

(No Model.)

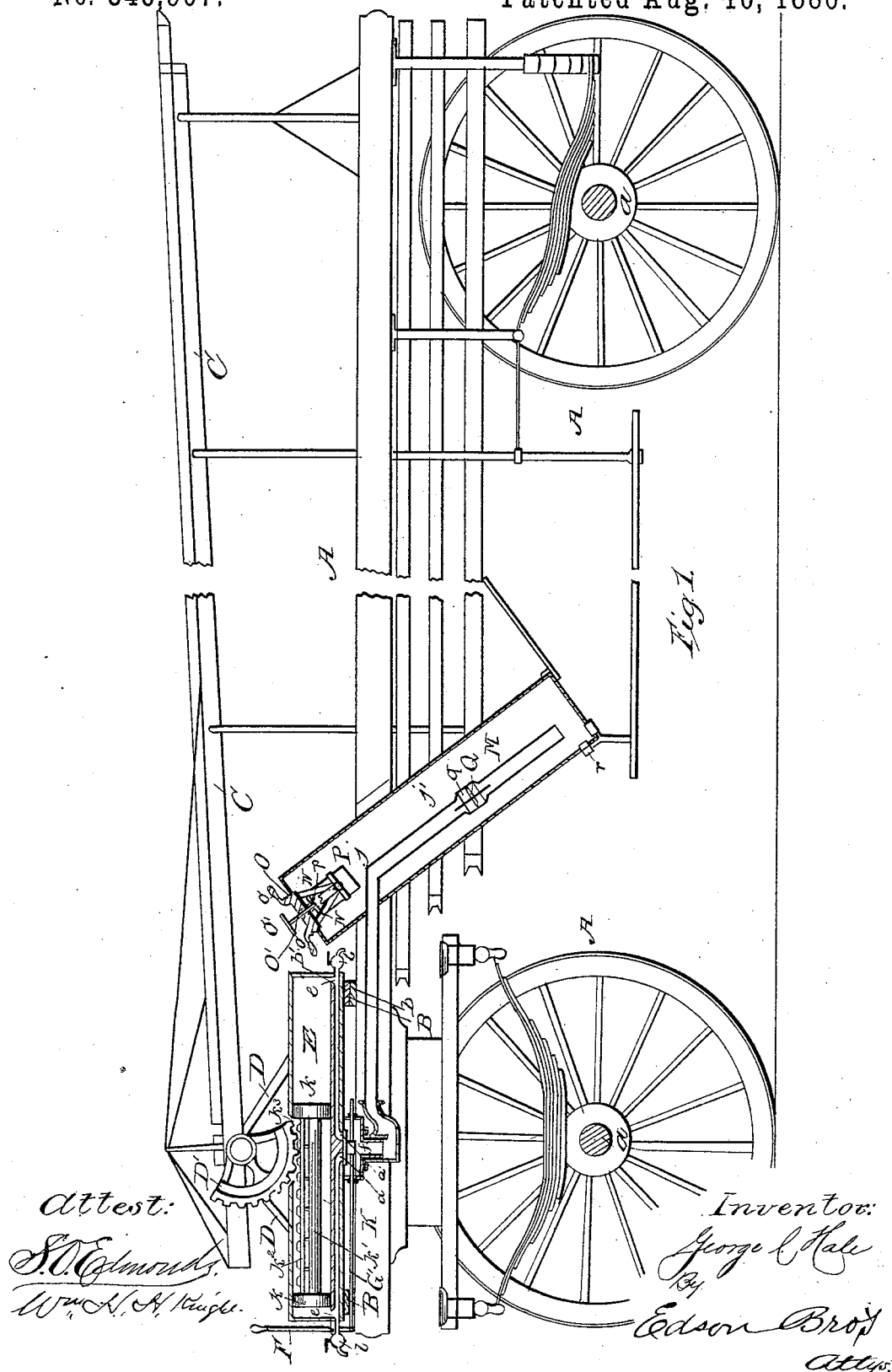
2 Sheets—Sheet 1.

G. C. HALE.

FIRE ESCAPE.

No. 346,907.

Patented Aug. 10, 1886.



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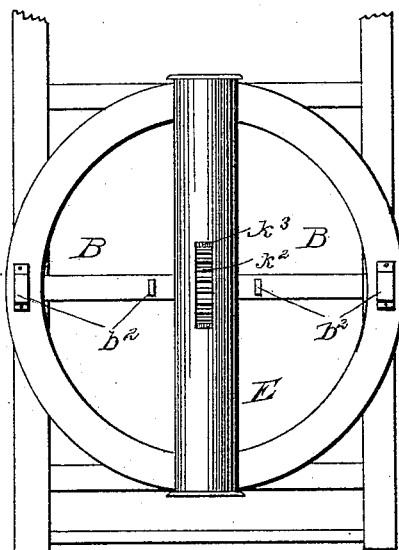


Fig. 2.

