

(No Model.)

2 Sheets—Sheet 1.

N. LITTLEFIELD.
EXTENSION FIRE LADDER.

No. 262,799.

Patented Aug. 15, 1882.

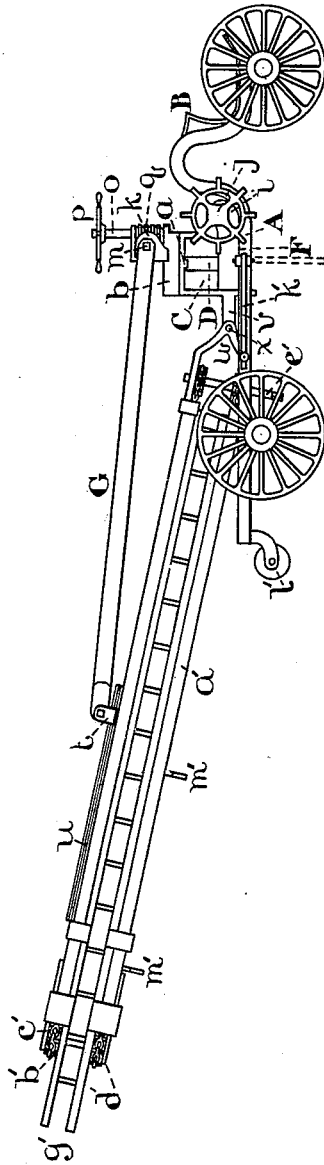


FIG. 1.

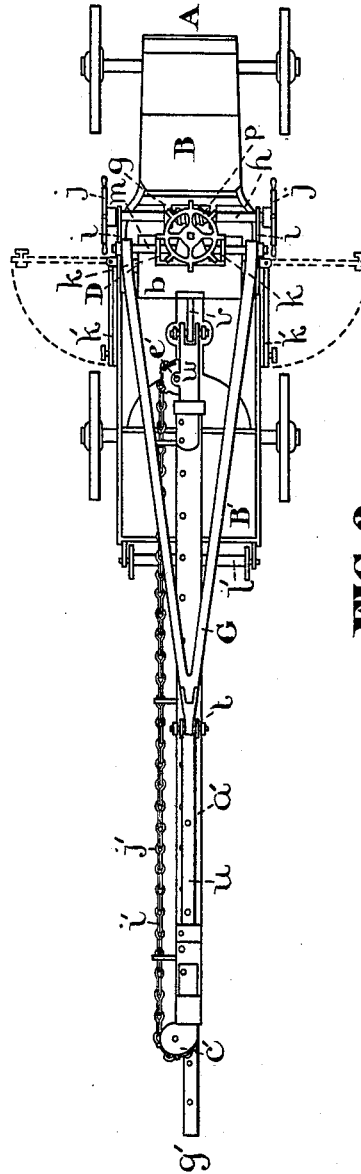


FIG. 2.

WITNESSES.

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Clifford & Clifford.

(No Model.)

2 Sheets—Sheet 2.

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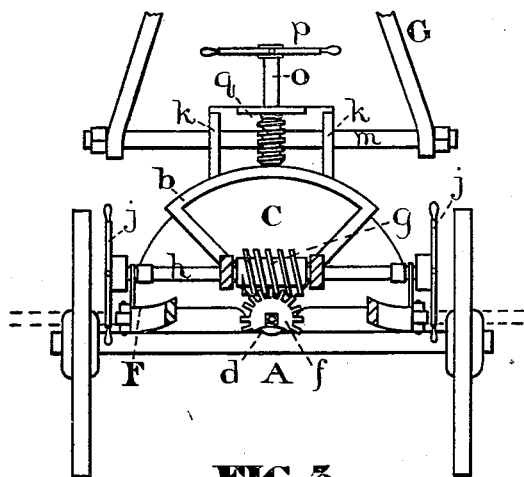


FIG. 3.

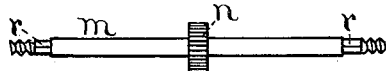


FIG. 6.

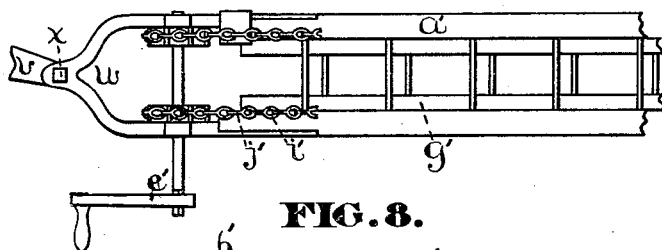


FIG. 8.

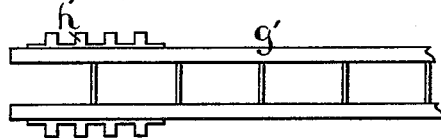


FIG. 9.



