

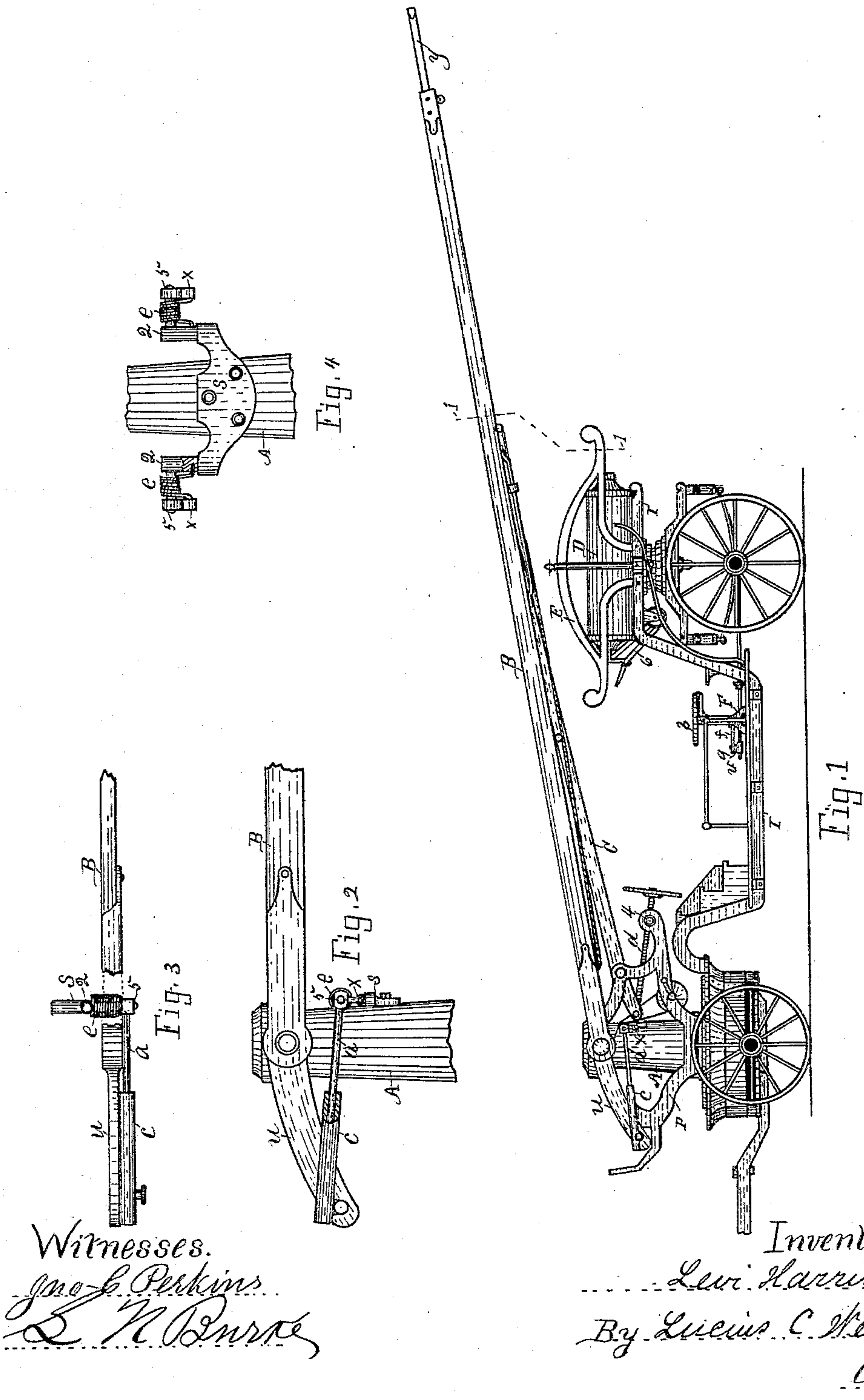
(No Model.)

2 Sheets—Sheet 1.

L. HARRIS.  
FIRE LADDER.

No. 401,433.

Patented Apr. 16, 1889.



Witnesses.  
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att.

