M. P. HIGGINS.

HYDRAULIC ELEVATOR.

No. 181,263. Patented Aug. 22, 1876.

Fig 4

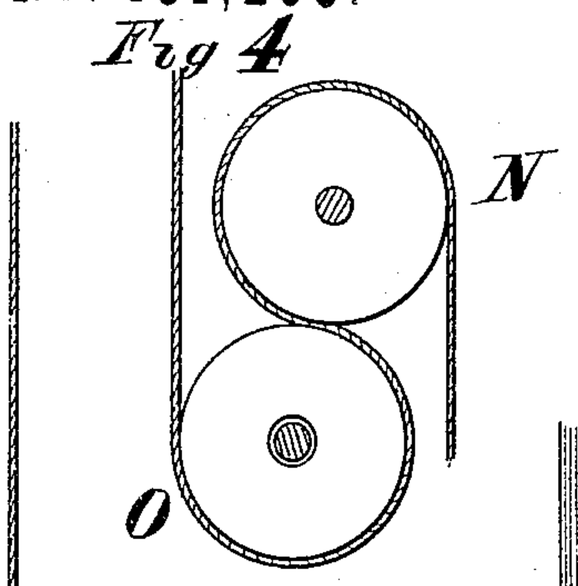
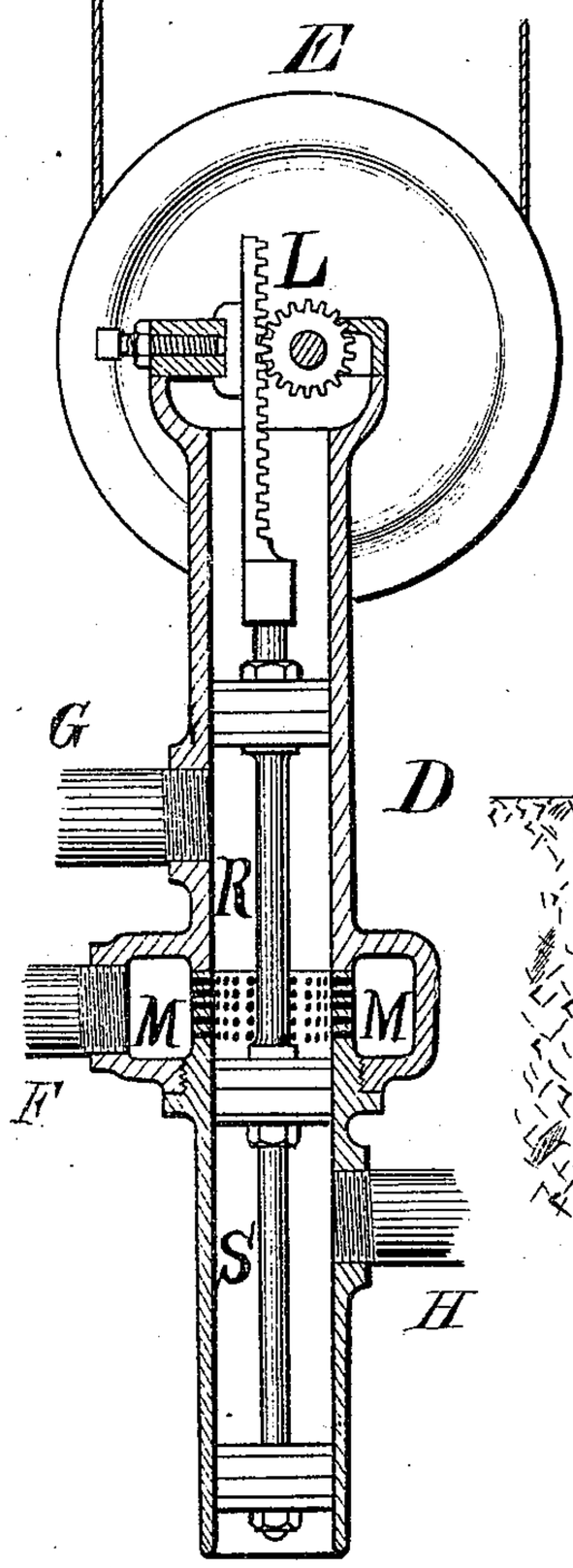


Fig. 3.



