3 Sheets—Sheet 1.

H. E. MARCHAND.

STEAM ENGINE.

No. 187,156. Patented Feb. 6, 1877.

Fig. 1.

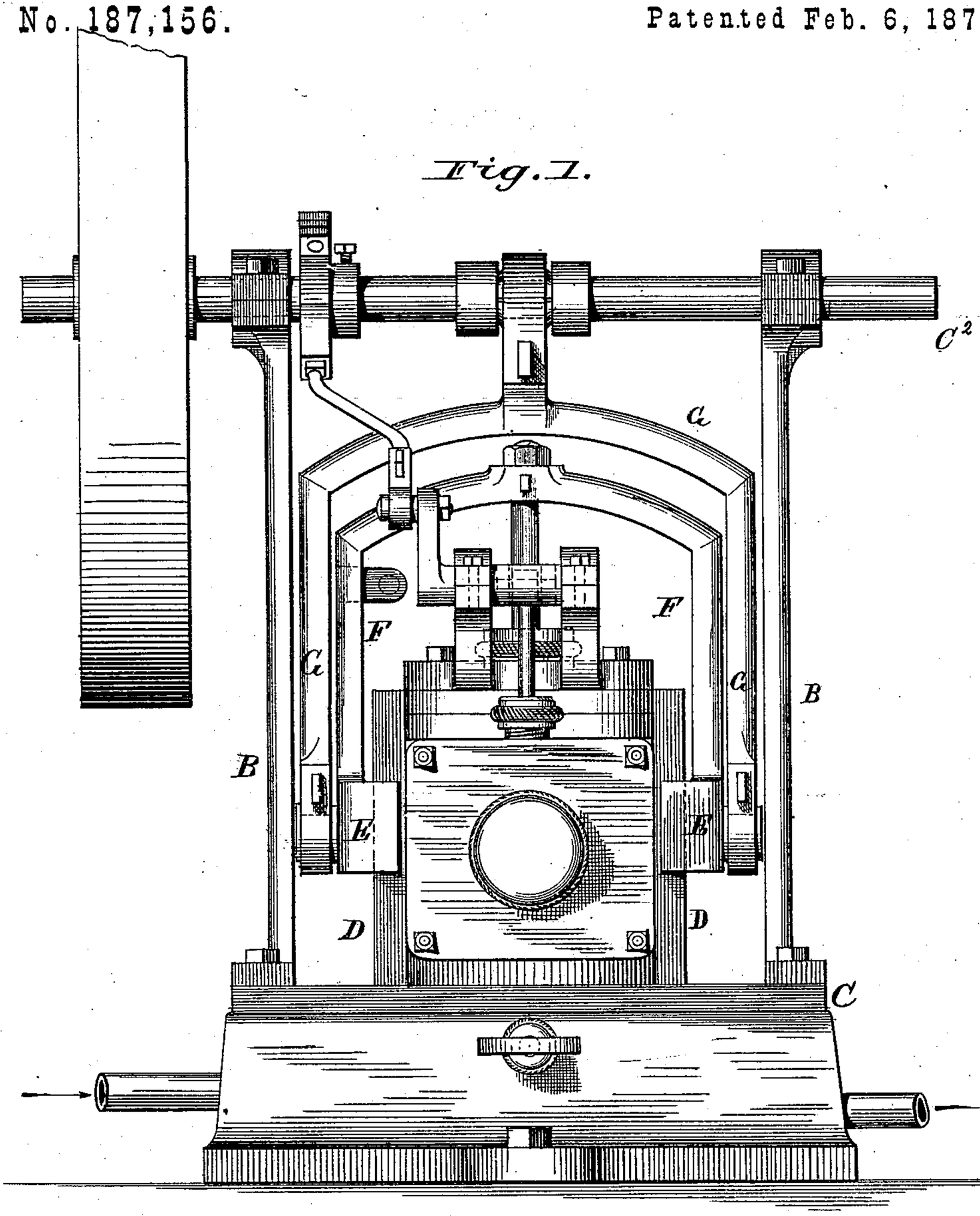

Fig. 2.

