L. L'HEUREUX.

TOWER FOR FIRE FIGHTING PURPOSES.

APPLICATION FILED FEB. 10, 1913.

**1,136,604.**

Patented Apr. 20, 1915.

4 SHEETS—SHEET 1.

Fig. 1.

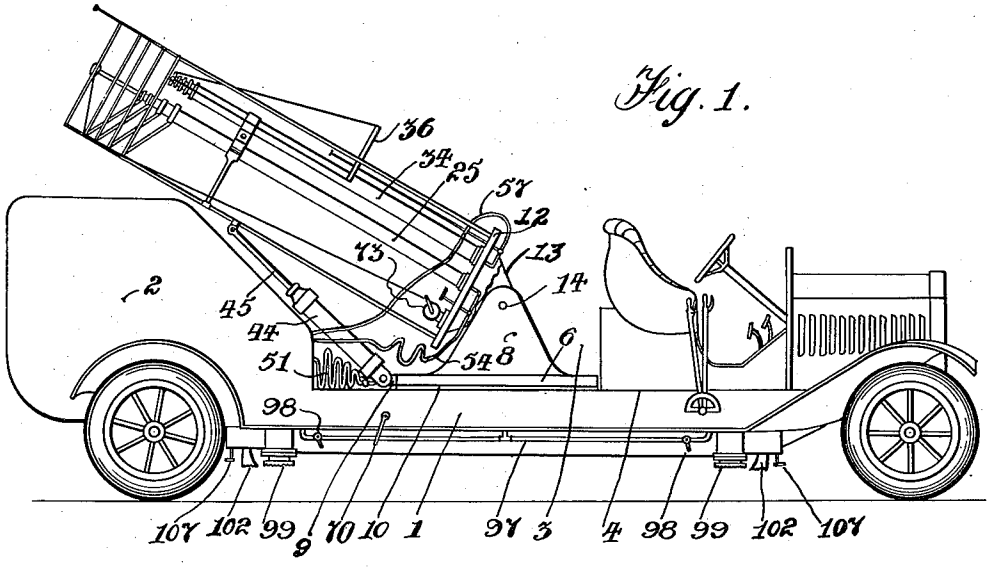
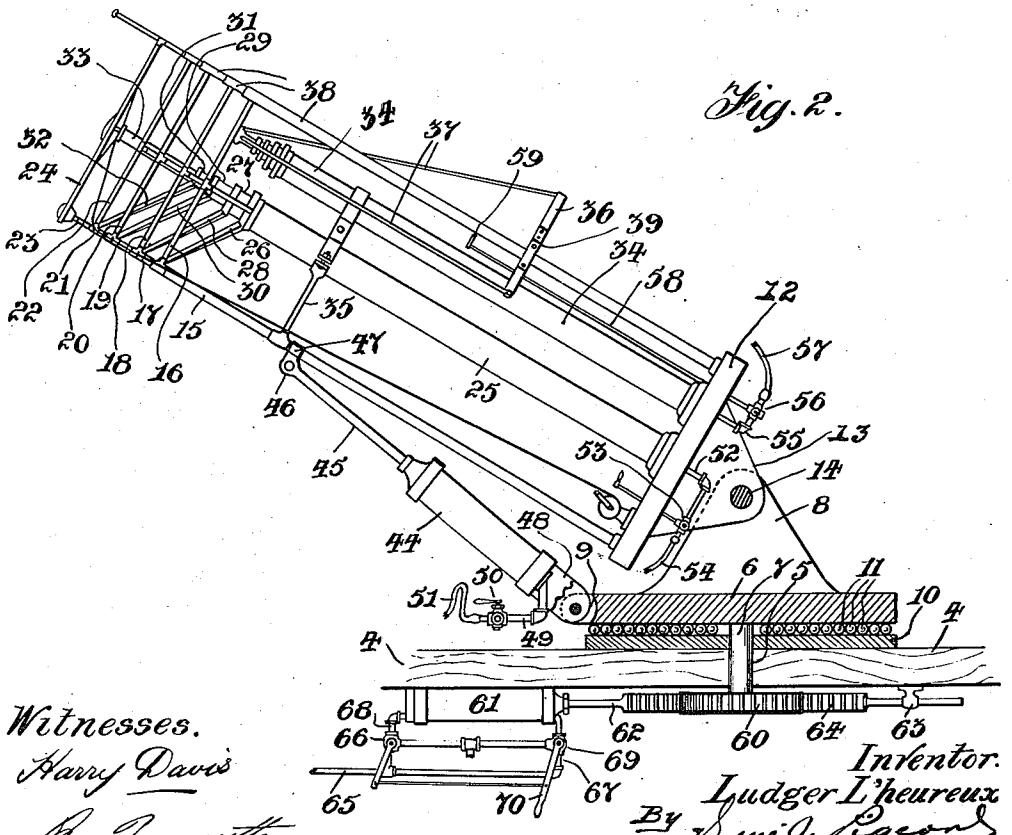



