(No Model.)

# W. C. POOLEY.

## Rotary Engine.

No. 238,963. Patented March 15, 1881.

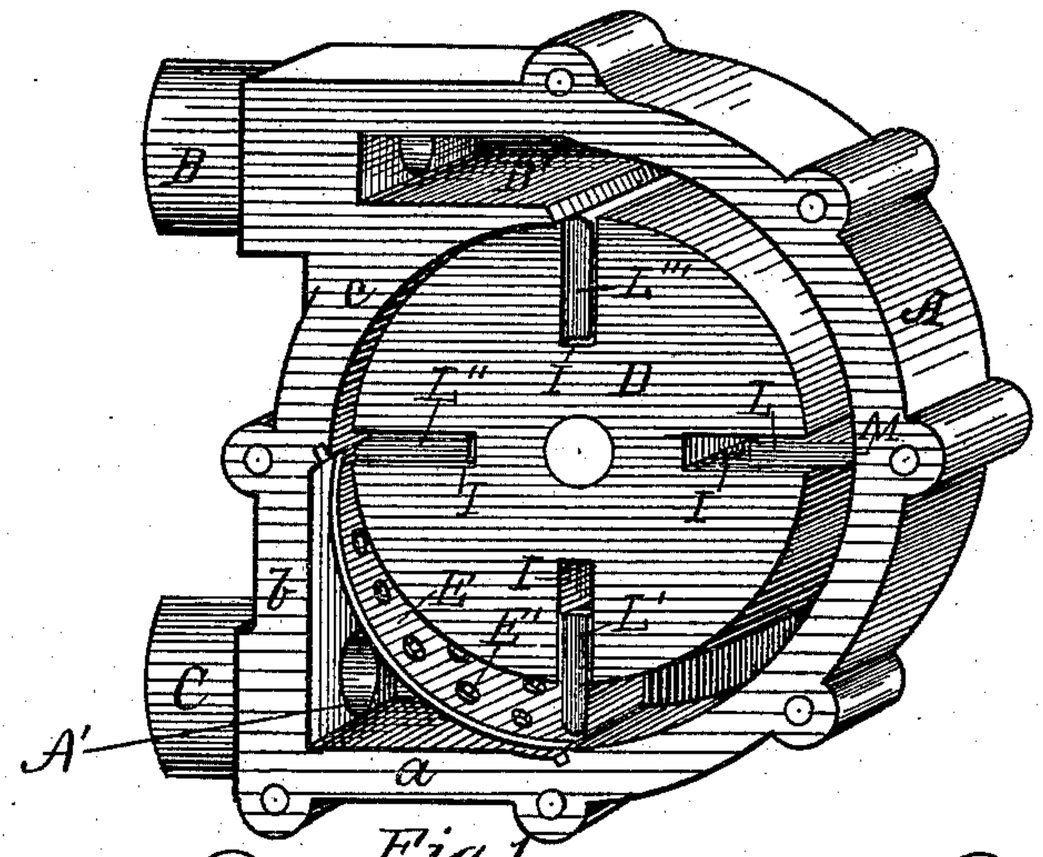


Fig. 1.

