

No. 754,282.

PATENTED MAR. 8, 1904.

E. F. DAHILL & J. R. GODDARD.
MACHINE FOR RAISING OR LOWERING LADDERS.

APPLICATION FILED OCT. 20, 1902.

NO MODEL.

2 SHEETS--SHEET 2.

Fig. 3.

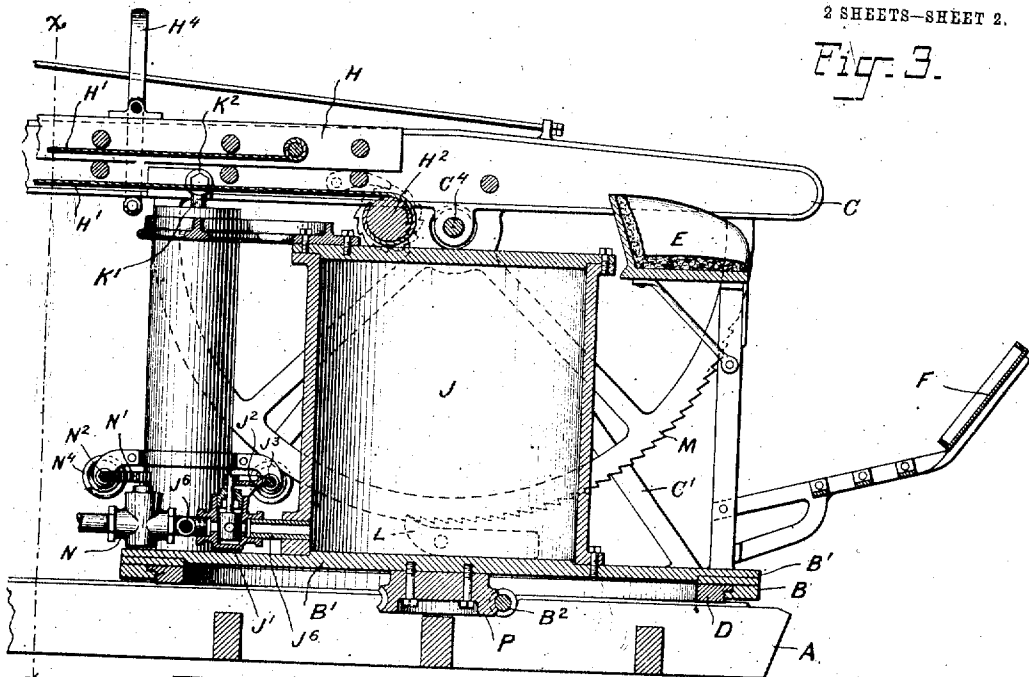


Fig. 5

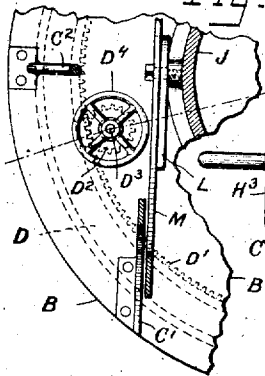
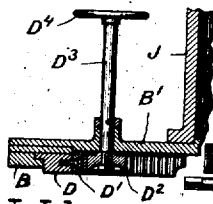


Fig. 6.



Witnesses.

John F. Nelson.
Jas. D. D. D.

