A. J. STEVENS.

STEAM MOVED VALVES FOR ENGINES.

No. 181,370. Patented Aug. 22, 1876.

Fig. 1.

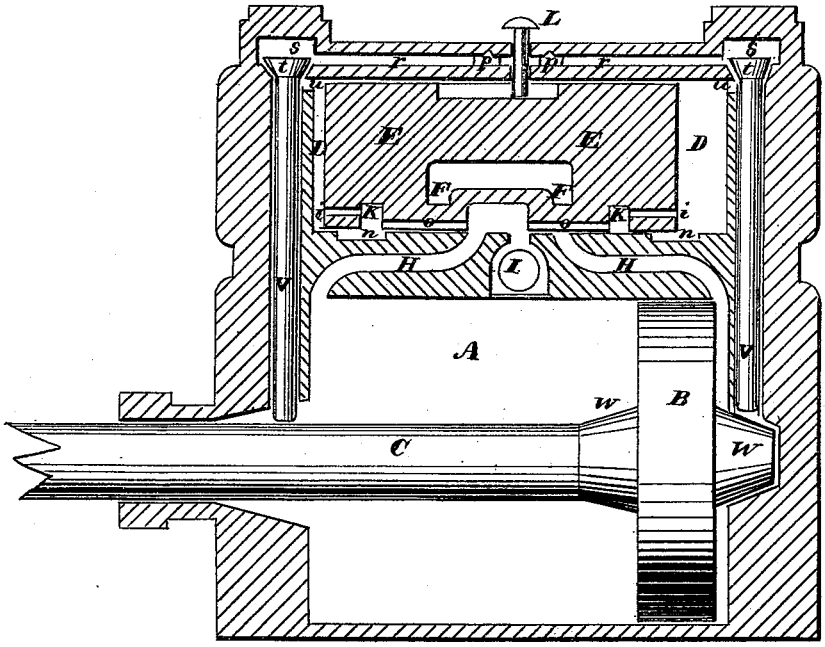


Fig. 2.

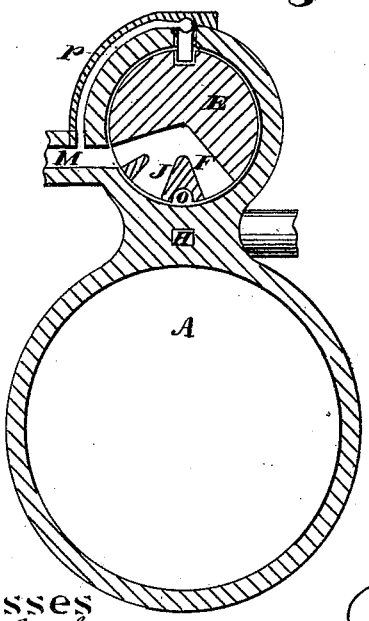


Fig. 3.

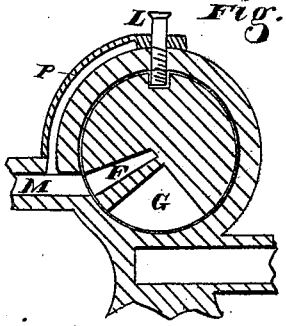
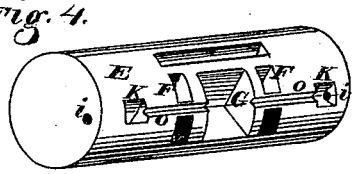


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

ANDREW J. STEVENS, OF SACRAMENTO, CALIFORNIA.

IMPROVEMENT IN STEAM-MOVED VALVES FOR ENGINES.

Specification forming part of Letters Patent No. **181,370**, dated August 22, 1876; application filed March 31, 1876.

To all whom it may concern:

Be it known that I, ANDREW J. STEVENS, of Sacramento city and county, State of California, have invented a Direct-Acting Steam-Engine; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention without further invention or experiment.

The object of my invention is to provide certain improvements in direct-acting engines of that class in which the valves are moved by steam and independently of any exterior mechanism.

My improvements consist in a novel construction and operation of valves for admitting steam to drive the main valve, which is also peculiarly constructed in detail.

Referring to the accompanying drawings for a more complete explanation of my invention, A is the steam-cylinder, containing the working-piston B, and having the piston-rod C extending through a stuffing-box, and thence into the pump-cylinder, where it connects with the pump-piston.

Above the steam-cylinder is the valve-chamber D, within which the main valve E moves. This valve is cylindrical in shape, moving from end to end of the chamber D, and has the main steam-ports F F and the main exhaust G formed in its lower surface, so as to correspond with the steam-passages H H, leading to the cylinder, and the exhaust-passage I, respectively.

The steam-ports F F are each made with a rib, J, of some thickness, standing vertically up in the middle, so that, while the steam passes freely over this rib, the face of the rib fits closely against the bottom of the valve-chamber, and has a small passage, *o*, made in its lower surface, which connects the main exhaust-port with the supplemental exhaust-ports *k*. This port is also made in the lower part of the valve, and, at the proper time, passes over a slot, *n*, made in the bottom of the chamber, and connecting with the end of the valve-chamber, so as to exhaust the steam from it after it has done its work. A small hole, *i*, extends from the port *k* to the end of the valve, and this serves as a regulator for the movement of the valve, by varying the size; or by its use the slot *n* can be dispensed with altogether, if desired. The valve is guided and prevented from turning by a pin, L, passing through the chamber and entering a slot made for it in the valve.

Steam is brought to the valve by a passage, M, and enters the ports F. A branch, P, from this passage extends up around the valve-chamber, and connects with small passages *r*, which lead to chamber S, beyond the ends of the main valve-chamber, as shown. Within these chambers S are small poppet-valves *t*, which admit steam to passages *u*, leading to the ends of the main valve-chamber, and by the alternate action of these valves the main valve receives steam, by which it is actuated. The stems V of these valves extend down, so as to stand just above the main piston-rod, their lower ends being properly shod with steel, and they are operated by means of inclined planes W, which are fitted to the piston, or the rod close to the piston, so that as the piston approaches either end of its stroke these inclined planes will alternately raise the valves *t*, and admit steam beneath them.

The operation of my engine will then be as follows: The piston being at one end of its stroke, the inclined plane upon that side, passing beneath the stem V, will lift the valve *t* upon that end from its seat. Steam having been admitted will fill the passages M, P, and *r*, and also the steam-ports F F in the valve E, by means of a side opening, *x*, in the valve. This brings one of the ports F over the passage H, leading to the end of the cylinder, and admits steam to drive the piston to the opposite end. The exhaust-port will then cover the opposite passage H and the exhaust-passage I, and allow the exhaust steam from the opposite end of the cylinder to escape. The movement of the valve E causes the supplemental exhaust-port *k* to connect with the end of the valve-chamber through the slot *n*, and this exhausts the steam from the rear of the valve E. The slot *n* stops far enough from the end of the valve-chamber to allow a portion of the exhaust steam to be retained, and thus cushion the valve at each end of the stroke.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The supplemental valves *t*, with their stems V, and the operating cones or inclines W in the main cylinder, in combination with the steam-passages *r* and *u*, the valve-piston, provided with ports *o*, *k*, and *i*, and the recess *n*, substantially as herein described.

2. The valve E, having the steam-ports F F and the exhaust-port G, and the ports *k*, *o*, and *i* upon its lower side, and the recess *m*, substantially as set forth.

ANDREW JACKSON STEVENS.

Witnesses:
JOHN RAFFERTY,
BEN SMITH.