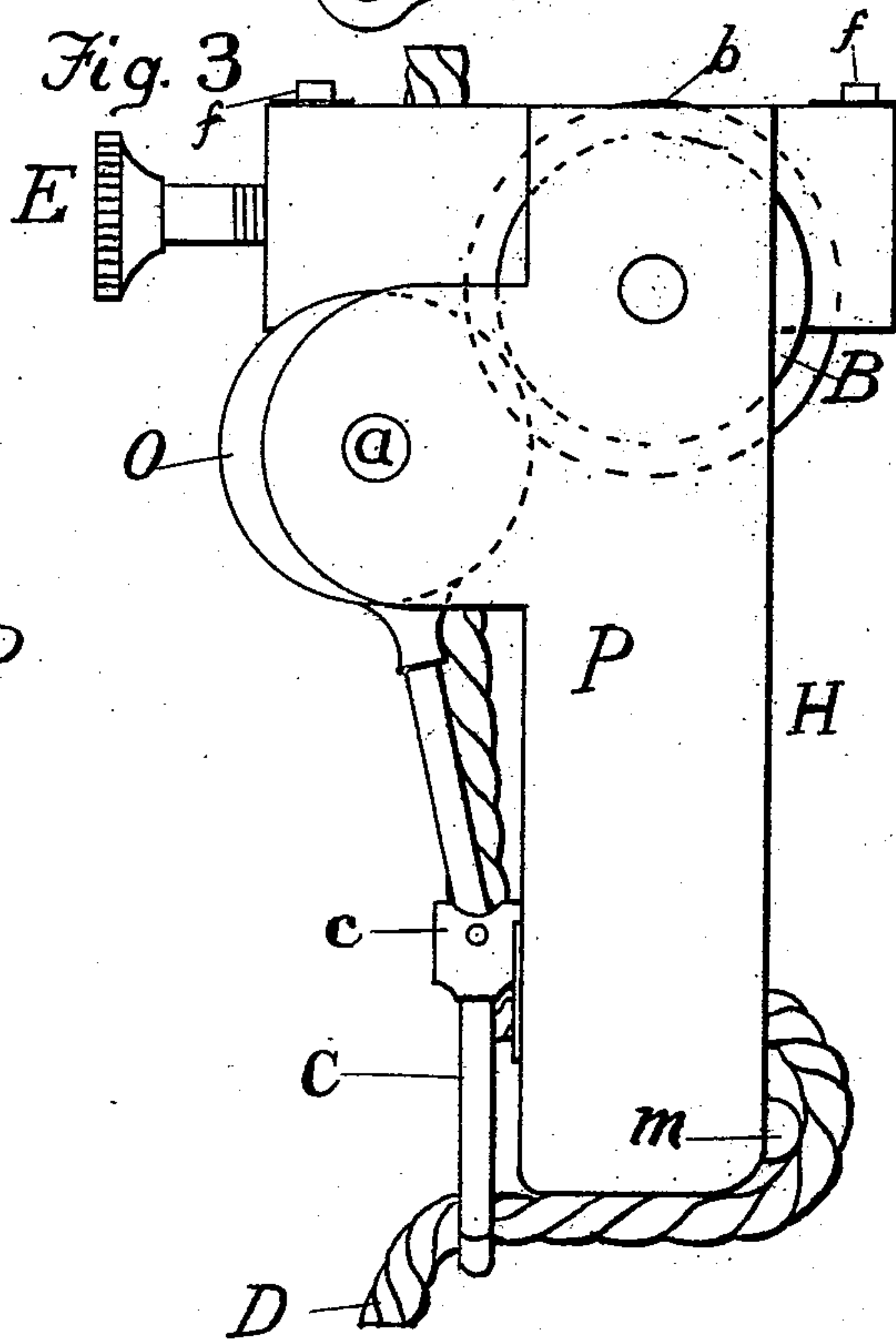
