(No Model.) 2 Sheets—Sheet 1.

L. HARRIS.

FIRE LADDER AND TRUCK.

No. 455,485. Patented July 7, 1891.

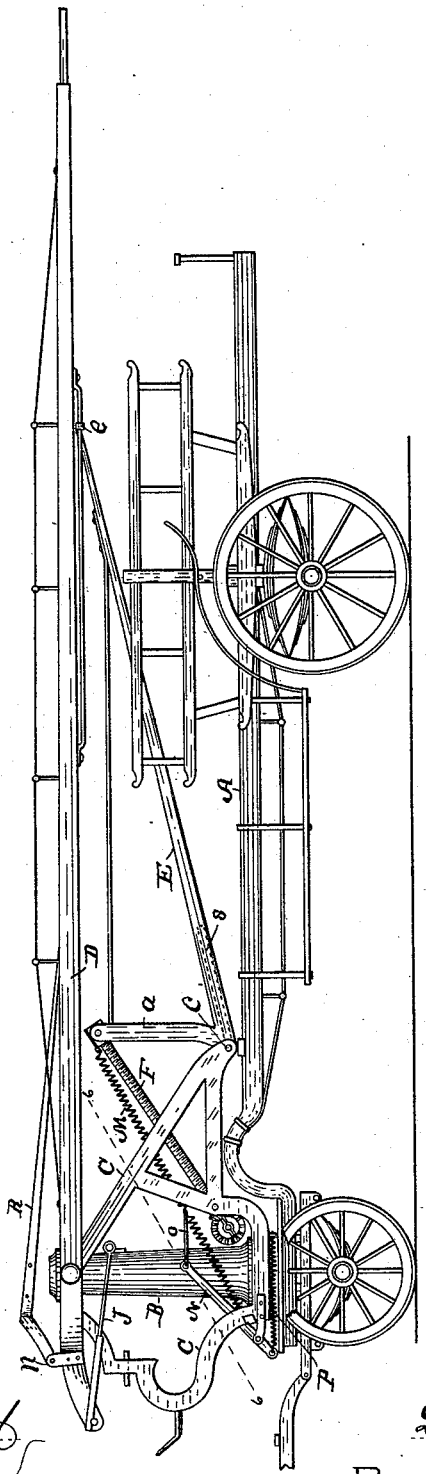

Fig. 1

Witnesses:
Walter S. Hood.
G. N. Burke

Inventor.
Levi Harris
By Lucius C West
Att'y.

(No Model.) 2 Sheets—Sheet 2.

L. HARRIS.

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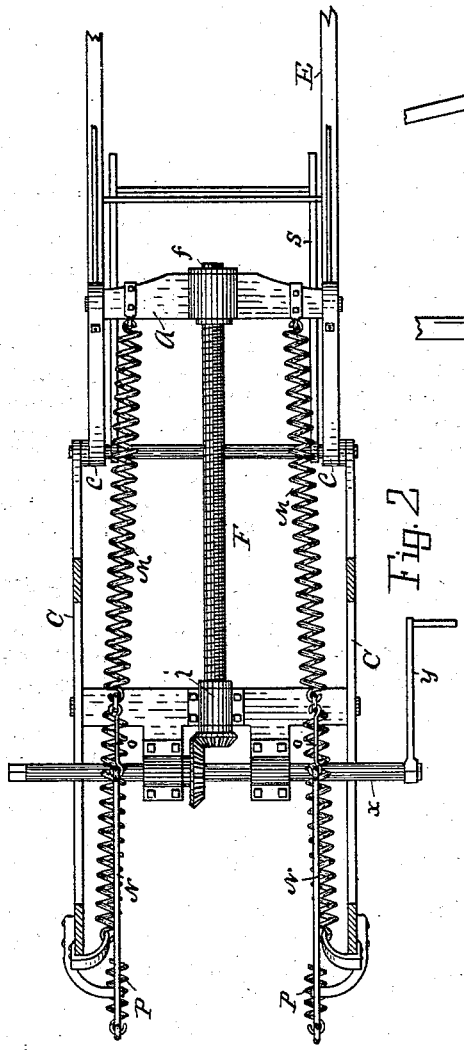

