

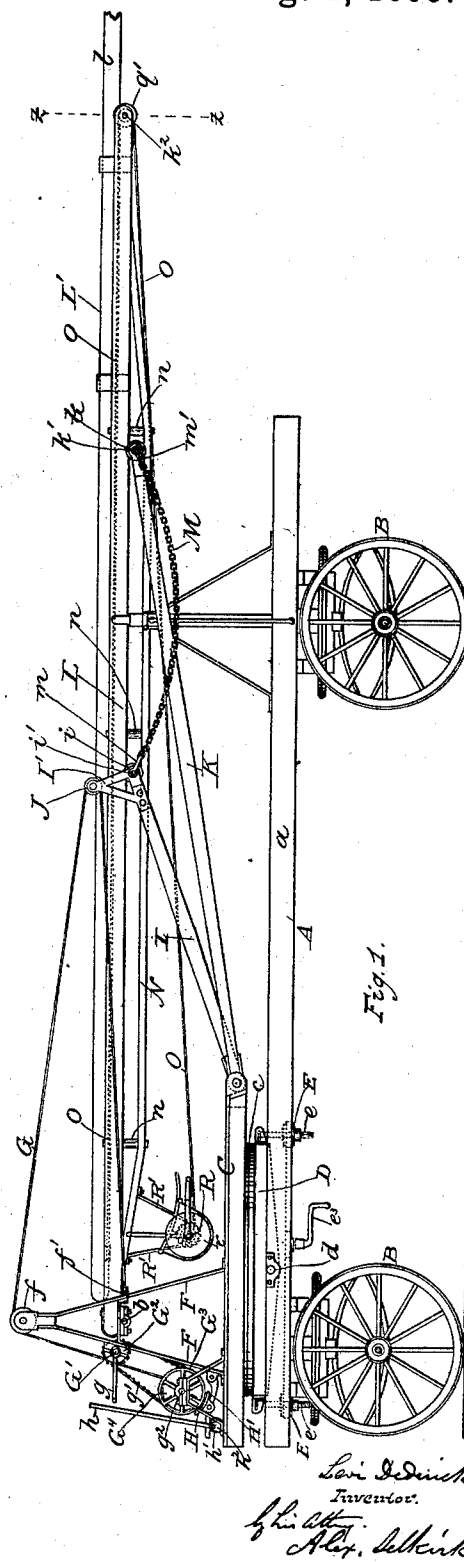
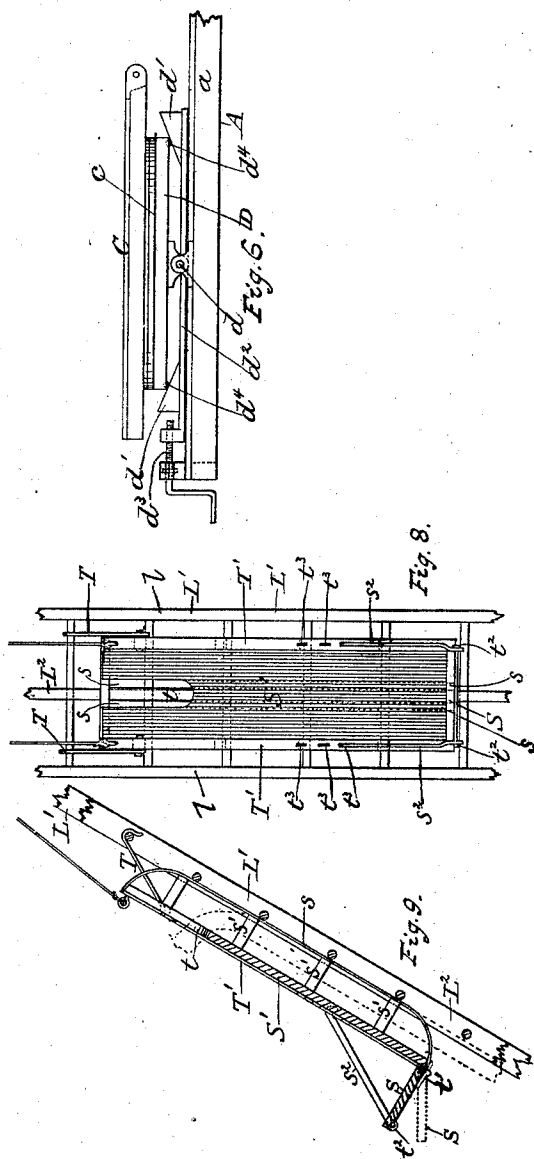
(No Model.)

