2 Sheets—Sheet 1.

E. H. HUNT.

HYDRAULIC ELEVATOR.

No. 187,710. Patented Feb. 27, 1877.

Fig. 1

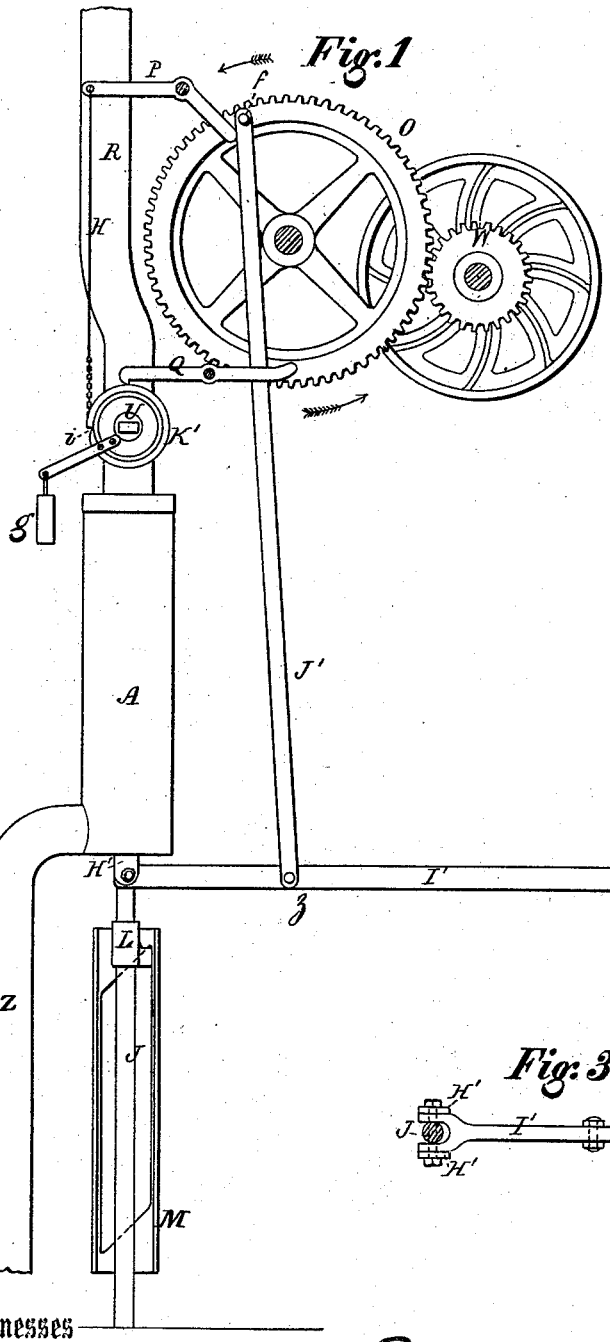


Fig. 2

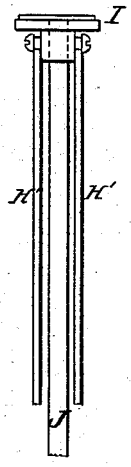
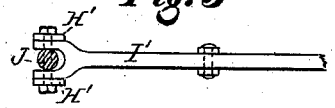


Fig. 3



Witnesses

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2 Sheets—Sheet 2.

