S. H. WHITMORE.

VALVES FOR STEAM-ENGINES.

No. 194,493. Patented Aug. 21, 1877.

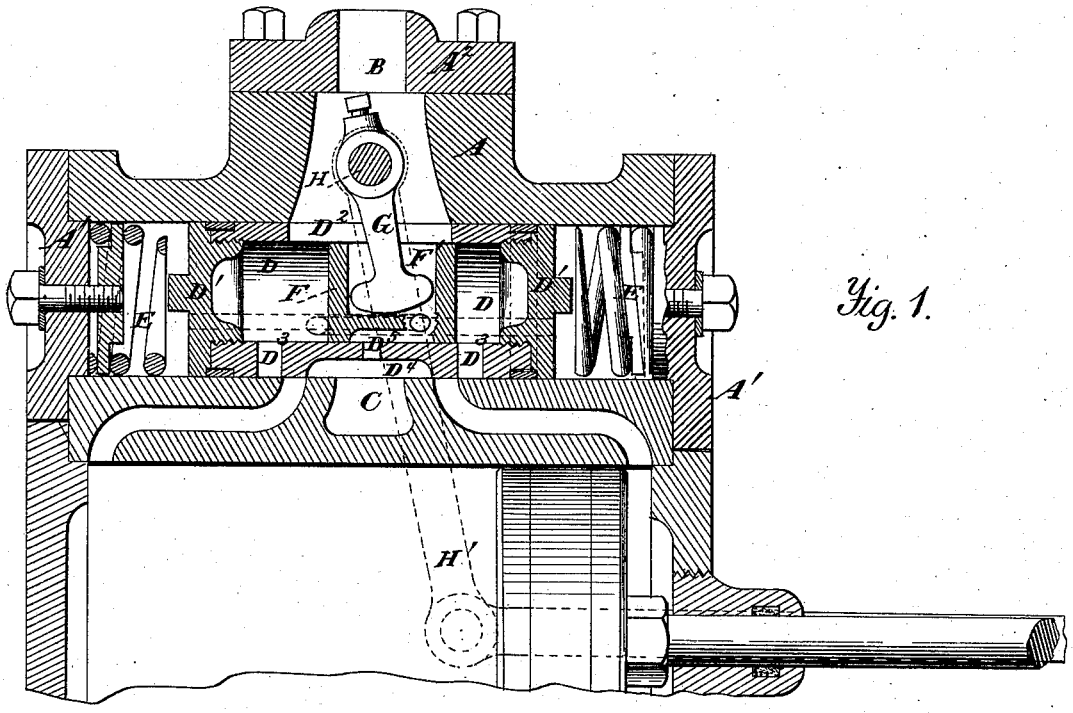


Fig. 1.

Fig. 3.

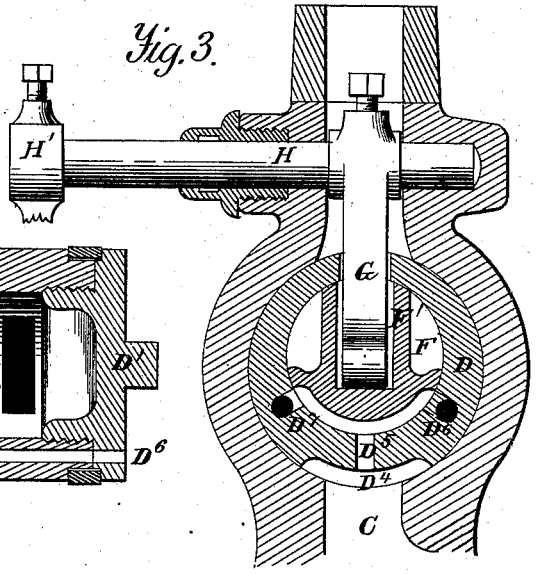
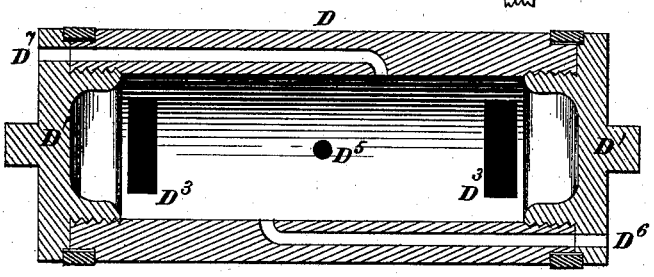


Fig. 2.