3 Sheets—Sheet 1.

L. DEDERICK.
EXTENSION FIRE LADDER.

No. 502,484.

Patented Aug. 1, 1893.



Witnesses,
W. Davidson Jones
Charles Dering.

L. Dederick
Inventor.
f. h. Atty.
Alex. S. Kirk

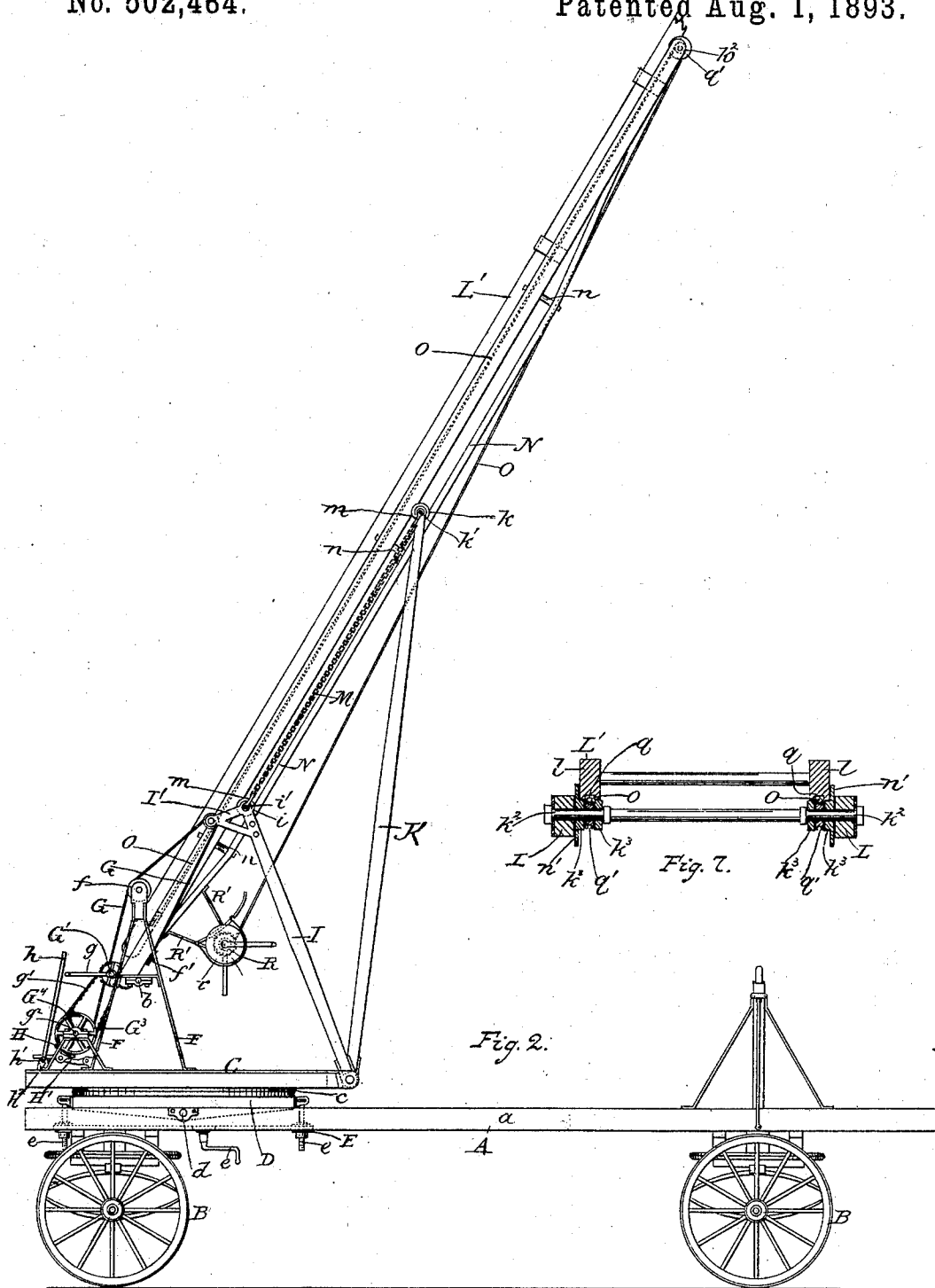
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3 Sheets—Sheet 2.