2 Sheets—Sheet 2.

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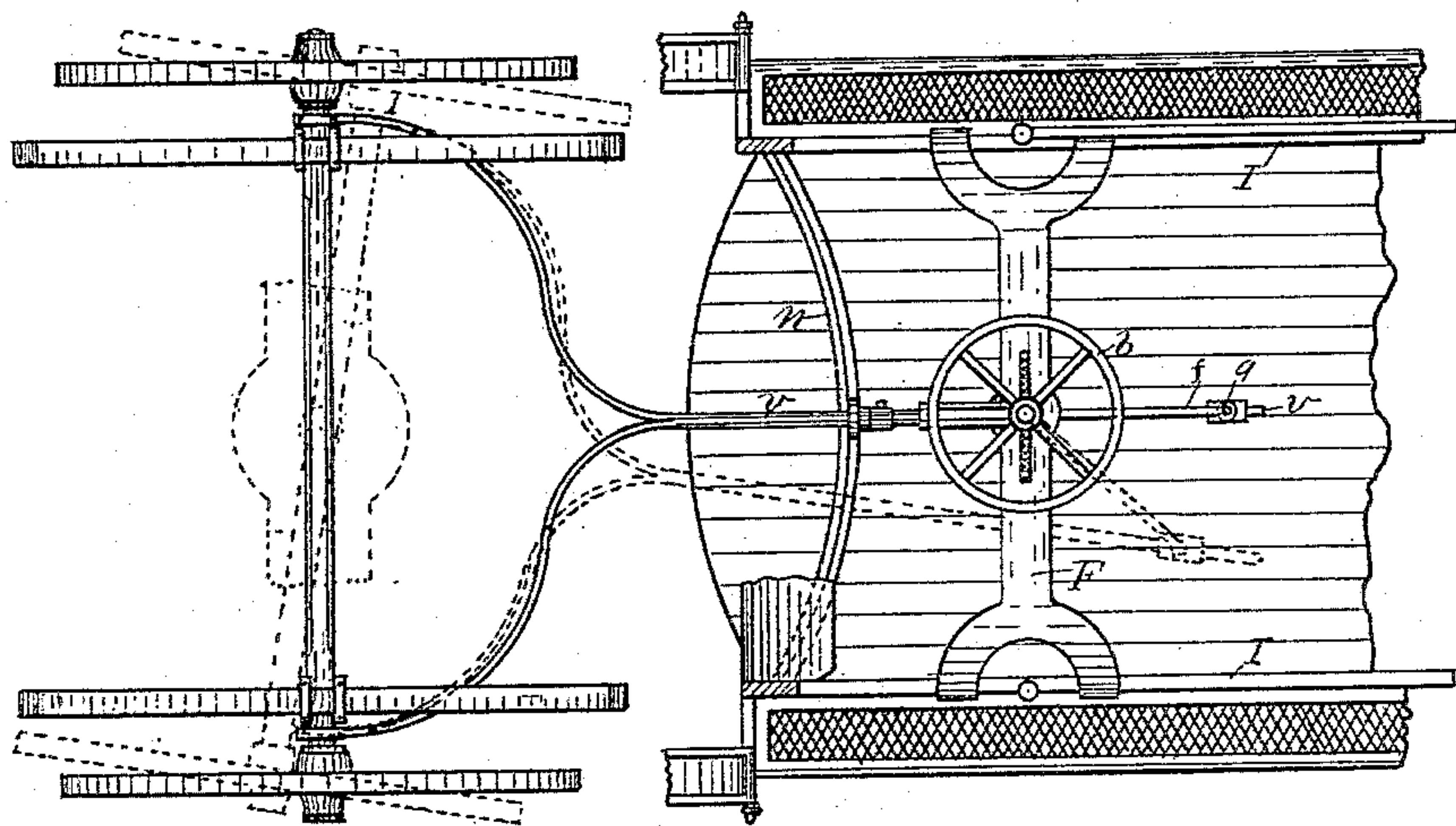