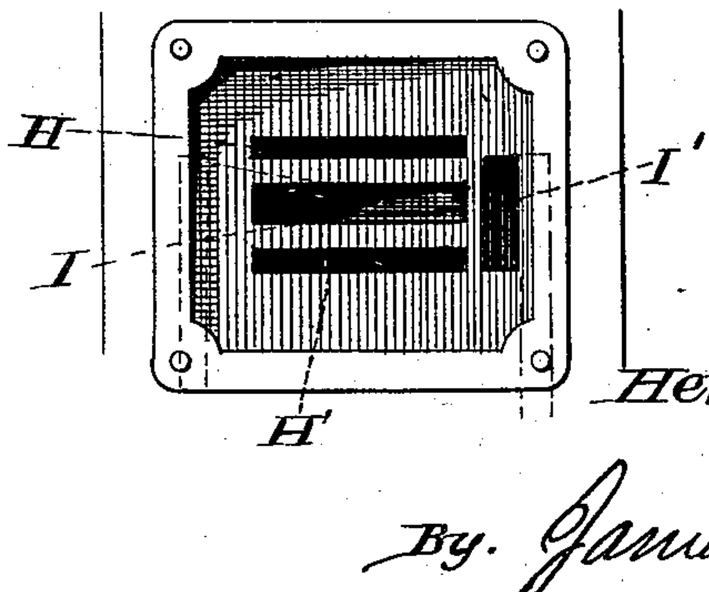

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Fig. 3.

