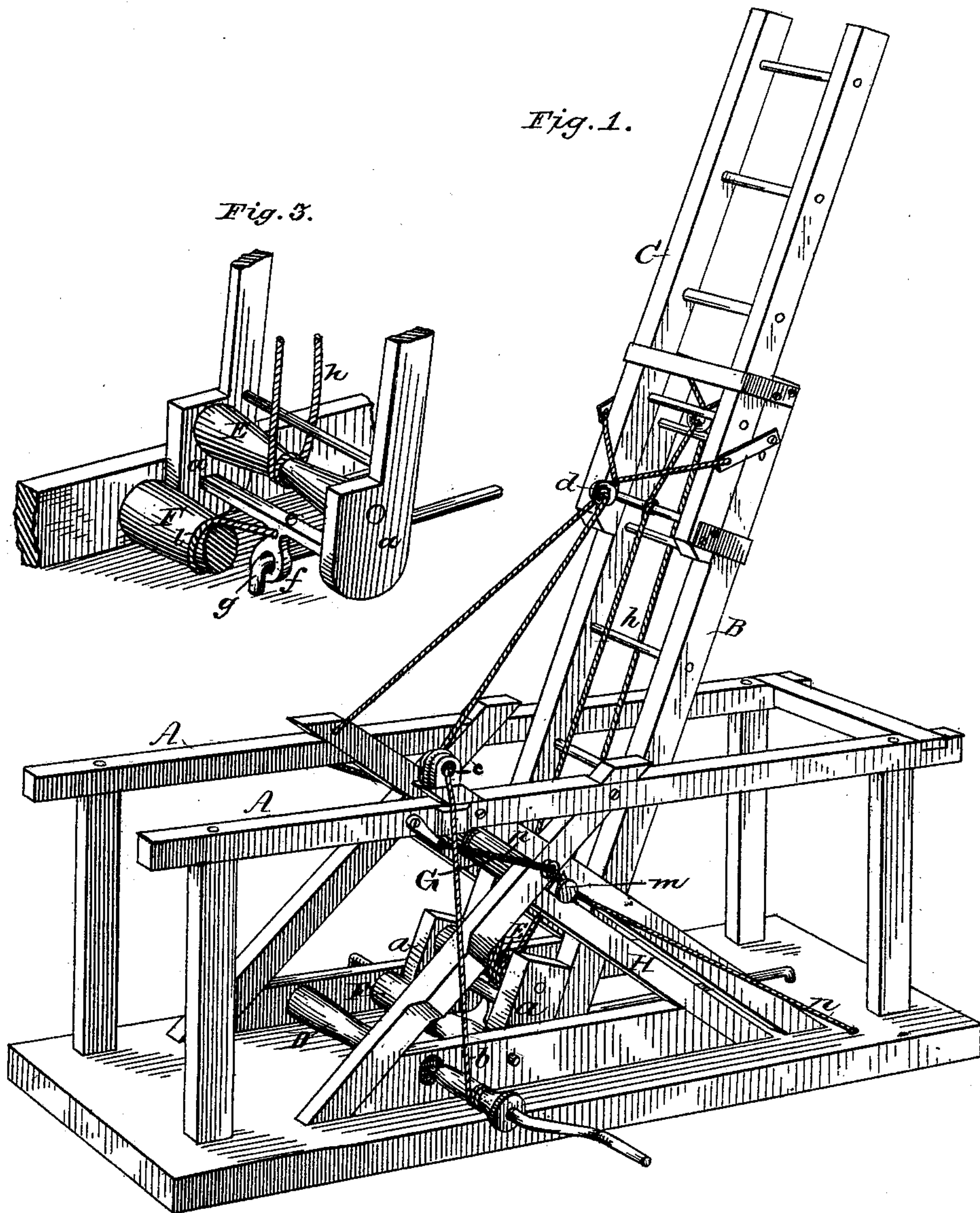


O. MARSHALL.
Extension-Ladder.

No. 219,749.

Patented Sept. 16, 1879.



