

No. 817,385.

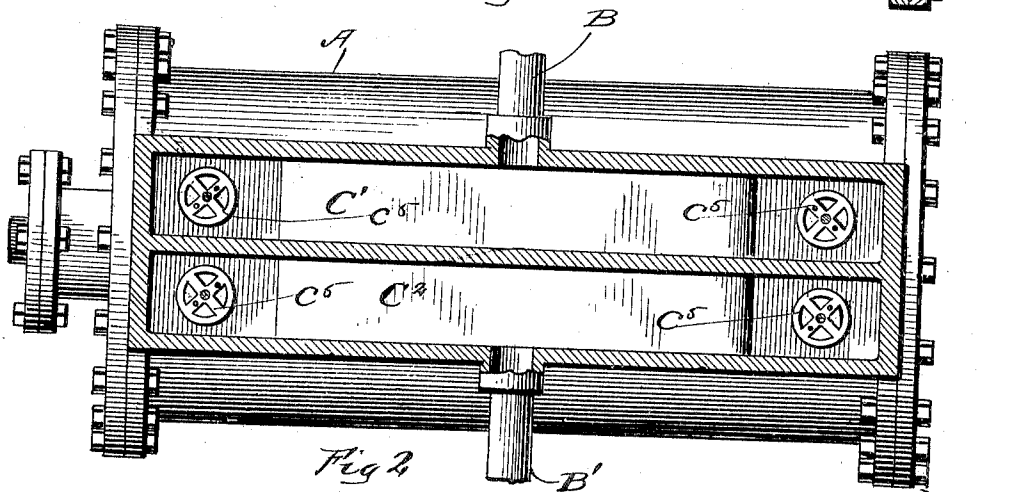
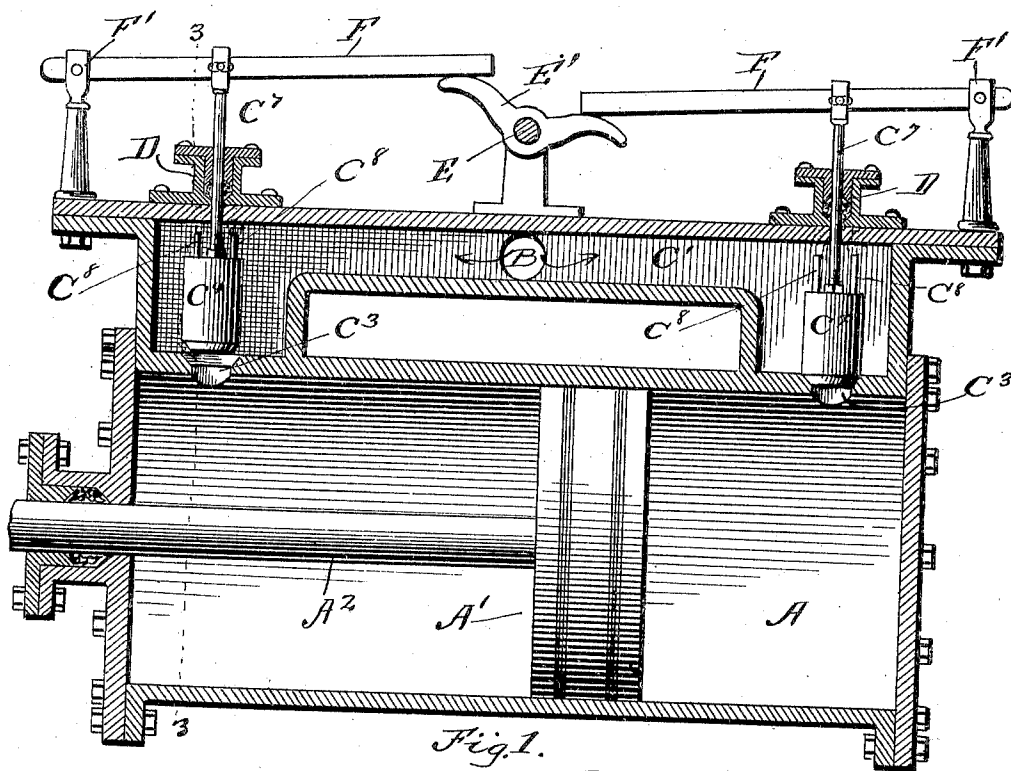
PATENTED APR. 10, 1906.