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Witnesses
T. Davidson Jones
Charles S. Searns

Levi Dederick
Inventor.
By his atty Alex. Leitch

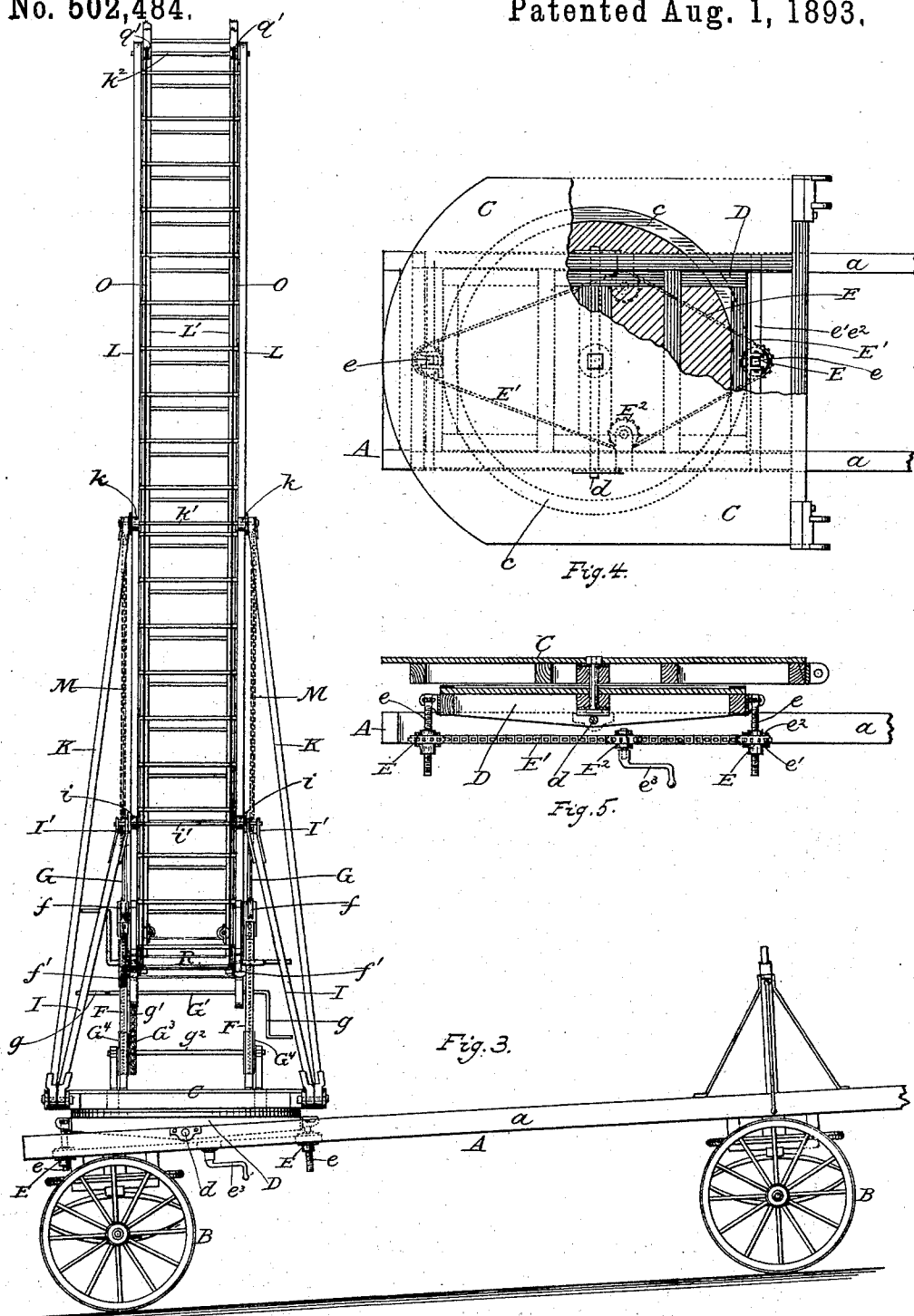
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3 Sheets—Sheet 3.

L. DEDERICK.
EXTENSION FIRE LADDER.

No. 502,484.

Patented Aug. 1, 1893.



Witnesses
 W. Davidson Jones
 Charles Seppala

Levi Dederick
Inventor.
By His Attorney
Alex. Selkirk

UNITED STATES PATENT OFFICE.

LEVI DEDERICK, OF ALBANY, NEW YORK.

EXTENSION FIRE-LADDER.

SPECIFICATION forming part of Letters Patent No. 502,484, dated August 1, 1893.

