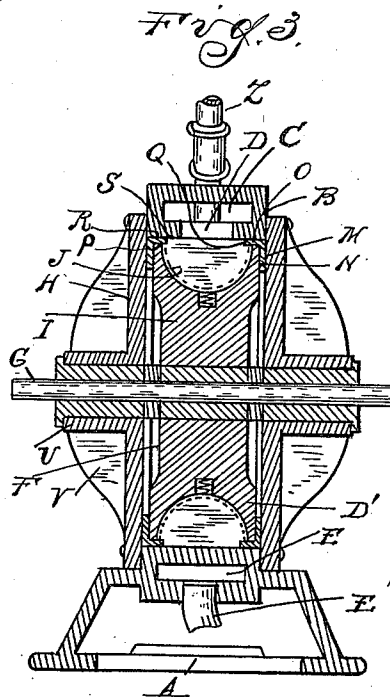
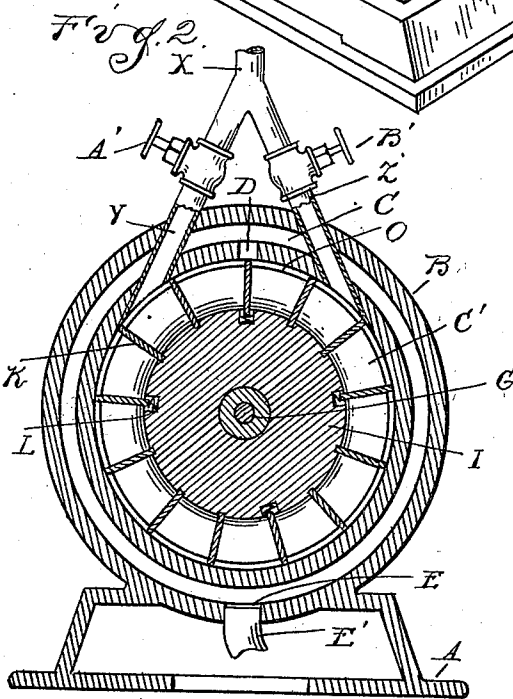


1,045,204.



Ulysses. Simons

By Christmas to Christmas

Witnesses
W. K. Foad
James P. Barry.

Atty's

UNITED STATES PATENT OFFICE.

ULYSSES SIMONS, OF HIGHLAND PARK, MICHIGAN.

ROTARY ENGINE.

1,045,204.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed February 19, 1912. Serial No. 678,488.

To all whom it may concern:

Be it known that I, ULYSSES SIMONS, a citizen of the United States of America, residing at Highland Park, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to rotary engines and has among the objects thereof to provide a simple, compact and durable structure and one in which the efficiency of engines of this type is increased, to produce an engine which may be driven in either direction and develop the same high degree of speed and power in either direction of rotation.

Other objects of my invention will more fully hereinafter appear.

Invention resides in the peculiar construction, arrangement and combination of parts as hereinafter described and particularly pointed out in the claims.

In the drawings,—Figure 1 is a perspective view of a device embodying my invention; Fig. 2 is a vertical central section therethrough; Fig. 3 is a section at right angles to Fig. 2.

A designates the base and B the cylinder which is mounted upon the base and preferably is formed integral therewith. Extending around the cylinder is an annular passage C which communicates adjacent the top of the cylinder with an exhaust port D and at the bottom with an outlet passage E, the latter either opening directly into the hollow base or being provided with a discharge conduit E' leading to any suitable point. Within the cylinder is a rotary piston F that is fixed to a shaft G journaled in bearings in the cylinder heads H. This piston is formed of a circular body portion I having a grooved periphery J and a plurality of equi-distantly spaced propeller blades K which engage recesses or bearings L in the grooved periphery.

M are retaining members for holding the blades within the bearings, these members being angle-shaped, the portion N of the retaining member engaging the side of the body portion, while the lateral flange O extends across the edge P of the body I into engagement with recesses Q in the side of the blades. The outer face R of the flange O is in the same plane as the outer edges S of the blades, and both the face R and

edges S fit against the inner wall of the cylinder, while the portions N of the retaining members form the desired fluid-tight connection with the cylinder heads and with the edges P, the parts being machined to permit of this result. The retaining rings are preferably held in place by being shrunk on.

