

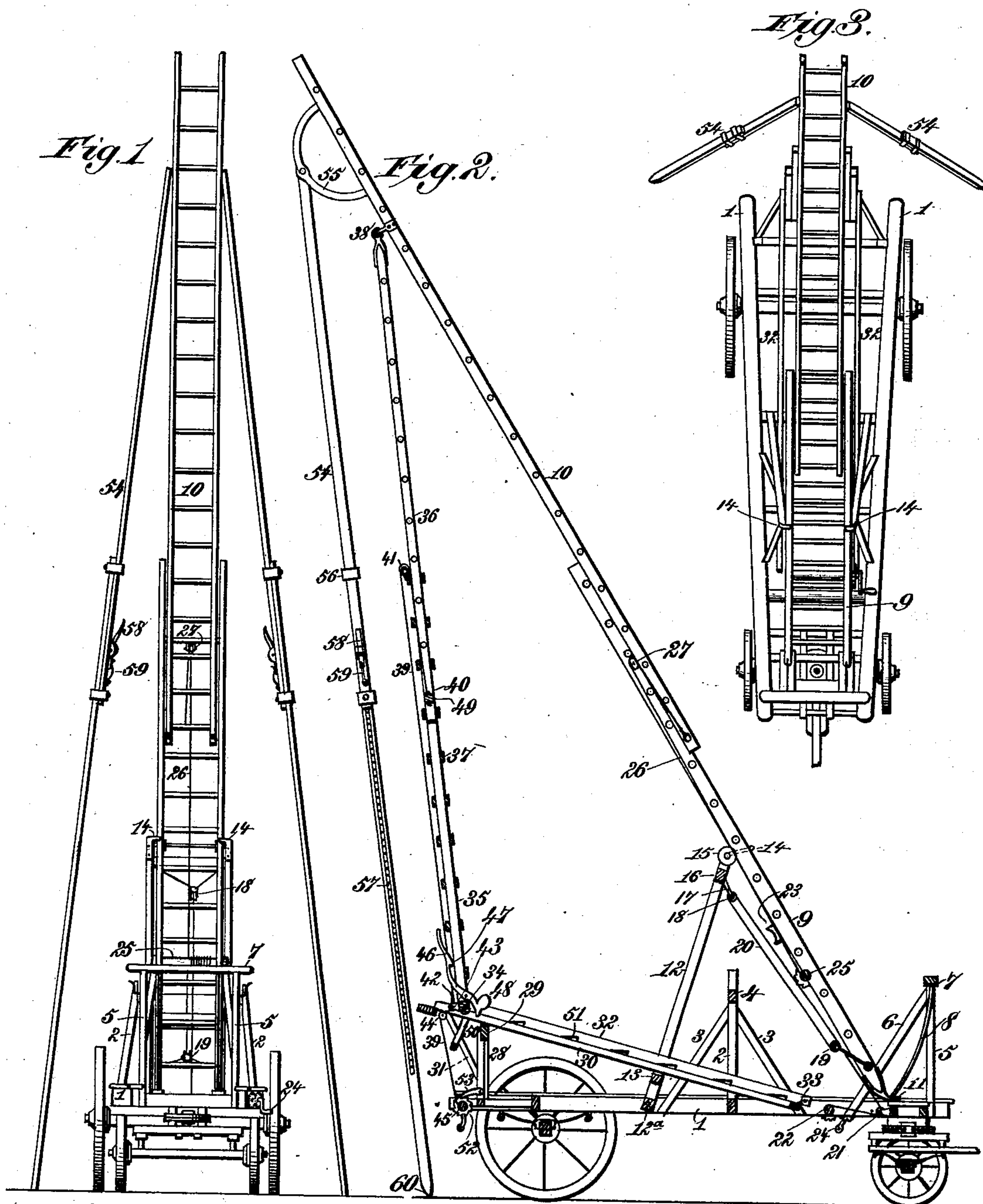
(No Model.)

2 Sheets—Sheet 1.

J. E. CLATOR.
EXTENSIBLE LADDER.

No. 362,609.

Patented May 10, 1887.



Witnesses,

Robert Emmett,

J. A. Rutherford

Inventor,

John E. Clator,

By

James L. Norris,
Atty.

