

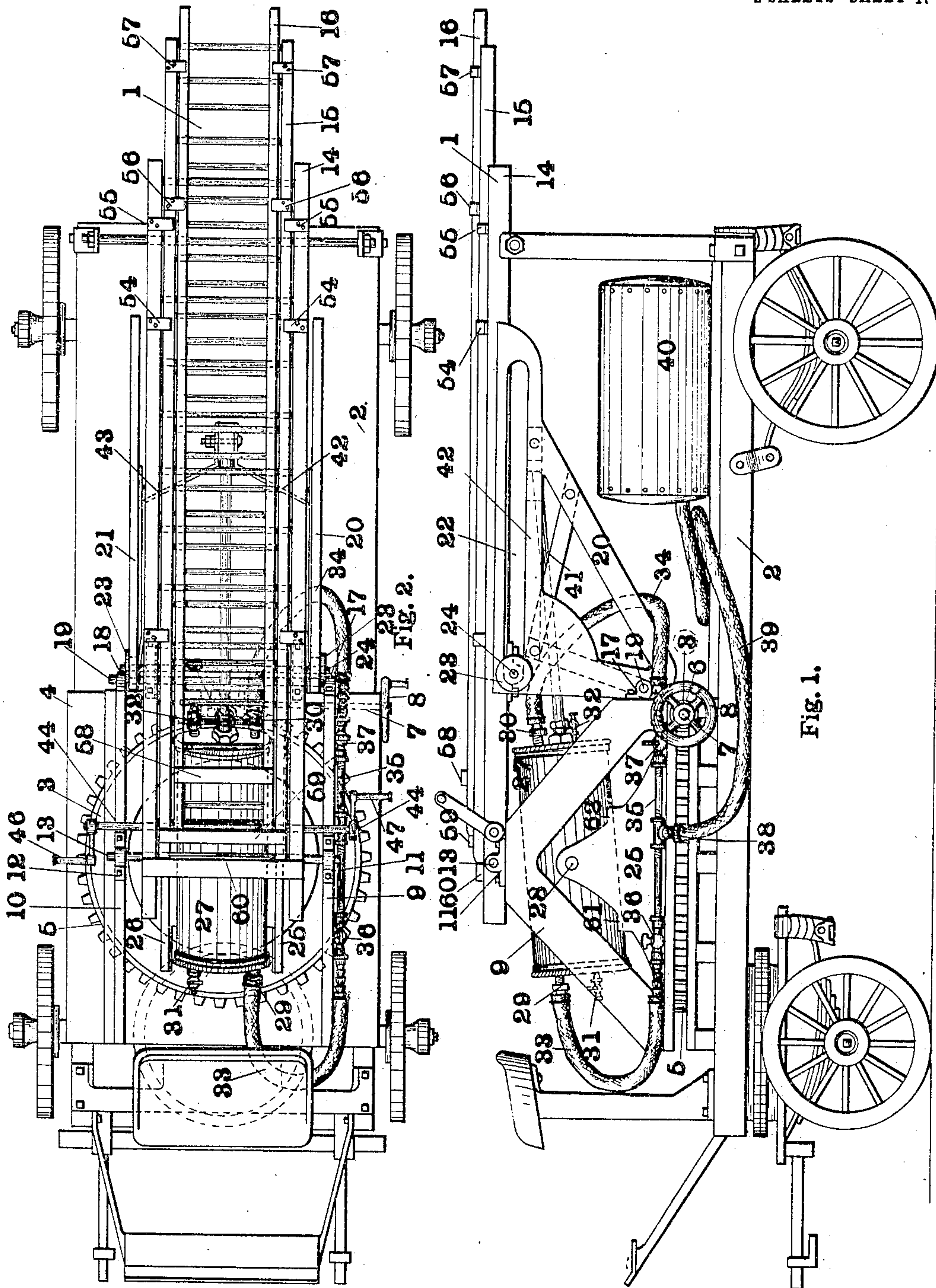
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T. HAINES.
TRUCK LADDER.

APPLICATION FILED FEB. 1, 1904.