In order to provide a long bearing for the ends of the shaft G the heads are formed with elongated hubs U which are reinforced by wings V extending therefrom to the periphery of the heads. The latter are secured to the cylinder in any suitable manner as by bolts or screws W. As there is a tendency for the torsional strains of the shaft to be transmitted to the securing means, the heads are made comparatively wide at the bottom so as to provide a large bearing face for engaging the base as shown in Fig. 1. This relieves the screws W of the greater portion of the stresses that otherwise would be transmitted to them.

X is the inlet conduit for the cylinder which communicates therewith by means of two branches Y and Z each extending tangential to the cylinder but in opposite directions, and A', B' are valves respectively controlling the branches Y and Z.

In operation, assuming the valve A' is open and the valve B' closed, the motive fluid entering through the branch Y will impinge against the blades and drive the piston in one direction, the fluid entering the pockets C' between the blades and being retained therein until the pocket registers with the port D. The fluid then exhausts through the port D into the annular passage C and discharges through the outlet E. It will be noticed that the exhausting fluid has an unrestricted passage in both directions around the cylinder. To reverse the engine it is merely necessary to close the valve A' and open the valve B'.

In order to reduce the weight of the piston without materially detracting from its strength, the sides of the piston body are formed concaved, while the groove in the periphery is provided with a rounded bottom which forms a thickened portion D' at the base of the sides of the groove, materially increasing the strength of the sides. Furthermore the blades are arranged intermediate the sides and do not extend there-through.

Preferably a plurality of blades (in the drawings 4) are constructed to have a slid-

ing engagement with the bearings or recesses L, and these blades are pressed toward the cylinder wall by means of coil springs *a* arranged in recesses in the head I. This
 5 avoids leakage of the steam around the outer ends of the blades in case the latter do not form the desired steam tight connection with the cylinder wall.

What I claim as my invention is:

10 1. In a rotary engine, a cylinder, heads for the cylinder provided with hubs, a shaft journaled in said hubs, and a rotary piston arranged within the cylinder and mounted
 15 upon said shaft comprising a body portion provided with a grooved periphery, said periphery having a plurality of equi-distantly spaced recesses intermediate the sides
 20 of the groove, blades engaging said recesses, said blades having recesses in the side edges thereof, and retaining rings having portions
 25 engaging the sides of the body and provided with laterally extending flanges extending across the outer edges of the sides of the groove into engagement with the recesses
 in the blades.

2. In a rotary engine, a cylinder, heads for the cylinder provided with hubs, a shaft
 30 journaled in said hubs, a rotary piston arranged within the cylinder and mounted upon the shaft, comprising a body portion provided with a grooved periphery, the
 35 latter having a plurality of equidistantly spaced radially extending recesses intermediate the sides of the groove, radial blades engaging said recesses and retaining rings
 for said blades arranged upon opposite sides of said groove and engaging the side edges
 of the blades.

3. In a rotary engine, a cylinder, heads
 40 for the cylinder provided with bearings, a rotary piston arranged within the cylinder

comprising a body portion having concave sides and formed with a grooved periphery, the groove being arranged centrally of the
 45 body portion and the base of the groove being concave, said periphery being provided with a plurality of recesses intermediate the sides of the groove, radially extending
 blades engaging said recesses, and a shaft to which the body portion is fixed, 50
 journaled within said bearings.

4. In a rotary engine, the combination of a cylinder having an annular passage therein, said passage communicating with the
 55 interior of the cylinder only at one side of the cylinder, there being an out-let port at the opposite side of the cylinder communicating with the annular passage, a rotary
 piston within the cylinder provided with a plurality of radial wings, and a tangential in-let for the cylinder. 60

5. In a rotary engine, the combination of a cylinder having an annular passage therein, said passage communicating with the
 65 interior of the cylinder only at the top of the cylinder, there being an out-let port at the bottom of the cylinder communicating with the annular passage, a rotary piston
 within the cylinder provided with a plurality of radial wings, and an in-let for the
 70 cylinder having oppositely extending portions tangential to said wings arranged at the top thereof and respectively positioned upon opposite sides of the point of communication
 75 between the interior of the cylinder and said annular passage.

In testimony whereof I affix my signature in presence of two witnesses.

ULYSSES SIMONS.

Witnesses:

N. J. BELKNAP,
 JAMES P. BARRY.

80 Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
 Washington, D. C."