Application filed November 24, 1891. Serial No. 412,960. (No model.)

To all whom it may concern:

Be it known that I, LEVI DEDERICK, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Extension Fire-Ladders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements on former inventions for improvements of extension fire ladders made by myself; and consists in the combinations of devices and elements hereinafter particularly described in this specification and specifically set forth in the claims.

The objects of my invention are to provide means by which the main ladder with its extension member can be easily raised from a horizontal position to a vertical one, and be supported by two sets of supporting braces which have their foot ends pivoted with the turn table or platform, and contribute to support of the ladder at points at a distance from the pivoted front end of the ladder; also to provide means by which the pull of the hoisting cables or ropes on the head ends of a pair of supporting braces, applied to the lower side of the main ladder at near its middle of length, will effect a partial elevation of the same, and then effect a transfer of the pull of the hoisting cables to the head ends of a second pair of moving supporting braces by means of which the further and full elevation of the ladder will be effected; also to provide in combination with a crank shaft a windlass or spool shaft, hoisting cables and friction rollers, a chain belt and sprocket wheels which will gear the crank shaft with the windlass or spool shaft together, whereby the ladder hoisting mechanism will be made more effective than heretofore; also to provide with the frame of the truck body and the turn platform, with which the main ladder is pivoted, a leveling frame and mechanism whereby the platform may be leveled when the truck is standing on a grade; also to provide means by which a fireman may be securely and safely supported at any desired elevation on the ladder for handling hose or

pipes for directing the discharges of water on fires; also to provide specific combinations of devices whereby the improvements in this invention may be embodied in extension fire ladders. I attain these objects by the means illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of a fire ladder with the ladders down. Fig. 2 is a side elevation illustrating the ladders elevated. Fig. 3 is a view of the truck standing on a grade with the ladder elevated and its platform leveled and turned so that the ladder is viewed from its rear side. Fig. 4 is a plan view of the leveling turn table platform with parts broken away for exposing hidden parts and devices. Fig. 5 is a longitudinal sectional view of the same, showing means for leveling the platform. Fig. 6 is a view illustrating a modification of mechanism for leveling the turn table. Fig. 7 is a cross sectional view taken on an enlarged scale, at line *z z*, Fig. 1. Fig. 8 is a plan view of the fireman's stand employed in connection with the ladder. Fig. 9 is a sectional view of the same.

The same letters of reference refer to like parts throughout the several views.

In the drawings A represents the body of the truck carrying the ladders and mechanism for operating the same. This body is composed of the side timbers or pieces *a* suitably joined together by cross pieces in the form of a frame as is the practice in fire ladders. This body or frame A has its forward end portion suitably secured with the fifth wheel of the front gearing of the truck and in such a manner that the front wheels B may be freely turned in either direction in relation to said body or frame. The rear end portion of the said body or frame is preferably projected rearwardly past the rear end gearing of the truck and is also secured with a similar fifth wheel, provided with the rear end gearing and so arranged that the rear wheels B may also be turned in either direction in relation to the said frame A. This truck body or frame A, mounted on the front and rear gearings as described, is free from liability of tilting sidewise and downwardly, in either direction, and the line of the top side of the said truck body or frame, in its cross direction, will in all cases be substan-

tially parallel with the lines of the axis of the wheels of the respective front and rear gearing which support the said truck body or frame A.

5 C is the turn table or platform with which the ladder is connected, and which supports the several mechanisms for operating the parts of this apparatus. This turn table is suitably mounted on circle *c* and turns on a
10 suitable king-bolt, as its pivot, which king-bolt holds the platform C with the leveling frame D.

