W. F. LEOPOLD.

ROTARY ENGINE.

No. 180,606. Patented Aug. 1, 1876.

Fig. 1.

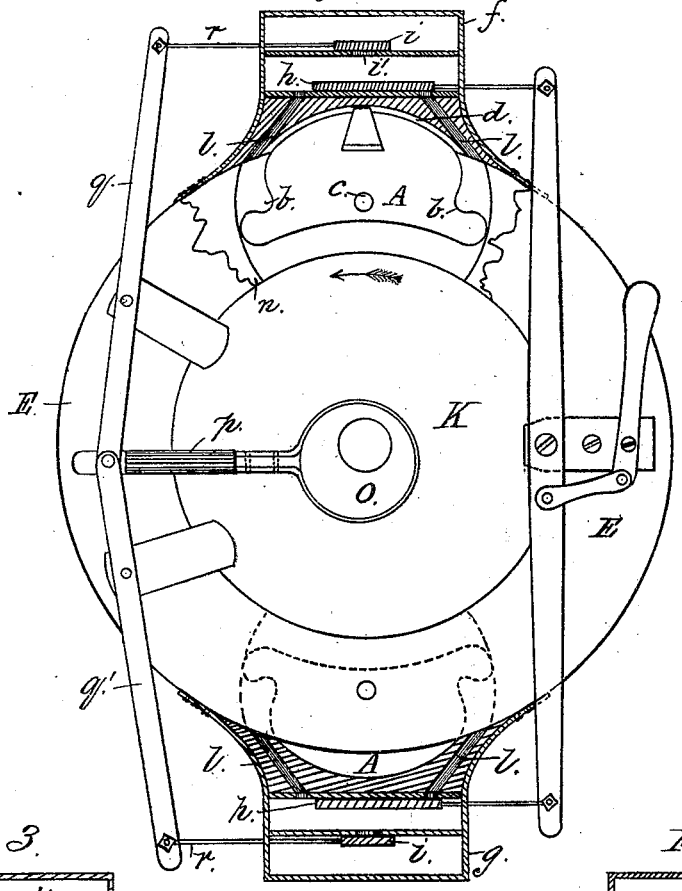


Fig. 3.

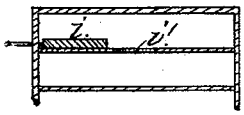


Fig. 4.

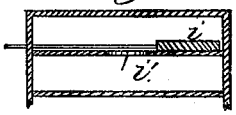
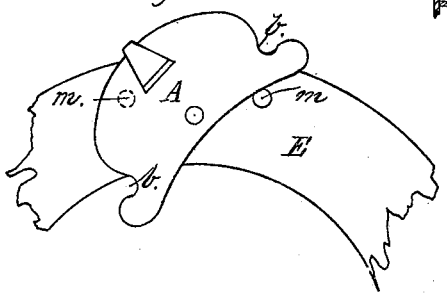


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM F. LEOPOLD, OF ST. JOSEPH, MISSOURI.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **180,606**, dated August 1, 1876; application filed December 27, 1875.

To all whom it may concern:

Be it known that I, WILLIAM F. LEOPOLD, of the city of St. Joseph, county of Buchanan, and State of Missouri, have invented new and useful Improvements in Rotary Steam-Engines; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

My invention consists in the employment in a rotary engine of abutments provided with pockets, and arranged to rock, and also serving automatically to open and close the exhaust-pipes, the construction permitting the wheel to be reversed or run in either direction.

In the drawings, Figure 1 is a front view of an engine embodying my invention, a portion being broken away to show the parts within; Fig. 2, a detached view of one of the abutments; and Figs. 3, 4, slide-valves.

The rocking abutment A is provided with a pocket, *b*, on each side of its pivot or axis *c*, these pockets serving to receive a full charge of incoming steam, and to insure a successful working of the abutment. This rocking abutment is arranged to work at its upper part in a chamber, *d*, located on the exterior of the wheel-case E, and above which chamber are the two steam-boxes *f g*, each of which is provided with an appropriate valve, *h* and *i*, respectively. The valve *i*, it will be understood, opens and closes twice during each revolution of the wheel K.

The inlet-ports from the steam-box are shown at *l l*, and an exit-pipe or outlet for the escape of exhaust steam is shown at *m*, its mouth being so located as to be closed and opened by the face of the abutment A during its rocking movements. (See Fig. 2.)

The periphery of the wheel K and the adjacent face of the casing A may be concaved to a semicircle in cross-section, as in the Harwood patent, No. 168,837, dated October 19, 1875, so as to form, in fact, an annular cylindrical tube.

The steam-boxes, where only two are employed, are placed directly opposite each other, one on each side of the shaft of wheel K, and in the same vertical line. When I employ four, six, eight, or ten ports, they are placed equidistant from each other, and so actuated that the pressure upon the journals is counterbalanced.

When the wheel K (revolving in the direction of the arrow) has carried the piston-head to the point *n*, the valve *i* gradually withdraws from the port *i'*, the steam rushes through the upper and the lower port, and, striking in the pocket *b* of the cylinder-head A, throws that end of it down against the wheel, as shown in Fig. 2, thus forming the abutment. The opposite end of the abutment being at the same time correspondingly raised, the exhaust steam then escapes at the rear of this abutment A through the exhaust-pipe, connected at *m*.

For operating the valves in the steam-chests I employ an eccentric, O, on the axis of the wheel K, the rod *p* of this eccentric being connected with and actuating the levers *q q'*, each of which actuates its respective slide-rod *r* and its attached slide-valve, the opening in the valve-seat and the valve being such that the valve shall be opened and closed twice in each revolution of the wheel—viz., once at long radius and once at short radius.

The valves for opening and closing the ports may be actuated either from the eccentric O, or by connection with the eccentric rod *p*, or in any other suitable manner.

The machinery for actuating all parts of this engine, it will be seen, is very simple and devoid of complication.

In the upper part of the abutment A I insert a wedge-shaped or dovetailed packing-piece, *r*, adapted to be thrown upward by the force of the steam, or by means of a spring, to form a steam-tight joint.

I claim—

In combination with the rocking abutment A, constructed with the pockets *b b*, exhaust-pipes arranged so as to be opened and closed by the side of the abutment during its movements, all as shown and described.

WILLIAM F. LEOPOLD.

Witnesses:

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