Fig. 2

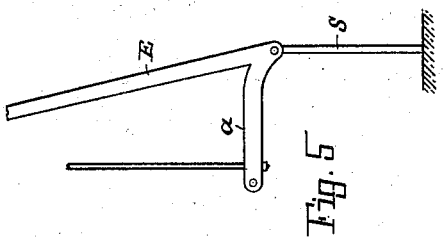

Fig. 5

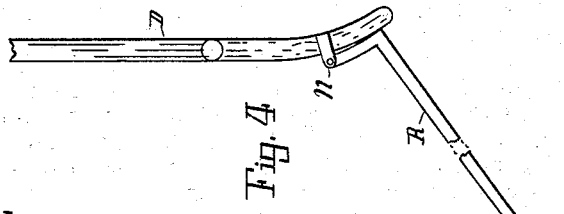

Fig. 4

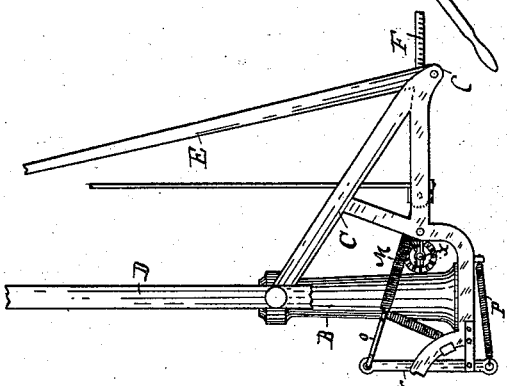

Fig. 3

Witnesses:
Walter S. Wood
L. H. Burke

Inventor.
Levi Harris
By Lucius C. West
Att'y.

UNITED STATES PATENT OFFICE.

LEVI HARRIS, OF KALAMAZOO, MICHIGAN.

FIRE LADDER AND TRUCK.

SPECIFICATION forming part of Letters Patent No. 455,485, dated July 7, 1891.

Application filed October 21, 1890. Serial No. 368,803. (No model.)

To all whom it may concern:

Be it known that I, LEVI HARRIS, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Fire Ladder and Truck, of which the following is a specification.

This invention relates to that class of fire ladders and trucks in which the base of the ladder is fulcrumed upon a revoluble pillar or support which turns on a pivot, and in which springs and screws are employed for raising the ladder, and more especially relates to Letters Patent granted to me May 17, 1887, No. 363,066, and Letters Patent granted to me April 16, 1889, No. 401,433.

The object of the present invention consists in certain improvements in the springs, screw, and lifting-lever, in connection with other features of the ladder, all of which will be particularly described and claimed below.

In the drawings forming a part of this specification, Figure 1 is a side elevation. Fig. 2 is a sectional view on the oblique line 6 6 in Fig. 1, looking from a point at the left, enlarged. Fig. 3 shows broken details enlarged from Fig. 1, showing the operation of the springs and lifting-lever; and Figs. 4 and 5 show further details below described.

Referring to the lettered parts of the drawings, A is the truck; B, the revoluble pillar pivotally mounted on said truck; D, the ladder fulcrumed to the top of said pillar; and C are brackets attached to said pillar and extending forward and in the rear therefrom, all substantially as in my prior constructions.

To the rear lower end of the brackets C is fulcrumed a lifting-lever E at *c*, Figs. 1, 2, and 3, having a base projection *a* at nearly right angles thereto—that is, when the ladder is down, as in Fig. 1, the lever E, which is attached to the ladder in a sliding manner at *e*, is at an oblique angle, the attachment being the same as in my first prior patent referred to. When the lever E is in this position, the base projection *a* will be at an upward vertical angle, and when the ladder D is elevated to a perpendicular, as in Fig. 3, the lever E occupies the same relative angle to the ladder, while the projection *a* will be at a horizontal angle, as in Fig. 3. A lifting-screw F has screw-bearings in the top of the base *a* at *f*, and this screw has revoluble bearings in the brackets C at *i*, Fig. 2.