Fig. 2.




Witnesses.

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4 SHEETS—SHEET 2.

*Fig. 5.*

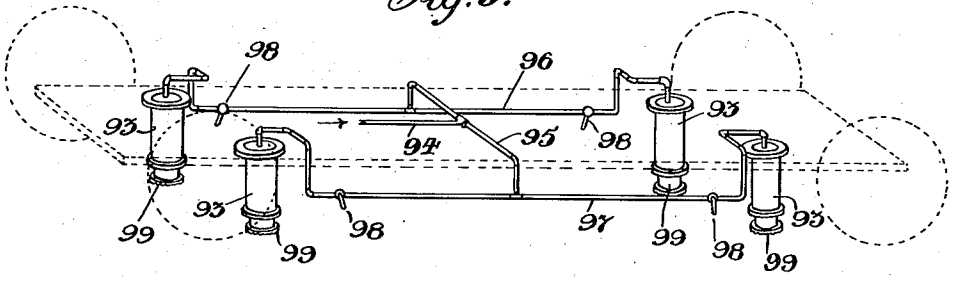
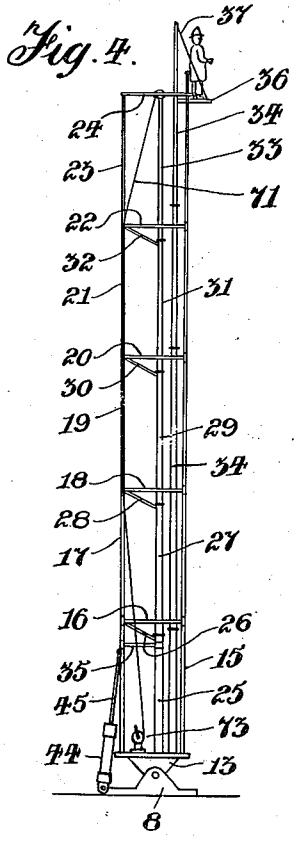