The leveling frame D consists of a frame composed of suitable longitudinal pieces
15 framed with cross pieces in a manner to give this leveling frame strength and stiffness. This frame D is suitably pivoted with the frame timbers *a* of the truck frame. This pivoting of the leveling frame with truck
20 frame can be accomplished in different ways, as by a pivot shaft *d* passing transversely through the truck frame and the leveling frame D, working between the timbers *a a* of the truck frame as shown in Figs. 4 and 5; or this
25 leveling frame may have suitable brackets secured with it, which are hinged with other brackets secured to the timbers of the truck frame as illustrated in Fig. 6. This leveling
30 frame D is calculated to be tilted in either direction, in relation to the truck frame, and held, and various mechanisms may be employed for that purpose, yet preference is given to the employment of force of a wedg-
35 ing element interposed between the truck frame and the outer ends of this leveling frame. This wedging element may be in the form of cams, or in the form of a straight wedge or a spiral wedge as found in a screw. When straight wedges are employed as wedges
40 *d'* in Fig. 6 I prefer to connect their thinnest ends together by means of a longitudinal piece *d''*, and by a suitable screw *d'''*, working through a bracket and holding with it as it is secured to the truck frame, and screwing in the up-
45 turned end of the longitudinal piece *d''* as illustrated in Fig. 6. When screws are employed as in Figs. 1, 2, 3, 4 and 5, I prefer to employ right and left hand screws *e e* secured with the opposite ends of the leveling frame
50 D and sprocket wheels E having screw threads in their hubs, corresponding with the screws *e e* respectively, and held between bars *e' e''*, but free to be revolved in either direction, so that when one of said screws is drawn
55 downwardly with the end of the frame it is secured to, the other will be thrust upwardly and carry with it the opposite end of the said frame. These sprocket wheels E may be revolved simultaneously by the means of an
60 endless sprocket wheel chain, *E'* and one or more supplemental sprocket wheels *E''* provided with cranks *e'''* and geared by means of said chain with the screw threaded sprocket wheels E as illustrated by dotted and full
65 lines in Figs. 4 and 5. When straight wedges as *d'* are used I prefer to have their inclines work with rollers *d''* secured to the lower side

of the leveling frame as shown in Fig. 6. These above described mechanisms operate to tilt and hold the leveling platform to any
70 degree of incline in relation to the truck frame as may be required for adjusting the said leveling frame or platform to a horizontal position when the truck is standing on a
75 grade with the truck frame on an incline as illustrated in Fig. 3. It is to be understood that I do not confine myself to the use of any particular mechanism for leveling said frame
80 D while the truck is on a grade, though preference is given to the mechanisms described.

FF are standards which are rigidly secured to the platform C relatively forward of the king-bolt. Rollers *f*, for receiving the hoisting
85 cables G, are mounted on spindles held in suitable bearings secured with the upper ends of the said standards.

G' is a crank shaft provided with one or more cranks *g* for revolving the same. Secured to this crank shaft is a sprocket wheel
90 G² which through link belt *g'* operates the sprocket wheel G³ secured to the windlass shaft *g''* which carries the spools or windlass
95 wheels G⁴, with which the hoisting cables G are secured. These spools receive the coils of the said hoisting cables when they are re-
100 volved in a suitable direction.

H is a brake shoe hinged with the platform or a stationary piece fixed thereto and is operated by lever *h* for applying and holding said
105 shoe in frictional contact with the rim of one of said spools or windlass wheels. A ratchet wheel also secured to said windlass shaft, and provided with a dog may also be employed for holding the said shaft from revolving, or a
110 ratchet wheel and dog may be provided with the crank shaft for the same purpose, so that the hoisting ropes or cables will be held where drawn to, without slipping or unwinding.

I I are bracing levers having their lower ends pivoted to the rear end of the turn plat-
115 form C, and having their upper ends in situation to have bearing, directly or indirectly, against the lower sides of the rails of the main ladder L, or against a fixed adjunct of the
120 same. Friction rollers *i* may be placed between the upper ends of these bracing levers and the said side rails of the ladder, and these
125 friction rollers may revolve on a single shaft *i'* running across the lower side of the ladder, and connecting with the upper ends of the said bracing levers, as shown in Fig. 3. With
130 the upper ends of the said bracing levers are the forwardly projected arms I', in the forward ends of which is mounted a sheave J which receives the fixed and forward end portions of the hoisting cables running back from
135 over the friction rollers *f*. Although these hoisting cables G for each side may be separate from each other and have their ends secured to the ladder at points near the pivot
140 shaft *b* on which said ladder swings, yet I prefer to make these hoisting cables in a single piece and hold them joined and over sheaves
145 *f'* suitably mounted and secured to the base

end of the ladder L as shown in Figs. 2 and 3. By these arrangements of parts and the simultaneous draft of the windlass on the two portions of the hoisting cable over the friction rollers *f* and through the sheaves J, the bracing levers I I may have their upper ends, loaded by the ladder, easily raised from a horizontal position shown in Fig. 1, to an elevated position as shown in Fig. 2.