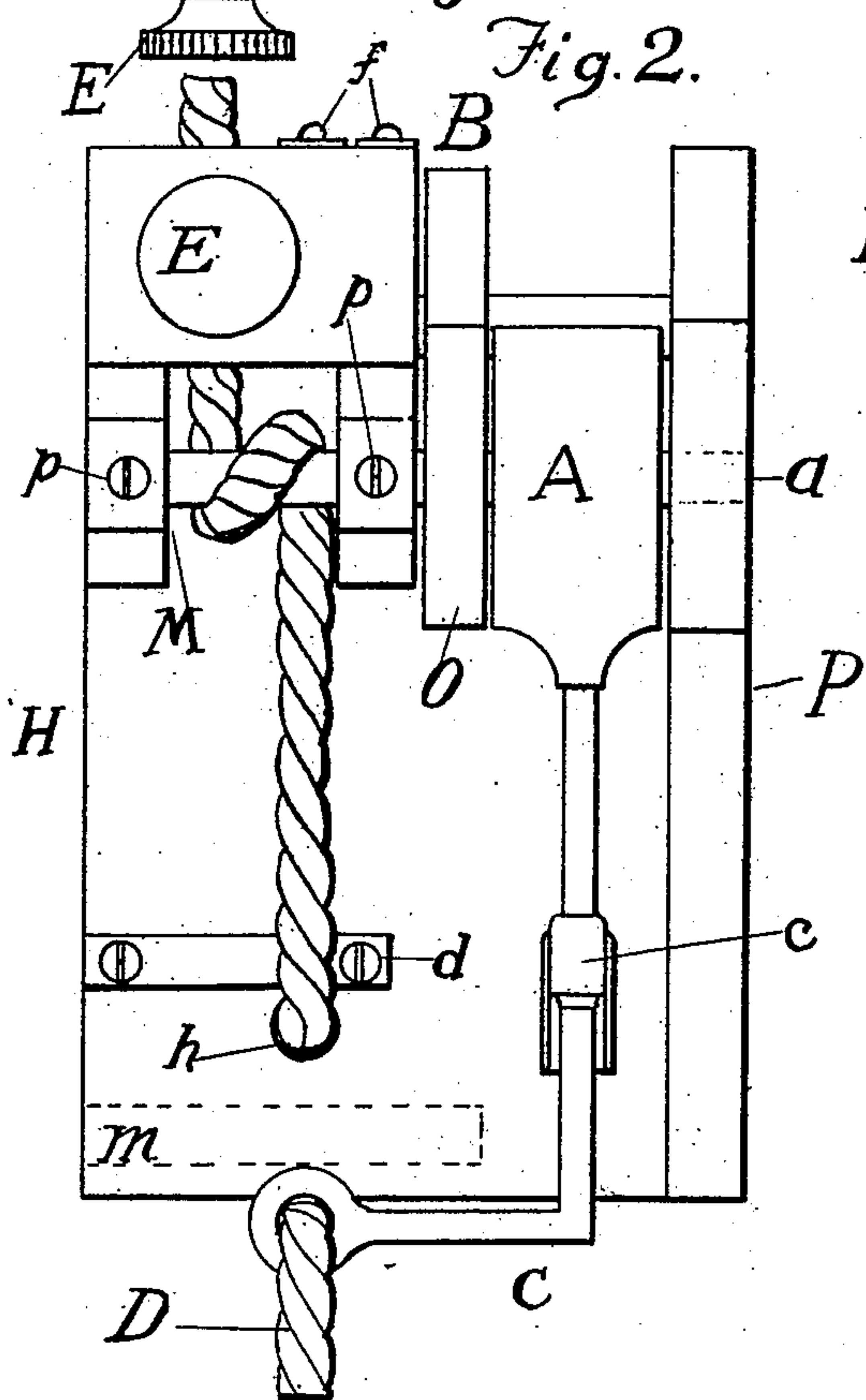
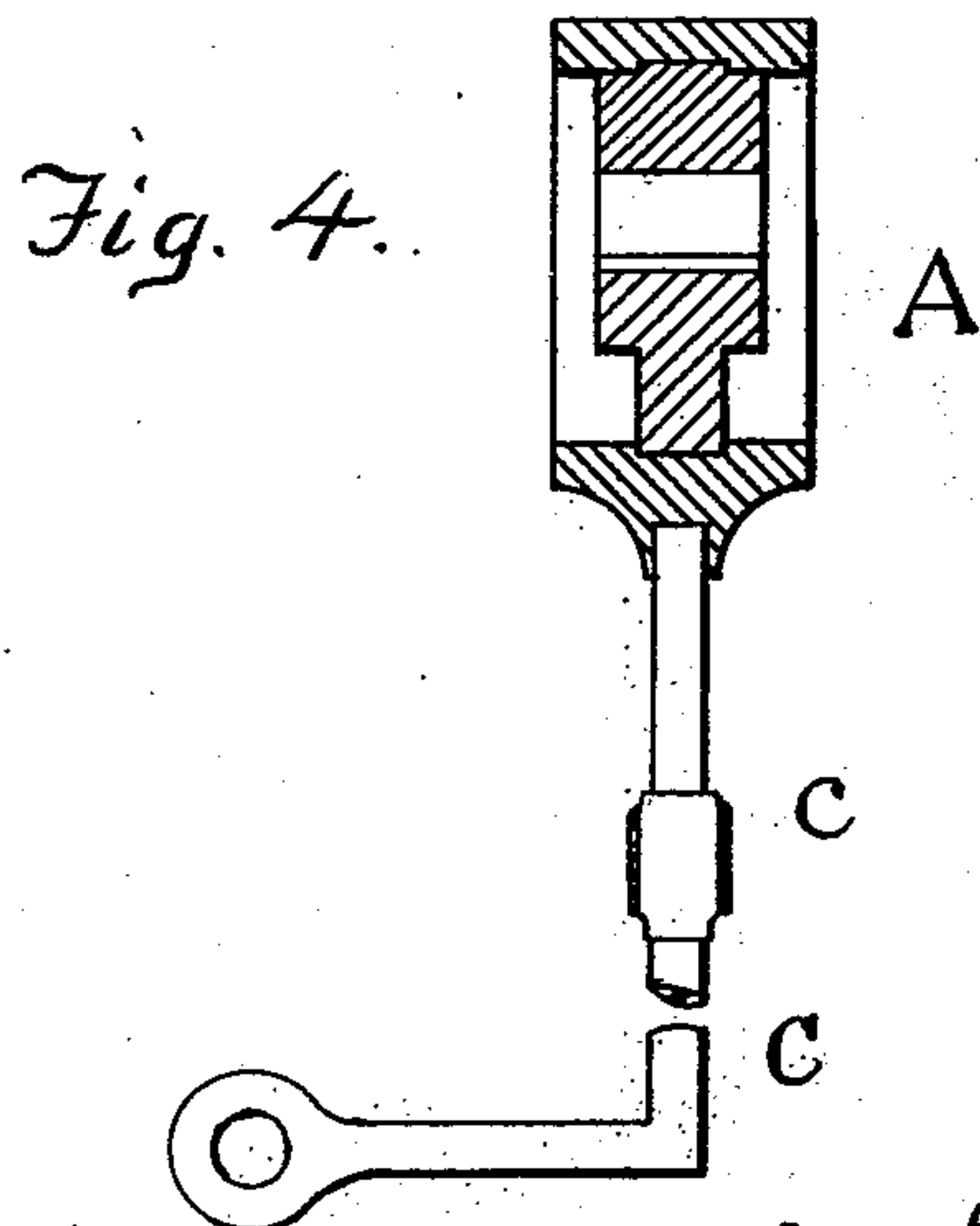
