(No Model.) 2 Sheets—Sheet 1.

J. S. BARTLETT.

STEAM ACTUATED VALVE.

No. 325,900. Patented Sept. 8, 1885.

Fig. 1.

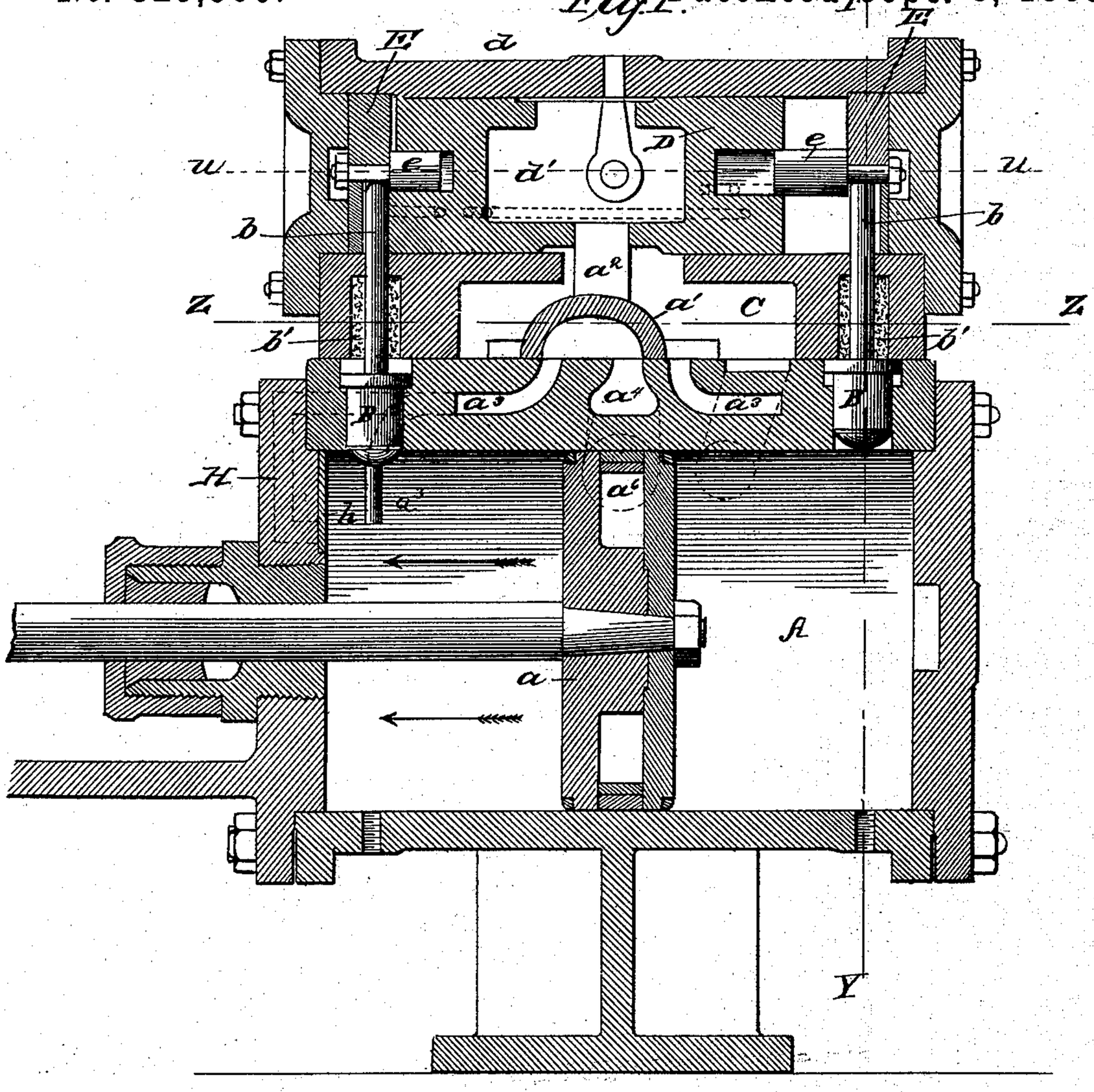
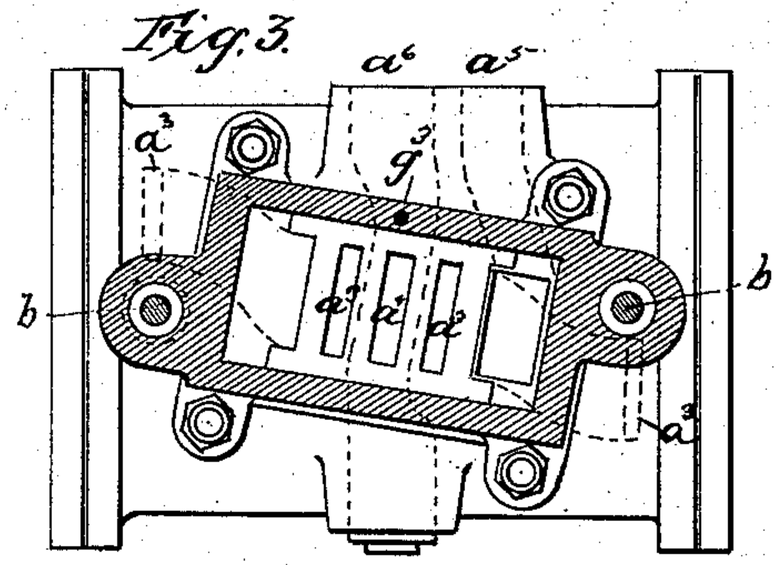