Witnesses.

A. Ruppert.

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UNITED STATES PATENT OFFICE.

SETH H. WHITMORE, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-HALF HIS RIGHT TO FREDERICK C. WELLS, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **194,493**, dated August 21, 1877; application filed November 29, 1876.

To all whom it may concern:

Be it known that I, SETH H. WHITMORE, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Valves for Steam-Engines, of which the following is a specification:

The object of my invention is to make a valve actuated by the direct action of the steam, the admission of which is regulated by a small interior valve actuated from some moving part of the engine.

In the annexed drawings, making part of this specification, Figure 1 is a vertical longitudinal section of the valve-chest and valves. Fig. 2 is a horizontal section on the plane of ports which carry steam to the ends of the main valve. Fig. 3 is a vertical transverse section.

The same letters are employed in all the figures in the designation of identical parts.

A is the steam-chest, which includes the valves. It is formed with a cylindrical chamber closed at each end by heads A^1, and covered by a cap, A^2, through which the induction-pipe passes, supplying steam from the generator at B; and C is the exhaust-pipe. Within the cylindrical chamber is placed a cylindrical valve, D, which is tubular, being closed at the ends by the caps D^1. An open slot, at D^2, admits steam to the interior of the valve, and also allows the arm G to actuate the secondary valve F in a manner which will be explained hereinafter. In the lower side of the valve are ports D^3, near each end, which admit steam to the cylinder through the induction and eduction ports in the ordinary manner. The valve D is also cut away, at D^4, to form a chamber in the lower face of the valve for the passage of steam from the eduction-port of the cylinder to the exhaust-pipe C. Another port, D^5, opens down through the bottom of the valve D into the recess D^4 for the escape of the exhaust under the auxiliary valve. Two other ports, D^6 and D^7, lead through the solid shell of valve D, from either end, to such part of the valve as will bring them under control of the auxiliary or secondary valve F.

By means of the last-named ports the steam is alternately admitted to and exhausted from the chambers at the ends of the valve D. In these chambers are placed spiral springs E, which stop the valve without shock as it is driven from end to end of the steam-chest.

The auxiliary valve F is on its face the segment of a cylinder, and has a recessed stem, F′, which receives the lower end of an oscillating arm, G, hung on a shaft, H, receiving motion from an arm, H′, connected with some of the moving parts of the engine. This valve, as it is positively actuated when thrown in one direction, permits steam to pass from the interior of the valve into the port D^6, and thence into the chamber in the end of the steam-chest, thus forcing the valve D to the opposite end of the chest. When the valve F is shifted by the motion of the arm G in the opposite direction, it opens communication between the port D^8 and the steam in the interior of the valve, thus admitting steam to the opposite end of the chest, and at the same time opening the communication between the opposite end and port D^5 through the duct D^6, thus permitting the steam from that end first filled to escape into the exhaust C. By this means the movement of valve F, admitting steam alternately to each end of the chamber in the valve-chest, actuates the valve which controls the admission of steam to the cylinder and its escape in the ordinary manner.

The valve D should be fitted with proper packing-rings, and all the working parts carefully fitted. It will be observed that the valves are very nearly balanced, so that they will work with little friction.

The position of the parts, relatively, may also be shifted without altering the principle of the mechanism.

In large valves I prefer to reverse the position of arm G and work it in the exhaust rather than in the live steam.

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

1. The steam-chest A and cylindrical hollow slide-valve D, having ports, as described, for the passage of steam to and from the chambers at the ends of the valve, and to and from the cylinder of the engine, in combination with the slide-valve F, placed in the in-

terior of valve D, and having its movement in the same direction, and independently actuated by the oscillating arm G passing through a slot in the shell of valve D for admitting steam to operate the said valve D, substantially as set forth.

2. The valve D, constructed with a cylindrical cavity, and ports D^3, D^4, D^5, D^6, and D^7, in combination with the auxiliary valve F, which is moved in the direction of the main valve, valve-chest A, oscillating arms G, and springs E, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SETH H. WHITMORE.

Witnesses:
WILEY S. SCRIBNER,
GEORGE P. GARY.