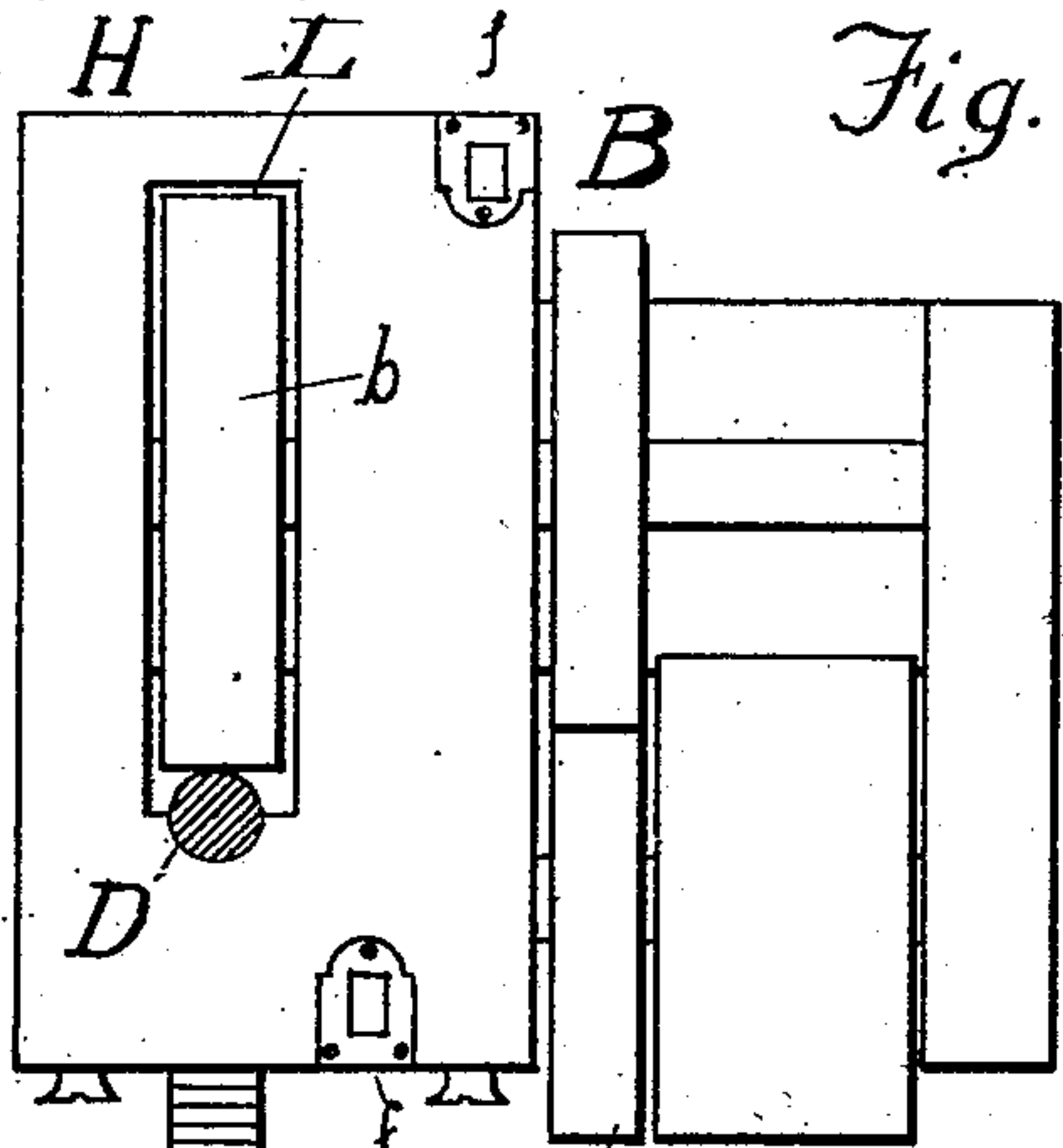