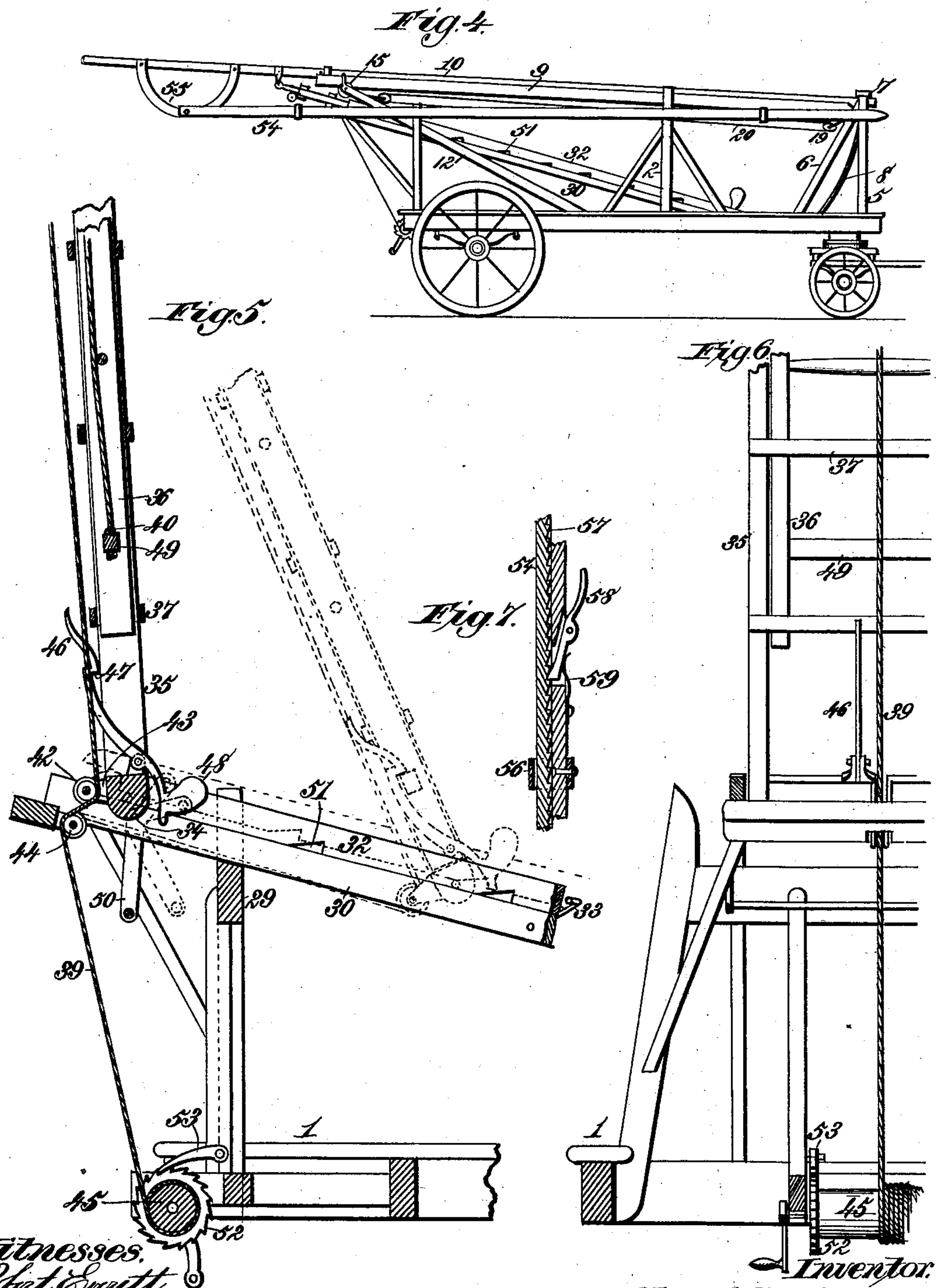
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UNITED STATES PATENT OFFICE.

JOHN E. CLATOR, OF WHEELING, WEST VIRGINIA.

EXTENSIBLE LADDER.

SPECIFICATION forming part of Letters Patent No. 362,609, dated May 10, 1887.

Application filed March 12, 1887. Serial No. 230,680. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. CLATOR, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented new and useful Improvements in Extensible Ladders, of which the following is a specification.

My invention relates to that class of extensible ladders employed by firemen; and the purpose thereof is to mount such ladders upon a suitable truck and so arrange them that they can be elevated at the required angle and then extended to the necessary length by the strength of a single operator.

It is also a purpose of my invention to provide simple extension-braces which will draw out by their own gravity and automatically lock at any point to support weight upon the ladder.

My invention also contemplates the provision of simple means whereby the extensible ladders may be elevated, adjusted to any angle between the horizontal and the perpendicular, and securely braced and held in such position, the several adjustments being all made by a single operator easily and expeditiously.

To these ends my invention consists in the novel features of construction and combinations of parts hereinafter fully set forth, and definitely pointed in the claims which follow this description.