Fig. 5

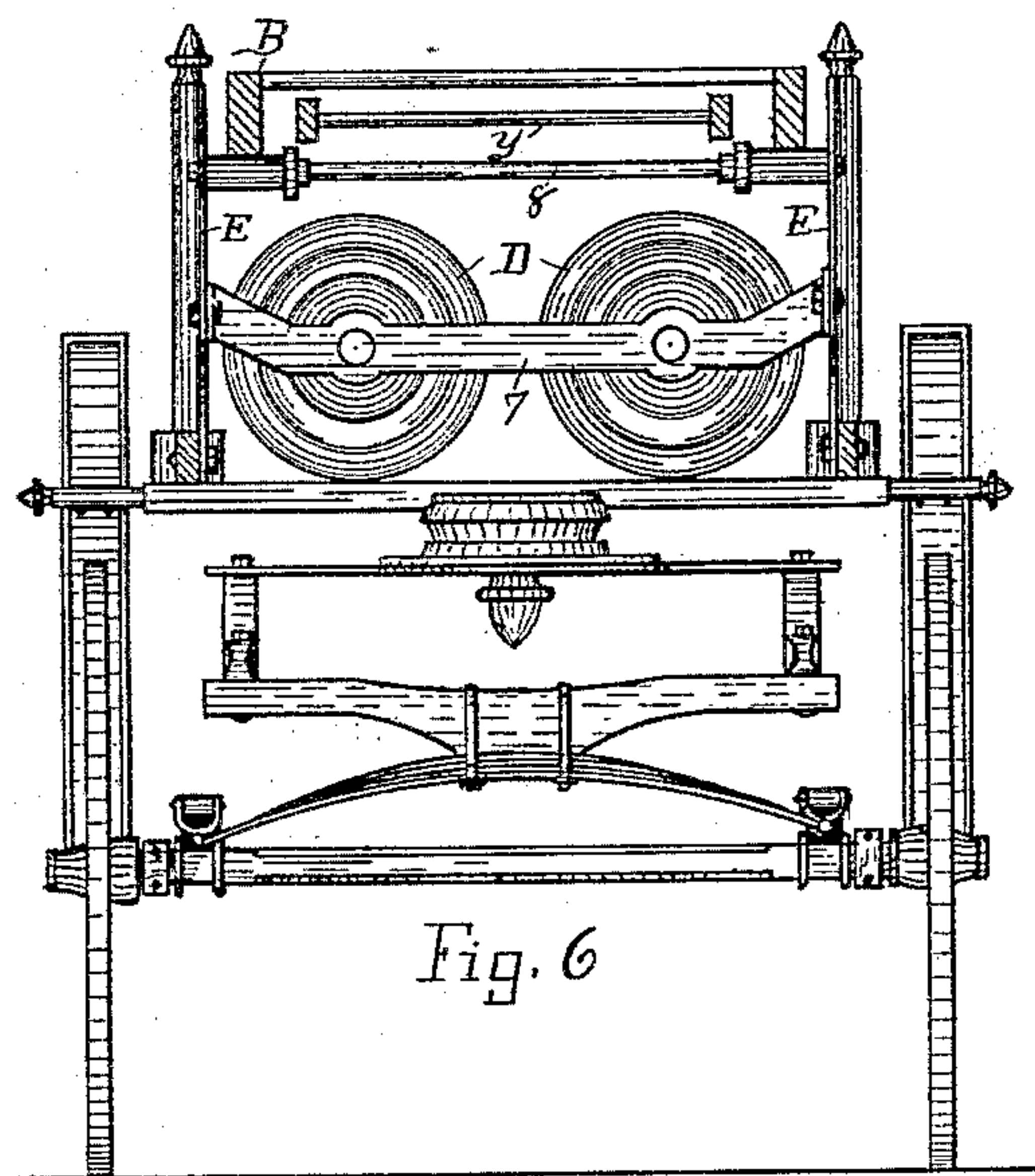


Fig. 6

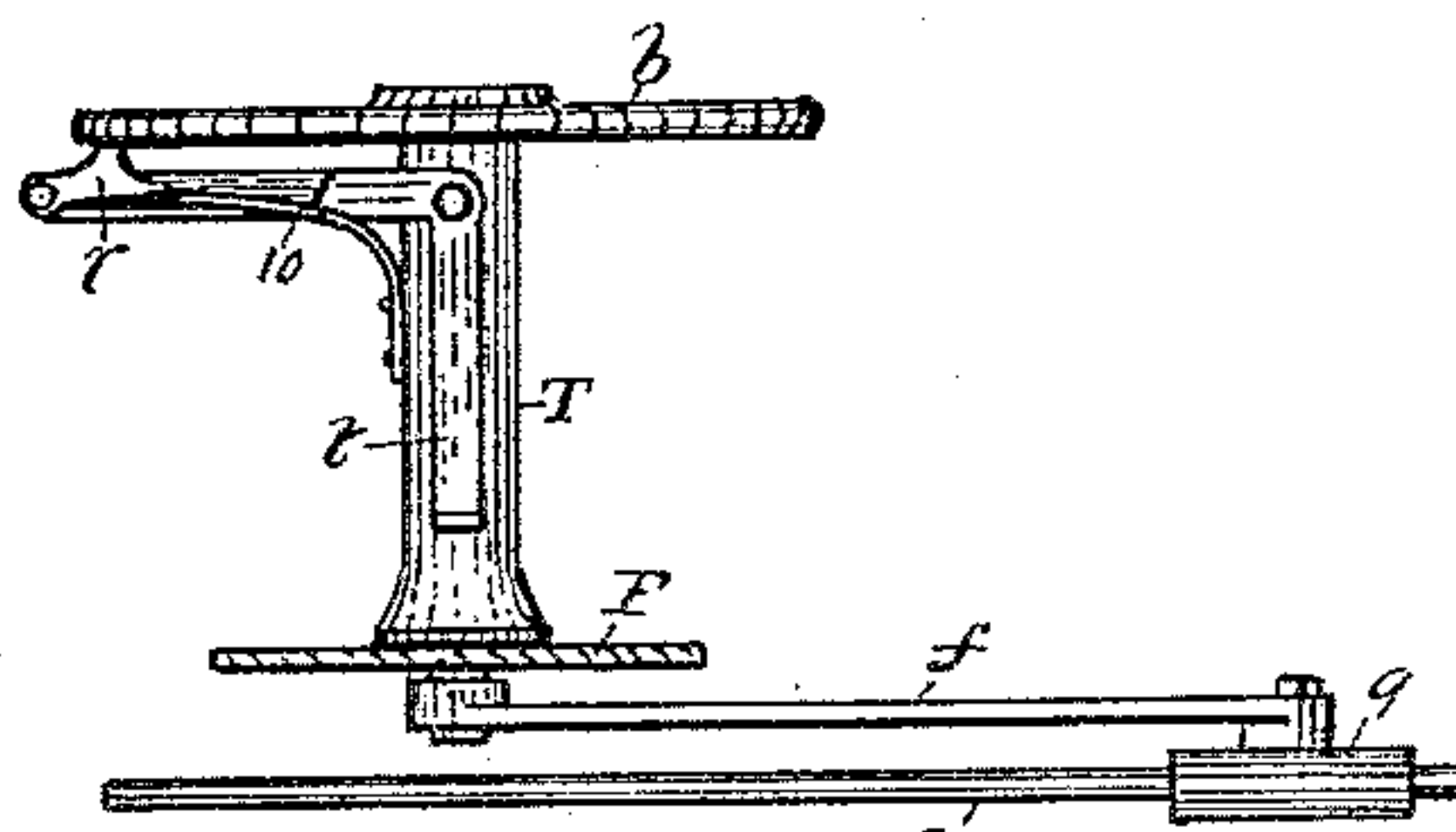


Fig. 8

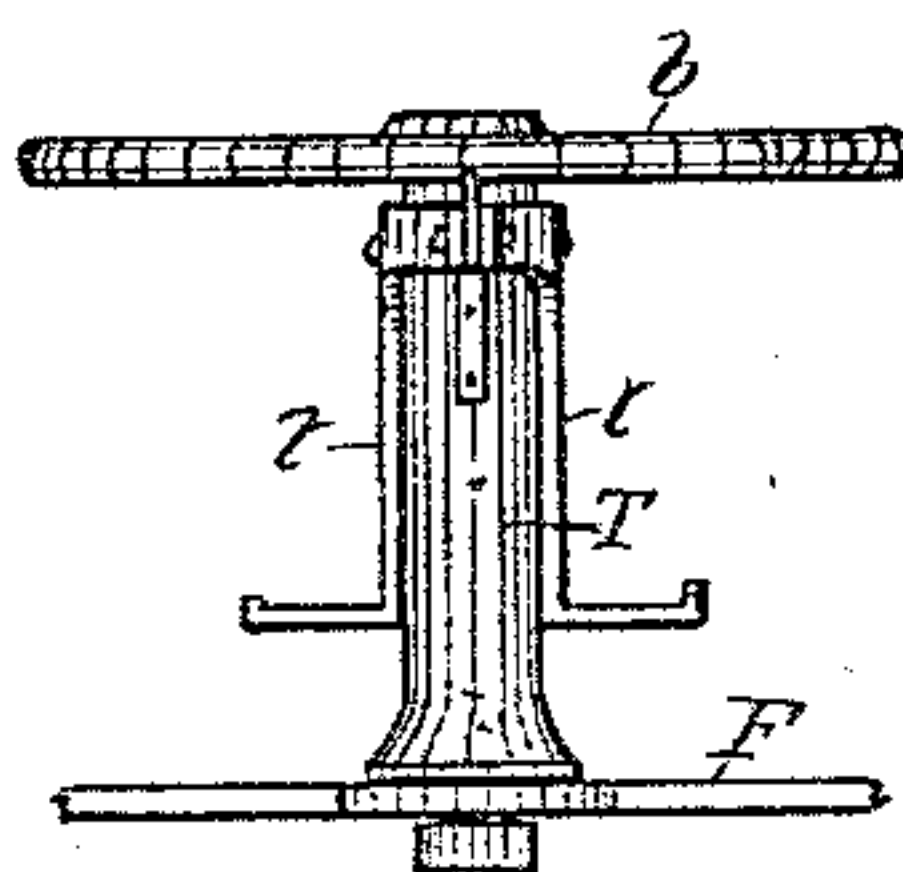


Fig. 7

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# UNITED STATES PATENT OFFICE.

LEVI HARRIS, OF KALAMAZOO, MICHIGAN.

## FIRE-LADDER.

SPECIFICATION forming part of Letters Patent No. 401,433, dated April 16, 1889.

Application filed December 6, 1887. Serial No. 257,125. (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 certain new and useful Improvements in Fire Ladders and Trucks, of which the following is a specification.

This invention relates to an invention patented to me in the United States May 17, 1887,  
