J. B. WARING, J. F. DARROW, & F. WINTERS, Jr.

Hydraulic-Engine.

No. 203,801. Patented May 14, 1878.

Fig. 1.

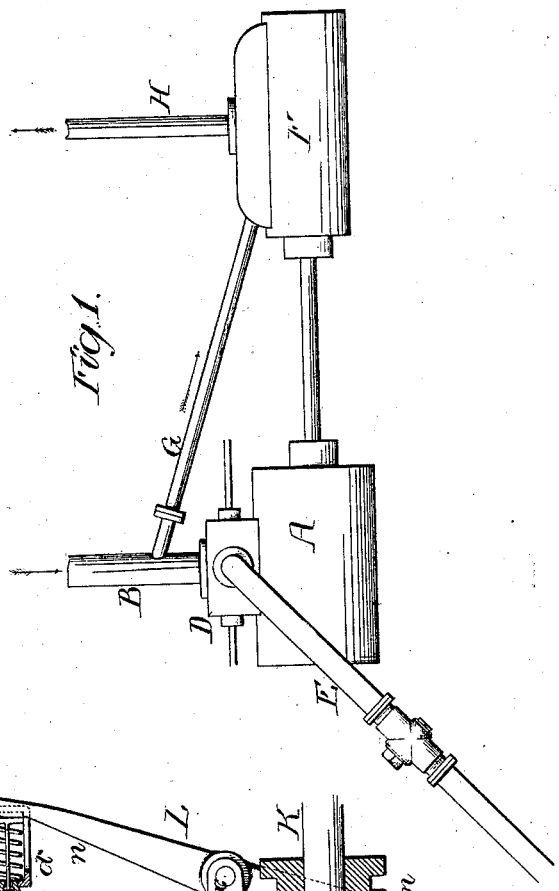
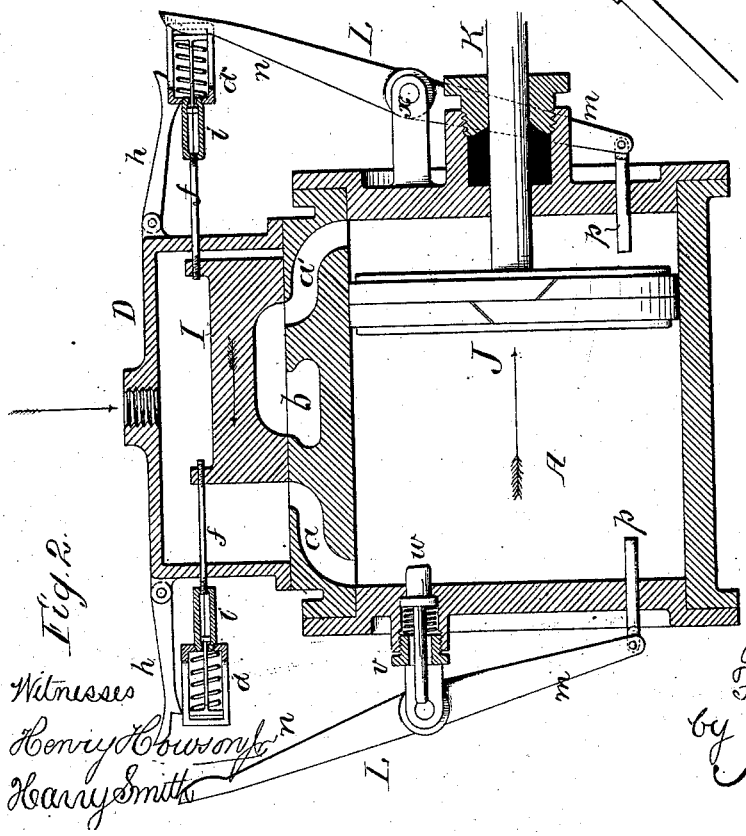


Fig. 2.



Witnesses
Henry Howson
Harry Smith

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UNITED STATES PATENT OFFICE.

JOHN B. WARING AND JAY F. DARROW, OF NEW YORK, N. Y., AND FRANCIS WINTERS, JR., OF ST. PAUL, MINNESOTA; SAID WARING ASSIGNOR TO SAID DARROW AND WINTERS.

IMPROVEMENT IN HYDRAULIC ENGINES.

Specification forming part of Letters Patent No. **203,801**, dated May 14, 1878; application filed August 22, 1877.