Fig. 3.



WITNESSES:

Fred. G. Dieterich

Solon C. Kemon

INVENTOR:

J. S. Bartlett

BY Munn & Co

ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

J. S. BARTLETT.

STEAM ACTUATED VALVE.

No. 325,900. Patented Sept. 8, 1885.

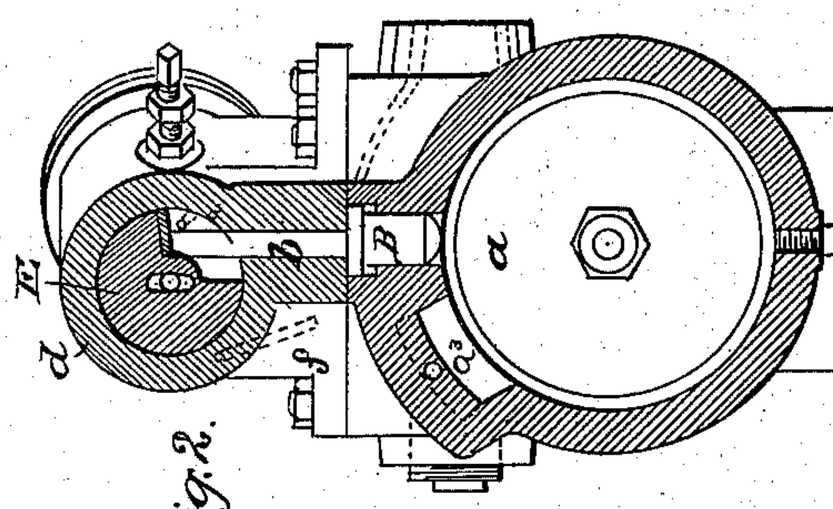
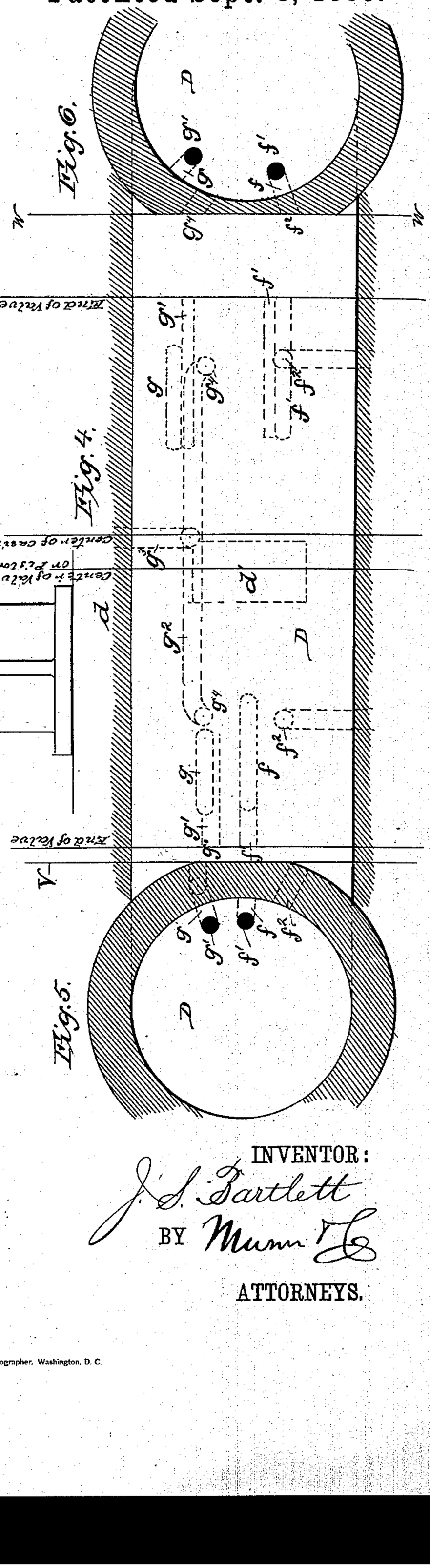


