F. W. GORDON.
Steam-Valve.

No. 216,515. Patented June 17, 1879.

Fig 1

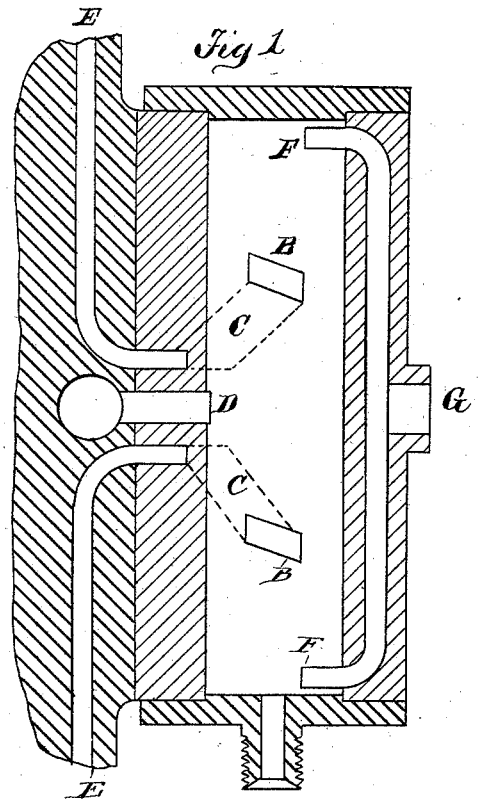
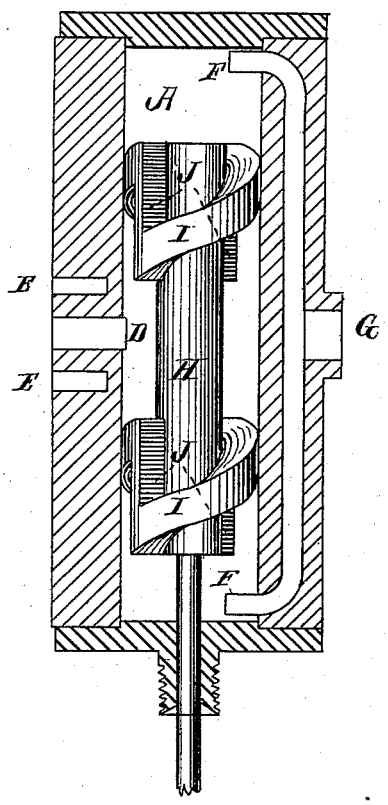


Fig 2



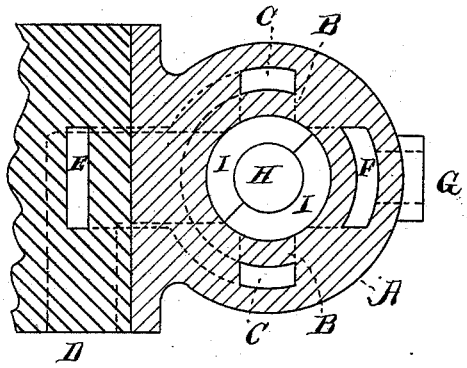


Fig 3.

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FREDERICK W. GORDON, OF IRONTON, OHIO.

IMPROVEMENT IN STEAM-VALVES.

Specification forming part of Letters Patent No. **216,515**, dated June 17, 1879; application filed February 25, 1879.

To all whom it may concern:

Be it known that I, FREDERICK W. GORDON, of Ironton, Lawrence county, Ohio, have invented a certain new and useful Improvement in Steam-Engine Valves, of which the following is a specification.

My invention relates to valves for permitting and regulating the admission and exhaust of steam to and from the cylinders of steam-engines.

It is of most utility in connection with special adaptations of the steam-engine to steam-hammers, steam-stamps, steam-rammers, direct steam-saws, and all such engines in which it is desirable to change the position of the end of the piston-stroke with reference to the end of the cylinder.

It is also applicable to engines worked by air or other vapor in the same manner as steam-engines, and is of utility in connection with ordinary types of engines, being applicable as a starting-gear.

