2 Sheets-- Sheet 1.

H. E. MARCHAND.
Steam-Valve.

No. 165,349. Patented July 6, 1875.

Fig. 1.

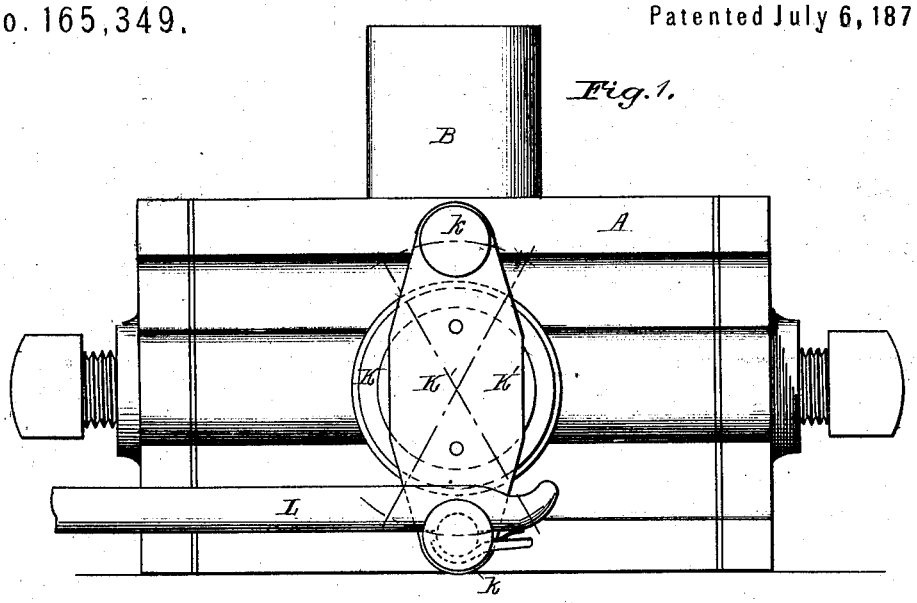


Fig. 2.

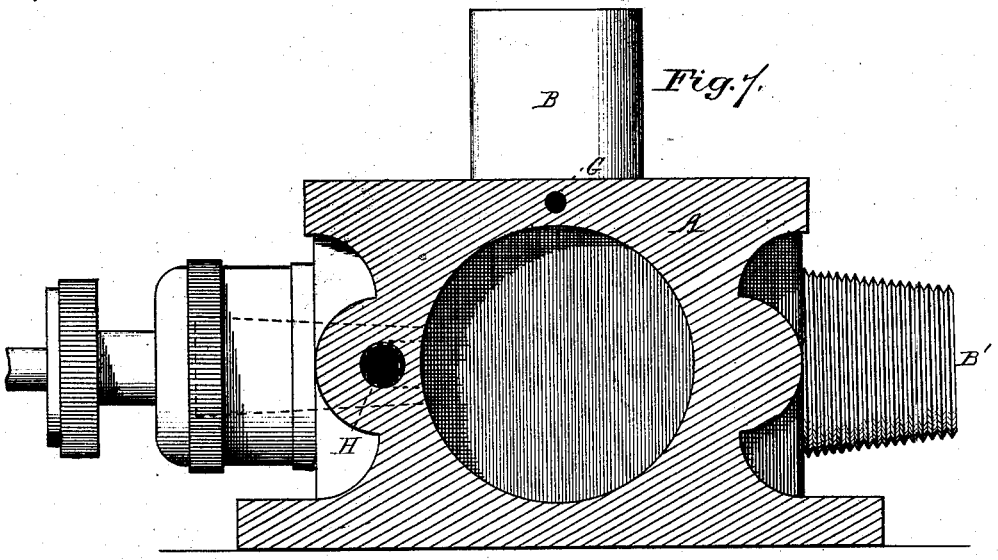
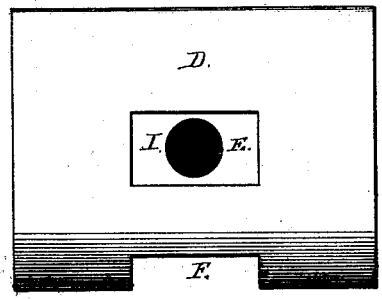


Fig. 3.



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2 Sheets--Sheet 2.

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Fig. 3.