FIG. 11.

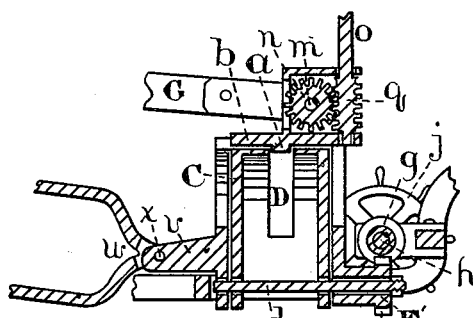


FIG. 4.

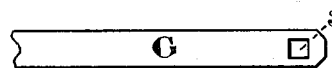


FIG. 5.

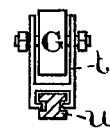


FIG. 7.

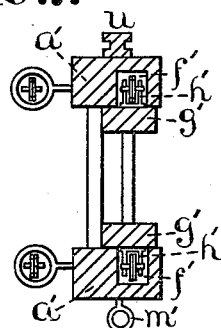


FIG. 10.

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UNITED STATES PATENT OFFICE.

NAHUM LITTLEFIELD, OF PORTLAND, MAINE.

EXTENSION FIRE-LADDER.

SPECIFICATION forming part of Letters Patent No. 262,799, dated August 15, 1882.

Application filed May 15, 1882. (No model.)

To all whom it may concern:

Be it known that I, NAHUM LITTLEFIELD, of Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Extension-Ladders; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a side view. Fig. 2 is a top plan. Fig. 3 is a front end view. Fig. 4 is a section of the mounting of the ladder and its brace. Fig. 5 is a view of the socket in the lower end of the brace. Fig. 6 is a view of the shaft to which the brace is attached. Fig. 7 shows the manner of the attachment of the brace to the ladders. Fig. 8 is a plan of the ladders, the chains, and the crank-shaft by which they are operated. Fig. 9 is a view of the inner or movable ladder. Fig. 10 is a transverse section of the ladders. Fig. 11 is a side view of the inner ladder, showing the projections that work into the chains.

Same letters show like parts.

My invention relates to fire-ladders. It consists in the combination of an adjustable mounting with extensible ladders; also, in the combination of an adjustable mounting with the extensible ladders and a brace; also, in the combination of an adjustable mounting, a brace, the extensible ladders, and certain devices, hereinafter to be named, for operating the ladders, the brace, and the adjustable mounting, all as hereinafter set forth and claimed.

My ladder and its accompanying machinery are mounted upon a strong and suitable carriage, A. This vehicle for the ladder and its accompanying devices has the seat B and the platform B'. The bed upon which the adjustable mounting works is also properly a part of the carriage, and is seen at C. It consists of two semicircular iron parts rising from the frame of the carriage, on the sides of it, and it has the slot D between the two semicircular parts. The slot is designated at D. The ends F of these semicircular parts extend down to the level of the top of the carriage, and their

lower edges are in contact with the side frame of the same. The slot D is to receive the projection *a* from the under edges of the adjustable mounting *b* of the brace G. This mounting is also curved in form, so as to fit over the top of the semicircular part C, and is so arranged as to move over its surface. The mounting *b* is pivoted in the ends F of the semicircular part C at *d*. Thus the mounting *b* is capable, by reason of its shape, of moving over the semicircular part C, is kept from swerving from side to side by the projection *a*, and is pivoted as before described. Furthermore, it is provided with a gear, *f*, which meshes with the worm *g* on the horizontal shaft *h*. This shaft has appropriate bearings at *i* in each side of the carriage frame or body. This shaft is operated by the brake *j*, or by a crank, or any well-known method.

The gear *f* being rigidly connected with the mounting *b*, it is apparent that the mounting will move from side to side over the semicircular part C, accordingly as the horizontal shaft *h* is turned and accordingly as it moves the gear *f*. Two ears, *k*, rise from the top of the semicircular part C, as seen in the drawings. Passing through these ears, and turning in them, is the shaft *m*. (Seen in Fig. 6.) This shaft carries the gear *n*, rigidly connected with it.

The upright shaft *o*, operated by the brake *p*, has the worm *q*, which meshes with the gear *n*. By this means the shaft *m* is made to turn as desired. The shaft *m* projects a little beyond and through the ears *k*, where it is furnished with the square ends *r*. (See Fig. 6.) Onto these squared ends fit the ends of the bifurcated brace G. (See *s*, Fig. 5.) Thus as the shaft *m* is turned in one way it will lift the farther end of the brace G up and when in the other way will drop it. The upper end of the brace is pivoted into a socket, *t*, Fig. 7. This socket is a sliding one, and with that view is fitted with a recess and two lips to fit over the guide or track *u*. (Seen in Fig. 7.) Thus as the upper end of the bifurcated brace G is lifted, in the manner hereinbefore described, it moves up along the guide or track *u*, and so lifts up the ladders, to which the sliding socket *t* is in this way connected. This is the way in which the ladders are lifted to a building in