Fig. 2.



WITNESSES:

Fred. G. Dieterich

Solon C. Kemon

INVENTOR:

J. S. Bartlett

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN SMITH BARTLETT, OF AKRON, OHIO.

STEAM-ACTUATED VALVE.

SPECIFICATION forming part of Letters Patent No. 325,900, dated September 8, 1885.

Application filed February 27, 1885. (No model.)

To all whom it may concern:

Be it known that I, JOHN SMITH BARTLETT, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Steam-Actuated Valves for Engines, of which the following is a description.

Figure 1 is a vertical longitudinal section through the center of my improved steam-engine. Fig. 2 is a cross-section through the same taken on the line *y y* in Fig. 1. Fig. 3 is a plan view of the ports in the steam-cylinder, showing the steam-chest in section through the line *z z* in Fig. 1. Fig. 4 is a plan view of the piston which actuates the slide-valve, showing the cylinder in which it works in section on the line *u u* in Fig. 1. Figs. 5 and 6 are end views of the piston which actuates the slide-valve, showing the cylinder in which it works in section on the line *v v* and *w w*, respectively, in Fig. 4.

My invention relates to steam-engines; and it consists in the detailed construction and combination of the parts hereinafter fully described, by which the steam is admitted to the cylinder and exausted therefrom.

In the accompanying drawings similar letters of reference indicate corresponding parts.

A is the steam-cylinder, provided with a piston, *a*, of ordinary construction. *a'* is a slide-valve, having the projecting lug a^2 on the back of it, but otherwise constructed to admit and exhaust the steam through steam-ports a^3 and exhaust-port a^4 in the usual manner. a^5, Fig. 3, is the steam-pipe, and a^6 the exhaust-pipe.

B are tappets provided with stems *b'*, passing upwardly through the recess *b'* in the steam-chest. The recess *b'* is filled with Babbitt metal or other packing to keep steam from leaking out round the stems *b*.

C is the steam-chest in which the slide-valve *a'* works. The ports in this steam-chest are arranged somewhat diagonally, in order that the tappets B may both come on the center line of the cylinder at the top, as shown in Fig. 4, and still permit them to act on one side of the center of rotary plates, as shown in Fig. 2.

D is a long hollow piston working in the cylinder *d*, and situated immediately over the top of the slide-valve. *d'*, Figs. 1 and 4, is a slot in piston D, with which the projecting lug a^2 on the slide-valve engages, so that the said piston D cannot move endwise without also moving the slide-valve, but is free to rotate to a limited extent in either direction without affecting the slide-valve, the said slot being carried round part of the circumference of the said piston, so as to leave plenty of clearance on either side of lug a^2.

E are heads working in the counterbore at the ends of cylinder *d*. These heads are adapted to receive a slight rotary movement from the stems *b* of the tappets B, as shown in Fig. 2, and are provided with connecting-pieces *e*, which couple them to the ends of the piston D and communicate to the said piston D all the rotary movement which the heads E receive from the tappets B. The piston D can, however, move lengthwise in cylinder *d* without operating on the heads E. The tappets B are arranged to rotate the heads E and piston D in opposite directions, so that when one of the said tappets is raised by the piston *a* striking against it, it will immediately press down the tappet at the other end of the cylinder.

