

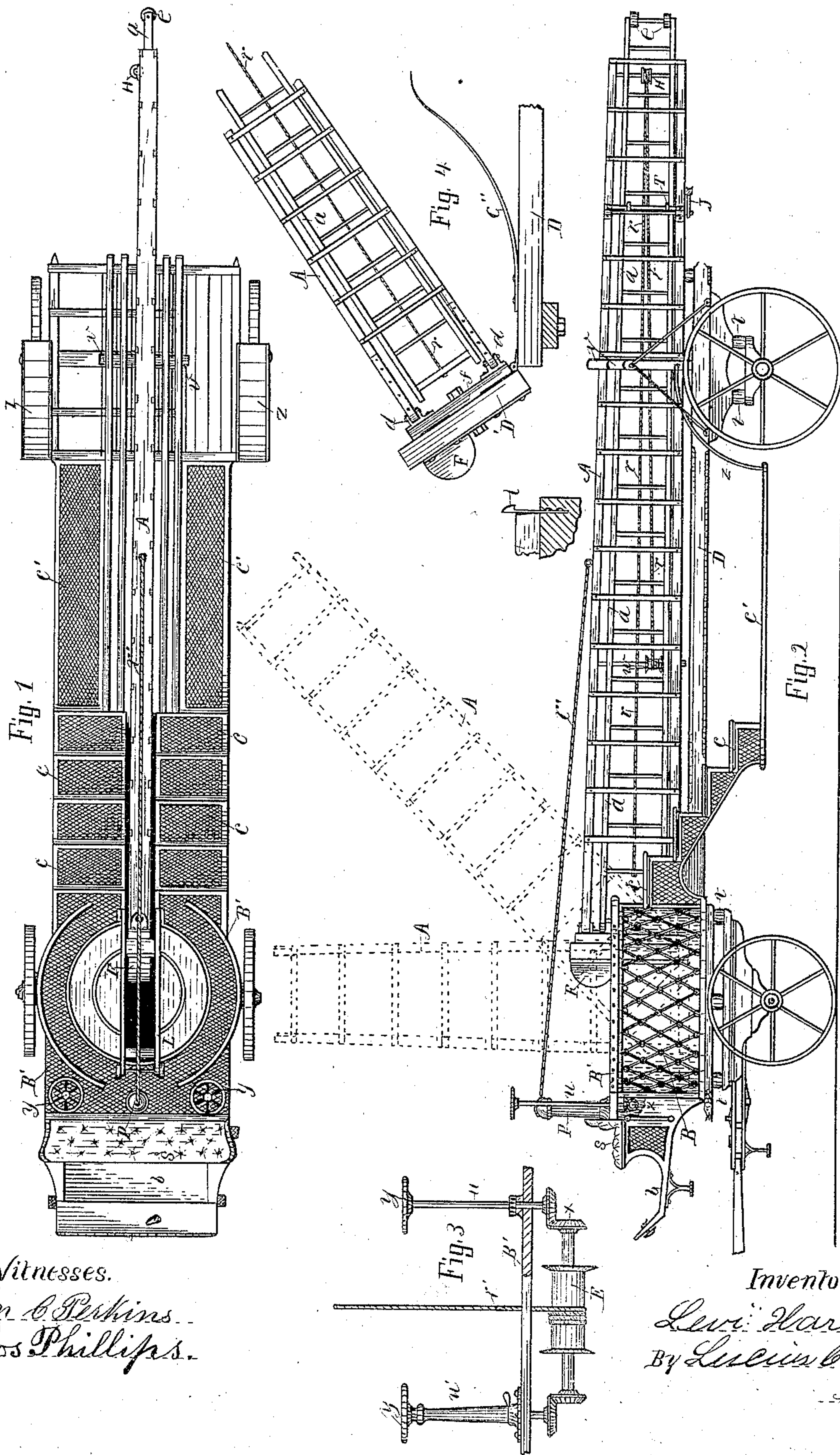
(No Model.)

2 Sheets—Sheet 1.

L. HARRIS.  
FIRE LADDER AND TRUCK.

No. 311,981.

Patented Feb. 10, 1885.