*Fig. 4.*



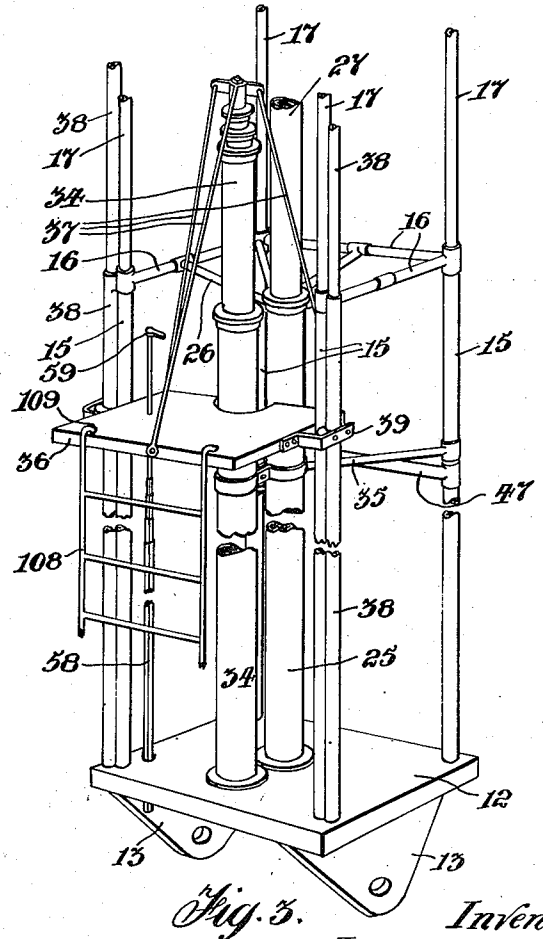




*Fig. 3.*

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4 SHEETS—SHEET 3.

Fig. 6.

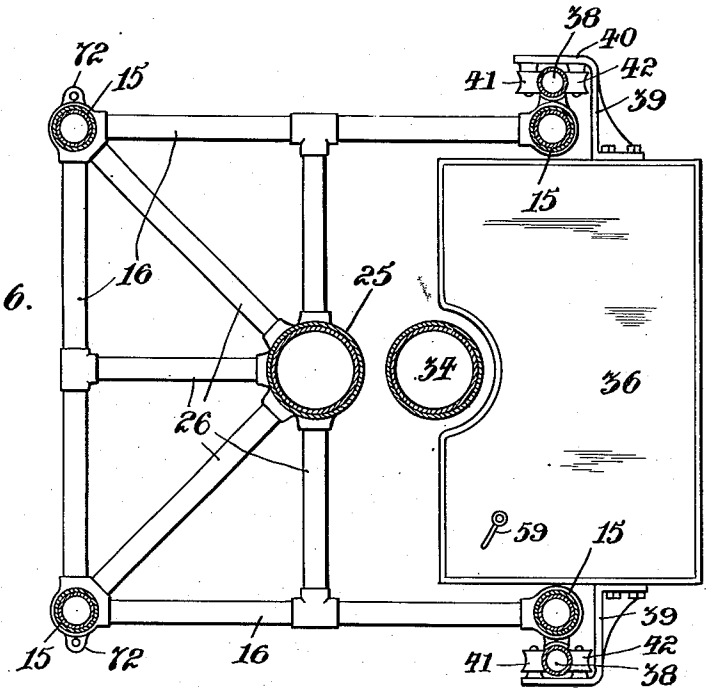
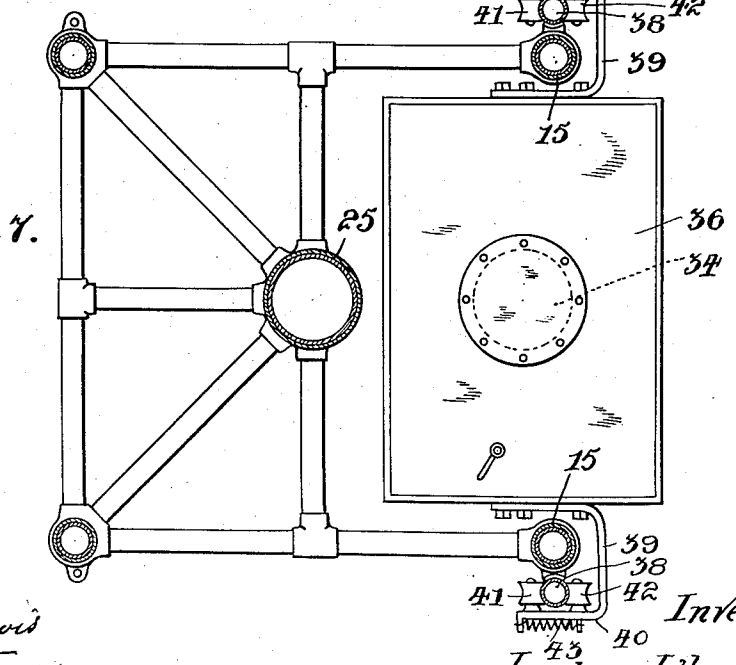



Fig. 7.

