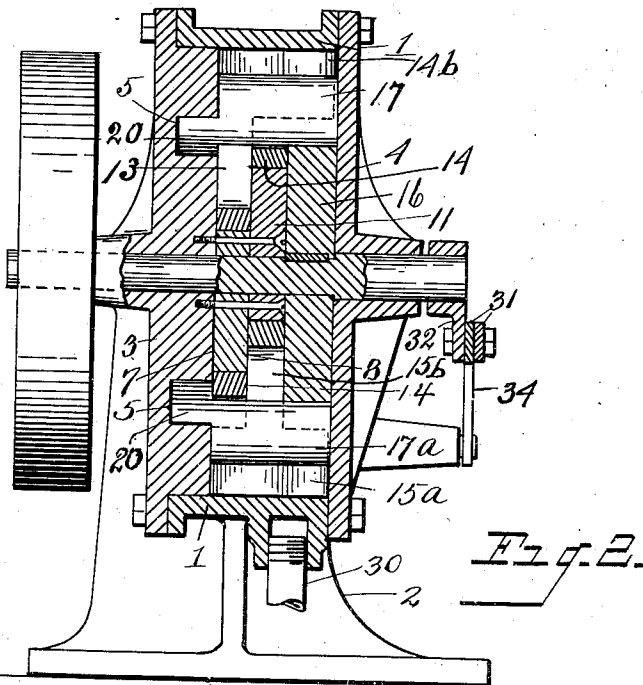
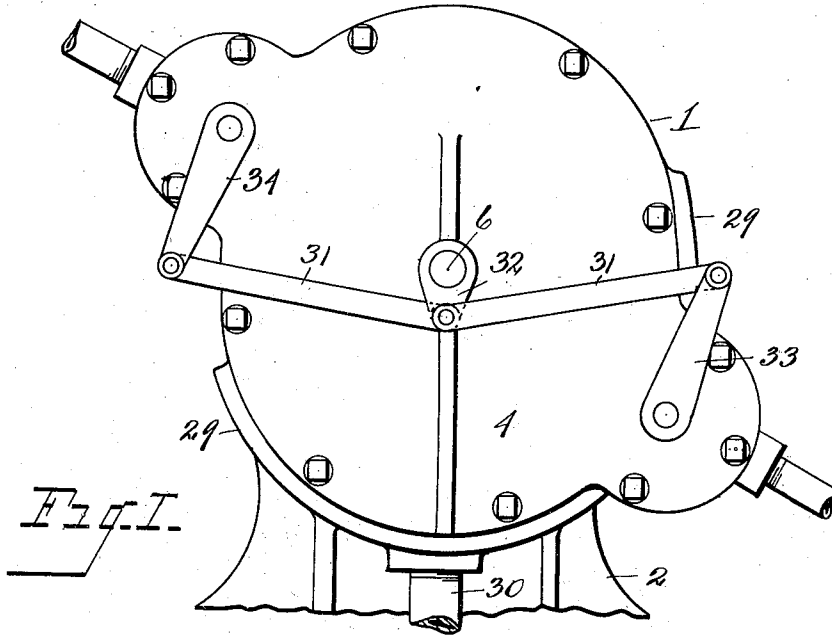


W. M. HOFFMAN.
 ROTARY ENGINE.
 APPLICATION FILED JUNE 10, 1911.

1,084,635.

Patented Jan. 20, 1914.