10 No. 363,066, in which the base of the ladder forward of its fulcrum was provided with weights, which weights, in conjunction with an arrangement of a lever and screw, were employed to assist in raising the ladder from  
15 the truck.

The object of the present invention is to dispense with the weights by an arrangement of springs and certain accessories clearly described below.

20 A further object is to make certain improvements in the tiller, and still a further object is to combine with the ladder-supporting truck a chemical-engine, all substantially in the manner below described and claimed.

25 In general the object sought in regard to the springs is to so associate the latter in a relation with the base of the ladder, which is beyond the fulcrum, that they will assist in raising the ladder.

30 In the drawings forming a part of this specification, Figure 1 is a side elevation; Fig. 2, an enlarged view of parts in Fig. 1 above the forward end of the truck; Fig. 3, plan of parts in Fig. 2; Fig. 4, a view looking  
35 from a point at the right of Fig. 2; Fig. 5, plan of Fig. 1 enlarged, the forward end of the truck being broken away and the ladder and its supports removed; Fig. 6, enlarged view of Fig. 1, looking from a point at the  
40 right, parts being in section on line 1 1 in Fig. 1; Fig. 7, a view looking from a point at the left of Fig. 8; and Fig. 8 is an enlarged view of parts of the tiller, looking from a point below Fig. 5 and from a point at the  
45 right of Fig. 7.

