal circumference of the ring. A depending wire loop extends through a boss on the dog, guided in slots in the casing and cover-plate, and provided with a handle below. A downward pull withdraws the dog and allows the ring to revolve. A further movement in the same direction brings an adjustable shoe on a screw-threaded extension of the dog into frictional contact with the interior surface of the ring, the friction thus produced acting with the sheaves to retard the descent, as in the form first described. The modified form is best adapted for large sizes intended to be mounted on a hook or crane attached to the window-casing in each room on the upper floors; but it may be made nearly or quite as small as the form shown in Figs. 1 to 6, and is more compact as it dispenses with the extension  $D^2$ .

I claim as my invention—

1. The casing  $A$ , having flanges  $A'$ ,  $A^2$ , the ring  $B$  guided between said flanges and carrying the wire  $M$ , in combination with the sheaves  $C$  and cover-plate  $D$ , substantially as herein specified.

2. The casing  $A$ , having flanges  $A'$ ,  $A^2$ , the ring  $B$  guided between said flanges and carrying the wire  $M$ , in combination with the sheaves  $C$ , and an additional friction mechanism engaging the interior of the said ring, and controlled by the user, all substantially as herein specified.

3. The ring  $B$ , shaft  $E$ , wheel  $E^2$  and yoke  $F$  adapted to frictionally engage the said wheel, in combination with each other and with the wire  $M$  and sheaves  $C$ , all substantially as herein specified.

4. The ring  $B$ , shaft  $E$ , wheel  $E^2$ , having holes  $e^4$ , yoke  $F$  and dog  $H$ , in combination with each other and with the wire  $M$ , substantially as herein specified.

5. The wire  $M$ , ring  $B$ , shaft  $E$  and wheel  $E^2$ , the latter having angular flanges  $e^3$ , in combination with the yoke  $F$ , having grooves  $f$ ,



adapted to engage frictionally with the said wheel, and the rod  $F^3$  and spring  $F^4$ , all substantially as herein specified.

5 6. The wire M, ring B, shaft E and wheel  $E^2$ , having holes  $e^4$ , in combination with the yoke F, rod  $F^3$ , spring  $F^4$  and dog H, substantially as herein specified.

10 7. The casing A, having flanges  $A'$ ,  $A^2$ , the ring B guided between said flanges, the shaft E extending through the ring, the pinion  $E'$  engaging the interior of the ring, in combination with the wheel  $E^2$ , having holes  $e^4$ , yoke F, rod  $F^3$ , spring  $F^4$  and dog H,  $H'$ , substantially as herein specified.

15 8. The casing A, flanges  $A'$ ,  $A^2$ , cover-plate D, ring B, wire M and sheaves C, in combination with the shaft E, pinion  $E'$ , wheel  $E^2$ ,

having holes  $e^4$ , yoke F, having surfaces engaging frictionally with the wheel, and guide-rod  $F^3$ , spring  $F^4$ , dog H and knob  $H'$ , all substantially as herein specified. 20

9. In a fire-escape, the wire M and casing A, the frame L, having cross-bars  $L'$  and the loop N attached to said cross-bars, all combined and arranged to serve substantially as 25 herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

JAMES WHEATON MADDEN.

Witnesses:

CHAS. E. SEARLE,

H. A. JOHNSTONE.