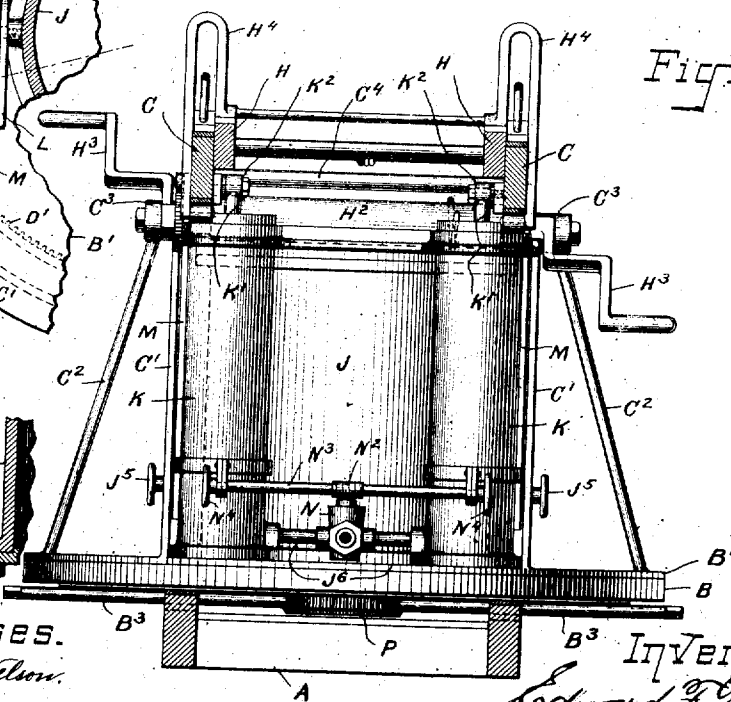


Fig-4.

Inventors,

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UNITED STATES PATENT OFFICE.

EDWARD F. DAHILL AND JAMES R. GODDARD, OF NEW BEDFORD,
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MACHINE FOR RAISING OR LOWERING LADDERS.

SPECIFICATION forming part of Letters Patent No. 754,282, dated March 8, 1904.

Application filed October 20, 1902. Serial No. 123,033. (No model.)

To all whom it may concern:

Be it known that we, EDWARD F. DAHILL and JAMES R. GODDARD, citizens of the United States, residing in New Bedford, county of Bristol, and Commonwealth of Massachusetts, have invented new and useful Improvements in Machines for Raising or Lowering Ladders Automatically, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to improvements in the means of raising and lowering a ladder from and to a horizontal or a substantially vertical position, as required, by compressed air or an equivalent gas under compression and mechanism whereby the ladder when raised may be swung into the desired position.

The objects of these improvements are, first, the facility and speed with which a ladder may be raised in comparison with the system now in use; second, to obviate the necessity of removing horses from the truck or the driver dismounting; third, to provide an effective and positive means of swinging the ladder in position; fourth, the ability to lower the ladder quickly or otherwise; fifth, to make it possible and practicable for one man to raise, lower, and place a ladder in the required position, whereas at present a force of from four to eight men is necessary, but not always available, thereby causing a waste of valuable time, which is frequently fatal to those whose rescue is desired. We attain these objects by the means and mechanism illustrated in the drawings, in which—

Figure 1 represents a plan view of the forward end of an aerial ladder and truck. Fig. 2 is a side elevation having parts broken away and showing one operating-cylinder in section. Fig. 3 is a vertical longitudinal section through the center of Fig. 1. Fig. 4 is a cross-section of Fig. 3 on line *xx*, showing rear view of cylinders and operating mechanism. Figs. 5 and 6 are detail views illustrating a modified form of turning mechanism.

In the drawings, A represents the truck-frame; B, the turn-table, on which is mounted

the ladder C. These mountings are shown as consisting of the inverted-V-shaped supports C' and the braces C'', having at their apex the bearings C'', in which the shaft C', which forms the pivot of the ladder C, is mounted.

D is a circular plate which acts as a pivotal bearing and support for the turn-table B and is firmly secured to the truck-frame A.

The seat E, foot-rest F, step G, and extension-ladder H, with its rope H', drum H'', cranks H'', and guides H', form no part of this invention, which consists simply of applying to the ordinary ladder-truck the apparatus, which will be presently described, for elevating, lowering, and turning of the ladder to the required position, all of which may be accomplished by one operator in a fractional portion of the time required by the present system, which necessitates the removal of horses and parts of the truck interfering with the operating of the raising and lowering devices, as well as delay in securing men required and the slow action of said devices, all of which occupy several minutes, whereas by the use of this invention the ladder may be raised in a few seconds and lowered as rapidly or leisurely as desired.