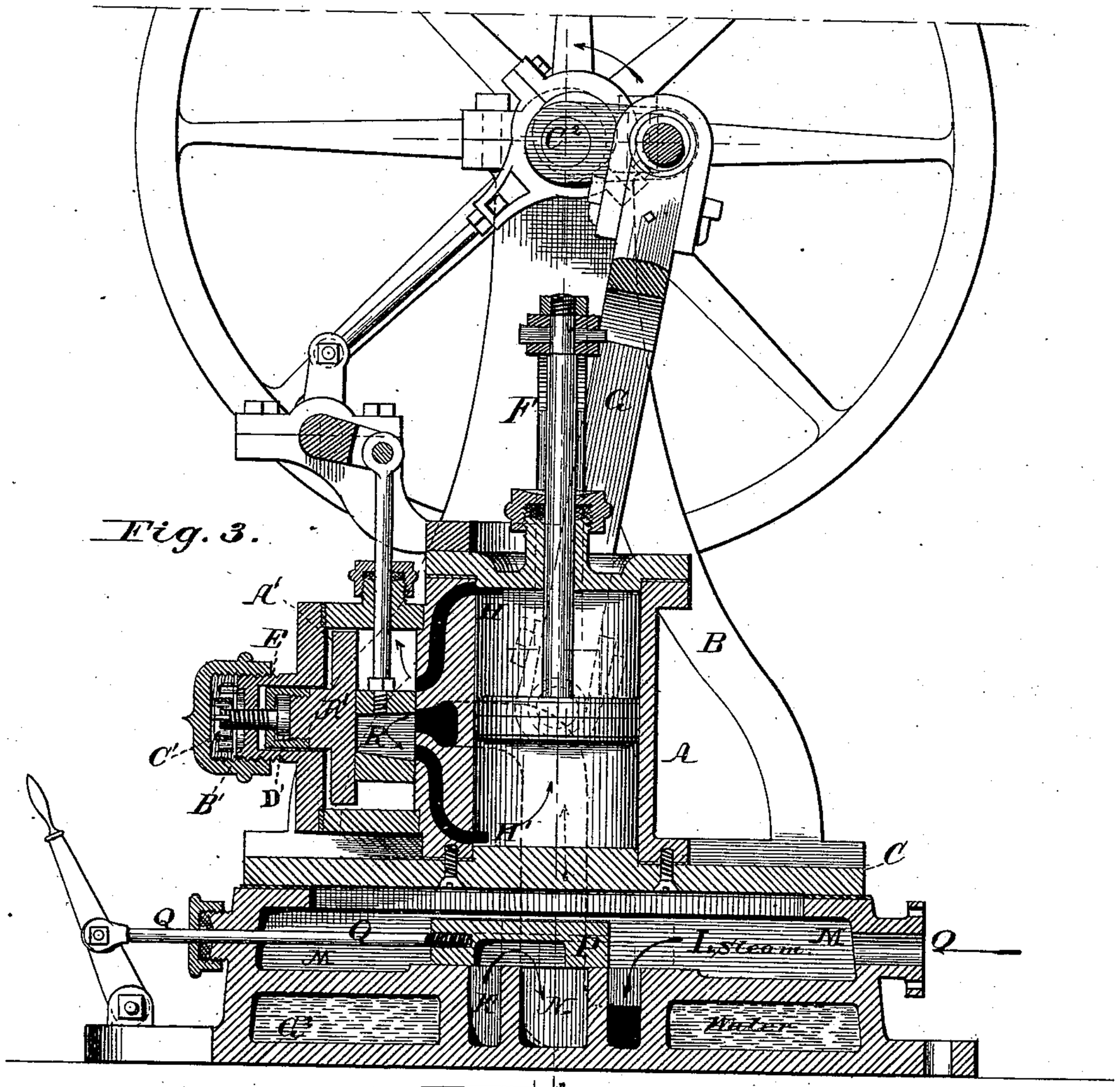
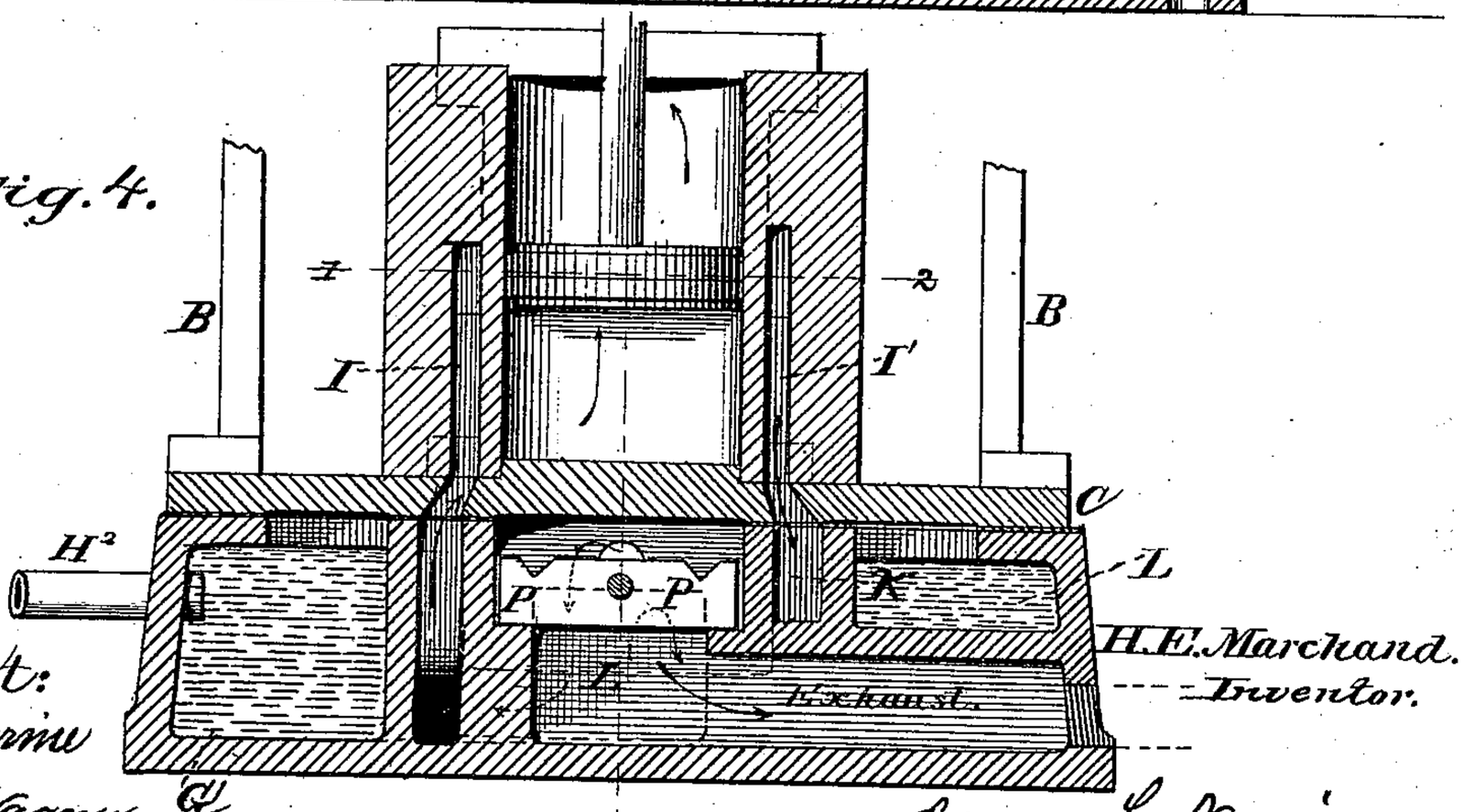