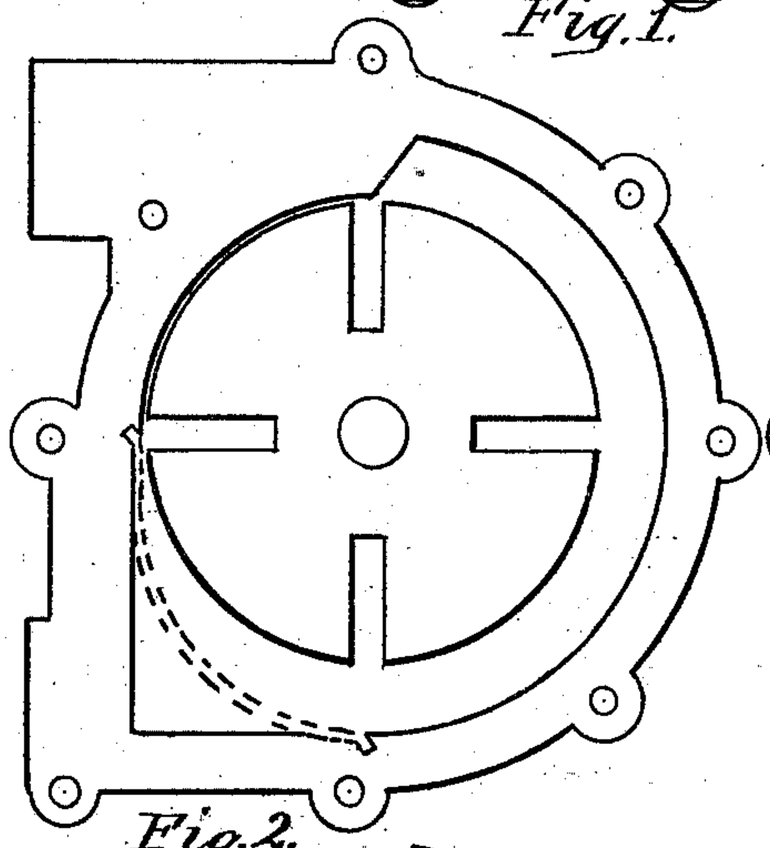

Fig. 2.

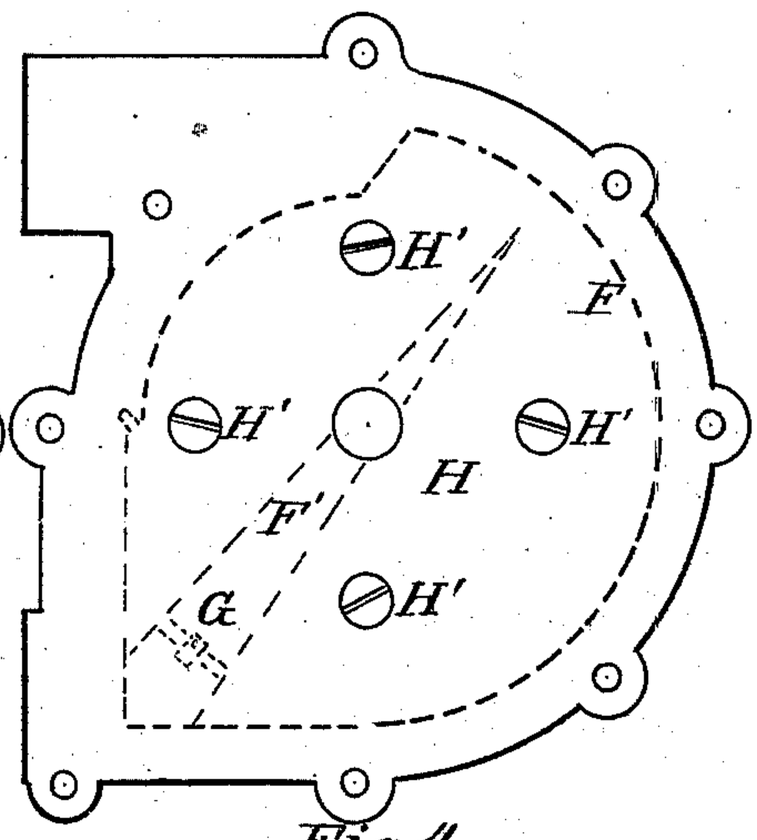


Fig. 4.

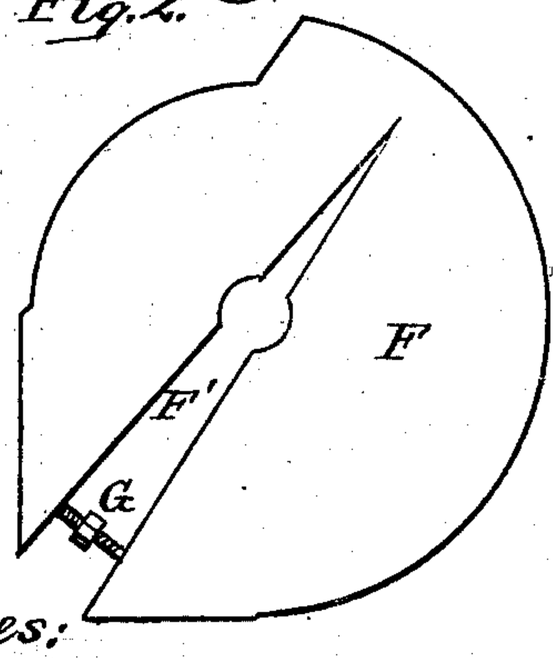


Fig. 3.