R. OWENS & R. BLACK.

STEAM VALVE.

APPLICATION FILED NOV. 8, 1904.

2 SHEETS—SHEET 1.



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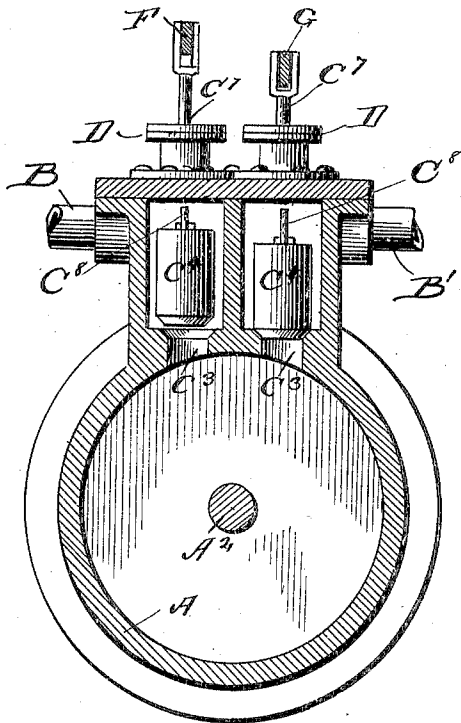


Fig. 3.

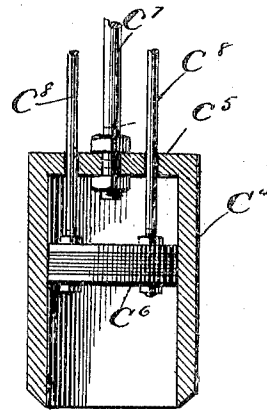


Fig. 4.

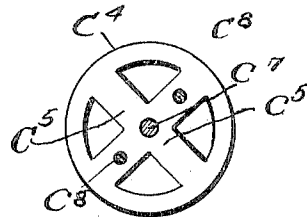


Fig. 5.

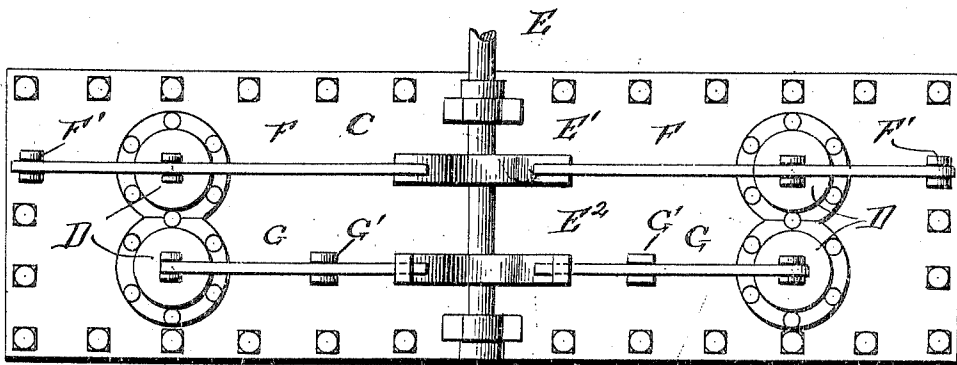


Fig. 6.

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UNITED STATES PATENT OFFICE.

ROBERT OWENS AND RUSSELL BLACK, OF CATLETTSBURG, KENTUCKY,
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STEAM-VALVE.

No. 817,385.

Specification of Letters Patent.

Patented April 10, 1906.

Application filed November 8, 1904. Serial No. 231,963.

To all whom it may concern:

Be it known that we, ROBERT OWENS and RUSSELL BLACK, citizens of the United States, residing at Catlettsburg, in the county of Boyd and State of Kentucky, have invented a new and useful Improvement in Steam-Valves, of which the following is a specification.

The object of this invention is an engine containing balanced steam-valves, both for the inlet and the exhaust ports.

The invention consists, essentially, in a hollow cylindrical valve having a piston therein.