Journaled in the brackets C, near the lower end of the screw F, is a transverse shaft *x*, having a crank-seat at each end, to which is attached a crank *y*, for the purpose of operating the screw, said screw F and shaft *x* being gear-connected, as in Fig. 2. By means of this oblique screw and its mode of operation and the angled lever which they operate an easy, speedy, and powerful leverage is obtained in throwing the ladder up to the position shown in Fig. 3. In addition to this peculiar construction I employ coil-springs M, preferably made in jointed sections, as in Figs. 1. 2, and 3. The upper ends of these springs are attached to the free end of the portion *a* of the lifting-lever, and their lower ends are attached to the forward end of the truck or the frame-work thereof. Thus the springs are at a similar oblique angle with the screw F when the ladder is down, and of course in said position the springs are greatly expanded, so that when the ladder starts to rise the springs M contract with great force and thus assist in raising the ladder, thus making the turning of the screw very much easier.

At N is a lever pivoted to the front end of the truck, said lever being link-connected with the joint of the spring M by means of a link *o*, attached to said joint and to the upper end of said lever. To the lower end of the lever N below its pivot is attached a coil-spring P, which is contracted when the ladder is up, as in Fig. 3, and is expanded when the ladder is down, as in Fig. 1—that is to say, when the ladder is raised, the spring P contracts, thus pulling on the lever N and carrying the joint of the spring M forward, so as to prevent it slackening and get it out of the way, as will be seen in Fig. 3.

At J in Fig. 1, is shown a spring arrangement which was employed in my first prior patent referred to; but as this may or may not be used in the present invention no detail description of it is here needed. Of course if it is employed the ladder will be raised still easier, but I deem the construction entirely successful without the old springs.

Figs. 1 and 4 show how the foot of the ladder may be provided with handles R, pivoted

to the ladder at *n*, so that when the ladder is down the handles will lie horizontally upon it, and when the ladder is up the handles will tilt down, as in Fig. 4, and may be employed by the firemen in swinging the ladder from one lateral position to another, during which action of course the pillar would rotate.

Fig. 5 shows a stop pivoted to the lower end of the lifting-lever E. This may be thrown down to rest upon the ground to assist in holding the weight of the ladder when it is swung around laterally upon the truck, and when it is not in use it may be turned up alongside of the lever E, as in dotted position at S in Fig. 1.

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

1. In a fire ladder and truck, the combination of a ladder fulcrumed at its base, a revoluble support, to which the latter is fulcrumed, brackets attached to said support, a lifting-lever pivoted to the brackets and having an angled base, a screw having screw-bearings through the free end of said base, and the springs in jointed sections attached at one end to the base of the lifting-lever and at the other ends to the brackets, substantially as set forth.

2. In a fire ladder and truck, the combination of a ladder fulcrumed at its base, the angled lifting-lever fulcrumed to the brackets which are attached to the revoluble support of the ladder, a screw having bearings in said brackets, the upper end of said screw having screw-bearings in the angled base of the lifting-lever, the jointed obliquely-angled springs attached to the base of the lifting-lever at the upper end and to the brackets at the lower end, and spring-actuated levers link-connected with the joint of said springs and adapted to carry said jointed springs forward when the ladder is raised, substantially as set forth.

3. The combination of the fire-ladder fulcrumed at its base and adapted to be swung laterally, means for raising said ladder, and the handles pivoted to the base of the ladder and adapted to lie horizontally upon the ladder when down and to swing down into position for use when the ladder is raised, substantially as set forth.

4. In a fire ladder and truck, the combination of a ladder fulcrumed at its base, a revoluble support, to which the latter is fulcrumed, brackets attached to said support, a lifting-lever pivoted to the brackets and having an angled base, a screw having screw-bearings through the free end of said base, a transverse crank-shaft having bearings in the brackets, said crank-shaft and screw being gear-connected, and the springs in jointed sections attached at one end to the base of the lifting-lever and at the other ends to the brackets, substantially as set forth.

In testimony of the foregoing I have hereunto subscribed my name in presence of two witnesses.

LEVI HARRIS.

Witnesses:
JAMES BAUMANN,
W. T. SMITH.