Fig. 4.



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3 Sheets—Sheet 3.

H. E. MARCHAND.

STEAM ENGINE.

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Fig. 5.

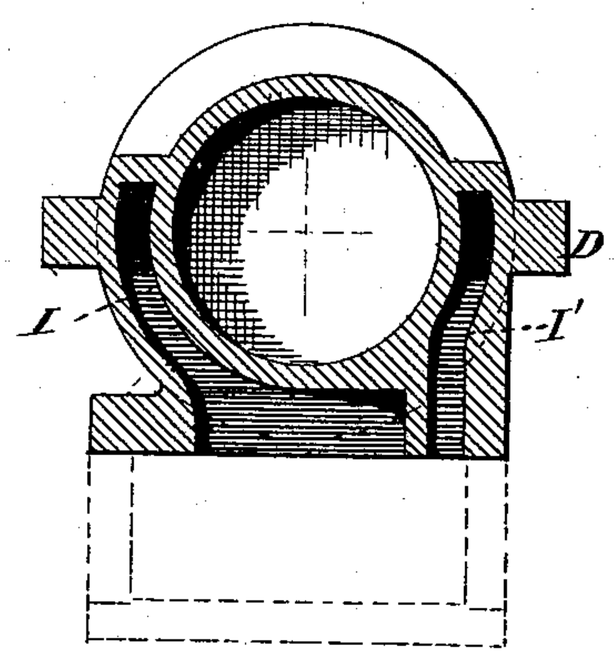
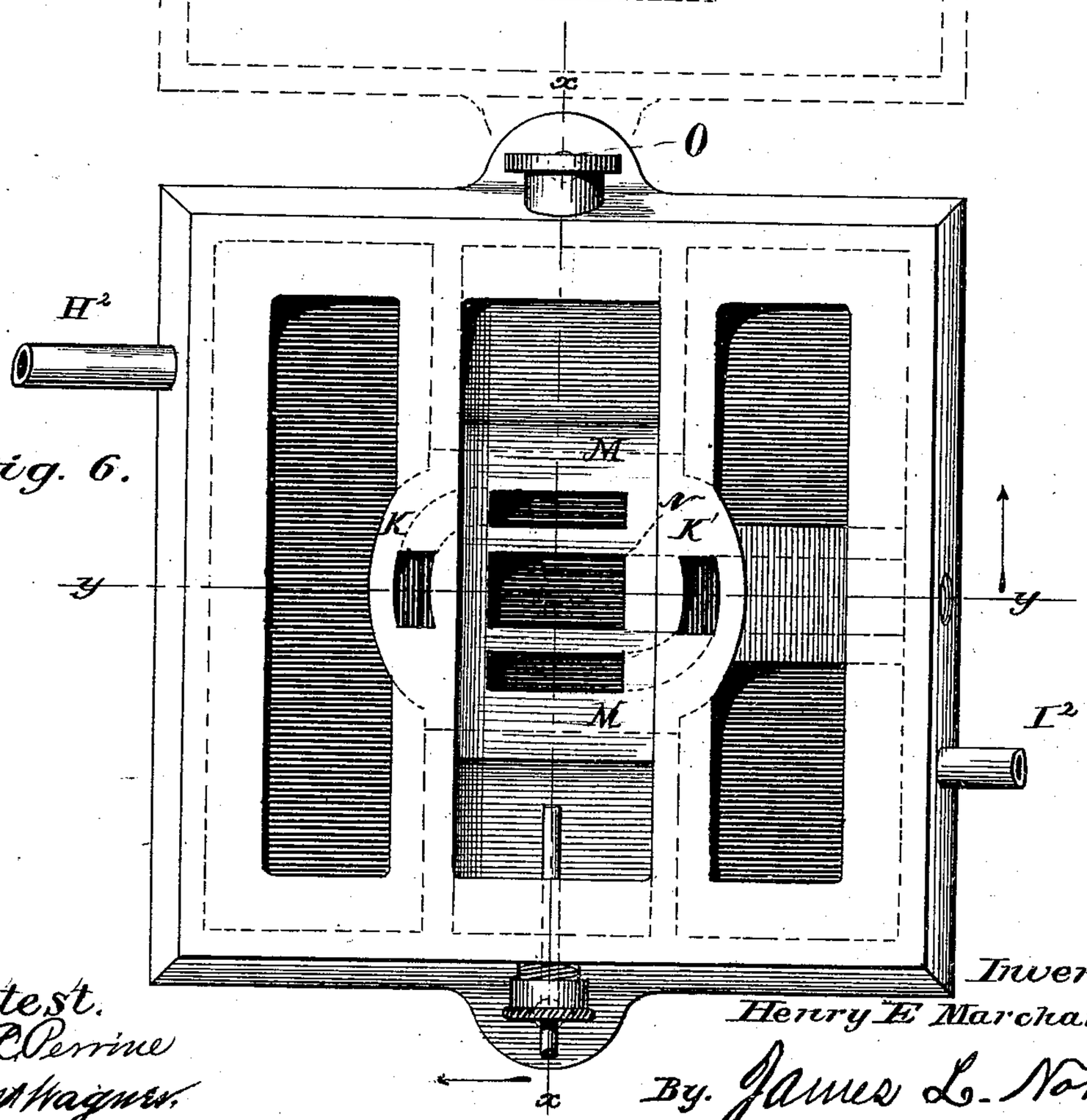


