J. COATES.

HYDRAULIC ENGINE.

No. 192,154. Patented June 19, 1877.

Fig. 1.

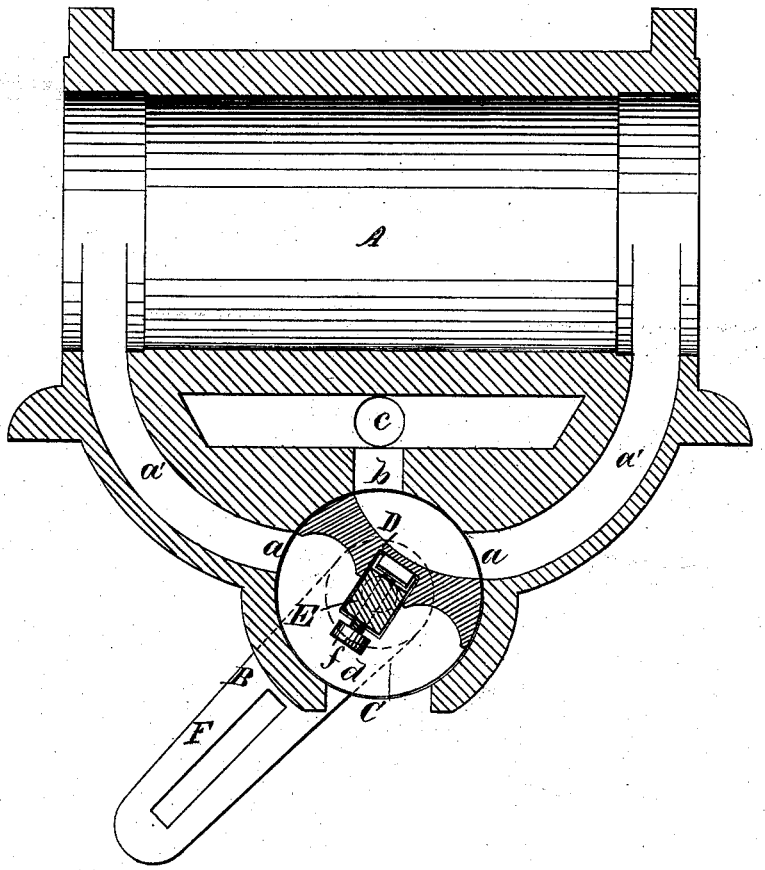
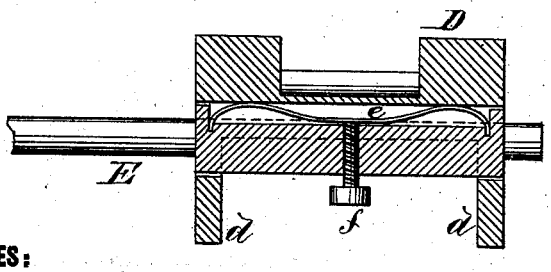


Fig. 2.



WITNESSES:

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BY

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UNITED STATES PATENT OFFICE.

JOHN COATES, OF ERIE, PENNSYLVANIA.

IMPROVEMENT IN HYDRAULIC ENGINES.

Specification forming part of Letters Patent No. **192,154**, dated June 19, 1877; application filed April 23, 1877.

To all whom it may concern:

Be it known that I, JOHN COATES, of Erie, in the county of Erie and State of Pennsylvania, have invented a new and Improved Water-Engine, of which the following is a specification:

Figure 1 is a longitudinal section of the cylinder of my improved engine. Fig. 2 is a longitudinal section of the valve and rocking shaft.

Similar letters of reference indicate corresponding parts.

My invention relates to that class of piston-engines that employ water under pressure as a motive power; and it consists of a valve of peculiar construction, and in the arrangement of passages in the cylinder for the ingress and egress of water.

In the drawing, A is a cylinder having upon its under side the cylindrical valve-chest B, having the ports *a a* and *b*. The ports *a* communicate with the ends of the cylinder A by the curved passages *a'*, and the port *b* is connected with the water-supply at *c*.

C is an outlet-opening located in the lower side of the valve-chest.

The valve D is capable of covering the supply-port *b* and one of the ports *a*, leaving the other uncovered.

The valve D is provided with circular end pieces *d*, which fit into corresponding recesses in the ends of the valve-chest. The back of the valve D is grooved, and the end pieces *d* are mortised to receive the squared portion of the rocking shaft E, which is journaled in the ends of the valve-chest.

The shaft E is recessed to receive the curved spring *e*, the ends of which rest in transverse grooves at the ends of the recess. The spring *e* is curved so that it is upwardly convex near each end, and bears against the valve D, forcing it to its seat.

A screw, *f*, passes through the center of the squared part of the shaft E, and bears upon the back of the spring *e*, and is designed for adjusting the upward pressure of the spring on the valve.

A lever, F, is secured to the end of the rocking shaft E, and is connected with an eccentric or some other moving part of the engine.

Water is taken in through the opening *c* and port *b*, whence it passes through the space in the valve and through the port *a* and passage *a'* to the cylinder. The water in the opposite end of the cylinder escapes through the passage *a'*, port *a*, and outlet C.

As the passages *a'* and ports *a* and space at the back of the valve between the circular end pieces *d* are wider than the port *b* and the space in the valve D, the water escapes freely from the engine by its own gravity.

The advantages claimed for my improvement are that the water is discharged by its own gravity, and therefore requires no force to eject the water after it is utilized. The construction of the valve is such that the friction and wear are reduced to a minimum, and the full power of the water is realized.

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

The combination, with the cylinder A, having chest B C, ports *a a b*, and passages *a' a'*, of the back-grooved rocking valve D, operating as shown and described, so that the valve may move clear of the exhaust-port, and allow the water to pass out freely without interrupting the valve.

JOHN COATES.

Witnesses:
BENJAMIN WHITMAN,
JOHN FERRIER.