

Nº 5.641.



UNITED STATES PATENT OFFICE.

P. D. M. CARMICHAEL, OF LEROY, NEW YORK.

ROTARY STEAM-ENGINE.

Specification of Letters Patent No. 15,641, dated September 2, 1856.

To all whom it may concern:

Be it known that I, P. D. M. CARMICHAEL, of Leroy, in the county of Genesee and State of New York, have invented a new and Improved Rotary Engine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a vertical section of the engine in a plane perpendicular to the axis, and Fig. 2, a section of the same parallel with the axis on the line x, x , of Fig. 1.

Similar letters of reference indicate corresponding parts in both figures.

This invention consists in a rotary engine that is applicable either as a motor to be operated by steam or other fluid, or as a pump for raising or forcing water or other fluids.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A, is a stationary cylinder containing a rotary eccentric piston B, secured to a shaft C, working in the center of the cylinder. The cylinder is constructed with a circular center block D, whose exterior face is perfectly concentric with the interior face of the outer wall of the cylinder, leaving an annular channel m, m , between the said center block and exterior wall of the cylinder. The center block is united at one end with one, a , of the heads constituting the ends of the cylinder, which head, with the center block and exterior wall of the cylinder, may all be cast together as shown in Fig. 2. The other end of the center block is faced up to stand a sufficient distance within the other end of the cylinder to leave room for the thickness of a circular disk b , which forms a portion of the piston. This disk b is concentric to the shaft C, and to the interior of the outer wall of the cylinder and is fitted to the interior of the outer wall of the cylinder with a slight taper, so as to be allowed to enter farther in, to compensate for wear when necessary. The disk b , is secured firmly to the shaft C, and carries the eccentric rim d, d , which is the portion of the piston upon which the steam acts. The eccentric rim d, d , must be of such diameters internally and externally and have such degree of eccentricity to the axis of the cylinder and shaft, that its in-

terior periphery will fit to the exterior of the circular center block D, of the cylinder at one point, while its exterior periphery fits to the interior of the outer wall of the cylinder at a diametrically opposite point, as shown in Fig. 1. The exterior of the rim d, d , is tapered to fit the interior of the outer wall of the cylinder and the exterior of the center block D and interior of the rim d, d , have a corresponding taper as shown in Fig. 2. The edge of the rim d, d , fits up to the back of the channel m, m . By this construction, of the cylinder and piston, the wear between all parts thereof is enabled to be compensated for by a screw e , working through the movable head f , of the cylinder.

F, is a sliding abutment, made in the form of an arc and working across the channel m, m . It is attached to an arm F, which works on a fixed center g , outside of the interior of the outer wall of the cylinder, and it is received within a groove or cavity G, G, which extends beyond the back of the channel m, m , in the cylinder, the said cavity G, G, being enlarged in the interior portion of the cylinder as shown in Fig. 1, to receive the arm F.

H, is a circular piece of metal fitted to rock in a seat at the middle of the length of the abutment E, and having a groove in it to receive the eccentric rim d, d of the piston. The rocker H, serves as a packing to the rim of the piston in the working of the latter through the sliding abutment and in order that it may adapt itself better to the varying relation between the eccentric rim d, d , and the abutment which is constantly taking place as the piston rotates; the said rocking piece H, has an arm h , attached to it provided at its extremity with two small lips which receive the edge of the rim between them. The edge of the rim may have rabbets turned in it to receive the lips i, i . The arm h , works in a cavity p' , within the back of the channel m, m . On one side of the abutment is the induction pipe I, and on the other side thereof is the eduction pipe J.

The operation is as follows: In all changes of position, of the piston in the cylinder, as produced by its rotation, the abutment E, and the bearing of the eccentric rim against the center block D, or against the outer wall of the cylinder, divides either that part of the channel m, m , included within the eccentric rim or the part without it, into two

chambers, one of which is in communication with the induction pipe and the other with the eduction pipe. In the position shown in black outline in Fig. 1, the space within
5 the eccentric rim is divided into two chambers L and M, and in the position shown in red outline the space without the eccentric rim is divided into two chambers L' and M'.
Take the first of these positions and suppose
10 the engine to be used as a motor impelled by steam. The steam enters through I, to the chamber L, finding no outlet, acts upon the interior of the rim *d, d*, to drive the piston around in the direction of the arrow
15 while the opposite chamber being open to the atmosphere prevents any resistance to such action. Suppose the piston to move on from the position above mentioned, the rim *d, d*, will gradually cross over the induction
20 port I, which changes the action of the steam to the outside of the eccentric rim *d, d*, by forming the induction chamber L', and eduction chamber M', on opposite sides of the exterior of the eccentric rim, and at the same
25 time provides for the escape of the steam that was in the chamber L, around the block D to the pipe J. The action of the steam on the outside of the eccentric rim will continue during half a revolution of the piston, when

the rim will again cross the induction pipe 30 and its action will be changed from the outside to the inside of the eccentric rim again. The action of the steam continues to change in this way from the inside to the outside and from the outside to the inside of the 35 rim *d, d*, acting on the inside during half of each revolution and on the outside during the other half. If the engine be used as a pump, rotary motion is given to its shaft C, in the direction of the arrow shown in Fig. 40 1, and the induction of water on opposite sides of the rim *e*, alternately takes place through the pipe I, and its eduction on opposite sides alternately through the pipe J.

What I claim as my invention and desire 45 to secure by Letters Patent, is—

The rotary engine composed of a piston with an eccentric rim *d, d* whose exterior fits at one point to the outer wall of the cylinder and its interior at a diametrically op- 50 posite point to a central circular block D, said rim working within a slotted rocker A, in an oscillating abutment E, and the whole operating substantially as herein set forth.

P. D. M. CARMICHAEL.

Witnesses:

BARNEY REAR,
HENRY STEUBER.