2 SHEETS—SHEET 1.



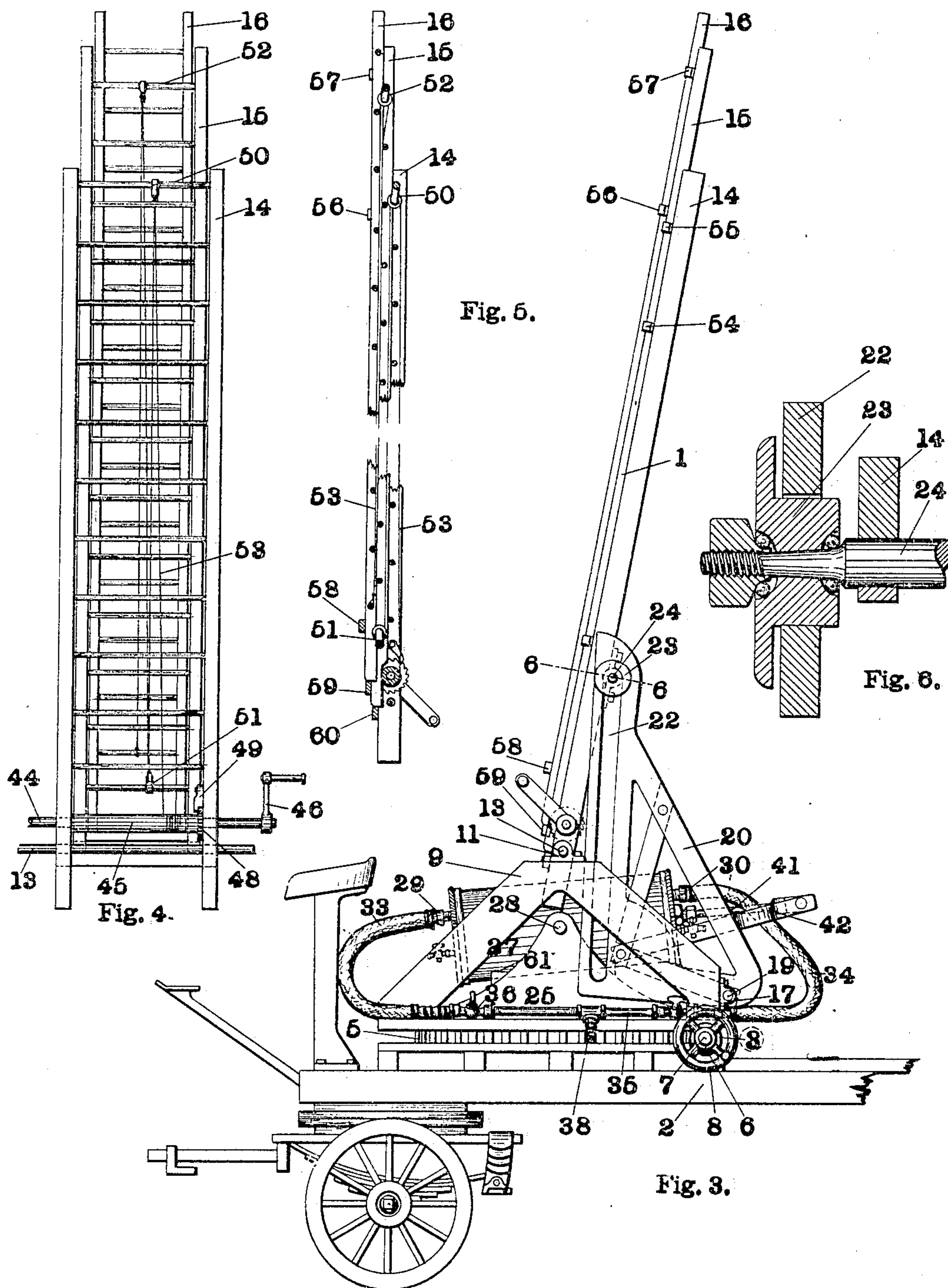
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UNITED STATES PATENT OFFICE.

THOMAS HAINES, OF ST. LOUIS, MISSOURI.

TRUCK-LADDER.

SPECIFICATION forming part of Letters Patent No. 787,982, dated April 25, 1905.

Application filed February 1, 1904. Serial No. 191,414.

To all whom it may concern:

Be it known that I, THOMAS HAINES, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have
5 invented a new and useful Improvement in Truck-Ladders, of which the following is a specification.