In order to make the object of my invention clearly understood, I will ask the reader to imagine a steam-hammer provided with a common slide-valve, and with some proper device for shifting the valve at the ends of the stroke. Assume that the stroke of the piston is two feet, and that the hammer-dies touch at the end of the downstroke. If, now, a piece of work one foot thick be placed between the dies, it is obvious that the hammer will descend upon it, and that, owing to the nature of the valve-gear, it will not ascend for a new stroke. Before the hammer can lift for a new stroke the lower port must be opened, and to allow this the valve-stem must be lengthened. Upon the proper lengthening of the valve-stem, the valve takes a new position with reference to the piston, and the piston-stroke takes a new position with reference to the cylinder. The valve-gear may also be arranged so that, instead of moving the normal piston-stroke one foot higher up in the cylinder, the stroke will be shortened a foot, and this subtraction made entirely at the lower end. The design of such a valve-gear is called for in connection with all steam-hammers and analogous steam-engines; and the design generally consists of some device which, being properly adjusted by hand, will, through the medium of more or less complex link-work, effect a practical lengthening or shortening of the valve-stem.

I now take for illustration the case of a plain slide-valve engine of common type provided with the usual gear for working the engine by hand. Such gear consists most always of some unhooking device by which the valve-stem may be freed from the eccentric. It is an unsatisfactory contrivance, and much ingenuity has been expended upon contrivances which would permit the ready re-engagement of the hook.

The object of my invention is to produce a perfectly-balanced steam-engine valve whose relation to the piston may be changed by simple rotation.

My invention consists of a piston-valve whose main functional elements are formed of sections of a multiple-threaded screw so joined as to form complete pistons at each end of the valve.

In the accompanying drawings, Figure 1 is a longitudinal section of the cylindrical steam-chest; Fig. 2, the same with the valve in position, and Fig. 3 a transverse section of the same.

In Figs. 1 and 3, I have shown the steam-chest as being in position on a steam-cylinder, a portion only of which is shown, E E being the usual steam-passages.

B B are the steam-ports in the steam-chest, which is cylindrical, and these ports communicate with the engine-ports through the cored passages C. The ports B B are arranged helically and parallel with each other. Each end of the steam-chest has a pair of these ports, one being opposite the other, and both communicating with the same cylinder-port, the same as is usual with piston-valve arrangements, the object being to secure the most port-area with the least width of port.

The central port, D, may be either the entry or exhaust port. The channels F F place both ends of the steam-chest in communication with the orifice G, which may be either the entry or exhaust orifice, according to which office D performs.

I prefer to use D as the entry-port, as the ends of the valve are then subjected to the pressure of exhaust-steam only, and the ends

are thus practically balanced without the necessity of compensating for the area of the valve-stem.

In Fig. 2 is seen the valve. It is an ordinary piston-valve, save that its fitting surfaces are arranged helically instead of squarely around it. These fitting elements are, in fact, sections of the thread of a double square-threaded screw.

Each of the elements I extends half round the valve, and the terminations of the pair of elements at the same end of the valve are joined by the longitudinal ribs J, thus causing each end of the valve to form a complete piston. Were there but a single port, B, at each end of the steam-chest, then the elements I at the ends of the valve would consist of a single-threaded helix joined by a single rib, J, at each end of the valve.

In the same manner three ports, B, in each end of the steam-chest would require the valve to be composed of sections of a triple-threaded screw.

The elements I at the valve ends are parallel with each other, and the whole device forms a piston-valve having helical closing edges and ports to suit, and the valve may be operated by any device suitable for other piston-valves, the only special requirement being that the valve-stem be free to rotate, and that the valve be attached to the stem, so as to rotate with it.

It is obvious that any rotation of the valve has the effect of moving the edges of the elements I with reference to the ports B to the valve-gear and to the engine-piston.

Devices for rotating the valve are no part of my invention, and, in fact, require no invention, as they can be readily supplied by those skilled in the art.

I might suggest, however, that in the case of a steam-hammer the lower end of the valve-stem may be square, and slide through a stationary guide susceptible of being rotated by a hand or foot lever, either by direct attachment or through suitable gearing, to change the direction of lever-motion.

In the case of a stationary engine having this valve as its main valve, the valve-stem, free to rotate, may be provided with a hand-lever and a detent for the normal point. The valve may, by simple rotation, be made to open either port.

I claim as my invention—

A balanced piston-valve whose encircling ribs I are arranged in the form of sections of a multiple-threaded screw, when each end rib is made continuous by longitudinal ribs J, joining the proper terminations of the sections, as described, in combination with a double set of two or more ports in the steam-chest, the whole constructed and arranged substantially as shown and described.

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Witnesses:
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