Referring to the lettered parts of the drawings, the ladders B, the rotatable pillar A, to which the ladder B is fulcrumed at its base, said pillar being mounted upon the forward  
50 end of the truck I, the brackets P, the pivoted lifting-lever C, and the screw d, attached

to the lower end of said lever beyond the pivot or fulcrum of said lever, are all substantially as shown and claimed in the Patent No. 363,066, above referred to. For a complete description of the lever C, screw d, and  
55 their mode of operation in raising the ladder B reference should be had to said patent. However, as the springs described farther on are not limited in their use to this particular lever and screw, this is not material, and for  
60 a sufficient understanding I will state that the screw d has screw-bearings in the end of the bracket P, or rather in a cross-piece that is attached, Fig. 1, to the rear end of each  
65 bracket, (there being a bracket P on each side of the truck,) and when the screw is run to the rearward the upper end of the lever C rises, and the ladder B is raised with it.

In the patent above referred to the extended ends u of the ladder B beyond the  
70 fulcrum of said ladder are weighted to assist the lever and screw in raising the ladder. In the present instance I employ the following features in lieu of said weights:

75 To the side of the pillar is attached a bar, S, projecting laterally from said pillar on opposite sides, Fig. 4. On each end of this bar S are projections 2 2, elbow in form. A spring, e, Figs. 2, 3, and 4, is supported by the  
80 horizontal part of said elbow projections 2—one on each, as here shown; but it will appear obvious that one spring, or more than two, may be employed in like relation with the ladder, as here shown.

85 c a is a lever provided with an angled end, x. The part a loosely slides in part c, Figs. 1, 2, and 3. One end of this lever is pivoted to the end extension, u, of the ladder B, and the other end is pivoted at 5 to the end of the  
90 horizontal part of the elbow 2. The object of having one part of the lever c a slide into or by the other is, that it may lengthen and shorten when the ladder B is raised and lowered. The springs e exert a downward purchase on the levers c a, one end of said  
95 springs being attached to the bar S and the other end to the angled ends x of said lever, Fig. 4. Thus when the screw d is turned to raise the ladder B the springs e and their levers c a assist.

100 It will of course be understood that there



is a lever *c a* on each side of the base of the ladder as indicated in Fig. 4, when there are two springs employed—one on each side—so as to obtain a like leverage on both sides of the ladder.

On the rear part of the truck I, I mount an ordinary chemical-engine composed of the revoluble cylinders D, (two preferred, but a greater or less number may be employed,) and of course in the manufactured apparatus the hose 6 and other well-known accessories. (Not here shown.)

Of course the chemical-engine *per se* is not new; but, so far as I am aware, I am the first to combine such an engine with a truck and a fire-ladder fulcrumed to a support on said truck. The advantages of this are obvious, two important ones of which may be named. No extra truck and team are needed for the chemical-engine, and, as it frequently happens that a ladder of this class, which can be quickly elevated to great heights, and a chemical-engine are all that is needed to extinguish the fire, the same can be accomplished by the men running up the ladder with the hose of the chemical-engine on the ladder-truck before a separate engine could be available or the water-hose be ready for use, thus making it unnecessary to use water, which a few moments' delay might make imperative.

There are many ways in which the cylinders D may be supported in a revoluble manner on the truck. A simple and effectual plan is shown in Figs. 1 and 6. The rear portion of the truck has a bracket or frame, E, on each side. A transverse bar, 7, is attached to the rear end of these brackets, and a like bar at the forward end. Fig. 4 shows the rear bar. The forward bar (not shown) is the same as this bar 7. The ends of the cylinders have axial bearings in these bars 7, so that the cylinders can be revolved for the well-known purpose of agitating the chemical contents of said cylinders.

One or more transverse bars, 8, are attached to the brackets E above the cylinders D, and the rear portion of the ladder in its down position is supported by said bar 8. Thus the brackets E, with their bars 7 8, (which bars also brace the brackets,) perform a double office—viz., they support both the ladder and the cylinders. This part of the apparatus is very simple and useful, and the brackets serve as an additional ornamentation to the truck. While it is a fact that tillers on ladder-trucks are well known and in common use, I have, so far as I know, effected simple and useful improvements in the same.

In Figs. 1, 5, 7, and 8, F is a strong support transversely to the truck-body and attached at the ends to the sides of said body. Mounted upon this support F is a hollow standard, T, in which the vertical shaft or pintle of the tiller-wheel *b* is placed, so as to be turned therein in either direction in the act of deflecting the rear axle of the truck in guiding the latter. A forked lever, *v*, is shown in Fig.

