I. MUNDEN.

ROTARY VALVE FOR COMPOUND ENGINES.

No. 193,455. Patented July 24, 1877.

Fig: 1.

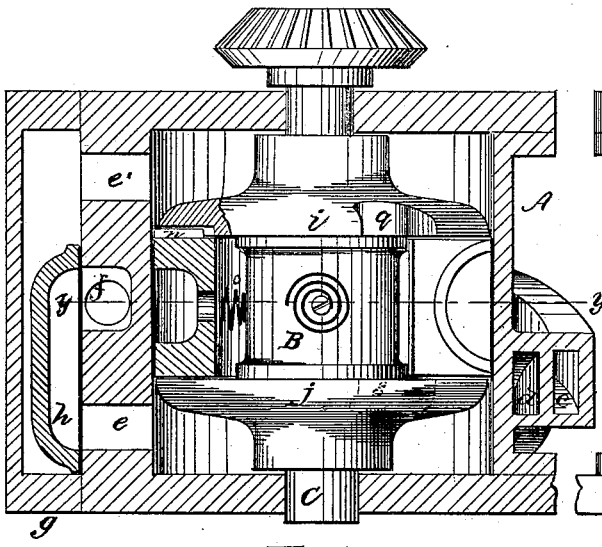


Fig: 2.

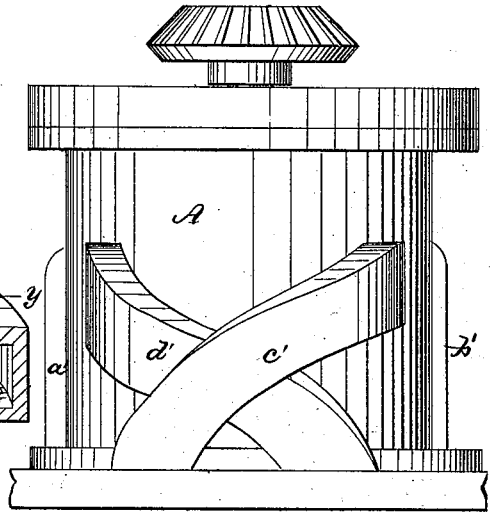


Fig: 3.

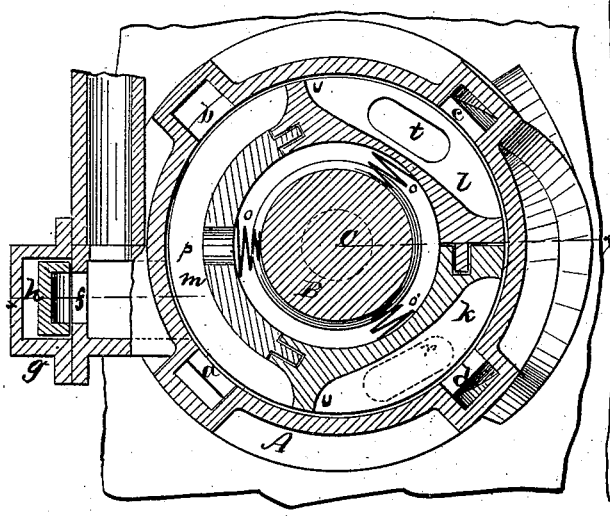


Fig: 4.

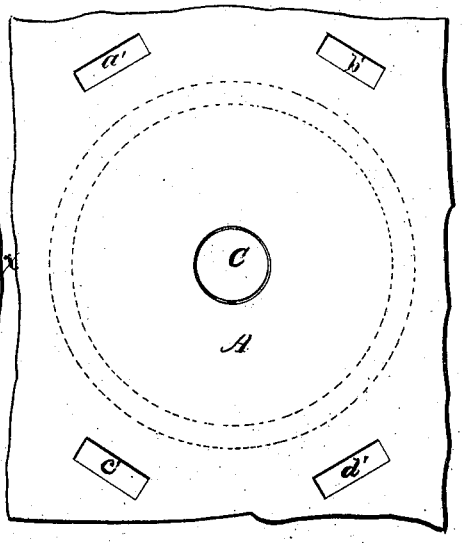


Fig: 5.

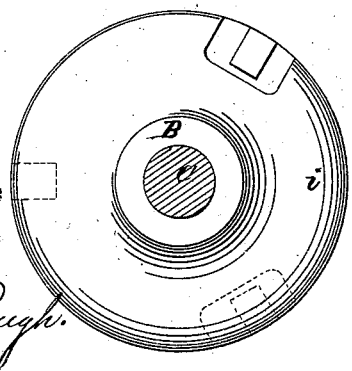
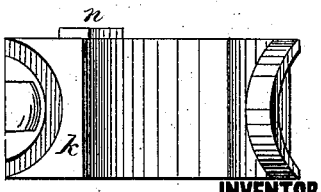


Fig: 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ISAAC MUNDEN, OF BRADENVILLE, PENNSYLVANIA.