E. H. HUNT.

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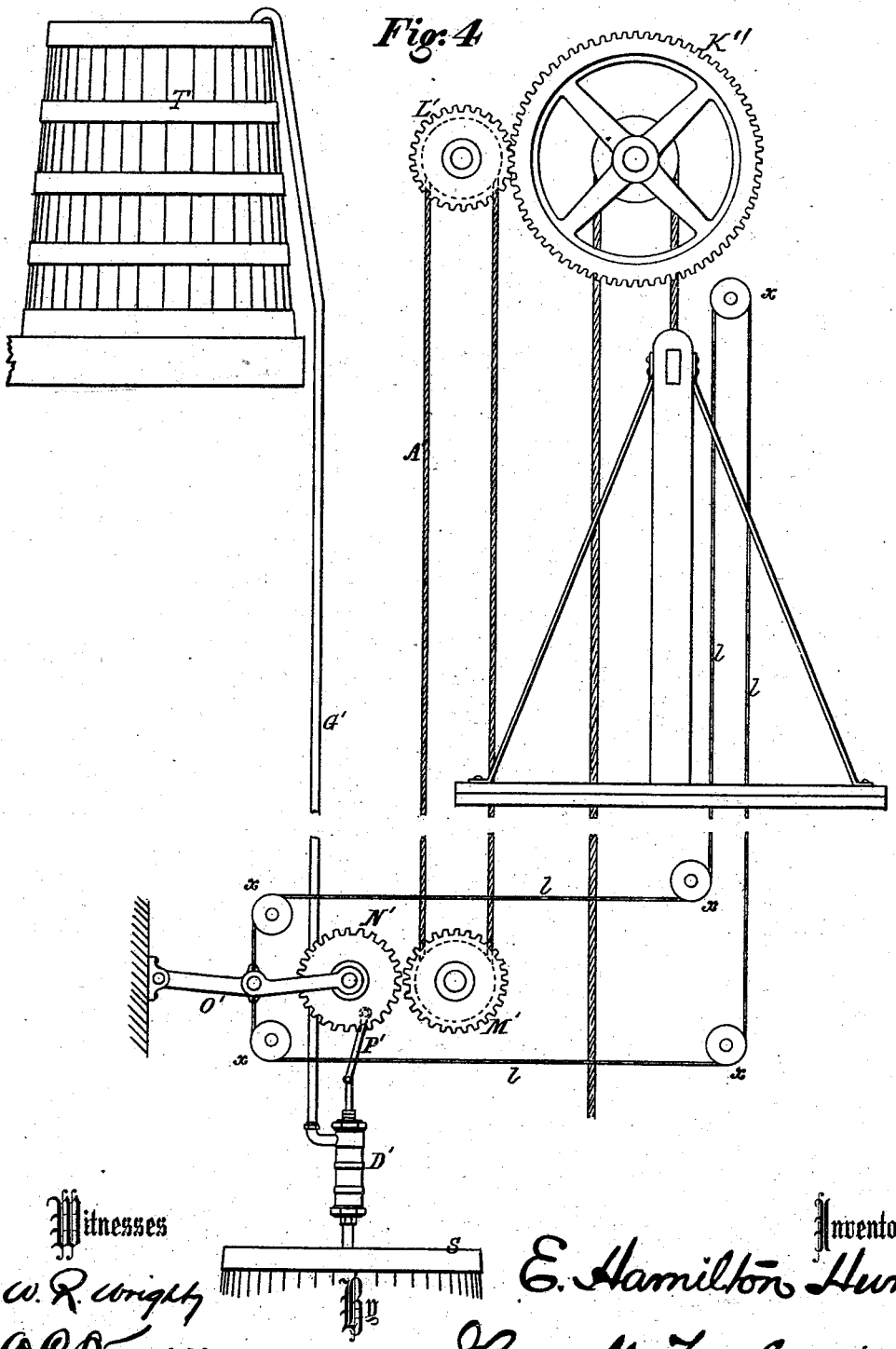
Fig: 4



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UNITED STATES PATENT OFFICE.

E. HAMILTON HUNT, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN HYDRAULIC ELEVATORS.

Specification forming part of Letters Patent No. **187,710**, dated February 27, 1877; application filed June 16, 1876.

To all whom it may concern:

Be it known that I, E. HAMILTON HUNT, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hydraulic Elevators, of which I hereby declare the following to be a full, clear, and precise description, reference being had to the accompanying drawings, which form part of the same.

This invention relates to certain improved apparatus for utilizing the weight and descending force of a column of water to raise an elevator, for which I have applied for Letters Patent of the United States; and consists in a modified structure of the driving mechanism and of the device for operating the force-pumps.

Of the drawings, Figure 1 is a side elevation of the cylinder, driving-gear, and connections; Fig. 2, a side view of the swinging piston-rods; Fig. 3, a plan of the balance-bar, with the piston-rod in section; and Fig. 4, a side elevation of the gearing and attachments for operating the force-pumps.

Similar letters of reference indicate corresponding parts wherever used.

With reference to the first three figures of the drawing, the following is the construction of my invention.