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4 SHEETS—SHEET 4.

Fig. 8.

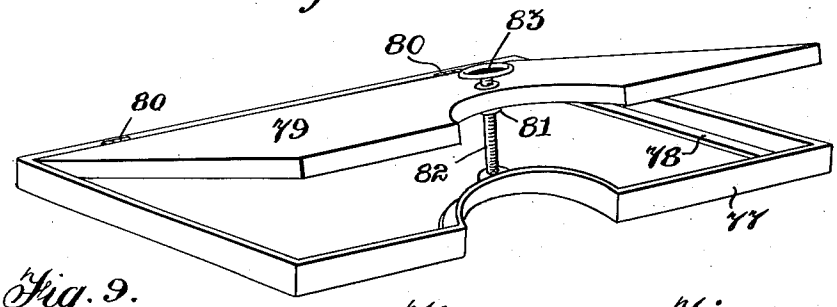



Fig. 9.

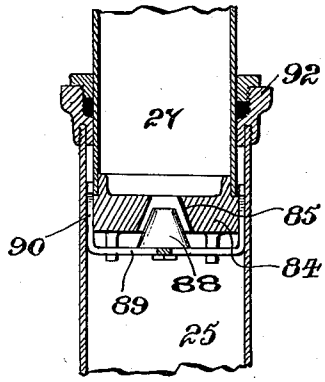



Fig. 10.

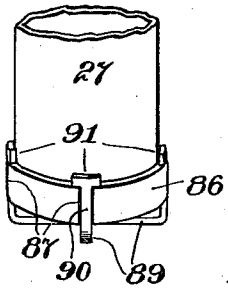



Fig. 11.

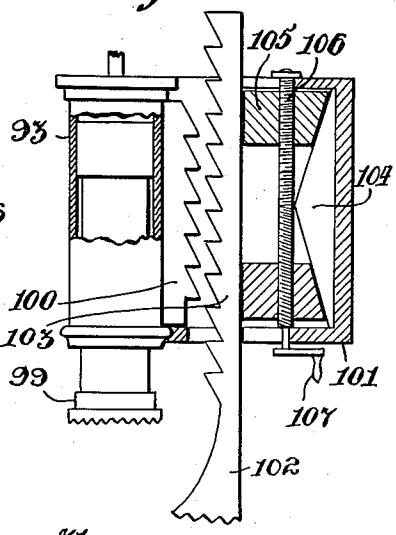
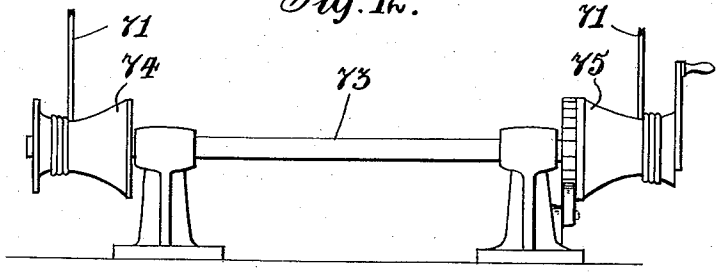



Fig. 12.

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# UNITED STATES PATENT OFFICE.

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## TOWER FOR FIRE-FIGHTING PURPOSES.

1,136,604. Specification of Letters Patent. Patented Apr. 20, 1915.

Application filed February 10, 1913. Serial No. 747,219.

*To all whom it may concern:*

Be it known that I, LUDGER L'HEUREUX, a subject of the King of Great Britain, residing in the city of Montreal, in the county of Hochelaga, in the Province of Quebec, in the Dominion of Canada, have invented certain new and useful Improvements Relating to Towers for Fire-Fighting Purposes, and do hereby declare that the following is a full, clear, and exact description of the same.

The invention is an improved tower for fire fighting purposes and the objects of the invention are to enable the firemen to more quickly and safely reach the upper stories of a building, to carry a hose to a sufficient height to throw water more advantageously into the building, to speedily offer the means of escape from a high window, and generally to provide a simple and efficient adjustable tower, easily operable and which will in most cases avoid the necessity of cutting down obstructing overhead telegraph wires in order to raise the tower.