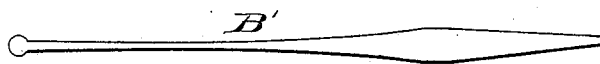


Fig. 3.

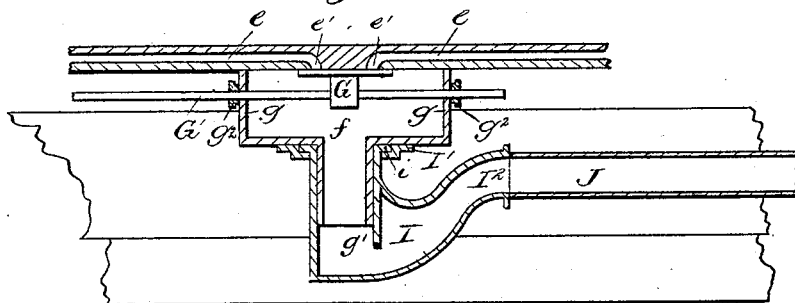


Fig. 4.

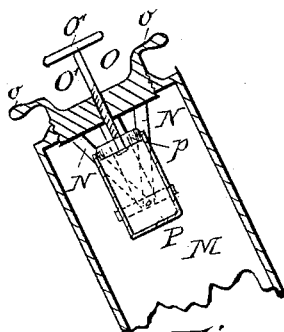


Fig. 5.

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# UNITED STATES PATENT OFFICE.

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## FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 346,907, dated August 10, 1886.

Application filed March 2, 1886. Serial No. 193,784. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE C. HALE, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Fire-Escapes, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in hook-and-ladder trucks; and it consists of the peculiar and novel construction and combination of parts, substantially as hereinafter fully set forth, and specifically pointed out in the claims.

The primary object of my invention is to provide means whereby a ladder can be elevated or adjusted to the proper required position within a very short time and without requiring the efforts or labor of the firemen in its elevation.

I propose to provide the truck with a reservoir wherein are placed certain chemical agents, which upon being set free enter into combination and exert great pressure on a movable piston carrying a rack which meshes with and rotates a toothed quadrant rigidly secured to the base or pivoted end of the ladder to be elevated, all as will be more fully described.

The apparatus is under immediate control of the attendant. The water-supply and the pressure thereof on the piston can be regulated and controlled, the valve-chamber is so disposed as to provide or form the pivot of the turn-table on which the ladder and the cylinder and its piston are mounted, and the receptacle containing one of the chemicals is easily and quickly operated to discharge its contents when required.

In the accompanying drawings, Figure 1 is a sectional elevation through a hook-and-ladder truck having my invention applied thereto. Fig. 2 is a detached detail view, in plan, of the pressure-cylinder and the turn-table, together with a part of the truck-body. Fig. 3 is a view of the handle-lever. Fig. 4 is an enlarged sectional view through the valve-chamber and a portion of the supply-pipe and the pressure-cylinder, and Fig. 5 is a sectional view through the upper portion of the reservoir.

Referring to the drawings, in which like letters of reference indicate corresponding parts in all the figures, A designates the body of the truck, of any common well-known form, which is supported on the axles *a*, having the carrying-wheels.

B designates the turn-table, which is of the usual class, and is secured upon the truck A at the forward end thereof. As shown herein, the turn-table comprises the two disks or wheels *b b'*, which are suitably connected to the truck and to one another, so that the upper disk or wheel, *b'*, is free to rotate in a horizontal plane to adjust a ladder, C, mounted thereon, to any desired point, the disk or wheel *b'* of the turn-table being adjusted, together with its ladder, after the elevation of the latter has been accomplished. The upper disk or wheel, *b'*, is provided with loops *b<sup>2</sup>*, as seen more clearly in Fig. 2, which loops are adapted to receive the tapered and enlarged end of a handle-lever, *B'*, (shown in detail in Fig. 3 of the drawings,) whereby the disk *b'* and the ladder mounted thereon can be conveniently adjusted by hand.