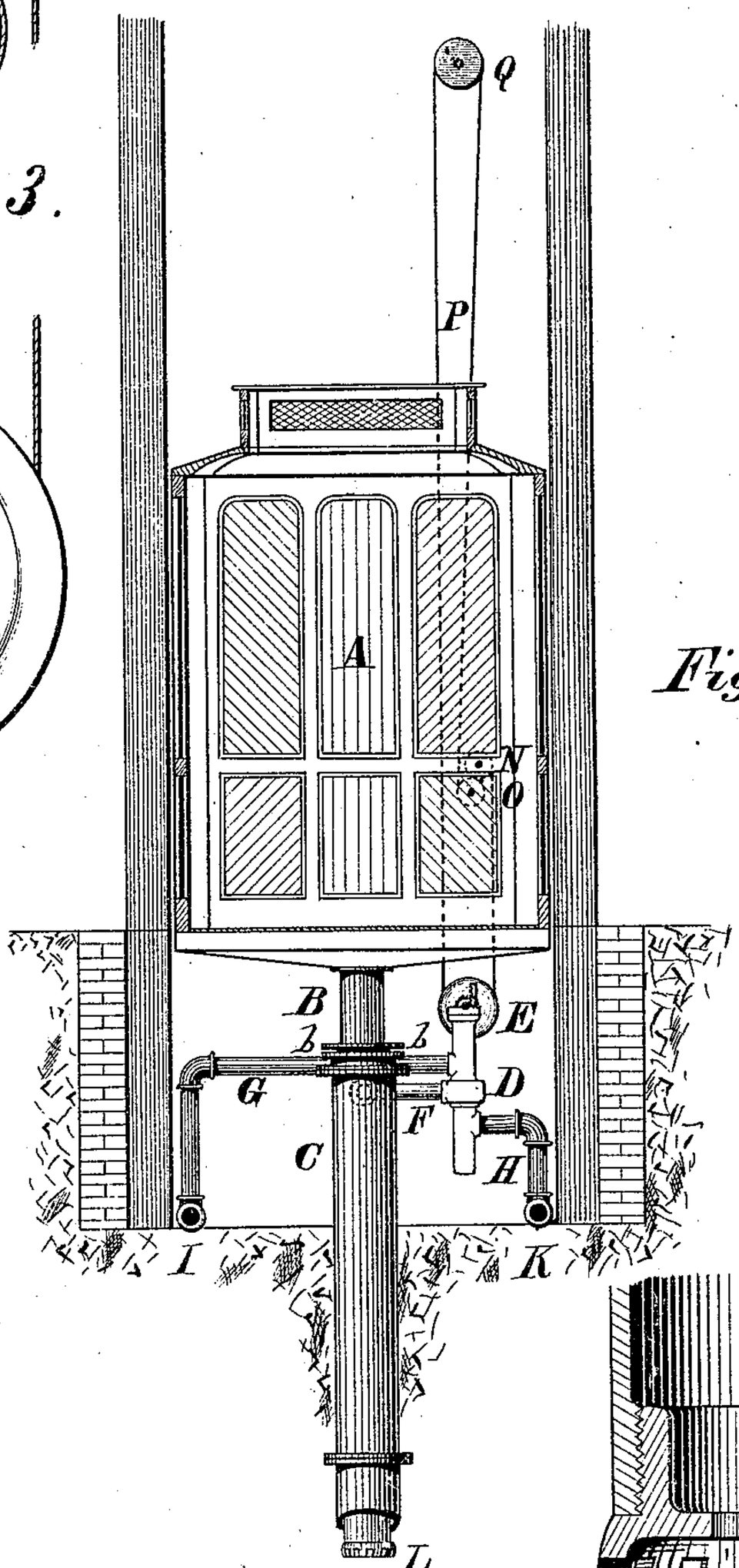
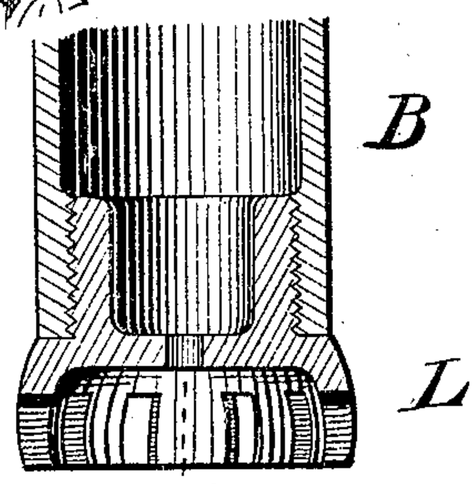


Fig. 1.

Fig. 2.



Witnesses;

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UNITED STATES PATENT OFFICE.

MILTON P. HIGGINS, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN HYDRAULIC ELEVATORS.

Specification forming part of Letters Patent No. **181,263**, dated August 22, 1876; application filed June 7, 1876.