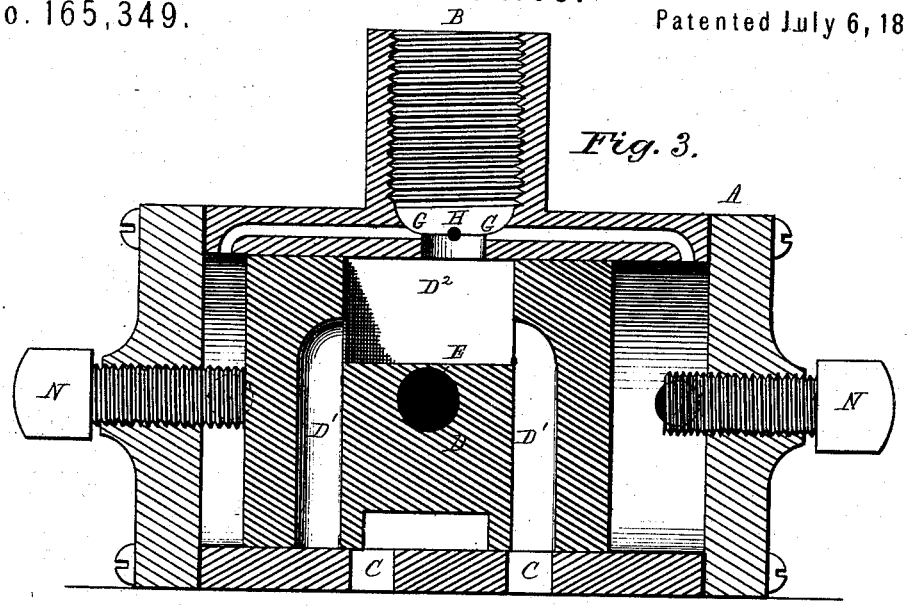


Fig. 4.

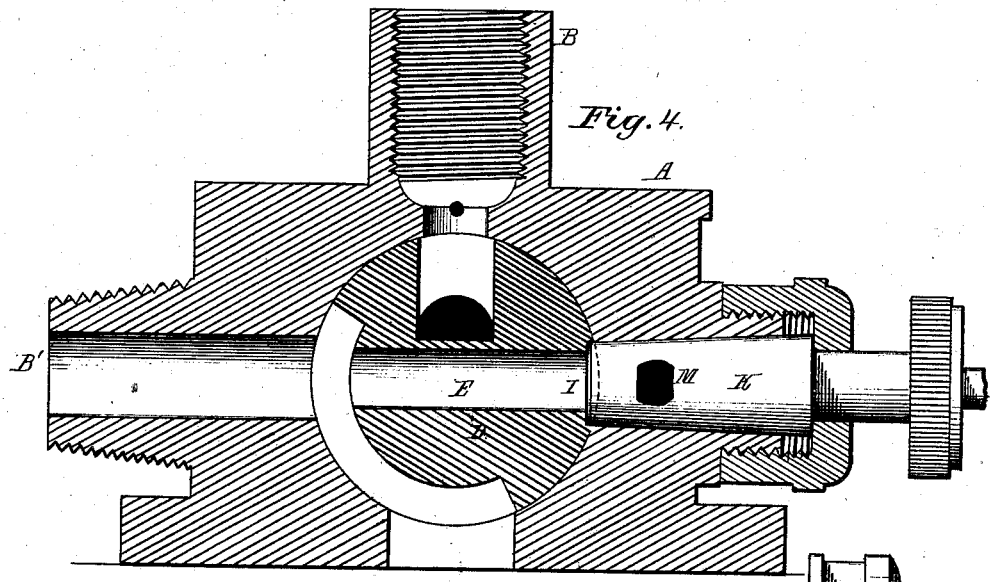


Fig. 5.

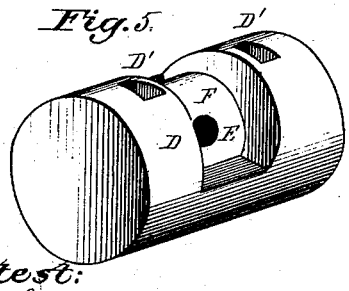
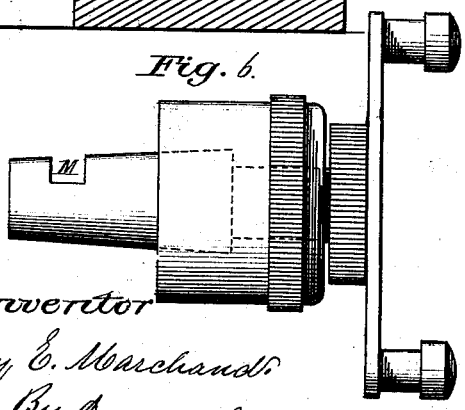


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY E. MARCHAND, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN STEAM-VALVES.

Specification forming part of Letters Patent No. **165,349**, dated July 6, 1875; application filed April 26, 1875.

To all whom it may concern:

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

My invention relates to steam-valves for that class of steam-engines in which the valves are operated by the direct action of steam; and my improvements consist essentially of a reciprocating valve having two exhaust-ports, one passing partly around said valve for exhausting the steam from the back of the piston in the main cylinder, and the other exhaust-port passing directly through the center of the valve for exhausting the steam from the rear of the valve, and both exhausts thus constructed in the valve being adapted to communicate with the main exhaust-port in the valve-box, as hereinafter described.