Referring to the drawings, Figure 1 is an elevation taken from the rear end of the truck in Fig. 2. Fig. 2 is a central vertical section of the parts shown in Fig. 1. Fig. 3 is a plan view of Fig. 2. Fig. 4 is a side elevation showing the ladders stowed upon it in position for transportation. Fig. 5 is a detail view, enlarged, showing the method of operating the braces. Fig. 6 is a partial elevation taken from the rear end of the truck. Fig. 7 is a detail view showing the construction of the extensible braces.

In the said drawings, the reference-numeral 1 designates a truck supported upon four wheels and having a length and width suitable for the purpose. Upon said truck-body, between the ends thereof, is erected a pair of vertical standards, 2, braced upon each side by inclined braces 3 and connected at or near their tops by a strong cross-piece, 4. Upon the forward end of the truck are uprights 5,

strongly braced by inclined pieces 6. These uprights are united at the top by a cross-piece, 7, and from the latter depend two parallel slightly-curved rods, 8, the lower ends of which are securely fastened to the floor of the truck.

The extensible ladders 9 and 10 are of any suitable construction, and are connected to slide one upon the other in any ordinary manner. The lower extremities of the first section, 9, are provided with eyes 11, which run upon the parallel curved rods 8.

Pivotally connected to the truck 1, between the uprights 2 and the rear end of the truck-body, is a brace, 12, composed of two parallel bars connected below by cross-braces 13. At their upper ends these bars are provided with hooks 14, which engage with the side bars of the ladder 9, but slide readily thereon. Upon each bar is journaled a roll, 15, which rests against the under edge of the side bar of the ladder and rolls thereon as the brace turns upon its pivotal support 12^a.

To the cross-bar 16, which connects the upper ends of the parallel bars of the brace 12, is attached, by a cord, 17, a block, 18, and to the foot of the ladder-section 9 is similarly attached a block, 19, the two being connected in the usual manner of a compound pulley by a rope, 20. This rope, after its final engagement with the block 19, is carried over a pulley, 21, and thence to a shaft, 22, both the latter being upon the truck, the first at or near the foot of the rods 8 and the last in rear thereof.

When the extensible sections 9 and 10 are stowed, they rest upon the cross-bar 4 of the uprights 2, a seat, 23, being mounted on section 9 for this purpose, and by the gravity of the rearward-extending portions the foot of the ladder-section 9 is raised, the eyes 11 sliding up on the rods 8 until the parts are in the position shown in Fig. 4, the brace 12 extending toward the rear of the truck and forming with the ladder an acute angle.

If it is now desired to elevate the ladders, the operator revolves the shaft 22 by means of a crank, 24, winding the cord 20 thereon and putting a strain upon the blocks 18 and 19. The rope 20, passing over pulley 21, acts upon the block 19 in such direction as to draw the foot of the ladder down upon the rods 8, and as the rope acts upon the brace 12 at a disad-

vantage, owing to the angle formed by the latter with the ladder, the foot of section 9 will be drawn down to the floor of the truck before the brace 12 begins to rise. During this movement the ladders simply turn on the cross-piece 4; but when the eyes 11 reach the foot of the rods 8 and the strain upon the rope is increased the brace 12 begins to rise, the rolls 15 moving on the under side of the ladder-section 9 until the required elevation is reached. After this adjustment is effected the section 10 is extended longitudinally on the section 9 by means of a shaft, 25, on the latter, upon which winds a rope, 26, passing from said shaft over a pulley, 27, and thence to an eye on the lower end of section 10, being the usual construction of extension mechanism in apparatus of this class.

Upon the rear end of the truck are standards 28, connected near the top by a cross-bar, 29. Upon this bar is supported a frame, 30, composed of two parallel bars extending forward and downward and connected to the truck between the standards 2 and the fore end. Braces 31 give a rigid support to the frame and prevent its longitudinal movement. Upon the parallel bars of the frame 30 rest bars 32, connected by links 33, which permit the bars 32 to rise somewhat off the bars 30. Upon the latter are supported the projecting ends or trunnions of a bar, 34, connecting the lower ends of an extensible brace composed of two sections, 35 and 36, the latter sliding within the former and between cleats 37 on both sides thereof.

The upper end of the section 36 is pivotally connected at 38 to the upper part of section 10 of the ladder. Section 36 of the brace is raised or extended by a rope, 39, extending from an eyebolt, 40, on the foot of said section, up over a pulley, 41, on the top of section 35, thence down, passing in rear of a pulley, 42, journaled between lugs 43 on the cross-bar 34, thence over a pulley, 44, on the end of the frame 30, and finally over a rope-shaft, 45, journaled in the end of the truck.