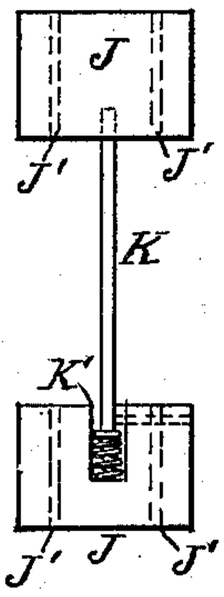


Fig. 5.

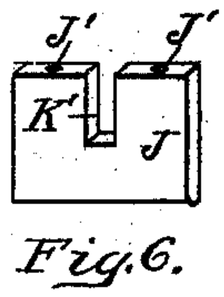


Fig. 6.

Witnesses:
L. B. Zerbe.
O. J. Bailey

Inventor:
William C. Pooley
by J. S. Zerbe
Atty

# UNITED STATES PATENT OFFICE.

WILLIAM C. POOLEY, OF LOUISVILLE, KENTUCKY.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 238,963, dated March 15, 1881.

Application filed January 7, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM C. POOLEY, of Louisville, in the county of Jefferson and State of Kentucky, have invented a new and useful Improvement in Rotary Engines, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a front perspective elevation with the front plate of the casing removed. Fig. 2 is a front view, showing the conformity of the casing within slightly modified. Fig. 3 is a view of the adjustable plate for the wheel and case. Fig. 4 is a front view of the cap of the casing, and Figs. 5 and 6 are detail views of the blades and connecting-rods.

The object of this invention is to construct a simple form of rotary engine or motor which shall be applicable alike for either steam or water, and which is also adapted, without material change, for measuring liquids, grain, &c.

By reference to the accompanying drawings this description will be made clear.

A represents the case of the engine, made any suitable shape externally, but of peculiar construction within. The supply-port B above and the exhaust-port C below enter the casing parallel with each other. The casing A, at the mouth of the supply-port B, extends along on the arc of the wheel D, and ends at a point vertical with the center of the said wheel. A steam-chamber, B′, is formed at the mouth of the supply-port, and the interior of the case A, from this chamber to a point half-way around the wheel D, is concentric with the wheel, but far enough from it to allow a channel-way for the blades of the wheel.

At the mouth of the exhaust-port C the casing A is cut away within, forming a corner, A′, the horizontal side *a* extending to a point on a vertical line with the center of the wheel D, and the vertical side *b* extending up to a point on a horizontal line with the center, for purposes which will be hereinafter explained.

4 That portion of the case represented by the last quarter of the wheel, and indicated by C, is concentric with the wheel, and in practice is close enough to the wheel to prevent the steam from passing through. It will thus be seen that the interior of the case through that space represented by the first half of the circumference of the wheel is concentric therewith, but of greater arc. The third quarter is cut away, forming a triangular or right-angled chamber, $A^2$, and the last quarter is concentric with the wheel, and of the same arc.

A metallic plate, E, preferably of steel, and of the same arc as the wheel D′, but eccentric therewith, is placed in the corner A′, so that its inner surface will be continuous with the inner surface of the wall of the case. This plate E has perforations E′ to allow the steam and condensed matter to pass through freely, and this plate bears the brunt of the friction from the blades.

In Fig. 3 a view is shown of a plate, F, of suitable form to fit the interior outline of the casing. This is provided with a V-shaped opening across nearly the entire face, and near the mouth a right-and-left screw, G, is interposed between the opposite sides and adapted to open or close the V-shaped opening, as desired, for the purpose of fitting said plate snugly and steam-tight in the case against the wheel. This is placed within the case, one on each side of the wheel, and is designed to take up the wear on the sides of the wheel.