The invention consists primarily of an extensible frame mounted on a suitable truck or vehicle with an elevator adapted to run up and down said frame, fluid means being preferably employed for raising and lowering the extensible frame and for raising and lowering the elevator.

The invention will now be fully described in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of the improved tower in its collapsed position and the vehicle on which it is carried. Fig. 2 is an enlarged side elevation of the tower fully collapsed and a portion of the vehicle in section to show the operating mechanism of the turn table. Fig. 3 is an enlarged perspective view, of the lower part of the tower removed from the vehicle and with the upper part broken away at the second section. Fig. 4 is a diagrammatic view of the tower extended and the elevator raised. Fig. 5 is a diagrammatic view showing the stabilizing cylinders of the vehicle and their pipe connections. Fig. 6 is a cross section of the tower showing a plan of the elevator and guiding means. Fig. 7 is a similar view to Fig. 6, but showing a modified arrangement. Fig. 8 is a perspective view showing an adjustable arrangement of elevator flooring. Fig. 9 is a fragmentary vertical section of the valve arrangement in the cylinders. Fig. 10 is a fragmentary perspective view of the lower end of one of the cylinders. Fig. 11 is a sectional detail of a desirable addition to the stabilizing cylinders, and Fig. 12 is a front elevation of a winch used for tightening up the tower when extended.

Like numerals of reference are used to denote like parts in the several figures.

Referring to the drawings 1 designates the vehicle which is preferably a motor vehicle having the seat arranged toward the forward end, and an air tank 2 of large capacity disposed over the rear wheels, leaving a space 3 at the approximate middle of the car adapted to support the extensible tower.

4 is the flooring of the car, having a vertical shaft orifice 5 therethrough where it crosses the space 3.

It may here be mentioned that any known system of keeping the air in the tank 2 at a constant pressure can be employed, a preferable form being a pump connected to the engine of the vehicle and adapted to be thrown automatically into action as soon as the pressure lowers in the tank, the engine of course being kept running whilst the vehicle is stopped at the fire.

6 is a turn table provided with a depending pin 7 journaled in the orifice 5, and also having the upstanding spaced brackets 8, and lateral lugs 9.

10 is a bearing plate encircling the pin 7 and resting on the flooring 4 beneath the turn table 6.

11 is a row or rows of ball bearings disposed between the turn table 6 and the plate 10 to secure free turning of said turn table.

12 is the base of the tower having the depending distanced ears 13 pivotally connected at their lower ends to the upper ends of the brackets 8 by the pin 14.

15 are corner posts in the form of tubes extending rigidly up from the base 12, one at each corner and braced at their top ends by the braces 16, 16, 16, thus forming the first section of the extensible tower.

17 are the corner posts of the second section of the tower, said posts being in the form of tubes of smaller diameter and telescoping into the first tower section similar braces 18 being provided at the top ends.

19 are the corner posts of the third section of the tower, said posts telescoping into, and

being braced at the top, in a similar manner to the first and second sections by the braces 20.

21 are the corner posts of the fourth section telescoping into the posts 19 and being braced at their tops in a similar manner to the lower sections by the braces 22.

23 are the corner posts of the fifth section telescoping into the posts 21 and braced at their top ends by the braces 24.

Any desired number of sections may be used to complete the tower, five being here shown by way of example.

25 is an air cylinder centrally upstanding from the base 12, and approximately the length of the first section and braced to the braces 16 by the struts 26. 27 is the cylinder of the second section telescoping into the cylinder 25 and similarly braced at the top by the struts 28. 29 is the cylinder of the third section telescoping into the cylinder 27 and similarly braced at the top by struts 30. 31 is the cylinder of the fourth section telescoping into the cylinder 29 and similarly braced by the struts 32.

33 is the cylinder of the top or fifth section telescoping into the cylinder 31 and rigidly secured at its top end to the braces 24 by struts not shown in the drawings.