Upon the cross-bar 34 is pivotally mounted a latch-lever, 46, having a detent-shoulder, 47, which is thrown by a weight, 48, inward or toward the brace. This lever is normally in engagement with the cross-bar 49, connecting the foot of the section 36, as shown in dotted lines, Fig. 5. A lever-frame, 50, pivoted upon the frame 30 and having its ends connected to the bars of frame 32, serves to raise the latter off the bars of the frame 30 when desired.

By operating the rope-shaft 45, the latch-lever 46, being engaged with cross-bar 49, will cause the lower end of section 35 of the brace to ride up the inclined frame 30, as indicated in Fig. 5. When the foot of said section reaches the upper end of the frame 30, the latch is cast off, and, the shaft 45 being again rotated, the section 36 is extended upon section 35 to any required distance. Notches 51 are formed in the rails 32, having square shoulders at one end and inclined faces ex-

tending toward the end of the frame. As the trunnions of the brace-section 35 move upward on the frame 30 they will simply raise the bars 32 as they pass said notches; but upon lowering the brace the said bars must be raised by operating the lever-frame 50. A ratchet, 52, and pawl 53 hold the shaft 45 against the strain of the rope 39, and similar means are provided on each of the rope-shafts employed.

To give the extremity of the extensible ladder 10 all possible support, as well as to steady it laterally, I provide extensible side braces, 54, pivotally connected to frames 55 on the ladder-section. These braces are made in two parts held together by clips 56 and sliding upon each other. A ratchet, 57, formed on one part, and a pawl, 58, pivotally mounted on the other, permit the extension of the braces, but prevent them from shortening, the pawl being constantly held in engagement with the ratchet by a spring, 59. The lower ends, 60, of these braces are sharpened to engage readily with the earth. By this invention the entire apparatus may be readily operated by a single person.

Heretofore an extension-ladder mounted on a truck-frame has been raised by an extensible brace comprising two sections and a rope and windlass to extend the sections, the upper section being connected with the extension-ladder and the other section having a roller at its lower end to travel on an inclined plane by the action of another rope and windlass. Such, therefore, I do not broadly claim.

Having thus described my invention, what I claim is—

1. The combination, with a truck, of extensible ladder-sections resting on a raised support on said truck, rods to which the foot of the ladder is connected by eyes movable on said rods, a brace pivoted to the truck in rear of the ladder-support and having sliding connection with the ladder, pulleys connecting the end of said brace and the foot of the ladder, and a pulley on the truck near the foot of the rods guiding the ladder-foot, over which the rope passes to the rope-shaft, whereby the foot of the ladder will be first drawn down and the top lifted subsequently, substantially as described.

2. The combination, with the extensible ladder, of the extensible brace provided with trunnions at its lower end, an inclined frame on which the trunnions move, a latch-lever locking the sections of the brace together, and an extending rope running from the extensible sections behind a pulley on the foot of the brace, over a pulley on the inclined frame, and to the rope-shaft, substantially as described.

3. The combination, with the extensible ladder-sections, of an extensible brace, an inclined frame on which the lower end of said brace moves, a weighted latch-lever locking the brace-sections together, rails lying upon and linked to the rails of the inclined frame, a lever-frame raising said rails, and an extending rope passing from the brace sections behind a pulley on

the foot thereof, over a pulley on the end of the inclined frame, and to the rope-shaft, substantially as described.

4. The combination, with a truck-frame and 5 the extensible ladder-sections carried thereby, of an extensible brace for raising the ladder-sections, and the pair of extensible brace-sections disconnected from the truck-frame, and the sections of each brace slidable longitudinally one upon the other and arranged at opposite sides of the ladder, one of said sections 10 having a ratchet and the other having a slot and a pawl, the acting end of which extends through the slot to engage the ratchet, substantially as described. 15

5. The combination, with the truck having the support 4 and the cross-bar 7, of the curved rods 8, the ladder-sections 9 and 10, the brace

12, having rolls 15, the pulleys 18 and 19, the pulley 21, rope-shaft 22, and rope 20, substantially as described. 20

6. The combination, with the ladder-sections 9 and 10, of the inclined frame 30, the rails 32, linked thereon and having notches 51, the brace-sections 35 and 36, having trunnions at 25 the lower end, latch-lever 47, pulley 42 on the foot of the brace, the pulley 44 on the frame 30, and the extension-rope 39, substantially as described.

In testimony whereof I affix my signature in 30 presence of two witnesses.

JOHN E. CLATOR.

Witnesses:

GRIFFITH B. JONES,
J. H. STAMP.