To all whom it may concern:

Be it known that we, JOHN B. WARING and JAY F. DARROW, both of the city and county of New York, State of New York, and FRANCIS WINTERS, Jr., of St. Paul, Ramsey county, State of Minnesota, have invented a new and useful Improvement in Water-Lifts, of which the following is a specification:

The main object of our invention is to construct an effective device for causing water, prior to its escape from a distributing-pipe to supply the lower portion of a building, to raise water for the upper portion of the building to an altitude which it cannot reach by the usual pressure in the distributing-pipes; and this object we attain in the manner which we will now proceed to describe, reference being had to the accompanying drawing, in which—

Figure 1 is a diagram, illustrating the principle of raising water on which our invention is founded; and Fig. 2, a section of the device which forms the subject of our invention.

In the diagram, Fig. 1, A represents the cylinder of the hydraulic engine, fully described hereinafter; B, a branch forming a communication between the main water-distributing pipe of a building and the valve-chest D of the engine; E, the exhaust pipe; F, the pump driven by the engine; G, the supply pipe of the pump; and H, the force-pipe, through which water is directed to the upper part of the building in the lower portion or cellar of which the engine is situated. All the water required for the lower part of the building must pass through the valve-chest, cylinder, and exhaust-pipe of the engine, which is operated by the pressure of the water, the pump forcing a supply of water to such upper portion of the building as it could not reach through the ordinary distributing-pipes.

As long as the exhaust-pipe is closed there can be no operation of the engine and pump; but when it is opened the water from the distributing-pipe, in seeking an outlet, must operate the engine before it can escape.

This mode of raising water will be especially serviceable in towns and cities where the head of water is so low or where the supply is so limited that it cannot reach the upper stories of the buildings through the usual distributing-pipes.

The cylinder A is similar to that of an ordinary steam-engine, having inlet-ports *a a'* and exhaust-port *b* communicating with the exhaust-pipe E, a chest, D, to which water is admitted from the distributing-pipe, a valve, I, piston J, and piston-rod K, connected to the plunger of the pump.

At each end of the cylinder is a lever, L, pivoted at *x*, the lower arm *m* of the lever being provided with a pin, *p*, which passes through the cylinder-cover, the end of the upper arm *n* being arranged to slide in a slot in the small cylinder *d*, and bearing against a piston in the said cylinder, between a shoulder in which and the said piston intervenes a spiral spring, a rod on the piston having a head arranged to slide, but not turn, in a projection, *i*, on the cylinder, and this projection being connected to the valve I of the engine by a rod, *f*.

An arm, *h*, has a shoulder for retaining the cylinder *d*, and consequently the valve, in the position shown on the right of the cylinder in Fig. 2.

The piston moving in the direction of the arrow will come in contact with the pin *p*, and the upper end of the lever *n* will gradually compress the spring in the cylinder *d* until the piston J has nearly reached the limit of its movement in the direction of the arrow, when the upper end of the lever comes in contact with the turned-up end of the arm *h*, and gradually raises the latter until the cylinder *d* is released, when the spring in the said cylinder will suddenly move the valve in the direction of its arrow, so that water will be admitted to the cylinder through the port *a'* and will be exhausted through the ports *a* and *b*, and the piston will commence its return movement, the valve mechanism at the rear of the cylinder having been in the meantime set to a proper condition to be operated by the piston when it approaches the limit of its rearward movement.

It will be seen that the movement of the levers L has no direct influence on the valve. They serve simply to compress the springs for operating the valves when they are released.

Through the rear cylinder-cover passes a pin, *w*, between a collar on which and a follower, *v*, intervenes a spring, so that after the pin has been struck by the piston and the latter retreats the said pin will at once be restored to its former position, ready to be struck by the piston when it returns.

This pin is connected with any suitable registering device, such, for instance, as is used in connection with gas and water meters, so that the amount of water which passes through the cylinder shall be duly recorded.

We claim as our invention—

1. A hydraulic engine in which are combined the following elements, namely: the valve I, its rods *f f*, springs for actuating the valve, retainers *h*, and levers L for first compressing the springs and then operating the retainers so as to release the said springs, all substantially as set forth.

2. The combination of the cylinder and its piston with the spring-pin *w*, as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

J. B. WARING.
JAY F. DARROW.
FRANCIS WINTERS, JR.

Witnesses:
A. P. BUTLER,
J. H. MOTT.