

J. W. HAYES.
Steam-Engines.

No. 154,248.

Patented Aug. 18, 1874.

Fig. 1.

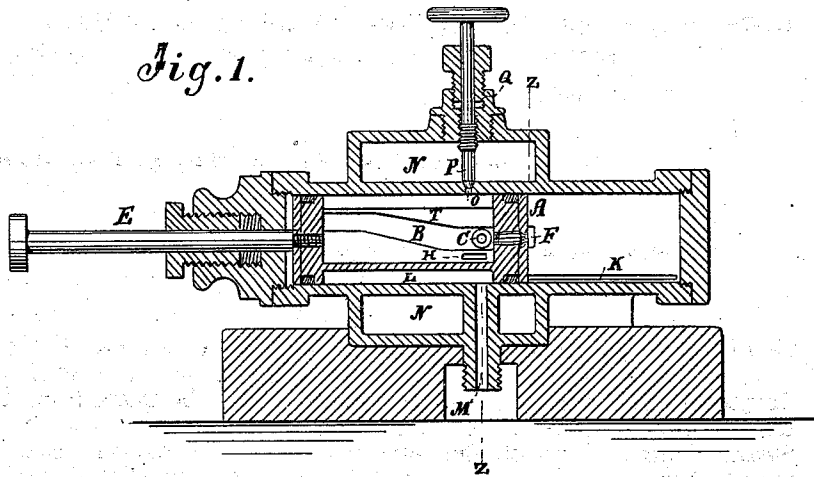


Fig. 2.

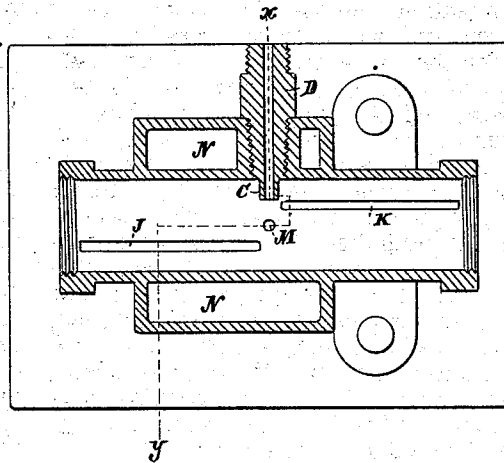


Fig. 4.

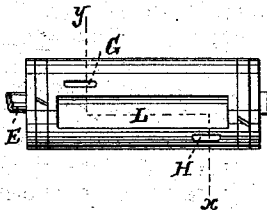
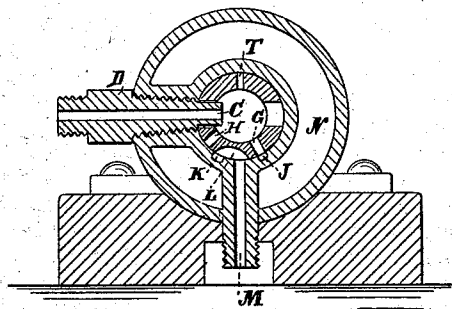


Fig. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN W. HAYES, OF CHICAGO, ILLINOIS, ASSIGNOR TO HIMSELF, THOMAS B. TWOMBLY, JACOB G. CROCKETT, AND GEORGE L. CHATFIELD, OF SAME PLACE.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **154,248**, dated August 18, 1874; application filed May 1, 1874.

To all whom it may concern:

Be it known that I, JOHN W. HAYES, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Steam-Engine, of which the following is a specification:

My invention consists of a contrivance of the piston, and the ports for employing the piston for the valve, the piston being made hollow, and receiving the steam into the hollow space, and discharging it therefrom to the cylinder, the motions for opening and closing the ports being effected by a stud-pin projecting from the interior of the cylinder into a spiral slot in the piston. The stud for causing the oscillation of the piston is formed on the end of the steam-pipe. The exhaust-pipe is adapted for the application of a suction-pipe, and the piston is adapted for being reversed endwise to convert the engine into a force-pump by reversing the ports relatively to the inlet and exhaust. The invention also consists of an oil-jacket surrounding the cylinder with a valve for admitting the oil into the cylinder as it is needed for lubricating the piston.

Figure 1 is a longitudinal sectional elevation of my improved engine. Fig. 2 is a horizontal section. Fig. 3 is a transverse section, taken on the line *xy* of Fig. 1, and *zz* of Fig. 2; and Fig. 4 is a side elevation.

Similar letters of reference indicate corresponding parts.

A represents the hollow piston; B, the spiral slot in one side; and C, the stud-pin for causing it to oscillate for changing the ports, the said pin being formed on the inner end of the steam-pipe D. A corresponding spiral slot is arranged in the opposite side of the piston for reversing its action, by reversing it endwise, for using it as a pump, and the piston-rod E is screwed into the piston, and the latter is provided with a screw-hole in each end, and a plug, F, for stopping up the unused hole. G and H represent the ports for the escape of the steam from the piston into the cylinder along channels J and

K in the wall of the cylinder. L is the channel, in the side of the piston, for the escape of the steam from the cylinder through channels J and K to the exhaust-port M.

When the piston is shifted to the left, it is turned so that communication is opened between the right-hand end of the cylinder to the exhaust L M through channel K, and the port G is opened to the other end of the cylinder through channel J to admit steam to drive the piston back.

When the piston is shifted to the other end of the cylinder that end will be opened to the steam by the channel K and port H, and the other end opened to the exhaust through channel J and exhaust-channel L.

N is the oil-chamber, surrounding the cylinder with a passage, O, through the latter at the top, and a valve, P, for opening and closing it, the valve-stem extending out through a stuffing-box, Q, for operating the valve.

The oil will be floated up to the passage by the water of steam entering the chamber through the passage O, and condensing and settling to the bottom of the oil-chamber.

A cock will be attached to the bottom of the oil-chamber for drawing off the water from time to time.

The piston will be balanced by the steam within it, so that it will afford all the advantages due to a balanced valve.

When used as a pump, the water will enter the piston through the exhaust M L and ports G H, and be expelled through the pipe D. The piston has a slot, T, in the top to allow the oil to enter it from the passage O to pass out through the ports below.

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

1. A hollow piston, A, pipe C, ports G H, and exhaust-channel L combined with a cylinder having channels J K and a pipe, M, substantially as specified.

2. The piston arranged to be changed endwise for converting the engine into a pump,

having a slot, B, on each side, in combination with the stud C and cylinder, as and for the purpose specified.

3. In combination, with the piston-cylinder, of a steam-engine, the surrounding cylindrical oil-chamber N communicating with the cylinder by the passage O and valve P, as and for the purpose specified.

4. The slot T, in the top of the piston, in

combination with the oil-inlet passage O and valve P on the cylinder, substantially as specified.

JOHN W. HAYES.

Witnesses:

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JOHN E. COLE,

W. F. THOMPSON.