H. E. WOODS.

STEAM-ENGINE VALVE.

No. 192,041. Patented June 12, 1877.

Fig. 1.

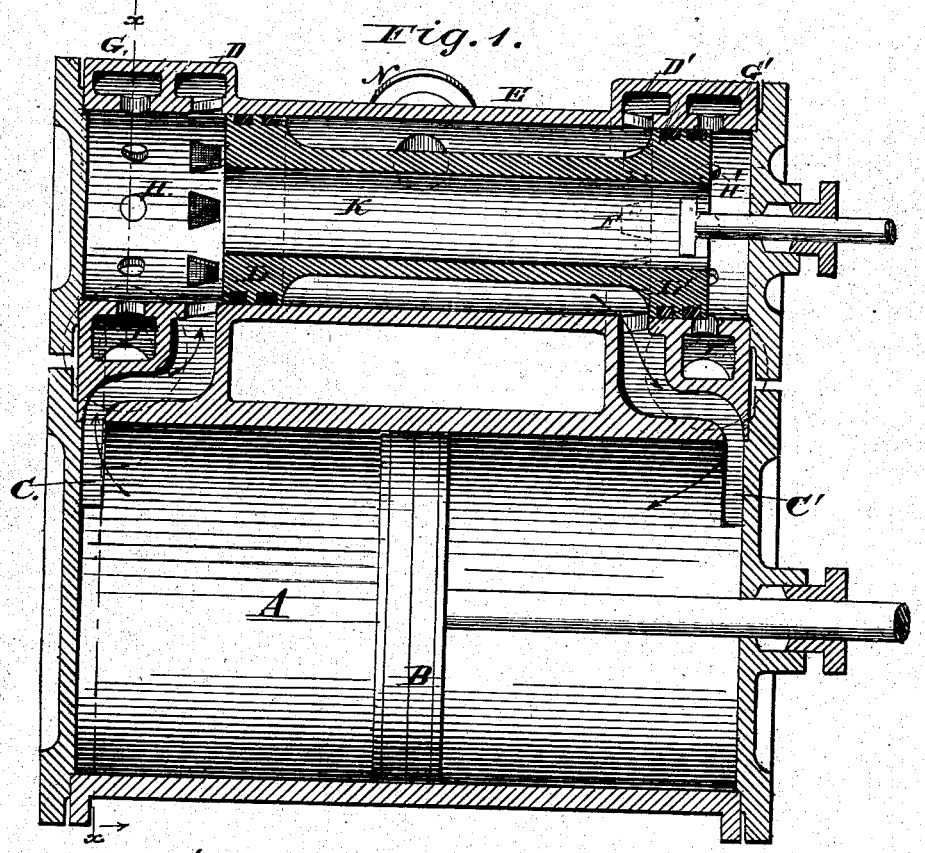


Fig. 2.

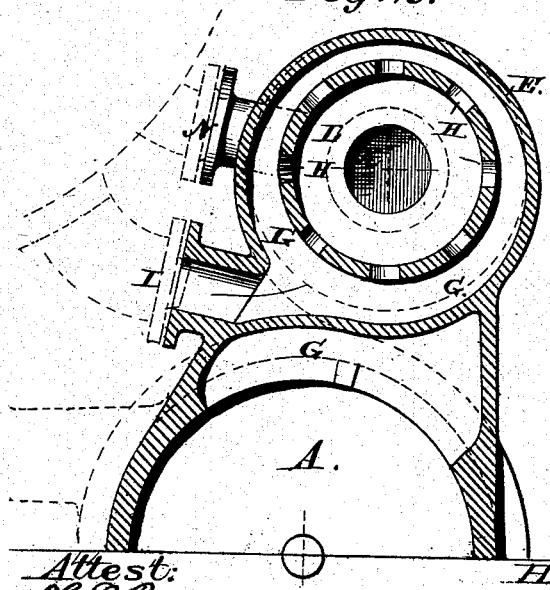
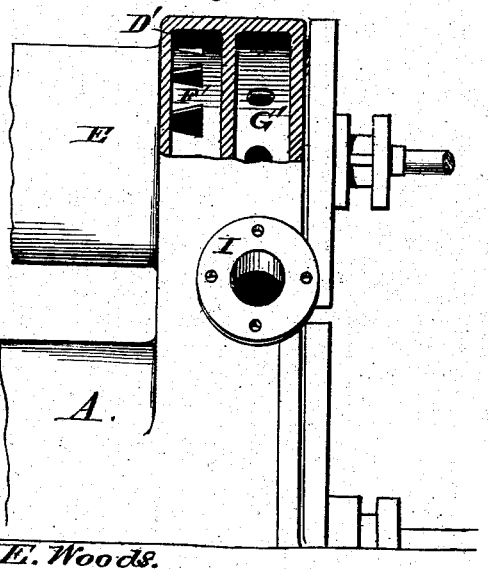


Fig. 3.