The ladder C is of the common form, and at or near one end it is provided with trunnions, which are journaled in standards or brackets D, that support the ladder when it is elevated, and these standards are secured on and carried by the rotatable disk or wheel *b'* of the turn-table B. The lower pivoted end of the ladder has a segment, *D'*, rigidly and permanently affixed or secured thereto, and the periphery of this segment is provided with a series of teeth or cogs, which mesh with and are actuated by a rack on a movable or reciprocating piston, presently described.

E designates the cylinder, which is rigidly secured to and carried by the rotatable disk, *b'*, and this cylinder is provided on its lower or under surface with the inlet-ports *e*, which open into the chamber of the same at opposite ends or heads, and communicate with the valve-chamber *f* at points in the cylinder-shell which are arranged but a short distance apart, *a a'*, so that they can be covered or shut off by a single valve, G. The valve-shell *g* is bolted or otherwise suitably secured to the hydraulic or pressure cylinder, and it has a depending nozzle or induction-port, *g'*, which fits within and is to

turn or rotate in a water-jacket, I, that is permanently secured to the truck-body A, this water-jacket having a lateral flange, *i*, at its upper edge, which is fitted or seated in a recessed portion or edge of a plate, I', bolted to the valve-chamber. The turn-table is thus free to rotate on a horizontal plane without disturbing the water-jacket I, and a suitable packing may be provided between said jacket and the valve-case, so as to obviate the danger of leakage, &c.

The water-jacket has a nozzle or contracted throat, I<sup>2</sup>, to which is suitably connected one end of a supply-pipe, J, which is supported on the truck-body by any preferable means, one end of said supply-pipe being bent or curved, as at *j*, to provide an angular section, *j'*, which is arranged longitudinally within the reservoir in which the gas is generated for actuating the piston K. The piston K is arranged within the hydraulic or pressure cylinder E, and has the two heads *k*, closely fitting the interior diameter of the cylinder, and a rod, *k'*, connecting the piston-heads. The rod carries a toothed bar or rack, *k*<sup>2</sup>, and with the same meshes the toothed segment of the pivoted ladder, the segment being projected into the cylinder through a longitudinal slot, *k*<sup>3</sup>, therein, so that it can mesh with the rack. The cylinder is provided with the draw-off cocks *l* in its heads, whereby it can be emptied of its contents to reduce the pressure on the piston and lower the ladder.

The valve G is mounted on a rod or stem, G', that extends through proper stuffing-boxes, *g*<sup>2</sup>, in the heads of the valve-case, and is thus supported in proper position, and to one end of the valve-rod is pivotally connected one end of a lever, F, that is arranged at the front end of the truck-body and pivoted to a lug or other proper support on one of the cylinder-heads.

M designates the reservoir in which the gas for actuating the piston is generated. This reservoir is arranged in an inclined position on the truck-body, to which it is secured in any suitable manner, and at its upper end it is provided with the depending arms or supports N and a removable cap or cover, O, having the handles *o* for its proper and easy manipulation. A receptacle, P, is pivoted below its center, or eccentrically, in the lower ends of the supports or arms N, so that when the cover *p* thereof is removed the receptacle will of itself assume an inverted position and empty the acid contained therein into the reservoir M. The cover *p* and the acid-receptacle P are made of glass, to resist the action of the acid contained therein, and the cover is mounted on the lower end of a threaded rod, O', which works in a similarly-threaded opening in the removable cover *o*, and is provided with a hand-wheel or other suitable handle, *o'*, for its convenient manipulation.

The removable cover *o* can be easily detached to permit the bicarbonate of soda to be placed in the reservoir or tank M, or to renew the supply of sulphuric acid in the pivoted

receptacle P, so that the apparatus is always ready for instant use. By turning the threaded rod *o'* in the proper direction the cover *p* will be withdrawn from the acid-receptacle, so that the latter will invert itself and empty the contents into the reservoir or tank.

The lower end of the supply-pipe terminates a short distance from the lower head of the reservoir, and said pipe has a valve-seat, *q*, therein, on which normally rests a check-valve, Q, to prevent the substance in the pressure-cylinder or upper end of the pipe from flowing back into the reservoir or tank, the lower end of which is provided with a nozzle, *r*, by means of which a hose or other suitable connection can supply the reservoir or tank with water.