Witnesses.  
*John C. Perkins.*  
*Delos Phillips.*

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



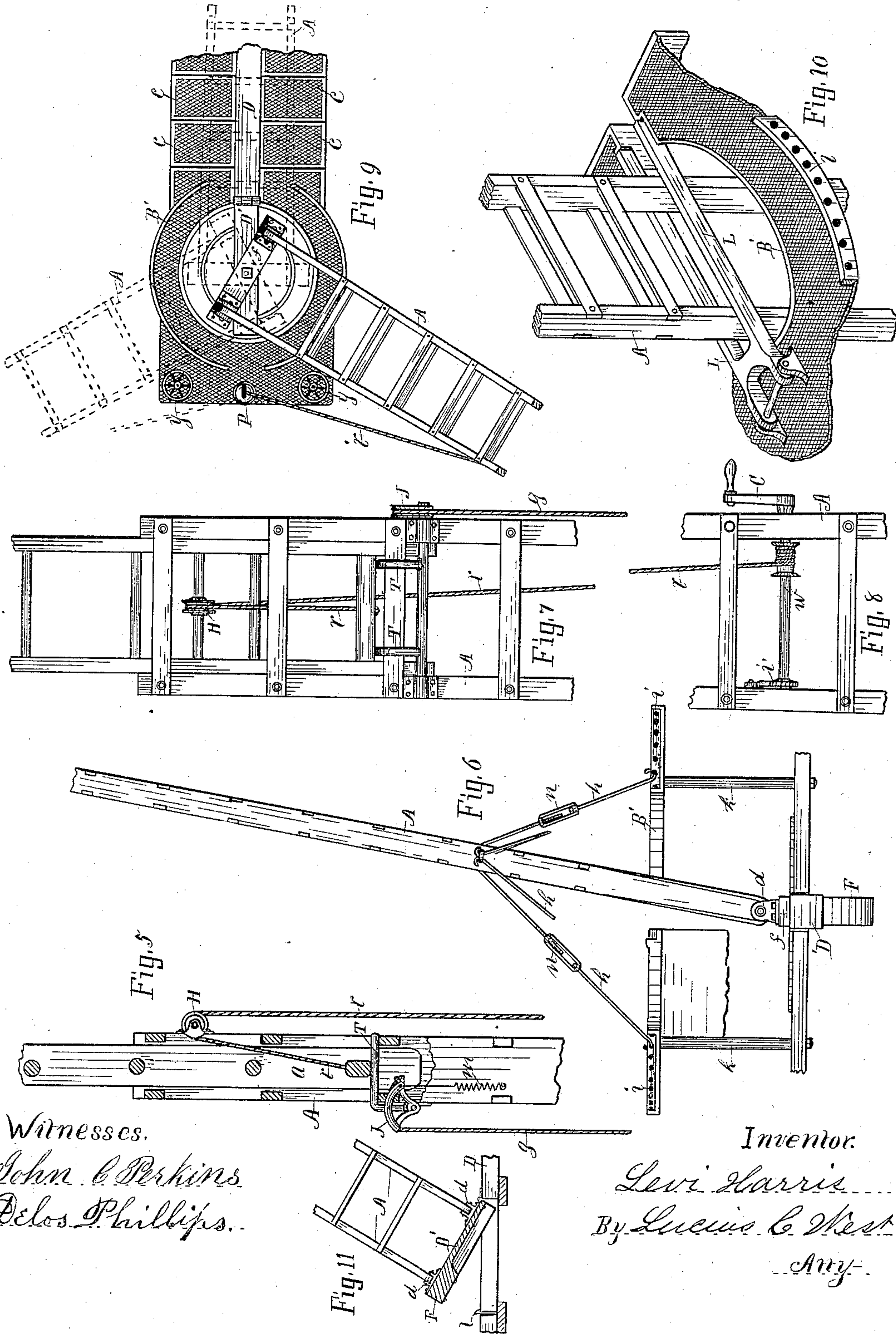
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*Atty.*



# UNITED STATES PATENT OFFICE.

LEVI HARRIS, OF KALAMAZOO, MICHIGAN, ASSIGNOR OF ONE-HALF TO  
DELOS PHILLIPS, OF SAME PLACE.

## FIRE LADDER AND TRUCK.

SPECIFICATION forming part of Letters Patent No. 311,981, dated February 10, 1885.

Application filed October 7, 1884. (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  
5 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 which are adapted to be raised up on  
10 a fulcrum at the base, and afterward extended in height.