Attest:
Clarence Poole
W. H. Morrill

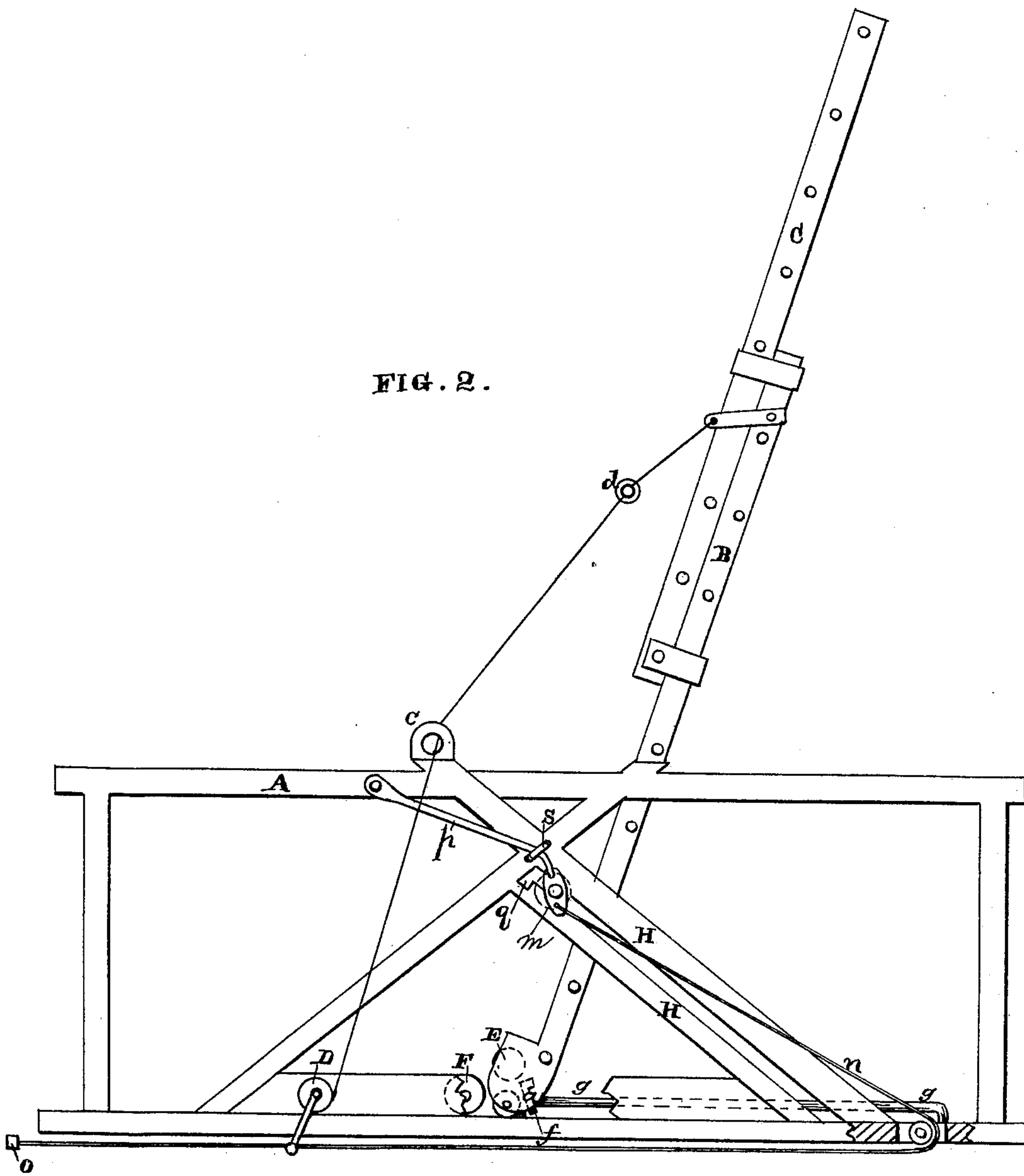
Inventor:
Oscar Marshall
by Newey & Co
his attys

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FIG. 2.



Witnesses

Geo. H. Strong.
Frank N. Brooks

Inventor
Oscar Marshall
By Dewey & Co. Attys

UNITED STATES PATENT OFFICE.

OSCAR MARSHALL, OF STOCKTON, CALIFORNIA.

IMPROVEMENT IN EXTENSION-LADDERS.

Specification forming part of Letters Patent No. **219,749**, dated September 16, 1879; application filed April 21, 1879.

To all whom it may concern:

Be it known that I, OSCAR MARSHALL, of Stockton, county of San Joaquin, and State of California, have invented an Improved Extension-Ladder; and I hereby declare the following to be a full, clear, and exact description thereof, reference being made to the accompanying drawings.

My invention relates to certain improvements in the method of operating extension and other ladders, derrick-masts, and other apparatus which it is necessary to frequently raise and lower; and it consists in a novel combination of drums or rollers, and a movable fulcrum mounted upon a suitable frame-work, so that the ropes from these drums act consecutively upon the ladders, the first drum acting to raise the ladder or mast to a certain position, and the second one completing its elevation, after which the apparatus is set to any incline or position desired by the aid of the two.

Figure 1 is a perspective view of my extension-ladder. Fig. 2 is a side view of the same. Fig. 3 is a detail view of the base of the ladder when raised.

Let A represent the frame-work in which the ladder is mounted; B, the main ladder, and C the extension-ladders. The lower end of the ladder is rounded off, as shown at *a*, and may be provided with rollers, so as to reduce the friction as it is drawn forward, as hereinafter described. A drum or roller, D, is journaled to the lower part of the frame, and has passing around it a rope, *b*, which passes through a leader, *c*, on top of the frame, thence through a block or eye, *d*, on the under side of the ladder, the other end of said rope being attached to the opposite side of the frame, as shown.

The extension-ladder C is shorter than the main one, and moves in suitable guides attached to the main ladder, as shown.

To the lower end of the main ladder is a swivel-bar, *e*, to which is fixed a leader, *f*, traveling on a slide or guide, *g*, on the bottom of the frame. A roller, E, carries a rope, *h*, which passes through an eye on the upper end of the main ladder, and has its other end secured to the heel of the extension-ladder, so as

to draw said extension-ladder C out to its full length.

