

T. MALCOLMSON.
ROTARY STEAM VALVE.

No. 179,861.

Patented July 18, 1876.

Fig. 1.

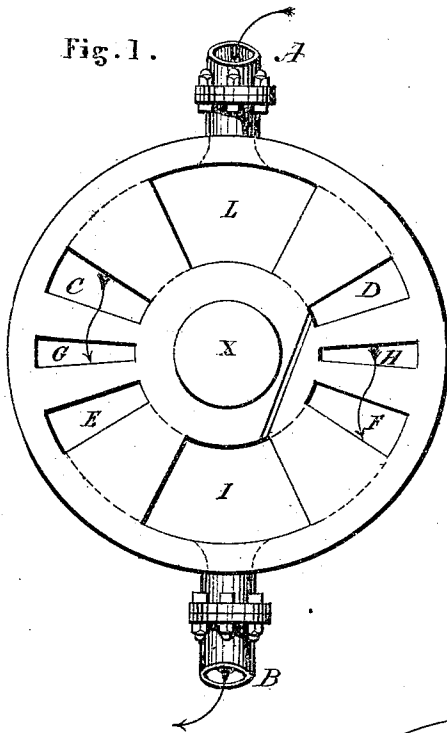


Fig. 2.

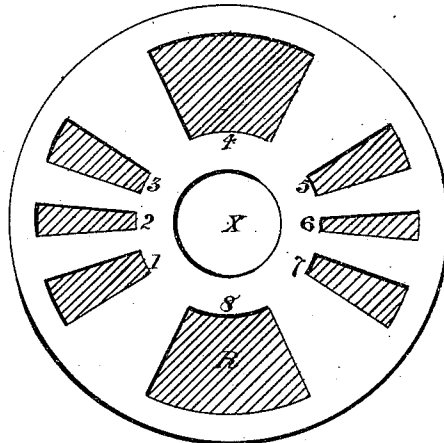
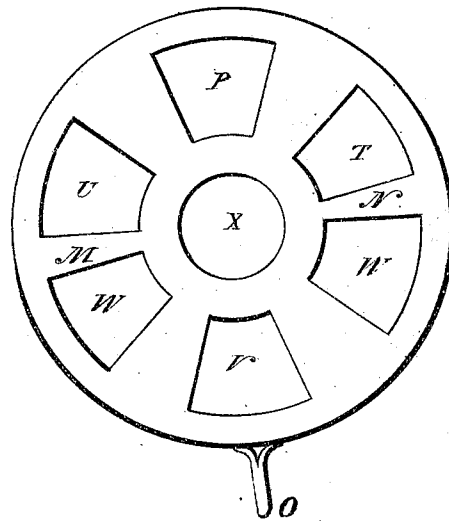


Fig. 3

WITNESSES :

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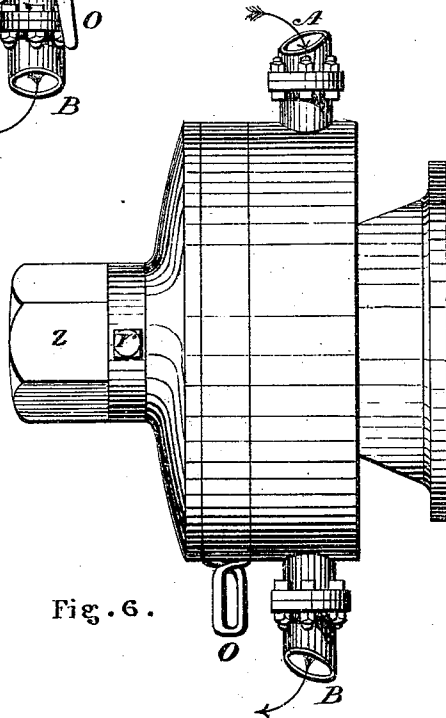
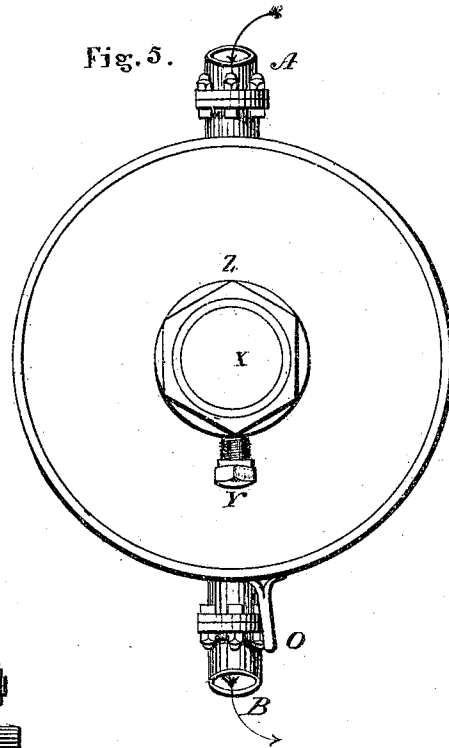
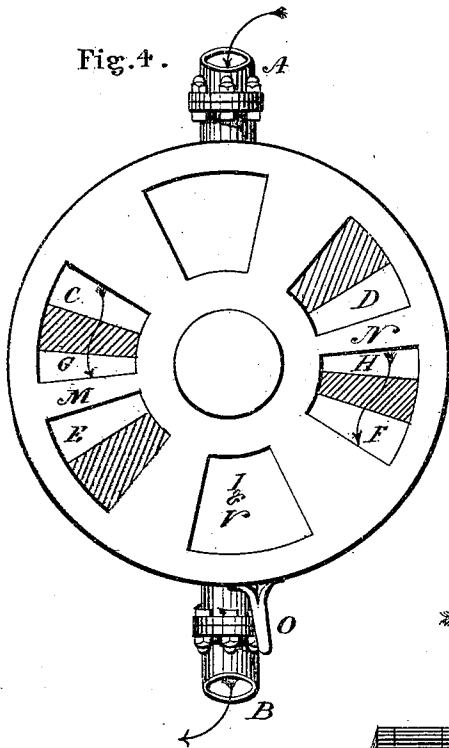
INVENTOR :