My invention relates to truck-ladders, and especially to truck-ladders for fire-department
10 service, and has for its principal objects to improve the mechanism for manipulation of the ladders by means of fluid-pressure apparatus, to provide manipulating means that will set and hold the ladders rigidly when raised,
15 to provide an improved apparatus for raising the ladders with respect to each other, to provide elevating and lowering means for the ladders, and other objects hereinafter more fully appearing.

20 My invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, and wherein like
25 symbols refer to like parts wherever they occur, Figure 1 is a side view of my improved truck-ladder. Fig. 2 is a plan view thereof. Fig. 3 is a side view thereof with the ladders elevated. Fig. 4 is a front view of the lad-
30 ders to show the rope-and-pulley arrangements for raising the ladders with respect to each other. Fig. 5 is a vertical sectional view, on a slightly-reduced scale, of the parts shown in Fig. 4; and Fig. 6 is a sectional view on
35 the line 6 6 of Fig. 3.

My improved truck-ladder 1 is mounted upon a truck 2 of any suitable construction. It is not limited in its use to the truck shown in the accompanying drawings, but may be
40 mounted upon a truck of any style and having any size.

The truck-ladder 1 is mounted upon a turn-
table 3, which turns in a circular opening in a base-plate 4 on the truck. To the bottom
45 of the turn-table 3 a worm-wheel 5 is secured and meshes with a worm 6 on a shaft 7, mounted in the base-plate 4. By means of a hand-wheel 8 on the shaft 7 the turn-table may be

turned in a horizontal plane to any position. Bearing-standards 9 10 are mounted on the
50 turn-table 3 and are provided with bearings 11 12 for the spindle 13, upon which the ladder is mounted. The ladder 1 consists of three relatively movable sections 14 15 16, in the first of which the spindle 13 is mounted. 55
Upon the lower rear portions of the bearing-standards 9 10 are bearings 17 18 for a spindle 19, upon which the ladder-elevating frames 20 21 are mounted. The elevating-frames are substantially triangular in elevation, the sides
60 standing substantially vertically and horizontally when the ladder is in its reclining position, being substantially at right angles to each other. Each of the frames is provided with a slot 22 upon the side opposite the angle
65 at which it is pivoted. Rollers 23 extend into the slots 22 and are mounted upon a shaft 24 on the ladder-section 14. Preferably ball-bearings are interposed between the rollers 23 and the shaft 24. 70

Between the bearing-standards 9 10 are two other standards 25 26, suitably spaced apart and having bearings in the upper portions. A cylinder 27 is provided with trunnions 28,
75 which are journaled in the bearings of the standards 25 26. The heads of the cylinder are provided with nipples 29 30 and cocks 31 32, respectively. The nipples are adapted for the connection of flexible tubes 33 34, leading from a pipe 35, mounted on the turn-
80 table. The pipe 35 is provided with cocks 36 37 near its ends and intermediate of the cocks with a nipple 38, to which a flexible tube 39, is connected. Within the cylinder is a piston
85 of ordinary form, the piston-rod 41 of which extends through the rear head of the cylinder. Links 42 43 are connected at one end to the piston-rod and at the other end to the forward upper corner of the elevating-frames 20 21, 90
respectively.

The mechanism thus far described operates as follows: When the ladder is in its reclining position, as shown in Fig. 1, the piston is at the rear end of the cylinder. The cocks 32 95
and 36 are closed and the cocks 31 and 37

opened. Air is thus admitted at the rear of the piston and forces it forwardly, the air in front of the piston escaping through the open cock 31 in the forward head of the cylinder.

5 As the piston and piston-rod 41 move forward the links 42 43 are carried along and transmit the force to the elevating-frames 20 21. These frames turn about their pivot-points, thus carrying their slots 22 forwardly and changing
10 their inclination. This results in the elevation of the ladder as the rollers 23 roll up in the slot until they reach the opposite ends of the slots 22, as shown in Fig. 3. The connection with the compressed-air reservoir may
15 now be maintained, or the cock 37 may be closed. In either case the piston is held in its foremost position by air under pressure, and the ladder is firmly held in its upright position. When it is desired to lower the lad-
20 der, cocks 31 and 37 are closed, and cocks 32 and 36 are opened. The piston will thus be forced rearwardly, and the reverse movement of parts will occur.