The operation of my invention is as follows: The sulphuric acid having been first placed in the receptacle, bicarbonate of soda and water are introduced into the reservoir or tank to adapt the apparatus for immediate use. When the ladder is to be elevated, the rod *o'* is turned to withdraw the cover *p* from the receptacle P, which will then assume an inverted position and discharge or empty the sulphuric acid into the water and bicarbonate of soda. These ingredients will enter into chemical combination and evolve a carbonic-acid gas, which will flow through the supply-pipe, the water, and valve-chambers, and thence to the cylinder, and force the piston in the proper direction to cause the rack to rotate the toothed segment and elevate the ladder C to the proper position, the valve G having been first adjusted to open one of the ports *e' e* by manipulating the pivoted lever F. Water is supplied in sufficient quantity and pressure to the cylinder to hold the piston and ladder in their proper position after the carbonic-acid gas has spent itself through the nozzle *r* of the reservoir or tank M. The piston-heads *k* of the piston do not move a distance sufficient to enable them to pass the slot *k*<sup>3</sup> in the cylinder, and thus permit the escape of the water. The ladder can be turned to any convenient position without disturbing the water-supply by means of the lever B' and the horizontally-rotatable turn-table, and the ladder can be lowered by merely opening one of the escape-cocks *l* therein, which may be provided with a conducting-pipe, to permit the water to escape and release the pressure on the piston.

From the foregoing description, taken in connection with the drawings, it will be observed that I provide a simple apparatus for raising a ladder in a minimum of time, and without requiring the labor of a fireman or other attendant.

The operations or adjustments necessary to set the apparatus in use can be performed or executed within a minute's notice, and the gas in sufficient volume and pressure will be generated within a short time. The devices for controlling the adjustments are all within easy and convenient reach and under immediate

control of an attendant seated or standing at one end of the truck-body.

I do not desire to limit myself to the details of construction and form and proportions of parts herein shown and described as an embodiment of my invention, as I am aware that many changes therein can be made without departing from the spirit or sacrificing the advantages of my invention.

10 Water-towers, fire-escapes, and stand-pipes or mains can be elevated in lieu of the ladder, and the ladder can be made in extensible sections and carry life-baskets, cars, or nets at its upper end to aid in the escape of persons from  
15 a burning building.

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

1. The combination, with a truck, of a gas-generator, a cylinder having a piston, connections intermediate of the generator and cylinder, a ladder, and mechanism actuated by the piston for elevating the ladder, substantially as described.

25 2. The combination, with a truck, of a gas-generator having a source of water-supply, a cylinder having a piston, a supply-pipe to the cylinder, a valve, a ladder, and means for elevating the same actuated by the piston, substantially as described.

30 3. The combination of a truck, a turn-table supported thereon, a ladder mounted on the table, a cylinder having a piston and carried by the turn-table, a gas-generator, and a supply-pipe intermediate of the cylinder and generator, substantially as described.

4. The combination, with a truck, of a turn-table carrying a pivoted ladder, a cylinder mounted on the truck and provided with a  
40 piston, means intermediate of the piston and ladder of elevating the latter when the piston is operated, a regulating-valve carried by the cylinder, a gas-generator, and a supply-pipe, substantially as described.

45 5. The combination, with a truck, of a turn-

table carrying a pivoted ladder, a cylinder having a piston, a water-jacket rigidly secured to the truck-body, a valve-chest carried by the cylinder and having an extension loosely mounted in the water-jacket, a supply-pipe to  
50 the jacket, and a gas-generator, substantially as described.

6. The combination of a slotted cylinder, a piston therein having a rack, and a pivoted ladder having a toothed segment meshing with  
55 the rack, substantially as described.

7. The combination of a truck, a water-jacket having an annular flange, a plate on which the flange is seated and secured to the truck, a turn-table carrying a cylinder, and a  
60 valve-chest secured on the cylinder and loosely fitted in the water-jacket, substantially as described.

8. The combination of a generator tank or reservoir, a removable cover thereto provided  
65 with a screw-threaded perforation, supports or arms, an acid-receptacle eccentrically pivoted in said supports or arms, and a cover to the receptacle connected to the lower end of a screw-threaded rod, which is adapted to be  
70 screwed up and down through the screw-threaded aperture in tank-cover, substantially as and for the purpose set forth.

9. The combination of a truck, a gas-generator having a reversible acid-receptacle and a  
75 supply-nozzle, a slotted cylinder having draw-off cocks, a piston having a rack, a pivoted ladder carrying a toothed segment, a valve-chest carried by the cylinder, a valve-rod having a valve, and a pivoted lever, a water-jacket,  
80 with which the valve-chest communicates, and a supply-pipe entering the gas-generator and having a check-valve, substantially as described.

In testimony whereof I affix my signature in  
85 presence of two witnesses.

GEORGE C. HALE.

Witnesses:

D. P. HUNTER,

A. VAN PATTEN.