3 SHEETS—SHEET 1.



Witnesses

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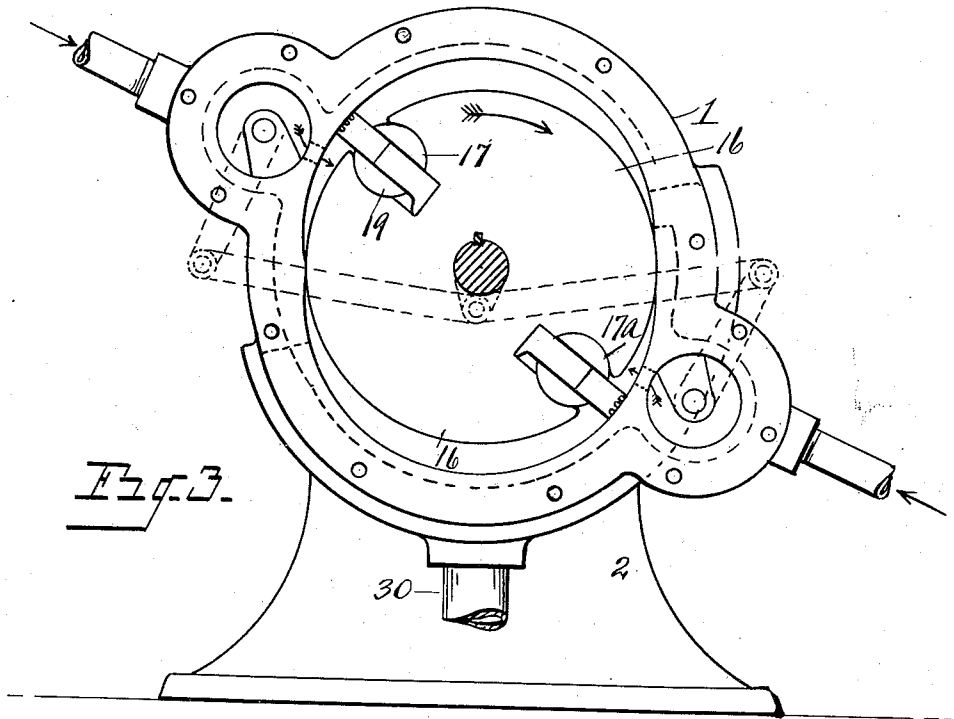


Fig. 3.

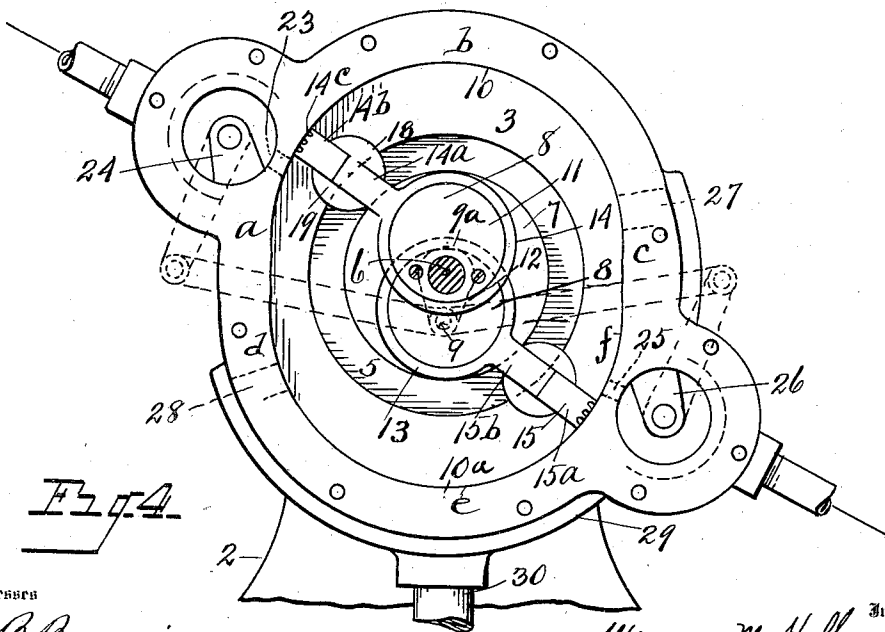


Fig. 4.

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3 SHEETS—SHEET 3.