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HORACE E. WOODS, OF ROCK ISLAND, ILLINOIS.

IMPROVEMENT IN STEAM-ENGINE VALVES.

Specification forming part of Letters Patent No. **192,041**, dated June 12, 1877; application filed May 10, 1877.

To all whom it may concern:

Be it known that I, HORACE E. WOODS, of Rock Island, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification:

This invention relates to certain improvements in the construction of steam-engines; its object being to provide for using the steam expansively, and at the same time provide for the rapid discharge of the waste steam by means of peculiarly-constructed steam-ports.

My invention consists, essentially, of a valve-chest having a central induction-port, and surrounding annular chambers at each end, and constructed with the trapezoidal-shaped ports communicating with the cylinder of the engine and with one of said annular chambers at each end of the valve-chest, other ports communicating with the remaining chambers and with eduction-ports, a hollow valve, having at each end a piston, being arranged within the valve-chest, all of which will be fully hereinafter described in detail.

In the drawing, Figure 1 represents a longitudinal vertical section of the cylinder of an engine with my improvement applied thereto; Fig. 2, a vertical section of the same through the line *x x* of Fig. 1; and Fig. 3, a detached view of one end of the cylinder and valve-chest, with a portion of the outer shell of the latter broken away, showing the ports of said water-chest.

The letter A represents the engine-cylinder, and B the piston of the same. C C′ represent the ports leading to each end of said cylinder, said ports communicating, respectively, with two annular chambers, D D′, surrounding the valve-chest E, near each end, by means of the peculiarly-shaped ports F F′. The said ports are constructed in the shape of trapezoid, with the bases or enlarged portions toward the opposite ends of the valve-chest and the constructed portions toward the center of said valve-chest. The letters G G′ represent two annular chambers surrounding the valve-chest at its ends, and communicating with said valve-chest by means of the ports H H′, and with the eduction-ports at I I′. The letter K represents a hollow valve-stem, connecting the two pistons L and L′, which move in the valve-chest, and serve to control the induction and eduction of the steam to and from the ends of the cylinder alternately. N represents the induction-port, which enters the valve-chest between the two pistons of the valves.

The valve-chamber and steam-cylinder are preferably cast in one piece, although they may be separately formed and secured together in any convenient manner, if desired.

The operation of my invention is as follows: In Fig. 1 the piston of the engine is represented at its half-stroke, in which the ports F F′ are both entirely uncovered by the pistons, the port F being in full communication with the port C leading to the cylinder A, and connecting said port with the exhaust-port of the valve-chest. The port F′ is, at the same time, in full connection with the port C′, connecting it with the central portion of the valve-chest, and supplying steam to the cylinder. As the piston continues its stroke the piston L′ gradually moves toward the smaller or contracted portions of the ports F′, while the piston L will, at the same time, move toward the enlarged portions of the ports F.

It will be thus observed that the induction-ports are much more rapidly reduced in area than the eduction-ports, allowing the steam to work to a great extent expansively. When the piston of the engine arrives at the end of its stroke, the pistons of the valve will have passed the ports F and F′, leaving the smaller ends of the ports F, in connection with the central portion of the steam-chest, in position to commence to admit steam from the chest to the cylinder, and the larger ends of the ports F′ in position to commence exhausting from the cylinder. The piston-valve will still continue its motion in the same direction, gradually opening the ports F from their smaller to their larger ends, and gradually opening the ports F′ from their larger to their smaller ends, until the ports F and F′ are again fully closed, when the piston of the engine will be again on the half-stroke in the direction opposite to that shown in Fig. 1, when the engine will commence to work in a manner similar to that first described.

It will thus be perceived that the induction-ports of the engine, during the greater portion

of its operation, are smaller in area than the eduction-ports, by which I am enabled to hold the steam in the cylinder in order to work it expansively, and at the same time provide for the free and rapid eduction of the discharge steam.

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

The valve-chest E, having an induction-port, and the surrounding annular-chambers D D′ and G G′ at its ends, and constructed with the trapezoidal ports F, communicating with the cylinder of the engine and the chambers D D′, and the ports H H′, communicating with chambers G G′, and eduction-ports I I′, in combination with the hollow valve-stem K, having at its ends the pistons L L′, substantially as and for the purpose described.

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

HORACE E. WOODS.

Witnesses:
JOHN THOMPSON,
CHRISTIAN SCHILLINGER.