Among the principal objects of this invention may be named raising the ladder edgewise by means of a counterbalancing-weight  
15 beyond the fulcrum-hinge of the ladder, to facilitate the handling of such ladder; raising the ladder by means of a weight and spring; and cushioning the fall of the ladder by the same spring; turning the ladder on a pivot at  
20 the base to different positions after raising; improved means for holding up the extensible part of the ladder; providing a truck with a box to receive and sustain the raised ladder, and with certain platforms, hereinafter described, to increase the utility. Other incidental objects will appear in the following description and claims.

In the drawings forming a part of this specification, Figure 1 is a top view of truck and  
30 ladder; Fig. 2, a side elevation; Fig. 3, an enlarged plan of a detail, parts being broken away; Fig. 4, a plan of broken details, showing operation; Fig. 5, a vertical section of Fig. 7, parts being left full; Fig. 6, details of Figs.  
35 1 and 2 in plan elevation, showing the ladder raised and sustained, the truck-box in said Fig. 6 being in cross-section with parts broken away; Figs. 7 and 8, a plan of means for raising and holding up the extensible part of the  
40 ladder; Fig. 9, broken detail of Fig. 1, showing change in position of parts, illustrating the operation; Fig. 10, broken details of Fig. 2 in top perspective; and Fig. 11 shows a change from Fig. 4, parts being in section.

45 Referring to Fig. 2, D is a central horizontal beam of the truck. This beam represents the ladder support or foundation, whether connected with a portable truck or fixed in some stationary position, the latter of which  
50 may be done for all purposes of forming a proper ladder foundation.

The ladder A, with its extensible part *a*, when not raised, rests edgewise on the foundation D in the horizontal center of the truck. The space each side of the ladder A may thus  
55 be utilized for loading and carrying hand-ladders or other firemen's apparatus without being laid upon the ladder A or in any way interfering with raising the same. The lower end of the ladder A is hinged at *d d* to a foot-  
60 block, D', directly in Fig. 11, and by the intervention of the pivoted base *f*, as in Fig. 4, the latter of which will appear explained farther along in the specification. The rear end of the foot-block D' is hinged to the forward  
65 end of the beam D.

Thus far explained, the ladder may be raised edgewise, and at once tilted in either direction laterally to allow the upper end to rest against  
70 a building without having to turn the ladder or the truck. Any means, well known or otherwise, which are suitable may be used to raise the ladder A. The raising may be facilitated by weighting the outer end of the foot-block D', as illustrated at F. In Fig. 4  
75 the weight F is bolted onto the foot-block. The weighting may be effected by casting the foot-block (preferably made of metal) and the weight integral with each other, Fig. 11. The design is to make the weight of a heft corre-  
80 sponding to the weight of the ladders, or approximately so, the hinge of the foot-block D' being the fulcrum; but the comparative weight of the two parts is a matter of choice.

To illustrate the utility of the weight, I have  
85 found that with a thirty-foot ladder and with a thirty-foot extensible part, making the weight so that the device would balance on its hinge when about at the angle in Fig. 4, a person with one hand can raise the ladders  
90 from a horizontal position to the vertical position shown by dotted lines A, Fig. 2.

As a means to assist in raising the ladder A, I have provided the truck with capstans  
95 *u u* and revoluble reel E, having gear-connections, Fig. 3. Between the capstans *u u* is a standard having a pulley in the top. (See P, Figs. 1 and 2.)

With the ladder A at the upper edge I connect a rope, *r'*, passing the same over the pul-  
100 ley of the standard P, and connect it with the reel E. Thus the ladder may be raised by



two men, one at each capstan, or by one man operating the capstan he happens to be the nearest to. This rope, however, is of special service in letting the ladder swing down, especially if the weight *F* is rather light, by holding the ladder from falling too suddenly.

In Fig. 4 is shown another assistant, which may be employed in raising the ladder first from the foundation-beam *D*, and in cushioning the descent. It consists of a spring, *c''*, of any suitable shape, the spring-tension of which will raise up on the ladder resting upon it.

In Figs. 4 and 11 a spring-catch is shown at *l*, which may be employed to receive and hold down the end of the foot-block *D'*.