In Fig. 4 is shown the front face of the front cap, H. This is provided with screws passing through the cap, the ends of the screws operating against the plate F, so that by simply turning the screws the plate F will be forced against the wheel or loosened, as desired. It will be noticed that this plate completely and tightly covers that portion of the channel-way in which the steam acts with a pressure on the gates.

The wheel D is provided with four slots, I, at equal distances apart, so that two will be on one line through the center and the others on a like line at right angles to the former.

The blades J are made of suitable width, thickness, and length to fit loosely in the slots I of the wheel, and are each provided with one or more perforations, J′, running through the entire length of the blade. These perforations permit the steam and water forced in the slots back of the blade to flow out during the passage of the blades over the space covered by the perforated plate E. Rods K pass through the wheel at right angles between the blades J, and a spring, K′, is interposed at

one end between the rod and blade, so as to take up any extra wear or exert a slight pressure against the wall of the case, and also to provide in a measure against the sudden centrifugal concussion of the blades against the side opposite to the eccentric surface E during the revolution of the wheel. To still further provide for readily and easily forcing back the blades at the point of contact with this eccentric surface, the advancing corners of the blades are beveled, which overcomes this in a measure.

The operation of the engine is as follows: In the position of the wheel as indicated in Fig. 1 the steam, on entering the port B, strikes the blade L, the blade L″ being depressed and the opposite blade, L′, extended. Each successive blade, as it reaches the point of the case at M, touches it, since the opposite blade, L′, operating against the eccentric part E, forces the blade L gradually, and the steam therefore acts in part against the blade L′ until the blades L′ L″ are vertical or a little beyond the vertical, since the eccentric surface (represented by the perforated plate E) begins to draw in gradually at this point.

It has been found in engines of this class that little, if any, provision has been made for forcing back the blades without damaging them. The point of impact against the perforated plate is therefore made as gradual as possible, and by experiment I find that the form herein shown is most satisfactory.

The plate E, being removable, can readily be replaced should it be injured by the repeated blows of the blades. The perforations along its entire length permit the water to flow out during a space equal to one-fourth of the circumference of the wheel, and thus obviate the serious objection to the condensation which takes place during the period of its operations. The plate being perforated, the gates are thereby not worn on the ends as unevenly as they would be were the exhaust a single opening. The plate being perforated up to where it has entirely closed the gate in a water-engine, the exhaust-water which is forced past a single port is not compressed at the sharp angle above, thereby retarding the motion of the engine.

It will be observed that the steam acts against a surface equal to the full face of one blade at all times, and the case being arranged, as shown, with a gradual eccentric, very little friction is produced by the movement of the blades.

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

1. In a rotary engine, the case having its interior wall through the first half of its circumference concentric with the wheel, but of greater arc, and having the space represented by the third quarter of the circumference cut away, leaving a triangular or right-angled corner, and the last quarter of the circumference concentric and of the same arc as the wheel, as herein set forth, and for the purpose specified.

2. In a rotary engine having a case provided with two inner concentric walls of different diameter, the combination of a removable perforated eccentric plate placed over the right-angled corner and above the exit-port, with the wheel having oppositely-disposed slots, in which are placed bevel-edged perforated blades connected by rods or pins operated by springs, substantially as described.

3. In a rotary engine, a wheel having oppositely-disposed slots and blades, in combination with a case having a disk or plate on one or both sides of the wheel, provided with a V-shaped opening having an adjusting-screw in its mouth, and interposed between the wheel and the case, so that the said disk or plate may be adjusted against the wheel by means of screws on the exterior of the case, as and for the purpose herein set forth.

4. In a rotary engine, a case having the two concentric walls of different arcs, as shown, the steam-chambers at the supply and exhaust ports, and an eccentrically-disposed perforated plate, in combination with a wheel having oppositely-disposed slots carrying blades provided with perforations, as shown, and the disk or plate interposed between the case and the wheel, all operating as and for the purpose herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 27th day of December, A. D. 1880, in the presence of witnesses.

WILLIAM C. POOLEY.

Witnesses:
JOHN M. FARRAR,
S. U. WEBB.