Attached to the heel of the main ladder is a rope, *l*, winding on a roller, F, provided with a crank, so as to draw the heel of the ladder forward, for the purpose hereinafter described.

A roller, G, is journaled in sliding boxes *m*, which fit in the inclined guides H, forming part of the frame, and serves as a movable fulcrum.

Attached to the two opposite boxes are the cords *n*, which pass down and under the frame-work, their ends being united below, and secured to a bar or handle, *o*. These cords serve to draw the rolling automatically-movable fulcrum down in its guides to the lower end, it being drawn up by the springs or elastic bands *p*, which are extended when the roller is drawn down.

At the top of the guides H are formed notches *q*, Fig. 2, which catch the boxes and prevent the roller being forced back, as hereinafter described.

The rubber bands lead through eyes *s*, just over the notch in the guides, so that when the weight of the ladder is relieved from the sliding rollers the boxes are automatically lifted out of the notch, ready to be drawn down the slides. When springs or weights are used they may be connected to the boxes in the same manner.

The operation of my device is as follows: The frame and ladder are placed in the proper position, the heel of the ladder being placed nearest the place which the ladder is intended to reach. When the ladders are in a horizontal position, as they remain when not in use, the movable fulcrum-roller G rests against the heel of the shorter extension-ladder C, and the springs are thus prevented from sliding said roller up its guides.

To raise the ladders the roller D is revolved, thus taking in the rope *b*, which, by passing through the block or eye *d* under the ladder, raises the outer end. As this outer end is raised, the roller or movable fulcrum G is released from the heel of the shorter ladder, and its weights, springs, or elastic bands draw it up the guides H automatically to the upper end of the frame, where the boxes fall into the

notches or slots *g*, thus holding it in position at the top of the inclined guides. An attendant then winds the roller *F*, and the rope *l* on said roller draws the heel of the ladder toward the roller *F*, the anti-friction rollers in the bottom of the ladder rolling along the frame. As the ladder is thus drawn backward, its middle rests on the rolling movable fulcrum *G*, which is now in the upper end of the guides, and takes the weight of the ladder. The swivel-bar and leader in the heel of the ladder, being connected to the guide, keep the heel down, and at the same time allow it to slide forward. As the heel is thus drawn forward the outer end of the ladder is elevated, the rope *b* on the roller *D* being allowed to run out, so as to let the said outer end rise until the ladder assumes a vertical position, with its heel resting against the roller *F*. Then, by still further slacking out the rope *b*, the upper end of the ladder falls in the opposite direction or toward the position the heel occupied when lying horizontally. By slacking the rope *b* more or less the ladder is maintained at any desired angle, controlled by said rope. The extension-ladder may then be run out.

To lower the ladder, the rope *b* is drawn in by its pulley till the ladder is slightly past the perpendicular. Then, by unwinding the heel-rope *l* from the roller *F* and continuing to draw in the rope *b*, the upper end is drawn down and the heel forward, the ladder sliding down and back on the movable roller *G*. After it is down so as to rest on said roller *G*, the boxes are lifted from the notches in the guides, and by drawing in the cords *n* by means of the handle *o*, said roller is slid down its guides toward the heel of the ladder until it comes behind the heel of the shorter ladder, where it is held. Then the rope *b* is allowed to run out, and the outer end of the ladder is lowered until it rests in its original horizontal position in the frame, ready for transportation. In this way I am enabled to raise and lower ladders, derrick-masts, and similar apparatus with slight effort and rapid motion. The sliding fulcrum enables me to do this with a suitable leverage at different points and positions

of the ladder, so that only a slight expenditure of power is necessary.

When used for an extension-ladder, the apparatus and frame are mounted on wheels, so as to be readily portable. When only a mast or derrick is used, part of the frame may be dispensed with, only that portion being necessary which includes the guides and their supports.

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

1. In combination with an extension-ladder, derrick, or mast, the rolling automatically-movable fulcrum-roller *G*, moving in inclined guides *H*, and provided with springs *p*, for automatically raising it in the guides, and cords *n* for drawing down, substantially as and for the purpose herein described.

2. The swivel-bar *e*, with its leader *f*, sliding on the guide *g*, in combination with the extension-ladder *B C*, heel-rope *l*, and roller *F*, whereby the heel or lower end of the ladder is controlled, substantially as and for the purpose herein described.

3. The rollers *D F* and cords *b l*, in combination with the fulcrum *G*, whereby the ladder or mast may be raised to an inclined position, and then drawn up to a perpendicular by successive movements, substantially as herein described.

4. The ladder or mast *B C*, provided with the cords *b l*, winding on the rollers *D F*, and having the swivel-bar *e*, with its leader *f*, running on the guide *g*, in combination with the automatically-movable fulcrum *G*, with its spring *p* and cords *n*, sliding in boxes *m* in the inclined guides *H*, notched at the upper end, whereby the ladder or mast is raised from a horizontal to a vertical position, and then set at any desired inclination, substantially as and for the purpose herein described.

In witness whereof I have hereunto set my hand.

OSCAR MARSHALL.

Witnesses:

GEO. H. STRONG,
FRANK A. BROOKS.