K K are bracing standards also hinged to the rear end of the turn platform C, with their outer ends directly or indirectly bearing against the lower side edges of the side rails of ladder L, and so as to be free to be moved in either direction and receive a portion or some of the weight of the said ladder. To avoid excessive friction between the moving upper ends of the said bracing standards and the ladder, friction rollers *k* are mounted on shaft *k'*, which shaft is arranged beneath the ladder and connects the outer ends of the said standards as shown in Figs. 3 and 7. These rollers have bearing against the lower edges of the side rails of the ladder against which they roll when the said bracing standards are being moved in either direction.

M M are draft chains or cables which connect the upper ends of the bracing levers I with the upper ends of the bracing standards K. The connection of the ends of the said draft chains with levers I and K may be effected by any suitable means, yet preference is given to the use of clevises *m m'* suitably pivoted with the upper ends of said levers and standards. The said draft chains or cables M are slack when the ladder is in its normal or horizontal position and at rest; they remain idle until the draft of the hoisting cables G have raised and carried forward the upper ends of the bracing levers to such a distance as to remove the slack of the said draft chains and transfer to said chains the pulling force of the windlass through the said hoisting cables drawing forwardly the outer ends of the bracing levers I. When the windlass G⁴ has been revolved so as to effect this transfer of power to the draft chains M, the free ends of the standards K will begin to operate as a medium for lifting the rear end portion of the ladder L, and the operations of the windlass being continued the power will, through the hoisting cables G and draft chains M, be communicated to the upper ends of the bracing standards and through them operate to continue the lifting of the ladder by their pushing force being applied to the lower or rear side of the ladder. When the upper or free ends of these bracing levers I and bracing standards K are being drawn forward those bracing devices are generally made to advance toward perpendicular positions and raise the ladder also toward a perpendicular position, and the nearer they respectively approach these perpendicular positions the more rapid the windlass may be revolved without necessitating an increase of power although the diameters of the coils are in-

creased. The foot ends of the said bracing levers I and bracing standards K are spread wider apart than their upper ends, and so as to stand out past a line drawn perpendicular to the free or upper ends of said bracing devices, so that said pieces I and K will, when elevated operate as side props or braces to the ladder, and by being joined with the platform C, which is of greater width than the base of the ladder, the widely spread foot ends of said bracing devices I and K, always maintained, produce an extended base at the turn platform, while their upper ends more contracted at the ladder are securely held with the same, and thereby these bracing devices are made to operate more effectually as side braces or props to the ladder than they would were their foot ends at the same distance apart as their upper ends. When the ladder is elevated and the bracing devices I and K are held by the hoisting cables and draw chains in their respective elevated positions they strengthen the ladder to resist deflecting strain by reason of their support to the ladder at two different points wide apart on the ladder.

The side rail of the ladder L has secured to each from its lower side a parallel bar N which extends longitudinally nearly the whole length of said side rail, and is arranged at a distance from said side rail about equal to the diameter of the friction rollers *k* carried by the free ends of the bracing standards K. These parallel bars N are secured by their ends to the side rails of the ladder and are tied at intervals with said side rails, by suitable tie posts *n n*. These longitudinal braces N and their tie posts *n n* operate to truss the side rails of the ladder and also serve as guards to prevent the friction rollers *k* from falling away from the lower edges of the side rails of the ladder.

The extension member L' of the ladder is extended from the main ladder by any suitable means, but preferably by means of the draft lines O running from the windlass R to over sheave *q* and then to the foot of the said extension member substantially as described in Letters Patent No. 444,820, granted to myself January 20, 1891. But instead of running the draft lines O exterior to the side rails *l l* of the extension member I form in the lower side edges of said rails longitudinal grooves *q* Fig. 7, which grooves receive said draft lines O. I also provide on shaft *k*² between rollers *k*³ *k*³ the sheave *q'* which is free to revolve independent of said friction rollers *k*³ *k*³ which are between the rear ends of the side rails of ladder L and the side rails of the ladder L'. One or both of the friction rollers *k*³ *k*³ of each pair, receiving between them the sheave *q'*, may be provided with a guide flange *n'* for holding said rollers from shifting laterally. In this arrangement the rollers *k*³ *k*³ and sheave *q'* may revolve at different speeds, and the draw line O, is made to be incased and out of exposure. The draft

line O for extending the extension member L' of the ladder runs from sheave q to the windlass R supported from the lower side of the main ladder L by suitable brackets R'.

5 This windlass R is provided with a suitable crank, and a ratchet wheel and dog, for holding the extension member to points extended, and also with a friction brake r for operation to regulate the speed of the said windlass when revolving by the force of gravity of the extension member when being lowered.