A is the cylinder; R, the water-supply pipe; U, a cock or valve in the same, the shaft of which passes through the pipe and is provided with a grooved wheel, K′, notched upon its periphery at *i*, and carrying a weight, *g*, upon the end of an arm secured to it. J is the piston-rod, extending down through the camway M, which is placed below the cylinder in this form. L is the arm upon the piston-rod which passes through the slotted portion of the camway. O is the main driving-gear, engaging, as before, with a smaller gear, W, upon the shaft which drives the hoisting-drum. P is a trip-lever, one extremity of which is in the path, as before, of the pivot-pin *f* of the crank. The other extremity is connected by the cord H to the valve-pulley K′. Q is a hook trip-lever, so adjusted that its hooked portion will fall into and engage with the notch in the valve-pulley, to prevent its rotation while the other extremity is in the path of the pin *f*. J′ is the connecting-rod pivoted to the balance-bar at *z*. I′ is the balance-bar, fulcrumed at *j* and counterbalanced by a weight, *k*, at one extremity, while at its other it is pivoted to the swinging bars H′ H′, which are trunnioned to the pistons, as shown in Figs. 2 and 3. I is the piston, constructed with a valve-plate and head-plate, as before.

Such being the construction of the driving mechanism, with reference to Fig. 4, the following is the construction of the device for operating the force-pumps. K″ is a large toothed wheel upon the shaft of the lifting-drum of the platform, which gears with a pinion, L′, upon whose shaft is set a grooved pulley. M′ is a similar pinion located below, and provided with a similar grooved pulley. A′ is an endless rope, or its equivalent, passing over the aforesaid grooved wheels, and operating to transmit the rotation imparted to it by the large wheel K″. N is a pinion similar to M, controlled by a toggle, O′, and set in horizontal sliding journals, so as to be thrown in or out of gear with M′. P′ is a crank upon the pinion N′, operating the force-pump D′, so as to return the water from the tank S below, through the pipe G′, to the tank T above. *l* is an endless cord passing over a series of pulleys, *x*, the upper one of which is located at the top of the building, and so connected to the toggle O′ as to throw the gear N′ into or out of clutch with the gear M′ by pulling upon either rope.

Such being its construction, the operation of my invention is as follows: In Fig. 1, the valve U is represented as closed when the weight *g* is down. As the pin *f* passes on in the direction of the arrow it strikes the lever P, whereby the cord H is lifted, and whereby, in turn, the valve-wheel K′ is rotated, carrying up with it its weight *g* until the hook trip-lever Q catches in the notch *i*, in which position the valve is opened and the water allowed to descend upon the piston, which, by reason of the upper inclination in the camway, is closed, the weight of the water forcing the piston to descend, the same driving down with it its rod J′ and swinging rods H′ H′, which depress the balance-bar and elevate its weight *k*, at the same time driving down the driving connecting-rod J′ until its pin engages or comes into contact with the lever Q, releasing it from its clutch upon the valve-wheel, which shuts

by the action of its weight. At the time when the pin strikes the lever Q the arm L within the camway will be deflected by its lower incline through the quadrant of an arc, as before, and will permit the escape of the water from the cylinder through the pipe Z. The driving force of the next driving-wheel carries the first over its dead-point, while the balance-weight *k* aids its action. The force-pumps are operated, as before, by the descending weight of the platform, and the arrangement of the endless rope *l* is such that it can be operated from the platform or from any floor of the building.

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

1. The combination, in an elevating apparatus, of the valve-wheel K′, provided with a counterbalancing-weight, *g*, and notch *i*, with the trip-lever P and cord H, with the hook trip-lever Q and the crank-pin *f* upon the driving-gear, the whole forming a device for automatically opening and shutting the valve U in the water-supply pipe R, substantially as described.

2. The combination, in an elevating apparatus, of the piston I, constructed and operating as described, the swinging piston-rods H′ H′, the balance-bar I, the balance-weight *k*, and the connecting-rod J′, the whole forming a device for driving the main gear O, substantially as described.

3. As a device for returning water through the pipe G′ from tank S into the tank T by the descending weight of the elevator-platform, the following mechanism in combination, viz: elevator-platform, hoisting-rope, lifting-drum, gear-wheel K″, pinion L′, driving-cord A′, pinion M′, pinion N′, and force-pump D′, substantially as described.

4. The combination of the pinion M′, operated as described, with the pinion N′ and force-pump D′, to elevate a column of water through the pipe G′ from the tank S into the tank T, substantially as described.

5. The combination of the toggle O′ and cord *l′* with the pinion N′ so as to throw such pinion in or out of gear with the pinion M′, substantially as described.

In testimony whereof I have hereunto signed my name.

E. HAMILTON HUNT. [L. S.]

Witnesses:

CHAS. TALLMAN,

JNO. B. WILLARD.