In the sectional view Fig. 3 the turn-table B is shown as having secured upon it the plate B', which for convenience of illustration forms the bottom of storage-tank J and the two operating-cylinders K, severally located beneath each side of the ladder C at a point in the rear of the fulcrum most effective for the operation of raising and lowering said ladder through their connection therewith of the piston-rods K', which are pivoted at one end to the ladder C at K'', their other ends being pivoted in the pistons K.

While it is preferable to use two operating-cylinders, we do not confine ourselves to the number, which it is obvious may be more or less, to accomplish the result.

Compressed air or its equivalent having been previously stored in the tank J, the valve J' (preferably controlled by means of worm-segment J'' engaging with worm J''' on shaft J'', having hand-wheels J'' at either end for con-

venience) is opened and allows the compressed air to pass through the pipes J⁶ into the cylinders K under the pistons K³, forcing them upward and through their piston-rods K⁴ causing the ladder to assume the desired elevation, as shown by short dotted lines, Fig. 2, in which position the ladder is maintained by the engaging of the pawl L in the toothed segment M, secured to and swinging with the ladder. Valve N, having its segment N', worm N² on shaft N³, with hand-wheels N⁴, serves to release the air in the operating-cylinders K as gradually as is desirable in lowering the ladder, valve J having been closed and pawl L thrown and held out of engagement with toothed segment M. The ladder when down is supported, as is well known, by brackets along its length mounted upon the truck-frame, but not shown. It is obvious that with a sufficient amount of compressed air this operation may be repeated any number of times, limited only to the amount of air-pressure and the size of the storage-tank. The turning of the ladder after being raised may be effected by the engagement of the worm-wheel P, centrally secured to the turn-table plate B', with the worm B² upon shaft B³, which is provided with square ends for cranks or hand-wheels, as desired, but not shown. In this case, however, it may be more convenient to operate the turn-table by means shown in detail plan, Fig. 5, and vertical section, Fig. 6, which consist of an internal gear D', secured to the fixed plate D, engaging with the pinion D², having its shaft D³ mounted in turn-table plate B' and operated by its hand-wheel D⁴. Thus it will be seen that each operation may be accomplished by one individual without having to move from his position upon the turn-table B.

We are aware that prior to our invention ladder raising and lowering devices have been made operated by gas or equivalent. We therefore do not claim such broadly.

What we claim, and desire to secure by Letters Patent, is—

1. In a fire apparatus, the combination of a truck, a turn-table on the truck, a ladder pivotally mounted on the turn-table, a tank or holder for fluid under pressure mounted on the turn-table beneath the horizontal axis about which the ladder swings, two vertical cylinders mounted on the turn-table directly beneath the side bars of the ladder when lowered, pistons fitted in said cylinders, two rods each pivotally connected at one end to one of the pistons and having its other end pivotally connected to the adjacent side bar of the ladder, a valved conduit connecting said tank with the cylinders below the pistons therein, and means for controlling the escape of fluid from the cylinders.

2. In a fire apparatus, the combination of a truck, a turn-table on the truck, a ladder pivotally mounted on the truck, a tank or holder on the turn-table, beneath the horizontal axis about which the ladder swings for holding fluid under pressure, a vertically-arranged cylinder on the turn-table beneath each of the side bars of the ladder, pistons in said cylinders, rods pivotally connected at their lower ends to said pistons and at their upper ends to the side bars of the ladder, a conduit connecting said cylinders below the pistons therein with the tank, a valve in said conduit, a shaft geared to said valve and extending beyond the sides of the ladder, a valve for regulating the escape of fluid from the cylinders, and a supplemental holding device for maintaining the ladder at any desired inclination.

In testimony whereof we have signed our names in the presence of two witnesses.

EDWARD F. DAHILL.
JAMES R. GODDARD.

Witnesses:

JAS. N. DORAN,
EDWARD F. BANNON.