In the bottom of the box *B* is formed a recess to receive the foot-block *D'* when the ladder is raised, Fig. 6. The foot-block is thus made secure and forms a safe base-support. The box *B* has an open top, preferably circular in form, surrounded by an elevated platform, *B'*, which terminates the top of the box. The rear side of the box has an opening, in which the base of the ladder is located when down, as in Figs. 1 and 2, and in which the ladder plays when raising and lowering it. The side walls of this opening assist in preventing the ladder from canting or swaying out of its proper edgewise position while down on the truck, and in the act of being raised as well. The platform *B'* is provided with a hinged ladder guide and rest, *L*, made substantially in the form of a tuning-fork. Its free ends rest in mortises in the platform each side of the rear opening of the box, Figs. 1 and 10. Thus when the ladder is raised it is sustained in an upright position. The ladder in this vertical position may be used away from the burning building, from the top of which ladder the firemen can throw water with their hose over onto said building. By raising the device *L* and swinging over forward of its hinge free from the vertical ladder, the latter may be tilted to an oblique angle, Fig. 9, letting it rest against the inner edge of the platform *B* or against the building, or both, owing to the location of the truck at the time and the use intended; or the ladder *A* may be given a less degree of tilt, Fig. 6, in which case brace-rods *h* are employed by hooking the lower end thereof in the holes *i* of the platform *B'* and the upper ends in staples or loops secured to the ladder. These rods *h* are provided with turn-buckles *n*, by which means they may be lengthened, shortened, or tensioned.

As before stated, the ladder *A* may be hinged to a base, *f*, centrally pivoted to the block *D'*, and preferably thus when the ladder is connected with a fire-truck. This construction is shown in Figs. 4, 6, and 9. In the latter figure its use is illustrated. By simply pushing the ladder around the inner circle of the platform *B'* the location of the ladder is quickly fixed or changed without reference to the particular position of the truck.

The advantages in this plan of shifting or

fixing the position of the ladder, which simply amounts to centrally pivoting the foot of the ladder and turning it thereon, are cheapness in construction and speed in operation.

These advantages hold good with reference to the entire ladder and truck construction.

While I am aware that it is not new with me to make an extensible ladder, yet, so far as I am acquainted with the prior state of the art, I have effected valuable improvements therein. The extensible part of the ladder loosely plays within the side pieces of the ladder *A*, the ladder having cleats or rounds on each side opposite each other. The upper end of the ladder *A* is provided with a pulley, *H*, Fig. 5. Connected with the lower end of the ladder *a* is a rope, *r*, which passes up over pulley *H* and down to a windlass, *W*, connected with the lower part of the ladder *A*.

In a suitable position near the top of the ladder *A* is connected an automatic ladder-lock, consisting of a shaft adapted to rotate, provided with a grooved lever, *J*, or equivalent at one end, and with elbow-rests *T*, adapted to reach across the slats or rounds of the ladder *A* opposite to each other, and thus forming a rest for the rounds of the extensible part *a* of the ladder. A spring, *m*, or equivalent is connected with the lever *J* and the ladder *A*. A rope, *g*, is secured to the lever *J*, and hangs down in reach of the operator.

When raising the ladder *a* by pulling on rope *r*, the rests *T* are raised or swung upward by the rounds of the ladder *a* below them coming in contact therewith, thus allowing the part *a* to be extended as high as desirable. As each round of the ladder *a* passes the rests *T*, the latter automatically swing to place on the cleats of the ladder *A*. Thus the ladder *a* may be run up any multiple of the distance between its rounds and stopped and locked at any round desired. This insures speed in action and absolute safety in use. The rope *g* is only used in letting the ladder *a* descend, which is effected by pulling a little on the rope *r* to raise the ladder-round off from the rests *T*, and then by pulling on rope *g* swinging the rests *T* out of the way and holding them thus until the ladder *a* is let down. In many cases the windlass *W* will not be needed, as the ladder *a* may be extended by pulling on the rope *r* with the hands. All the ropes in the construction are preferably flexible metal.

The upper end of the ladder *a* may be provided with rollers *e*, to facilitate extending the ladder farther while the upper end of the ladder rests against the wall of a building in contingent uses. The truck is provided with side platforms, *c' c'*, and steps leading therefrom to the platform *B'*. These platforms *c' c'* and *B'* and the steps *c c* are designed to be made of iron with a rough surface on top.