34 is a series of telescoping cylinders, very similar to those just described for the tower sections, secured to the base 12 and extending upward within the tower sections alongside the hereinbefore described cylinders, being braced to the cylinder 25 by the brace 35.

36 is a platform or elevator suspended from the top section of the series of telescoping cylinders 34 by the ropes 37.

It will be seen from the drawings that in each section, the braces at the top ends of the corner posts extend across three sides only, thereby leaving one side open from top to bottom of the tower in which the platform 36 is fitted and guided to run up and down therein as hereinafter described.

38 are guide rods in the form of tubes respectively arranged parallelly adjacent and rigidly secured to the posts 15 to the outer side thereof and extending from top to bottom of the first section, similar rods being provided for the second, third, fourth and fifth sections and telescoping into each other.

39 are rigid brackets extending laterally from each side of the platform 36 respectively and offset rearwardly at 40.

41 and 42 are a pair of concave rollers journaled in the offset 40 of each bracket 39 and contacting the guide rods 38 on opposite sides, thus securing easy running of the platform 36 up and down the tower.

In Fig. 7 a little different arrangement of elevator is shown, in which the raising and lowering cylinders 34 are disposed nearer the edge of the base on the open side of the tower and the platform 36 is supported directly on top of the top section of said cylinders without the suspending ropes 37. Also in this figure it will be seen that one of the concave guiding rollers, preferably the one 42, is pressed into contact with the rods 30 by a spring 43 thus better accommodating this guiding arrangement of rollers to the joints between the sections of the rods 38. 44 is an air cylinder having a piston rod 45 pivotally secured at its upper end 46 to the middle of a cross bar 47 (see Fig. 3) on the lower section of the tower. 48 is a lug projecting from the lower end of the cylinder 44 and pivotally secured to the lateral lugs 9 of the turntable 6. It will now be seen that when the piston of the cylinder 44 moves outwardly the result will be to swing the tower from the leaning position shown in the drawings, toward the perpendicular. 49 is an air pipe leading into the bottom of the cylinder 44 and provided with a controlling valve 50, said pipe being coupled to the air tank 2 through the medium of a pipe 51, the latter being flexible to accommodate the various movements of the tower base. 52 is an air pipe leading through the base 12 into the bottom of the cylinder 25 and provided with a controlling valve 53, said pipe being also coupled to the air tank 2 through the medium of a flexible pipe 54. 55 is an air supply pipe leading through the base 12 into the bottom of the lower cylinder of the series 34 and provided with a controlling valve 56, said pipe being also coupled to the air tank 2 through the medium of a flexible pipe 57. 58 is a rod extending up, from the valve 56 through the base 12 up to the platform 36, said rod being of a telescopic nature (angular in section) to accommodate the raising and lowering of the platform and provided with a handle 59 within reach of the person on the platform. 60 is a gear wheel rigidly mounted at the lower end of the pin 7 of the turntable. 61 is an air cylinder preferably secured to the underside of the car flooring 4 and having a piston therein from which extends the piston rod 62, guided at its outer end in the eye 63 and intermediately fashioned into a rack 64 meshing with the gear 60. 65 is an air supply pipe leading from the tank 2 and having branches 66 and 67 leading respectively into the forward and rear ends of the cylinder 61, said branches having the coupled controlling valves 68 and 69 with the operating handle 70. These valves and also the valves 50, 53 and 56 are of the three way kind, that is to say, in one position permitting air to enter the cylinder, in another position cutting off both cylinder and supply, and in another position permitting air to exhaust from the cylinder, the valves 68 and 69 however, being arranged so that while air is entering one

side of the cylinder 61, the other side will be exhausting air through the valve to atmosphere. Thus it will be seen that by supplying air to the cylinder 61 the turn table may be rotated through the medium of the rack 64 and gear 60, in either direction according to which way the valve handle 70 is turned.