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY E. MARCHAND, OF ALLEGHENY, PENNSYLVANIA.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **187,156**, dated February 6, 1877; application filed November 23, 1876.

To all whom it may concern:

Be it known that I, HENRY E. MARCHAND, of Allegheny city, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification:

This invention relates to certain improvements in steam-engines, its object being to provide for reversing the engine without the use of the ordinary link-motion heretofore employed, to provide for more effectually balancing the slide-valve, and to prevent the condensation of the steam in the supplementary valve-chest.

My invention consists, first, in the combination, with a steam-cylinder and its slide-valve, of a supplementary valve chest or chamber, provided with two induction-ports communicating with ports leading to the slide-valve chest of the cylinder, and with an eduction-port leading to the escape-pipe, and having a slide-valve capable of closing either of the ports leading to the slide-valve chest, and putting the other in communication with the exhaust-port, for the purpose of reversing the action of the engine, as more fully hereinafter explained; second, in the combination, with the supplementary valve-chest which contains the reversing-valve, of two chambers, one on each side of the valve-chamber, through which the hot water may be passed, in order to heat the valve-box and prevent the condensation of steam therein, as more fully hereinafter set forth.

In the drawings, Figure 1 represents an elevation of my improved engine. Fig. 2 represents the seat of the slide-valve, showing the induction and eduction ports. Fig. 3 represents a vertical section of my improved engine. Fig. 4 represents a detached sectional view of the cylinder and supplementary valve-chest. Fig. 5 represents a horizontal section of the cylinder; and Fig. 6 a top view of the supplementary valve-chest, showing the various parts of the same.