10 S is a platform capable of being moved on the ladder and its extension member from one end to the other, at will. This platform is 15 secured to the curved runners s, in any suitable manner. This platform extends out from the ladder in direction at right angles, or nearly so, to the same and to such a distance as to afford ample standing room for a fireman when 20 holding a pipe, or other instrument, for service in putting out fires. With this platform S is provided the guard panel S' arranged about parallel with the runners s and setting out from the same to such a distance as to 25 admit hose to pass from either direction between the said guard and the ladder. This guard is rigidly secured to the runners s by suitable knees s' s'. Platform S is also preferably pivoted to said guard and its connection thereto is strengthened by rods s². In 30 this guard is made opening t for passage of the hose from the lower side, or from the ladder, to outside the guard and the reach of the fireman standing on platform S. This platform and its guard are shown in Fig. 8 to be 35 about midway between the side rails of the ladder, yet they may be nearer to one side rail than the other so that persons may pass between the said platform and its guard and 40 one of the side rails. T' T are hooks for securing this platform and its guard to the ladder at any point thereon. Suitable ropes or lines are employed for elevating or lowering this platform, at will.

45 The windlass R is mounted on bearings which are held at a distance down from the side rails of the main ladder when it is in a horizontal position, and at a distance rearward of the crank shaft, which operates to 50 actuate the hoisting windlass of the main ladder, when the main ladder is advancing toward a perpendicular, so that persons operating the two hoisting mechanisms at the same time will not interfere with each other.

55 The brake shoe H is preferably attached to lever H' which is pivoted by one of its ends to a fixed piece, with its free end on eccentric h' which has its bearing in standard h² and is so connected with lever h as to be 60 turned by it, for forcing lever H' upwardly and cause the shoe to hold with the rim of the windlass or sprocket-wheel G⁴.

In most cases it is preferred to so hinge the fireman's platform S to the runners s or the 65 guard panel S', as at t, so as to permit the said platform being adjusted to substantially a horizontal position as illustrated by dotted

lines in Fig. 9. With this platform so adjustable, the supporting rods s², one at each end of the said platform, have their lower ends 70 pivoted with the outer ends as at t² while their upper ends are provided with hooks or other suitable catching devices for engaging with eyes t³, or equivalent co-acting engaging devices secured with the sides of the guard panel 75 S', preference being given to oblong eyes t³ made with iron plates T' T' secured to the outer sides of the side rails of the said guard panels, Figs. 8 and 9.

To strengthen the ladder so as to sustain 80 the weight of one or more firemen handling hose filled with water, the ladder is made with a middle rail L² Figs. 8 and 9, arranged midway between the outer rails L L. When this 85 third rail L² is employed in the ladder, additional runners s s, indicated by dotted lines in Fig. 9, for bearing on the rounds of the ladder at each side of said middle rail, are employed with the platform S and guard S', to 90 prevent them from shifting laterally.

By the above described improvements the ladders may be quickly elevated, and the ladder be made to have a level base support, 95 when the truck is standing on a grade, and be braced, from swaying sidewise, at points on different planes from a broad base; at the same time provision is made for holding a fireman and hose in service at any suitable point on the ladder, with the fireman amply 100 protected.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a fire ladder, the combination with a truck frame which is supported from the front 105 and rear wheels without liability of being tilted at will in any direction, a leveling frame, a shaft pivoting said leveling frame with the truck frame, so that the former may be tilted only in direction backwardly, and forwardly, a turn platform, a metallic circle interposed between the said turn platform and leveling frame, a vertical king bolt pivoting the turn platform central in relation to the said interposed circle and with the said leveling frame, mechanism, described, interposed 115 between the truck frame and said leveling frame, and capable of being operated at will for tilting the latter forwardly or rearwardly in relation to the direction of said truck 120 frame, substantially as and for the purposes set forth.

2. In a fire ladder, the combination with a truck frame which is supported from the front 125 and rear wheels without liability of its being tilted sidewise in either direction, the leveling frame D jointed with the said truck frame so as to be capable of being changed from a horizontal to an inclined position in either way in direction of the length of the truck 130 frame, a turn platform supported parallel with the said leveling frame and revolving horizontally on the latter, a ladder which has its foot end pivotally connected with standards

which are secured to the upper side of the said turn platform, neighboring its axis of rotation, of the co-acting wedges d d' interposed between the truck frame and said leveling frame and having their inclines running toward each other and connected together by the longitudinal piece d^2 and a screw shaft d^3 holding with a bracket which is secured with the truck frame and screwing into a screw-threaded bracket connected with the connecting piece d^2 substantially as and for the purposes set forth.