**F. W. HARKINS.**  
**FIRE ESCAPE.**

(Application filed Feb. 19, 1902.)

(No Model.)



*Witnesses.*

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# UNITED STATES PATENT OFFICE.

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## FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 714,108, dated November 18, 1902.

Application filed February 19, 1902. Serial No. 94,788. (No model.)

*To all whom it may concern:*

Be it known that I, FRANCIS W. HARKINS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Machine for the Safe Descent from a Height of Weights or Bodies, or Fire-Escape, of which the following is a specification.

My invention relates to improvements in said machines by which the friction of a rope down which they slip with their adjacent parts operates to check the speed of any descending body attached to them, and the objects of my improvements are, first, to provide an inexpensive machine of this kind, and, second, to have it work automatically to check the speed of the descending body at frequent intervals, an object which has hitherto been unattained by the means presented. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is the plan or top view of the device. Fig. 2 is a front view, and Fig. 3 is a right side view, of the same, while Fig. 4 is a view of the lifting-rod with attached cross-head and its connections.

Similar letters refer to similar parts throughout the several views.

H is the frame of the machine, is made of wood or metal, and is T-shaped. At its upper end it has a longitudinal slot L for the insertion of the friction-wheel *b* and the perpendicular passage of the rope D, and toward the lower end it has a horizontal hole *h*, through which the rope goes from front to back (after passing once around an axle *a*) and bending around the half-round *m* passes thence underneath the frame H to and through the ring of C. On the front of frame H is borne the axle or barrel *a* (which revolves in the bearings M) and the half-round *d*. It also has a set-screw E to adjust the pressure of rope D against the friction-wheel *b*. The axle *a* is continued on the right side for the eccentric A, which by means of the ordinary strap and rod moves the cross-head *c* and the rod C. Just inside of the eccentric-wheel and borne also on the axle is a friction-wheel O, which rubs against the wheel B, whose axle is the axle of the wheel *b*. Adjustment of these friction-wheels is secured by means of the set-screws *p p*.