The letter A represents the cylinder of the engine, which is mounted upon a bed or base, C, and B B upright standards, located on each side, in the upper part of which the driving-shaft C^2 of the engine is journaled. On opposite sides of the cylinder are formed ways D, upon which the sliding blocks E travel, to which are pivoted the piston-rod guide F and the connecting-rods G, which give motion to the driving-shaft.

The letters H and H^1 represent the ports leading from the valve-seat to each end of the cylinder. The letters I and I^1 represent ports extending from the ports K K′ in the supplementary valve-chest L, up each side of the cylinder, and terminating at the seat of the slide-valve chest, the port I terminating between the ports H and H^1, and the port I^1 at one side of the valve-seat, as shown.

The ports K and K′ communicate with the interior compartment or chamber M of the supplementary valve-chest at each side of the exhaust-port N, the said chamber being connected with the induction-pipe O leading from the boiler. In said chamber is located a slide-valve, P, similar to the ordinary slide-valve of an engine, to which is attached a valve-rod, Q, which is capable of sliding back and forth in said chamber, and of such construction that when shifted to one side it will leave one of the ports K K′ in connection with the chamber M, and establish communication between the other and the exhaust-port.

The slide-valve proper of the engine, represented by the letter R, is chambered, as shown, and is of such construction as to alternately bring the ports H H^1 into connection with the central port I, leaving the port not covered by the valve in communication with the valve-chest, which is at all times in communication with the port I^1.

The operation of this part of my invention is as follows: Let the slide-valve R be in position shown in Fig. 3, exposing the port H and connecting the port H^1 with the usual exhaust-port. Upon admitting steam to the chamber M it enters the port K, and passes upward through the port I into the chamber in the slide-valve R of the engine, and from thence into the port H^1, leading to the end of the cylinder, the exhaust passing out of the other uncovered port into the valve-chest, and from thence out through the port I^1 to the exhaust-port. Upon reversing the slide-valve P the steam from the chamber M enters the port K, and from thence passes into the valve-

chest of the engine on the outside of the slide-valve, and into the cylinder through the uncovered port, the exhaust passing under the slide-valve and through the covered port into the exhaust-port, thus reversing the action of the engine.

The letter A′ represents the balance-plate, by means of which the slide-valve is held to its seat. Said plate is provided with a screw-stem projecting through a stuffing-box, B′, in the top of the valve-chest, said stem being connected to a spring, C^1, located in a recess in the top of the stuffing-box, which automatically turns the screw-stem, and serves to keep the plate uniformly pressed upon the valve, and compensates for the wear of the bearing-faces of said plate and valve. In order to more perfectly balance said plate and prevent the same from being unduly forced against the valve by the pressure of steam within the valve-chest, the stem is provided with a shoulder, D′, at its lower end, over which fits a sleeve, E′, which is secured upon the boss or projection F′ of the balanced plate by a screw-thread or otherwise, serving to hold said plate upon the stem against any downward pressure against the valve.

At each side of the chamber M in the supplementary valve-chest are formed chambers G^1, which communicate by means of a passage, G^2, under one end of the chamber M, and are connected, by means of the pipes H^2 and I^2, with the boiler, said chambers serving to prevent the condensation of steam in the valve-chest by the circulation of a current of hot water through the same.

I do not here claim the balance-valve and its operating devices, as such will form the subject of a separate application for Letters Patent.

What I claim, and desire to secure by Letters Patent, is—

1. In combination with the cylinder of a steam-engine, a supplementary valve-chest communicating with the valve-chest of the engine by means of ports at each side of the cylinders, one entering under the slide-valve and the other opening directly into the valve-chest, the supplementary valve-chest being provided with a slide-valve adapted to uncover either of the ports leading to the valve-chest proper, and throw the other port into communication with an exhaust-port in said supplementary valve-chest, substantially as described.

2. In combination with the supplementary valve-chest, the chambers for the circulation of hot water to prevent condensation of the steam in the valve-chest, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of the subscribing witnesses.

H. E. MARCHAND.

Witnesses:

JAMES L. NORRIS,

JOS. L. COOMBS.