3. The combination with a turn platform, a leveling frame, a metallic circle interposed between said turn platform and leveling frame, a vertical king bolt arranged central in relation to said circle, and pivoting the said turn platform with said leveling frame, a truck frame rigidly supported by the wheel gearing of the carriage, a horizontal shaft pivoting said leveling frame with said truck frame, so that the leveling frame and turn platform mounted thereon can be tilted only forwardly and rearwardly in relation to the truck frame, mechanism, described, interposed between the truck frame and the said leveling frame, and operated at will for leveling said leveling frame and turn platform mounted thereon, and standards, rigidly secured to said turn platform, for pivoting and holding the foot end of a ladder at all times within the circle of the circle interposed between the leveling frame and said platform, substantially as and for the purposes set forth.

4. In a fire ladder the combination with a ladder having its base end pivoted with a platform, of bracing levers pivoted by their foot ends to the same platform and having with their free ends friction rollers which are applied to the lower sides of the side rails of the ladder and having forwardly projected arms, each carrying a sheave, of hoisting cables having their ends connected with the foot end of the ladder and running over the said sheaves and then to over friction rollers mounted on a plane above the foot end of the ladder to a windlass or spools for winding up said hoisting cables, substantially as and for the purposes set forth.

5. In a fire ladder the combination with a ladder having a pivoted connection with a platform, a pair of bracing levers having their foot ends pivoted to the same platform and receiving by their free moving ends the weight of the ladder, of bracing standards pivoted also to the same platform with their free moving ends so applied as to lift said ladder when they are moved upwardly and forwardly, of a draft chain or connection between the free ends of the said bracing standards and those of the bracing levers and hoisting cables connecting the free ends of said bracing levers with a windlass or spools which may be revolved at will, substantially as and for the purposes set forth.

6. In a fire ladder the combination with a ladder having a pivot connection with a plat-

form and capable of having its rear end elevated or lowered, of the longitudinal bars N arranged parallel with the side rails of the ladder at a short distance from their lower edges and secured at their ends to said side rails—and at intervals by tie posts n , where- by the ladder may be stiffened and friction rollers working between said side rails and longitudinal bars will be held in place, substantially as and for the purposes set forth.

7. In a fire ladder, the combination with the main ladder of an extension member having grooves in the lower side edges of its side rails, of sheaves mounted on a shaft so as to revolve directly opposite said grooves, and friction rollers made in sections and mounted on the same shaft with the sheaves between said sections of the friction rollers, substantially as and for the purposes set forth.

8. In a fire ladder the combination with a ladder which is capable of being elevated at will, of a platform extended at an angle out from the ladder and capable of supporting a fireman when in service from the ladder, of runners having bearing on the rounds of the ladder and holding the said platform free from contact with said ladders so that hose may be held in place between, substantially as and for the purposes set forth.

9. In a fire ladder, the combination with a ladder of a platform extended at an angle out from the same, a guard between the ladder and said platform and extended upwardly with provision for holding hose, and runners having bearing on the ladder and holding the platform and guard off from the ladder and provision for holding said platform and guard in secure connection with the ladder, substantially as and for the purposes set forth.

10. In a fire ladder, the combination with a ladder having its foot end pivoted to a platform, and its free end capable of being elevated toward a vertical position, of bracing devices having their foot ends set wider apart than the width of the ladder and pivoted to the said platform at points distant from the point of pivoting of the said ladder, with the bodies of said bracing devices inclined relatively inwardly with their free ends secured with the ladder substantially as and for the purposes set forth.

11. In a fire ladder, the combination with the windlass of the hoisting cable of the main ladder, and brake shoe H carried by lever H' pivoted by one of its ends to a piece fixed to the platform, of the pivoted eccentric h' arranged beneath the free end of said lever and secured to hand lever h so as to be turned by the same, substantially as and for the purposes set forth.

12. In a fire ladder, the combination with the ladder capable of being elevated from a horizontal position toward a vertical one, of the platform S capable of being adjusted to a horizontal position, guard-panel S' and adjustable connecting rods s^2 between the outer ends of said platform and the said guard

panel, substantially as and for the purposes set forth.

13. In a fire ladder, the combination with a ladder having midway between its side rails
5 L L, the middle rail L', of the platform S, guard panel S' and runners s s, substantially as and for the purposes set forth.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

LEVI DEDERICK.

Witnesses:

W. DAVIDSON JONES,
CHARLES SELKIRK.