The piston D has upon its surface four channels, *f f* and *g g*, which channels communicate with the space between the ends of the said piston and the heads E by the holes *f' f'* and *g' g'*. The channels *f* and holes *f'* are for admitting steam from the steam-chest C to the ends of cylinder *d* between piston D and the heads E, while the channels *g* and holes *g'* are for exhausting the steam therefrom after it has acted upon the said piston D. Two passages (marked f^2) are provided in casing *d*, which connect the channels *f* with the steam-chest C. A channel, g^2, is also formed in the thickness of the metal of casing *d*, and provided with passages g^3 and g^4, which connect the channels *g* with the exhaust-pipe a^6. (See Fig. 1.)

Steam is admitted to and exhausted from cylinder A as follows: When the piston *a*, traveling in the direction of the arrow in Fig. 1, approaches the front end of its stroke, it lifts up the tappet B at the front end of the cylinder. The stem *b* turns the head E at that end of the cylinder, and with it the piston D in cylinder *d*, causing the said piston to rotate (see Figs. 4 and 5) until the end of channel *f* is directly over the end of passage f^2 at the front end of the cylinder. This rotary movement also places channel *g* of piston D in communication with passage g^4 and channel g^2 in

cylinder *d*, and allows any steam between the end of piston D and head E at that end of cylinder *d* to escape through passage g^3 into the exhaust-pipe a^6. Steam flows from the steam-chest up passage f^2 at this end of cylinder *d* through channel *f* and hole *f'*. The pressure of this steam forces over the piston D, and with it the slide-valve *a'*, thus admitting steam to the front end of cylinder A. The piston *a* then moves in the opposite direction to the arrow in Fig. 1 until the back end of the cylinder is reached and the tappet at that end raised. A similar series of movements then occurs at the back end of the cylinder. When the piston *a* approaches either end of cylinder A sufficiently to entirely cover either one of ports marked a^3, cushioning of the exhaust-steam takes place. In order that the piston may start back when the slide-valve is moved over without losing the beneficial effect of this cushioning, a supplementary port, H, is provided in the cover at either end, connecting port a^3 with the extreme end of the cylinder. The end of this port is covered with flap-valve *h*, which is held down when the cushioning occurs, and opens when the pressure of the steam comes behind it sufficiently to let enough steam pass it to start back the piston on its return-stroke.

As the ports a^3 and H are arranged diagonally to the cylinder, as shown in Fig. 3, there is but one point (shown in Fig. 1) where the said ports open into the cylinder, and that is on the left-hand side of Fig. 1, the mouth of the ports a^3 on the right hand being in the half of the cylinder that is cut away.

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

1. In a steam-engine, the combination of cylinder A, piston *a*, slide-valve *a'*, having lug a^2, tappets B, having stems *b*, heads E, provided with connecting-pieces *e*, piston D, having channels *f f* and *g g*, and holes *f' f'* and *g' g'*, cylinder *d*, having channel g^2, and the passages f^2, g^3, and g^4, substantially as described and shown, and for the purpose set forth.

2. In a steam-engine, the combination of the tappet B, actuated by the piston at the ends of its stroke, the head E, receiving rotary motion from said tappet-valve, connecting-piece *e*, and piston D, provided with channels for admitting steam behind it, substantially as shown and described.

3. In a steam engine, the combination of the tappet B, head E, connecting-piece *e*, piston D, receiving rotary motion from said tappet, and having channels *f* and *g* and holes *f'* and *g'* therein, cylinder *d*, having channel g^2, and the passages f^2, g^3, and g^4, substantially as described and shown.

4. The combination, with a steam piston and cylinder having tappets B, of a set of ports and valves, and rotary piston D, all arranged obliquely to the axis of the cylinder to permit said tappets to operate on one side of the axis of the rotary piston, substantially as described and shown.

JOHN SMITH BARTLETT.

Witnesses:
M. A. CRAIG,
D. G. CHURCH.