IMPROVEMENT IN ROTARY VALVES FOR COMPOUND ENGINES.

Specification forming part of Letters Patent No. **193,455**, dated July 24, 1877; application filed April 30, 1877.

To all whom it may concern:

Be it known that I, ISAAC MUNDEN, of Bradenville, in the county of Westmoreland and State of Pennsylvania, have invented a new and Improved Rotary Valve for Compound Steam-Engines, of which the following is a specification:

Figure 1 is a central section of my improved valve, taken on line *x x* in Fig. 3. Fig. 2 is a side elevation. Fig. 3 is a transverse section on line *y y* in Fig. 1. Fig. 4 is an inverted plan view, showing the arrangement of the steam-passages. Fig. 5 is a detail view of the valve-carrier. Fig. 6 is a detail view of one of the sections of the valve.

Similar letters of reference indicate corresponding parts.

My invention relates to rotary valves for compound steam-engines.

It consists in the arrangement of a hub carrying a circular valve, that is made in three divisions. The casing of the said valve is provided with four ports, which admit steam into two cylinders, and with two ports connecting with a reversing-valve.

The object of the invention is to provide a valve that will admit steam to the first cylinder in the engine at the boiler-pressure throughout its entire stroke, and conduct steam from this cylinder to the auxiliary cylinder, and from thence to the exhaust-passage of the valve-casing, as hereinafter fully described.

Referring to the drawing, A is the cylindrical valve-chest, having the ports *a b c d*, which are connected with the cylinders by the steam-passages *a' b' c' d'*. Ports *e*, *e'*, and *f* are formed in the side of the cylinder, and covered by a steam-chest, *g*, which contains a D-valve, *h*, which is capable of covering either of the outside ports *e* and the central port *f*. By means of this valve the steam may be directed into either end of the cylindrical valve-chest. B is a hub that is secured to the shaft C, that is journaled centrally in the heads of the valve-chest A, and is provided with flanges *i j*, between which the segments *k l m* are placed. These segments of the valve are fitted together by tongues and grooves, to form a steam-tight joint between them, and they are provided with lugs *n*, which fit in corresponding recesses in the flanges *i j*, which prevent the valve-segments from slipping. Springs *o* are attached to the hub B, for forcing the valve-segments outward against the interior surface of the valve-chest A. An aperture, *p*, is made in one of the valve-segments, to admit steam between the said segments and the hub B. A notch, *q*, is made in the flange *i*, and an aperture, *r*, is made in the side of the valve-segment *k*. A notch, *s*, is made in the flange *j*, and an aperture, *t*, is made in the valve-segment *l*. The steam-spaces in the valve-segments *k l* are separated by the portion *u* of the segments, which is wide enough to cover either of the ports *a b c d*. The steam-space in the valve-segment *m* is of sufficient length to cover two of the ports *a b c d* through a fraction of a revolution of the valve. The shaft C is connected with the main shaft of the engine by means of any suitable gearing that will cause it to rotate with a positive motion at the same rate of speed as the main shaft.

The operation of my improved valve is as follows: Steam is admitted through one of the ports *e e'*. In the present case it is admitted through the port *e*, whence it passes through the openings *q* in the flange *i*, and through the opening *r* in the valve-segment *k*, which admits the steam through a quarter of a revolution to the several ports *a b c d* in succession. These ports are connected with the steamways of the two cylinders by the passages *a' b' c' d'*, the passages *a' c'* being connected with one of the cylinders, and the passages *b' d'* being connected with the other cylinder. The passages *d' c'* cross at the side of the steam-chest, to secure the required relation between the steamways of the cylinders and the division of the valve. The valve-segment *m* follows the segment *k*, and conducts the steam from the exhaust side of the piston, which is receiving steam through the valve-segment *k*, to the end of the cylinder at the opposite side of the valve, which is diagonally opposite that portion of the cylinder that receives the steam through the valve-segment *k*. The segment *l* follows the segment *m*, and as it passes the several ports of the valve-chest the steam escapes through the opening *t*, and thence through the ports *e* and *f* to a condenser, or into the open air. By moving the

valve *h* so as to cover the port *e'* and uncover the port *e*, steam is admitted, where before it escaped, and the action of the engine and valve is reversed.

The advantages claimed for this invention are, its economy in the use of steam, the facility with which the engine may be reversed, and its simplicity and compactness.

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

The combination of the valve-chest A, having ports *a b c d*, and the hub B, having flanges *i j* and valve-segments *k l m*, tongued and grooved together, substantially as shown and described.

ISAAC MUNDEN.

Witnesses:
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