71 are a pair of guy ropes secured to the top section of the tower, preferably to the upper end of the cylinder 33 and extending downwardly on either side the tower through eyes 72 at the upper end of some of the sections and thence to a winch 73 mounted on the upper side of the base 12 and having a pair of reels 74 and 75 on which the ropes 71 are adapted to be wound, a pawl and ratchet mechanism 76 being provided to prevent unwinding except when the pawl is manually knocked out of engagement with the ratchet.

In Fig. 8 is shown a means for tilting the platform or elevator to bring it in a more or less horizontal position when the tower is leaning. In this arrangement the platform has a frame 77 carrying the guiding brackets and the suspension ropes, said frame having an interior ledge 78. 79 is the platform proper hinged at the forward edge to the frame 78 by the hinges 80. 81 is a screw box secured to the platform 79 and in which threads the screw 82 provided with a hand wheel 83 at the top and swivelly connected at the bottom end to the frame 77. It will thus be seen that by turning the hand wheel 83 the platform 79 will be raised or lowered at the rear edge as required, and if the tower is leaning rearwardly the angle of the platform may be correspondingly changed to a level position for the better accommodation of the person or persons standing on the platform.

In Figs. 9 and 10 is shown a detail of a desirable arrangement for regulating the proper raising of the telescoping cylinders. The lower end of each cylinder except the bottom one is stopped by a head 84 having a central orifice 85 therethrough fashioned into a valve seat, said head also having a small lateral flange 86 with vertical grooves 87 at intervals therearound. 88 is a valve correspondingly shaped to the orifice 85 and carried by the radial arms 89, whose upwardly offset ends 90 have a sliding movement in the grooves 87 limited in a downward direction by the T shaped ends 91, and in an upward direction by the seating of the valve. 92 is the gland at the upper end of each of the telescoping cylinders except the top one. Assuming there is no air in the cylinders and it is desired to raise them, the supply valve is operated and as soon as air enters into the lower cylinder, the valve 88 in the second cylinder is forced to its seat thereby cutting off the entrance of air to the other cylinders which raise together all in their inner positions until the second cylinder reaches its extreme outer position, when the T shaped ends of the radial arms abut the underside of the gland 92, thus forcing the valve 88 off its seat and allowing air to enter the second cylinder, after which precisely the same action occurs until the cylinders are all fully out.

93 are four stabilizing cylinders or jacks arranged at separated points beneath the car flooring as shown in the drawings and supplied with air from the tank 2 through pipes 94, 95, 96 and 97, a controlling valve 98 being provided for each cylinder. Each of the cylinders 93 has a plunger 99 extending downwardly through its lower end and a vertically arranged ratchet toothed rack 100 at one side thereof, (see Fig. 11) surrounded by a box 101.

102 is a leg sliding vertically through the box 101 adjacent to the rack 100 and having a corresponding toothed rack 103 adapted to engage the rack 100 at certain times.

104 is a double incline at the back of the box 101, and 105 are blocks abutting the said incline on one side and on the other side abutting the back of the leg 102.

106 is a right and left hand threaded rod extending through correspondingly threaded orifices in the blocks 105 and provided with a handle 107 at one end. On turning the handle 107 the blocks 105 will therefore be drawn together or separated, and on doing so will mount or descend the incline 104 thereby pressing the rack 103 into, or allowing it to fall out of engagement with the rack 100.

In the use of this invention, the vehicle 1 is driven to the place of the fire and backed up as close as possible to the building. The car is now lifted slightly and leveled, by the use of the stabilizing cylinders so that it is perfectly secure from slipping or bouncing on its springs and in order to lock the leveled position of the car, the legs 102 are dropped by simply turning the handles 107, then when the lower ends of said legs contact the ground said handles are turned again to force the rack 103 into engagement with the rack 100 and so lock the leg in its lowered position and nullifying the effect of any leak in the cylinders 93. The valve 50 is now turned to let in a supply of air to the cylinder 44, which has the effect of forcing out its plunger and rod 45, which in turn forces the tower up to the desired angle, which may or may not be perpendicular. The valve 53 is now turned to let in a supply of air to the tower raising cylinders. This has the effect of extending the tower by forcing out the upper cylinders which carry therewith the corner posts 15, that is to say, all above those in the first section. When the tower is raised to the desired