In the accompanying drawings, Figure 1 represents a side elevation of my improved valve-box and a portion of the steam-cylinder; Fig. 2, a detached view of the cylindrical valve; Fig. 3, a longitudinal vertical section through the valve-box and valve; Fig. 4, a transverse vertical section; Fig. 5, a perspective view of the valve; Fig. 6, a detached view of the auxiliary oscillating valve; and Fig. 7 is a transverse vertical section, showing the exhaust-ports, &c.

The letter A represents a valve-box with the usual induction and eduction ports B B′ and ports C C in the bottom, which correspond to the ports of the cylinder. D represents a cylindrical, semi-cylindrical, or polygonal valve, adapted to move longitudinally back and forth in the valve-box A. Said valve is provided with ports D^1 D^1, branching from a port, D^2, the whole forming a continuous double port extending through the valve. The port D^2 falls directly under the induction-port B, and the lower ports D^1 D^1 are alternately brought over each port C C, so as to admit steam alternately into each end of the cylinder as the valve is shifted. The valve D has also a port, E, extending from a recess, F, cut across one side of said valve to the opposite side, said port extending directly through the valve D. Said port and recess serve to form communication alternately between the ports C C and the exhaust-port as the valve D is shifted. G G represent two ports leading from the induction-port B of the valve-box to each end of the same, and serving to admit live steam on both sides of the valve D, and H H represent two similar ports leading from each end of the valve box to the center of the same, and opening into the interior opposite a longitudinal recess, I, on the valve D, which connects with the port E leading to the exhaust. The ports H H are alternately thrown into communication with the exhaust-port by the shifting of the valve D, the ends of said ports being alternately covered and uncovered by the ends of the said valve, establishing the communication through the port E. The letter K represents an oscillating or rotating valve or cut-off set in one side of the valve-box A. Said valve has secured to its outer end a double crank, K′, with crank-pins *k* at each end, over either of which the slot in the end of the eccentric rod L of the engine may be set, providing a ready means of reversing the action of the valve and engine by simply changing the eccentric rod from one to the other of the pins. The valve or cut-off K is made hollow and open at one end, the open end terminating in the recess I in the valve D. At one side of the valve K is formed a slot, M, the object of which will be hereinafter explained. The end of the said valve K setting in the recess I prevents the valve D from turning and displacing the ports. N N represent two adjusting-screws passing through opposite ends of the valve-box, and abutting against the ends of the valve D, for the purpose of adjusting and limiting its motion to prevent the cushions at the ends of the valve from closing the ports.

The operation of my invention is as follows: The parts being in position, as indicated in Fig. 3, steam will be admitted through the ports B and C to the right-hand side of the cylinder, the opposite side being in communication with the exhaust-port through the port C, leading into the recess F and port E. Live steam is also admitted through the ports G G to each side of the valve in the valve-box, but the left-hand side of said box being in communication with the exhaust, the difference in the pressure on opposite sides of the valve

keeps it in position. When the piston reaches the opposite end of its stroke, the cam of the engine reverses the oscillating or rotating valve or cut-off K, shutting off communication with the right-hand side of the valve-box and the exhaust, and establishing communication with the left. This shifts the valve D, changing the ports of the cylinder, as will be readily understood. By admitting steam to both sides of the valve, and operating the same by connecting each side alternately with the exhaust-port, as described, the valve cannot by any possibility become centered, as in other engines of this class as heretofore constructed. The guide slot or recess in the side of the reciprocating valve, in which the end of the cut-off valve sets, prevents any possibility of said main valve shifting around so as to displace the ports, rendering the action of the valve perfectly reliable.

I claim as my invention—

1. A reciprocating valve constructed with two exhaust-ports, one passing partly around the same to exhaust the steam from the back of the piston in the main cylinder, and the other port passing directly through the center of the valve for exhausting the steam from the rear of the valve, as described, and both of said exhausts being adapted to communicate with the main exhaust in the valve-box, substantially as shown and described.

2. The valve D, constructed with the central port D^2 and ports D^1 D^1, branching laterally therefrom, the recesses F extending across one side of said valve, and the port E extending directly through the center of the valve, as described, in combination with the ports H H leading from each end of the valve-box to the center thereof, and opening into the recess I in the valve D, as and for the object specified.

3. The valve-box having the ports H H and G G and the valve D, constructed with the port E extending through the same, the central port D and the branching ports D^1 D^1 and recess I, in combination with the hollow oscillating cut-off K, having its open end resting in the recess I in the valve D, and constructed with the slot *m* opening into said hollow cut-off, and adapted to communicate with the exhaust-port of the valve-box, as and for the object specified.

In testimony that I claim the foregoing I have hereunto set my hand.

HENRY E. MARCHAND.

Witnesses:

JAMES L. NORRIS,

JOS. L. COOMBS.