flames. But it is often necessary to turn the ladders to one side to avoid cornices or projections on buildings, telegraph-wires, and other objects that in cities are often near the upper parts of buildings and prevent the free use of the ladder. With this view the semicircular part and the adjustable mounting are devised. The movements of the mounting *b*, which are produced by the gear *f* and horizontal shaft *h*, as before described, carry with them the bifurcated brace *G*. This brace controls the motion of the ladders in this direction, and thus the ladders, either when fully or partly extended, can be moved sidewise at the top end as may be necessary. With this view, at the bottom of the ladders and at the bottom of the adjustable mounting *b*, the ladders are connected with a bar, *v*, projecting from the mounting, so that they will turn from the same center as the mounting when moved by the bifurcated brace. In fact, it is both the brace and the bar *v* that move the ladders from side to side.

The brace *G* also sustains the ladders in any position, and renders them safe to mount and able to sustain a great weight. Both a motion of the ladders in the direction of the length of the carriage and across it is prevented by the structure and combination of the brace with the ladders.

The bar *v* fits into a socket in the piece *w*, connected with the lower end of the ladders. The bar is wide, so as to present a bearing-surface to the inner faces of the socket, and so as thus to turn the ladders from side to side as the adjustable mounting is turned; but the socket, the bar, and the pivot *x* permit the ladders to rise and fall as they are lifted or depressed by the bifurcated brace *G*.

It remains to describe the ladders. As usual, with extensible ladders, one moves or slides in the sides of the other. This is illustrated in Fig. 10. *a'* shows the lower ladder. At its upper ends the sides are furnished with wheels *b'* in proper bearings *c*. The wheels have cogs *d'* to catch between the chains that are used to elevate the second ladder, and so keep them taut, and aid in lifting the second ladder. At the bottom the lower ladder, *a'*, is furnished with a windlass, *e'*, operated by a crank or any convenient way, and having two wheels like those placed at the top ends of the sides of the same ladder.

An endless chain passes over and around each of the two sets or pairs of wheels on the same side of the lower ladder. These chains pass down on the outside of the sides of the lower ladder and up in grooves *f'* on the insides of the sides of the lower ladder, *a'*. The chains have links composed of two parts—one longer and larger than the other, but of one piece of metal—and with the openings of the links in planes at right angles to each other. The lower ends of the sides of the upper ladder, *g'*, are furnished with teeth *h'*, Figs. 9 and

11. These teeth pass on each side of the metal of the larger links, which are up edgewise for this purpose in the grooves *f'*, and are thus prevented from slipping on the chains, because, the other and smaller links lying in a plane at right angles to the plane of the larger links, the ends of the shorter links afford a stop and bearing for the teeth *h'*. These teeth *h'* extend into the grooves *f'* in the sides of the lower ladder. On the windlass *e'* and the wheels at the top of the lower ladder it is of course the reverse, and the teeth there pass on each side of the shorter part of a link and bear against the ends of the longer parts. The teeth *h'* are seen in Fig. 10, also the longer link at *i'* and the shorter one at *j'*. Now, as the windlass *e'* is turned it is evident that the ladder *g'* can be raised or lowered.

h' shows steadying-bars to be turned out, as illustrated, to prevent the carriage from tipping when the ladders are extended; but the carriage is intended to be made of great strength and steadiness.

l' is a hose-reel.

m' are eyes through which to run up a hose and for convenience in handling the same.

My ladder can be used with great effect in aiding to direct a stream of water at the exact point desired, and in rescuing persons surrounded by burning parts of a building and in the upper stories of the same. On account of the ease and quickness with which it can be moved from place to place it will be found especially valuable for the latter purpose, and the nicety with which the ladders can be directed to a window or other part of a building enhances the usefulness of the machine for this purpose.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. The combination of the adjustable mounting *b*, moving on the semicircular parts *C*, the horizontal shaft *h*, worm *g*, and the ladders *a'* *g'*, connected with the adjustable mounting, as and for the purposes herein set forth.

2. The combination of the adjustable mounting *b* with the extensible ladders *a'* *g'* and the bifurcated brace *G*, connecting with the mounting and ladders, as herein set forth, and operating as described.

3. The combination of the adjustable mounting *b*, the ladders *a'* *g'*, the brace *G*, the horizontal shaft *h*, with its gear *f*, worm *g*, shaft *m*, gear *n*, worm *q*, the windlass *e'*, the wheels at the top of the ladder *a'*, and the chains, all operating as and for the purposes herein set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

NAHUM LITTLEFIELD.

Witnesses:

HERBERT M. SYLVESTER,
JOHN P. KERRIGAN.