P is a piece screwed on the side of the frame H to protect the mechanism. It also may support the ends of the axles of the wheels.

*ff* are eyes screwed on the top of the machine or otherwise, through which a rope or strap may be passed to form a sling or fastening for the body or weight attached to the machine.

The operation of my device is as follows: On loosening the screw E sufficiently gravity causes the frame H to slip downward along on the rope, thus making the friction-wheel *b* revolve, which by means of the wheel B on the same axle revolves the friction-wheel O, and thus actuates the mechanism connected to the rod C, causing it to rise and fall alternately, and as the rope passes through the ring of C this rise and fall alters the friction of the rope with the frame H or acts to clamp the rope to the frame H, so as to alternately stop the downward progress of the machine partially and temporarily and then to leave it again free to obey the law of falling bodies. The rope is carried around the axle *a* to increase the friction and prevent injury in case for some reason the wheels B *b* fail to work, the action of the axle being to supplement or assist that of the friction-wheel *b*. These two thus work together to produce one result. Cog-wheels may be used for the friction-wheels B O, if desired, and a cam can be used to actuate the rod C instead of an eccentric. A crank also may be used. The eccentric and cross-head are of ordinary construction. The wheel *b* and the screw E may exchange places relative to the rope D without materially altering the machine, in which case the wheel may be made to turn a simple crank fitted to one or both ends of either its axle or the axle *a*, thus replacing the eccentric shown in the drawings, or an additional friction-wheel may be used on the other side of the rope between the screw E and the rope instead to secure any additional friction desired.

Any kind of a rope may be used with this device.

I do not claim, broadly, a device for lessening by friction the fall of a body slipping down a rope, nor in such a device a stationary wheel around which a rope is wound to produce friction, nor any revolving pulley by which a rope may be tightened about a sta-



tionary wheel, nor any grooved friction-blocks whereby friction is reduced.

The details of construction may be varied considerably without altering my invention substantially. Therefore I do not limit myself to the exact form, arrangement, and combination shown; but

What I claim as new, and desire to secure by Letters Patent, is—

10 1. The rope D, frame H perforated at L and h to admit the passage of the rope D, wheel b, axle a, the last two made to revolve by their friction with the rope in the descent of the frame H, the axle a bearing at its end the wheel O, while b is rigidly connected to wheel B, both b and B being on the same axle, B by its friction with O aiding and supplementing the latter's action, the two united to secure the movement of the eccentric A on the axle a, A actuating the rod C, being connected therewith by the ordinary eccentric strap, rod and the cross-head c, the rod C being provided at its lower end with a ring through which the rope D after passing under the frame H is threaded and by the movement of rod C is alternately raised and lowered, the first action tending to clamp the rope against the lower surface and edge of the frame H, thus at frequent intervals increasing its friction with rope D and diminishing the speed of descent of frame H, the latter action reversing the former, freeing the rope and allowing the descent of frame H temporarily, rod C and its connected parts being so designed as to act as an automatic governor in this descent, in combination with parts B, O, c, C, A, substantially as described, for the purpose specified.

20 2. The frame H, having perforations L and h for the passage of a rope D, and wheel b so situated in L that it is revolved by the descent of the frame H along rope D adjacent and having also axle a with rope D turned about it, in bearings on its surface intermediate of L and h, wheel b being connected on the same axle with friction-wheel B, while B is connected frictionally with O which is on axle a, both B and a being united to secure with certainty the rotation through friction of the eccentric A fixed on axle a, on the descent of rope D by frame H, eccentric A connected by means of the ordinary strap, rod and cross-head to rod C, which is framed with a ring for the threading of the rope D and clamping it to the edge and under surface of frame H on the rotation of axle a, thus increasing the friction of frame H and rope D and regulating the descent of frame H in combination with rope D, and parts b, B, a, O, A, C, c, substantially as described, for the purpose specified.