height the guy ropes 77 which previously have been paid from the winch by the knocking out of the ratchet are now tightened by turning the winch handle and winding the ropes onto the reels 74 and 75, the ratchet being placed in position again to prevent unwinding. We now have the full pressure of the air tank forcing the cylinders 25, 27, 29, 31 and 33 outwardly against the restraining pressure of the guy ropes 77, therefore the tower becomes to all intents and purposes a rigid structure incapable of wabbling, and it may here be mentioned that a somewhat similar tightening device, could also be used in connection with the cylinder 44, though it would hardly be necessary, because the tower will not likely be moved over beyond the perpendicular on the far side of the cylinder 44. The turn table is now operated through a movement of the valve handle 70 as hereinbefore explained in the desired direction, and now everything is ready for the use of the elevator. One of the firemen now takes his place on the platform 36 and grasps the handle 59 turning it in the desired direction to allow air to enter from the tank 2 through the pipes 57 and 55 into the series of elevator cylinders 34. The cylinders become at once extended or blown outwardly and carry up the platform 36, which may be stopped at any desired height by simply turning the handle again and shutting off the air supply, say for example, that the elevator is stopped in front of a high window where a person is desired to escape, that person simply steps on the platform along with the fireman, and both descend on the platform by simply turning the handle 59 to allow the air to escape from the cylinders 34. In order to assist in demounting from the platform 36, a ladder 108 may be provided, having hooked upper ends 109 fitting corresponding holes in the platform 36, or the said ladder may be supported from the tubes of the lower tower section. It will now be seen that the tower can be raised to any angle, rotated in any direction, and extended to any height desired, in a very short time, while the elevator can be very speedily run up and down for life saving purposes, the whole thing being exceedingly simple to operate.

The winch 73 may be driven by power also from the tank 2 if desired.

It will be obvious that many of the details of this improved tower may be changed without departing from the invention as claimed in the following claims for novelty.

What I claim as my invention is:

1. In a tower for fire fighting purposes, an extensible frame formed of telescoping sections, telescoping rods rigidly carried by said frame and extensible therewith and forming tracks, an elevator engaging said tracks and adapted to run up and down said frame, runners on said elevator embracing said tracks, means for raising and lowering said frame and tracks and separate means for raising and lowering said elevator.

2. In a tower for fire fighting purposes, an extensible frame having extensible tracks at one side thereof, said frame being formed of a number of telescoping sections, each having a pair of tracks rigid therewith and adapted to telescope with the tracks of the adjacent section, a telescopic fluid cylinder parallelly arranged within said frame sections for extending purposes, an elevator adapted to run up and down said tracks, runners on said elevator embracing said tracks to prevent lateral movement of the elevator in relation to the extensible frame, a second telescopic cylinder arranged between said tracks for raising and lowering the elevator and means for supplying fluid to said cylinders.

3. In a tower for fire fighting purposes, a telescoping air cylinder suitably supported, an extensible frame comprising a plurality of sections each of which comprises four corner posts suitably braced together and to one of the cylinder sections centrally disposed therebetween, said sections having all one open side and the posts and cylinders of each consecutive section telescoping into the posts and cylinder of the section therebelow, a pair of tracks formed of telescoping sections carried one by each of the corner posts at the open side and whose sections correspond to the sections of the frame, an elevator in the form of a platform fitting said open side of the frame and having means for engaging said tracks, a second air cylinder adapted to raise and lower said platform up and down said tracks and means for supplying fluid to said cylinder.

4. In a tower for fire fighting purposes, a vehicle, an extensible tower flexibly secured at its lower end to said vehicle, a platform adapted to travel up and down said tower, means for guiding said platform in its movement up and down the tower, means for tilting the floor of said platform, means for extending and collapsing said tower and means for raising and lowering said platform.

Signed at the city of Montreal, Canada, this 22nd day of January 1913.

LUDGER L'HEUREUX.

Witnesses:
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CHAS. ISAACS.