With this object in view the invention consists in the novel features of construction and combination of parts hereinafter described, particularly pointed out in the claims, and shown in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical sectional view through the cylinder and steam-chest of an engine. Fig. 2 is a longitudinal horizontal section through the steam-chest. Fig. 3 is a section on the line 3 3 of Fig. 1, the valves, stems, and stuffing-boxes being shown in elevation. Fig. 4 is a detail sectional view of the valve. Fig. 5 is a plan view of the valve, parts being shown in section. Fig. 6 is a plan view of the steam-chest.

In the drawings, A represents a cylinder, in which works the piston A', having the usual piston-rod A². Steam and exhaust pipes B and B', respectively, are provided leading to and from the steam-chest C. This chest is divided longitudinally into two compartments C' and C², the compartment C' forming the steam-chamber and the compartment C² forming the exhaust-chamber. Ports C³ give communication with the cylinder A at points adjacent each end of each of the compartments C' and C², the said ports being formed to provide valve-seats for the valves C⁴. We provide four valves, two in the steam-chamber C' and two in the exhaust-chamber C², and all are similar in construction.

Referring more particularly to Fig. 4, it will be noted that the valve C⁴ is hollow and upwardly and downwardly open, being beveled at its lower end to fit the valve-seat formed at the upper end of the port C³, controlled by the valve. At its upper end the valve is formed with an integral web C⁵, and in the valve

works a piston C⁶, to which is connected suitable guide-rods C⁸, and these guide-rods pass upwardly and loosely through the members of the web C⁵, as clearly shown in Figs. 4 and 5. The valve-stem C⁷ is connected to the center of the web and passes upwardly through a suitable stuffing-box D. A rock-shaft E is transversely journaled on the top of the steam-chest C and carries rocker-arms E' and E². Levers F are pivoted at their outer ends to standards F', carried adjacent the ends of the steam-chest C, and their free inner ends rest upon the curved end portions of the rocker-arm E'. Intermediate their ends the levers F are pivotally connected to the upper ends of the stems C⁷ of the valves arranged in the steam-chamber C'. The rocker-arm E² is arranged on the rock-shaft E above the exhaust-chamber C², and levers G are pivoted intermediate their ends to standards G', carried by the chest C, and the inner ends of these arms are connected to the ends of the rocker-arm E², and their outer ends are pivotally connected to the upper ends of the valve-stems C⁷ of the valves C⁴, arranged in the exhaust-chamber C². It will be obvious, therefore, that the valves arranged in the steam-chamber C' will be oppositely acting relative to those in the exhaust-chamber.

It will be obvious that after the valve C⁴ has seated itself the piston C⁶ will have a slight free play within the valve without lifting the valve from engagement with the valve-seat, the guide-stems contacting at their upper ends with the wall of the chamber C', preventing the piston engaging the valve-web. Steam being admitted into the valve on both sides of the piston, the latter will take up the pressure of steam upon opposite sides of the valve, and the valve will therefore be practically balanced, and only the weight of the valve plus the slight pressure upon the web will have to be overcome in order to lift the valve.

It will be obvious that as the inner ends of the arms or levers F rest freely upon the rocker-arm E' the valves C⁴, having their valve-stems C⁷ connected to said levers, are free to move upward independently of movement of the rocker-arm. The ends of the rocker-arm E² are turned upwardly and slotted, the inner ends of the levers G resting freely in the slots, as shown in dotted lines, and the pis-

tons C⁶ in the exhaust-valves also have a limited freedom of movement independent of movement on the part of the valve-casing C⁴.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. An engine-valve comprising a cylindrical casing upwardly and downwardly open, having a web at the top and beveled at its lower end, a piston therein, guide-rods carried by the piston and extending upwardly through the web, and a valve-stem connected to the web.

2. The combination with a steam-cylinder having ports adjacent each end, a steam-chamber having communication with each of said ports, said steam-chamber being divided longitudinally into two compartments, each compartment having communication with two of said ports, a steam-supply pipe opening into one compartment, an exhaust-pipe

leading from the other compartment, elongated valves arranged in each compartment and adapted to close the said ports, each valve being open at each end, a web being formed at the outer end of each valve, a piston arranged in each valve adapted to prevent passage of steam through the valve, valve-stems extending outwardly through the walls of the steam-chamber, pivoted levers carried by the said chamber, means for connecting the valve-stems to said levers, and the rock-shaft adapted to move the levers and actuate the valves oppositely with respect to each other and independent of movement of the pistons in the valves.

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