To all whom it may concern:

Be it known that I, MILTON P. HIGGINS, of the city and county of Worcester, State of Massachusetts, have invented an Improved Hydraulic Elevator, of which the following is the specification:

The objects of my invention are, first, to utilize, for operating freight or passenger elevators, the power derived from the difference in the hydraulic pressure between the high and low service-pipes in city supplies, whereby there is no waste or consumption of water—*i. e.*, the water is taken from the high service-pipes, using the power derived therefrom; it is then discharged by forcing it into the low service-pipes, from which it is available for use; second, to provide a ready and convenient means for efficiently operating the action of the valve; third, by a peculiar construction of the operating parts of the valve or valves, to give to the operator complete control of the car, and insure an easy, uniform motion to the elevator when the water is let on or shut off; fourth, by a peculiar construction of the valve, to obtain a perforated water-port, so the cup-leathers will pass it smoothly.

These objects are obtained by the combination of any suitable form of hydraulic elevator and the two city service-pipes I and K, K having a hydraulic head less than I, and the valve D, or its equivalent, as shown in the drawing, Fig. 1. In this case I have shown the form of elevator known as the direct-acting hydraulic elevator.

A is an ordinary passenger or freight car. C is the water-cylinder, terminating with a cone, M, at its lower extremity, to facilitate the sinking of the cylinder into the earth to a depth equal to the height the elevator is to run. The plunger B is finished cylindrical its entire length, and passes through a hydraulic packing at *b*. The cylinder-pipe being considerably larger in diameter than the plunger leaves a free passage for the water down the annular space around the plunger, which plunger is raised with a force due to its area into the water-pressure at the packing *b*. G is the pipe conducting the water from the high service-pipe I to the valve D, and when the valve is in a certain position the water has free passage into the valve, through the valve, and to the cylinder through the pipe F. The elevator is consequently forced upward until the valve is so changed as to shut off the ingress of the high service-water, when the elevator remains fixed until a further change is made in the position of the valve which opens the passage through the pipe H into the low service-pipe K. The weight of the car and plunger is sufficient to cause it to run down against this low pressure, and thus force the water out of the cylinder into the low service-pipe K, thus using the power derived from the difference of pressure in the two service-pipes, and returning the water into the low-pressure service without waste or deterioration. The construction of the lower end of the plunger is shown in Fig. 2. L is a plug screwed into the pipe B, having a passage, R, to admit water into the plunger. This plug has portions projecting somewhat outside of the plunger, so that its finished surface may not come in contact with the inside of the water-cylinder.

My improved means of operating the valve is shown in Fig. 1, and in detail in Figs. 3 and 4. The valve has a vertical motion in the valve-cylinder D by means of the rack on the valve-stem, operated by the pinion on the axle of the wheel E. A flexible cord passing around the wheel E passes around two pulleys, N O, as shown in Figs. 1 and 4. These pulleys are attached to the outside of the car, the pulley O having a slight lateral motion on its axle, so that when the tension comes on the cord the pulleys are drawn together, and the cord is somewhat pressed between them. The axle of the pulley N passes through the side of the car, and carries a hand-wheel on the inside of the car, by which the pulleys N O are operated, and the flexible cord moved in either direction, at the will of the operator.

I am aware that a method for controlling the motion of the car by an endless cord has been in use; but in all cases, so far as I know, a single pulley has been used at N, and in consequence of this it has been impossible to run the flexible cord without so much crowding and chafing as to make it very objectionable, particularly in view of the tension necessary to keep it in working condition.

My improved valve is shown in section in

Fig. 3. It consists of a cylinder and a piston-rod with three heads, with cup-leather packings. The upper and lower heads are employed in order that the valve may always be exactly balanced, whatever the pressure may be through the pipes G and H. Thus far the construction of the valve is well known; but, so far as I know, the method shown for giving the slow motion to the moving parts of the valve, as shown at L, and the peculiar construction with reference to the perforated port at M, has never been used—perforated ports generally being made by inserting a lining into the valve-cylinder. In my valve the cylinder consists of two pieces of metal put together by inserting one piece, S, (previously perforated,) into the bell-shaped end of the other, R, thus making a continuous cylinder, with perforated port, without the expense of a lining in the valve-cylinder, as shown in the drawing at M. As the water comes in through the pipe G it passes through the small perforations outward into the annular space M, which entirely surrounds the perforated partition and passes out the pipe F.

I claim as my invention—

1. The combination, substantially as described, of a hydraulic elevator, with two services of different heads or pressures, and the valve D, or its equivalent, as and for the purposes set forth.

2. In a hydraulic elevator, substantially as described, the combination of the flexible cord and two or more pulleys, N O, and the valve-gear E, when combined and operated in the manner as and for the purposes described.

3. A water-valve having a perforated port, constructed as and for the purposes described, consisting of a cylinder of two parts, R and S, S having a perforated portion inserted into the bell mouth or enlarged part of the other, R, as above set forth.

M. P. HIGGINS.

Witnesses:

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