The arrangement for raising the ladder-sections with respect to each other will now be described.

At the lower end of the ladder-section 14 a shaft 44 is mounted. Upon it is a winding-drum 45, and it is provided with cranks 46 47
30 at its opposite ends. A ratchet-wheel 48 is mounted on the shaft 44 adjacent one side bar of the ladder-section, and a cooperating pawl 49 is pivotally mounted on the said side bar. A pulley 50 is mounted upon the top round of
35 the ladder-section 14. Pulleys 51 52 are mounted upon the bottom and top rounds, respectively, of the ladder-section 15. A rope 53 is secured at one end to the winding-drum 45, passes over the pulley 50, down to the
40 pulley 51, up to the pulley 52, and then is secured to the lower round of the ladder-section 16. L-shaped guides 54 55 are mounted on the ladder-section 14 for the ladder-section 15, and similar guides 56 57 are mounted on the
45 ladder-section 15 for the ladder-section 16. These guides project over the fronts of their respective ladders. At the bottom of the ladder-section 16 is a bar 58, which will engage the guides 56 when the said section is at its high-
50 est position with respect to the ladder-section. The ladder-section 15 has a similar bar 59, which will engage the guides 54 when the said section is at its highest position with respect to the ladder-section 14. When the drum 45
55 is rotated to wind up the rope 53, the ladder-section 16 will be raised first, as it is lighter than the ladder-section 15. When, however, the ladder-section 16 has moved upwardly until its bar 58 engages the guides 56, further move-
60 ment with respect to the ladder-section 15 will be stopped. Then the ladder-section 15 will begin to move upwardly with respect to the

ladder-section 14, taking the ladder-section 16 with it, of course. At its uppermost position the bar 59 will strike the guides 54, and the
65 ladder will be held in this position, the ratchet and pawl preventing its running down. The usual automatic catches for the ladders may be provided in addition; but they are not necessary.
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A bar 60 upon the ladder-section 14 serves to support the ladder-section 15 when in its lowermost position, and the bar 59 on the ladder-section 15 serves to support the ladder-section 16 when in its lowermost position. Stops
75 61 and 62 are provided to limit the oscillation of the cylinder 27 to a small angle.

Obviously my device admits of considerable modification, and therefore I do not wish to be limited to the specific construction shown and
80 described.

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

1. A truck-ladder comprising a platform, a ladder pivotally mounted thereon, rollers
85 mounted on said ladder rearward of its pivot-point, pivoted ladder-elevating frames having slots for cooperation with said rollers, an actuating-cylinder mounted on said platform and provided with a piston and piston-rod, and
90 means operatively connecting said piston-rod and said ladder-elevating frames.

2. A truck-ladder comprising a platform, a ladder pivotally mounted thereon, ladder-elevating frames pivoted on said platform and
95 each provided with a slot substantially parallel with said ladder in its lowered position, rollers on said ladder and engaging said slots, respectively, near the vertical plane through the pivot of said elevating-frames when said
100 ladder is in its lowered position, and means to actuate said elevating-frames to raise said ladder.

3. A truck-ladder comprising a platform, a ladder pivotally mounted thereon, ladder-elevating frames pivoted on said platform and
105 each provided with a slot substantially parallel with said ladder in its lowered position, rollers on said ladder engaging said slots, respectively, near the vertical plane through the pivot of said elevating-frames when said ladder is in its lowered position, and an actuating fluid-pressure cylinder mounted on said platform and operatively connected to said elevating-frames to actuate the same and raise
115 said ladder.

4. A truck-ladder comprising a platform, a ladder pivotally mounted thereon, ladder-elevating frames pivoted on said platform and
120 each provided with a slot substantially parallel with said ladder in its lowered position, projections on said ladder extending into said slots, respectively, and engaging said frames near the vertical plane of their pivots when

said ladder is in its lowered position, a fluid-pressure cylinder mounted on said platform, and a piston and piston-rod therein operatively connected with said elevating-frames at
5 points lying in a plane through their pivot-points approximately perpendicular to the direction of said piston-rod.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOS. HAINES.

Witnesses:

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