30 3. In a fire-escape frame H having perforations L and h for the passage of rope D axle a whose bearings are fixed on frame H, intermediate of perforations L and h a turn of the rope being taken around a, in the passage from L to h, axle a having the eccentric A

fixed at its end which eccentric is connected by its strap to a cross-head c, the three being of ordinary construction, the cross-head connected to a rod C that is provided with a ring for the threading of the rope after it has left h and passed beneath the frame H, axle a and the elements connected thereto being so designed and adapted that on the descent along the rope of the frame H the rotation of the axle a caused by friction of the rope D actuates the rod C, at every rotation alternately raising and lowering rod C by the first action clamping a part of the rope D below the frame against the edge and lower surface of the frame H, thus increasing the friction of frame with rope, by the second action lowering and freeing the rope, thus modifying and regulating automatically the speed of descent along the rope of the frame, in combination with a rope D, and parts A, c, C, substantially as described, for the purpose specified.

4. In a fire-escape, a frame perforated for the passage of the rope and bearing on its surface intermediate of the perforations an axle around which a turn of the rope is taken (to secure friction to revolve it through the descent of the frame along the rope) which axle is connected by the ordinary mechanism of eccentric and rod and cross-head to a rod, having a part formed into a ring through which the rope is threaded after passing beneath the frame, the rod and its connections being so designed and adapted that at each revolution of the axle the rope below the frame is alternately raised and lowered, the first action being to clamp the rope against the edge and lower surface of the frame, thus increasing the friction of rope and frame and the second action being to free the rope from the frame, both actions serving to modify and regulate the descent of the frame along the rope, in combination with a rope substantially as described, for the purpose specified.

5. In a fire-escape the combination of a rope with a frame perforated for the passage of a rope, having in the passage with bearings on the frame, an axle around which the rope is turned, the axle being connected by mechanism of the ordinary kind with a rod, a lower portion of which is turned in the form of a ring through which the rope is threaded after passing beneath the frame, the axle and connected parts being so designed and adapted as to secure, with each rotation of the axle caused by the friction of frame and rope in the descent of the frame along the rope alternately a raising and lowering of rod, ring and rope, the first action being ultimately to clamp the rope to the edge and under surface of the frame, and thus increase the friction of rope and frame, the second action to free the rope, both actions serving automatically to regulate the speed of descent of the frame along the rope, substantially as described, for the purpose specified.

6. In a fire-escape the combination of a rope, a frame perforated for the rope's passage in



the descent of the frame, an axle having bearings, borne by the frame, the axle in the descent being revolved by the friction of the rope wound about it and a rod connected by  
 5 mechanism of the ordinary kind with the axle and so arranged that it is alternately raised and lowered as the axle turns, having its lower parts made into an eye, for the  
 10 threading of the rope after its passage beneath the frame by which means a portion of the rope beneath the frame is raised and clamped against the edge and lower surface  
 15 of the frame thereby increasing the friction of rope and frame and retarding the descent of the frame and then lowered so as to be free permitting the descent of the frame as  
 20 before, all parts being adapted to secure proper action, substantially as described, for the purpose specified.  
 25 7. In a fire-escape the frame H having perforations L and h for the passage of a rope down which it travels, axle a having bearings on the frame and the rope turned about it designed to revolve the axle through the  
 30 friction of the rope in the descent of the frame, and having at its end rigidly fixed the eccentric A which by means of the ordinary mechanism of the eccentric strap and rod and cross-head, attached to A at each revolution  
 of the axle, serves to raise and lower the connected rod C and by means of its terminal ring through which the rope is threaded, after passing beneath the frame, to lift the rope and clamp it to the under surface and

edges of the frame and again in turn lower 35 and free the rope, in combination with a rope and parts A, c, C, substantially as described, for the purpose specified.

8. In a fire-escape, a frame perforated for the passage of a rope and having an axle, 40 around which the rope is wound, in such passage on bearings fixed to the frame, the axle prolonged beyond its bearings and terminated by a crank, fitted in the ordinary manner to a rod which below the frame is provided with 45 an eye in combination with such rod and a rope threaded through the perforations of the frame and through the eye of the rod, all parts being designed and adapted to secure 50 by the friction of the frame and its parts with the rope, in the descent of the frame along the rope, the rotation of the axle and consequent alternate raising and lowering of the eye and threaded portion of the rope, the first action tending to clamp the rope against 55 the edge and lower surface of the frame, increasing the friction and retarding the descent of the frame, the second action tending to free the rope both actions serving to regulate and control automatically the speed of 60 descent of the frame and make it safe, substantially as described, for the purpose specified.

FRANCIS W. HARKINS.

Witnesses:

THEODORE SMITH,  
 PHILIP FRANCIS MORAN.