Thomas Malcolmson.

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UNITED STATES PATENT OFFICE,

THOMAS MALCOLMSON, OF OIL CITY, PENNSYLVANIA.

IMPROVEMENT IN ROTARY STEAM-VALVES.

Specification forming part of Letters Patent No. **179,861**, dated July 18, 1876; application filed April 7, 1876.

To all whom it may concern:

Be it known that I, THOMAS MALCOLMSON, of Oil City, in the county of Venango and State of Pennsylvania, have invented a new and Improved Oscillating Balance Steam-Valve, which invention is fully set forth in the following specification, reference being had to the accompanying drawings.

The object of my invention is to construct a balance-valve for steam-engines in such a manner as to avoid as much as possible unnecessary friction, and thereby prevent the wear or cutting of the valve and valve-seat, and to operate easily, and to be easy of access.

Figure 1 represents the valve-seat, which is attached to the steam-cylinder.

A is the induction-pipe; B, the eduction-pipe or exhaust-pipe; C and D the induction-ports connected with the pipe A, and are always full of live steam—*i. e.*, exposed to boiler-pressure when the engine is in motion. E and F are the exhaust-ports, and are connected with the pipe B. G and H are the cylinder-ports, through which the steam is admitted before and behind the piston-head alternately. G and H are the ports through which the steam from the boiler passes into the cylinder from C and D, and also permits the exhaust steam to pass out of the cylinder into the exhaust-ports E and F.

I is a shallow steam-chamber in the valve-seat, connected with the port D by the channel K, so that it is always full of live steam, and when the steam is on the pressure is equal on the valve at the three points, C, D, and I.

Fig. 2 represents the valve removed from the valve-seat. It is a circular plate of metal, with the steam-chambers V, U, T, and W W therein. P is only a blank chamber to remove surplus metal. V U T are always full of live steam, and W W are exhaust-chambers.

Fig. 4 represents the valve on the valve-seat, and shows the relative position of the steam-ports with the steam-chambers in the valve, I showing the bottom of the shallow steam-chamber in the valve-seat seen through the steam-chamber V in the valve.

C, D, E, F, and G H show the ports in the valve-seat, as described, seen through the steam-chambers in the valve.

M N constitute the valve proper, and when the valve-plate, represented in Fig. 2, is oscillated by the arm O, connected with the engine by crank or cam, as valves are usually operated, the parts M and N alternately open and close the cylinder-ports G and H.

Fig. 3 represents the cap of the valve removed so as to show its inner surface.

At X on the valve-seat is a bolt or stud, which passes through a hole, X, in the center of the valve-plate, (see Fig. 2,) and also through the cap, Fig. 3, where it is secured by a nut, Z, and set-screw Y, as shown at Fig. 6. The valve-plate oscillates between the seat, Fig. 1, and the cap, Fig. 3.

Fig. 5 shows an end view of the valve when attached together by the bolt and nut and set-screw. Fig. 6 is a side view of the valve with all its parts adjusted in working order.

On the face of the cap (see Fig. 3) are represented the steam-chambers 1 2 3 4 5 6 7 8. These are shallow depressions made in the cap, one of them, 8 R, being a blank to correspond with the blank L, Fig. 1, so as to have no greater amount of metal surface brought in contact than is possible, and when the valve-plate, Fig. 2, is put on the valve-seat Fig. 1, and the cap, Fig. 3, adjusted in its proper place, the steam-chambers 1 2 3 4 5 6 7 in the cap are all filled with steam, thus pressing the valve-plate against the valve-seat with the same force that it is forced off the seat by the steam in the ports and the chamber I.

By this construction the valve-plate oscillates between the valve-seat and cap, with the steam pressing both sides alike, thus and thereby making a perfect balance-valve.

What I claim as my invention is as follows, to wit:

The valve-plate, having steam-ports T U V and exhaust-ports W W, operating in combination with the valve-seat, having cylinder-ports G H, exhaust-ports E F, and steam-ports C and D, and chamber I communicating with the latter, and the cap having ports corresponding with those in the seat, substantially as and for the purpose specified.

THOMAS MALCOLMSON.

Witnesses:

A. B. RICHMOND,
O. B. GOODWIN.