In regard to the material used in the entire construction, it is a matter of mechanical judgment and propriety. The truck may be provided with bolsters *v v*; or any practical arrangement may be adopted to utilize the space



each side of the ladder A for needed purposes in the economy of firemen discipline, so long as it does not necessitate the movement of hand-ladders or other apparatus before raising the ladder A, with its extension *a*.

The other details of the truck need not be herein described, as they are subject to any desired variations.

The steps in the operation of the ladder at a fire may be briefly reviewed as follows: As soon as the truck nears the burning building, and, in fact, before the horses are stopped, the firemen standing on the platforms commence raising the ladder. When at a vertical position the extensible part *a* is run up to the desired height, and even while this is being done the guide-rest L is swung away, freeing the ladder and allowing it to be at once tilted and turned by firemen hold of it to the window or roof where the parties are to be rescued from. The rescuers at once run to the top of the ladder to perform their duty. In short, so simply and well arranged are all the parts of the construction that within fifteen seconds from the time the truck stops parties may be mounting the top of the ladder from an upper-story window of a high building, and in perfect safety from any danger of the ladder breaking or falling.

Having thus described my invention, what I desire to secure by Letters Patent is--

1. The combination of a ladder which is supported on its edge in a horizontal position, a foundation-support, and a foot-block hinged to the foot of the ladder, the end of said block being connected with the support by a hinge-fulcrum, whereby when the ladder is raised edgewise to a vertical position the foot-block forms a horizontal extension to the support, admitting of laterally tilting the ladder on its hinges at its foot, substantially as set forth.

2. A fire-truck provided with a ladder resting on its edge when in transit, and having a hinge-fulcrum at its foot, on which it is raised in an edgewise position, and a counterbalancing-weight beyond said fulcrum to assist in raising the ladder, substantially as set forth.

3. The combination of a truck having a suitable ladder-foundation with a foot-block hinged thereto and provided with a weighted end beyond the hinge-fulcrum, and a ladder hinged to the foot-block at its lower end, substantially as set forth.

4. The combination of a ladder-foundation, a ladder connected thereto at its base by a hinge-fulcrum, and a suitable spring between the foundation and ladder to assist in raising the ladder and to cushion its fall, substantially as set forth.

5. The combination of a truck provided with the capstans, reel, and gear connections,

and a ladder-foundation, a ladder connected thereto at its base by a hinge-fulcrum provided with a weight beyond the fulcrum, and a rope connecting the ladder and reel, substantially as set forth.

6. A ladder and an extensible part provided with means of extending said part, and with the automatic ladder-lock, consisting of the shaft, its end lever and spring-connection, and the elbow-rests, all adapted substantially as set forth.

7. The combination of a truck provided with a ladder-foundation, a box having an open top, the rear opening and recessed bottom, a weighted foot-block connected to said foundation at the end by a hinge-fulcrum, an extensible ladder hinged to the foot-block in a manner to be transported and raised edgewise and tilted laterally, and the forked hinged ladder-guide on top of the box to receive the raising ladder and sustain it in an upright position, substantially as set forth.

8. The combination of a fire-truck provided with a suitable ladder-foundation, a ladder hinge-fulcrumed at its base in a manner to rise edgewise, hinged to tilt laterally, and pivoted to turn in different positions.

9. The combination of a truck provided with a ladder-box having a platform at the top, an open top bounded by said platform, and an opening in the rear side of the box, and a ladder hinge-fulcrumed at its base in a manner to rise through the opening into said box, hinged to tilt laterally, and pivoted or swiveled at its lower end, whereby the ladder may be pushed around the inner supporting edge of the box-platform, substantially as set forth.

10. The combination of a fire-ladder truck provided with a ladder-box having an elevated platform bounding the open top of said box, side platforms, steps leading therefrom to the box-platform, and a ladder centrally and horizontally resting in the truck on its edge and hinge-fulcrumed at its base, adapting it to be raised edgewise into said box, substantially as set forth.

11. The combination of a ladder box having a series of holes at the upper edge, a ladder adapted to tilt laterally in said box, and provided with the staples or equivalents, and brace-rods for detachable connection with said holes and staples to stay the ladder at different angles, substantially as set forth.

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

LEVI HARRIS.

Witnesses:

DELOS PHILLIPS,  
EUGENE LITTELL.