5, one branch of said lever being attached to one end of the rear axle and the other branch to the other end of said axle. A vibratory arm, *f*, is attached (at one end) to the lower end of the shaft of the tiller-wheel *b*, Fig. 8, and the other end of said arm is pivoted to the sliding collar 9 on the lever *v*. When the tiller-wheel and its vertical shaft are turned, the arm *f* swings laterally, carrying the free end of the lever *v* with it, and this deflects the axle, as shown by the dotted positions of the axle, lever *v*, and arm *f* in Fig. 5. During this action the collar 9 of course slides on the lever *v*. An elbow-lever, *t*, having a lateral turn at the lower end upon which to place the feet, is pivoted at the angle of the elbow to the standard T. A dog, *r*, is pivoted to the rear end of the lever *t*, and said dog is held up to engage a niche in the tiller-wheel *b*, Fig. 7, for the purpose of locking the tiller in its normal position when the truck is going in a straight course for any considerable distance. The operator disengages the dog from the tiller-wheel by tilting the lever *t* with his foot. Two of these levers *t* are here shown—one on each side of the standard—and they converge near to each other at the upper rear end, between which ends the dog is pivoted; but a single lever will serve, and, if preferred, the levers and spring-actuated dog may be dispensed with entirely and the operator hold the tiller in its normal position when going straight ahead.

Having thus described my invention, what I claim as new is—

1. In combination, a ladder-support, a ladder fulcrumed at its base to said support and having the end extensions beyond said fulcrum, and springs exerting a downward leverage on said end extensions to assist in raising the ladder, substantially as set forth.

2. In combination, a ladder-support, a ladder fulcrumed at its base to said support and having the end extensions, a two-part lever having the angled end, one part sliding within the other, said lever at the angled end having a pivotal support, the other end being pivoted to the end extension of the ladder, and a spring attached to the angled end of said lever and exerting a downward leverage on the lever to assist in raising the ladder, substantially as set forth.

3. In combination, a ladder-support, a ladder fulcrumed to said support and having the end extensions beyond the fulcrum, a pivoted lifting-lever, a screw for operating said lever, and a spring or springs exerting a downward leverage on the end extensions of the ladder to assist the lifting-lever and screw in raising the ladder, substantially as set forth.

4. In combination, a ladder-support, a ladder fulcrumed to said support at its base and having the end extensions beyond the fulcrum, a lifting-lever pivoted to a support, a screw for operating said lever, levers made in two parts, one part sliding within the other



and having the angled ends, said ends pivoted to a support, the other ends being pivoted to the end extensions of the ladder, and the springs exerting a downward leverage on said extensions to assist the lifting-lever and screws in raising the ladder, substantially as set forth.

5. In combination, a truck having the revoluble pillar mounted thereon, a ladder having the end extensions and being pivoted to said pillar back of said extensions, a transverse bar attached to said pillar and provided with an elbow end each side of the pillar, levers capable of lengthening and shortening and being pivoted at one end to the elbow ends of said bar and having the angled ends, the other end of these levers being pivoted to the end extensions of the ladder, and the springs attached to the angled ends of the two-part levers and to the elbow ends of the transverse bar, said springs and their levers exerting a downward leverage on the end extensions of the ladder to assist in raising said ladder, substantially as set forth.

6. In a tiller for a truck, the combination of the tiller-wheel, a pivoted foot-lever, and a spring-actuated dog pivoted to said lever in position to engage the tiller-wheel and lock the tiller in its normal position, substantially as set forth.

7. The combination of the truck-body, the transverse support, the hollow standard mounted upon said support, the tiller-wheel and its vertical shaft, the latter being revoluble in said support, the vibratory arm attached to the wheel-shaft, the forked lever, a sliding collar thereon, to which collar the end of the vibratory lever is pivoted, and the wheeled axle to which the forked lever is attached, substantially as set forth.

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

LEVI HARRIS.

Witnesses:

HAMPDEN KELSEY,  
E. A. BALLYEAT.