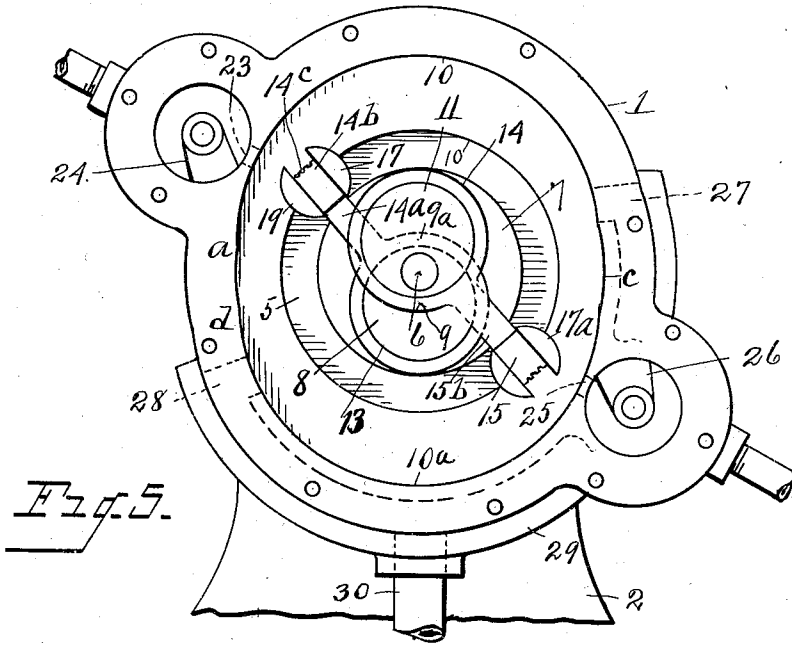


Fig. 5.

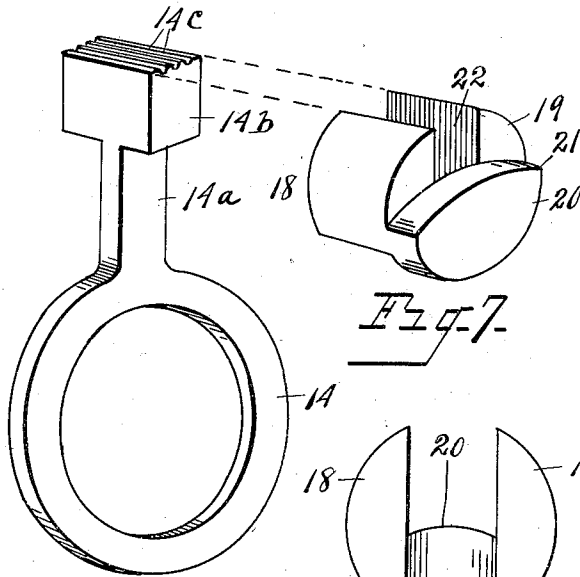


Fig. 6.

Fig. 7.

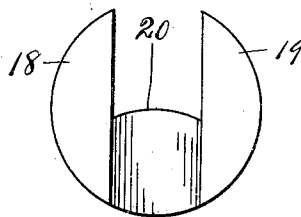


Fig. 8.

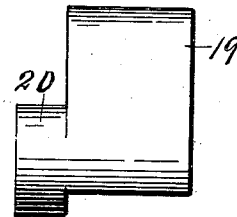


Fig. 9.

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UNITED STATES PATENT OFFICE.

WILLIAM M. HOFFMAN, OF BUFFALO, NEW YORK.

ROTARY ENGINE.

1,084,635.

Specification of Letters Patent.

Patented Jan. 20, 1914.

Application filed June 10, 1911. Serial No. 632,325.

To all whom it may concern:

Be it known that I, WILLIAM M. HOFFMAN, a citizen of the United States, residing at Buffalo, county of Erie, State of New York, have invented a certain new and useful Improvement in Rotary Engines, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to rotary engines.

It has for its object an improved rotary piston engine.

In the drawings:—Figure 1, is a side elevation showing that part of the engine on which the projections containing the valves appear. Fig. 2, is a vertical cross section longitudinal of the shaft. Fig. 3, is a side elevation with the front case removed and showing the side opposite to that shown in Fig. 1. Fig. 4, is an elevation, as in Fig. 3, in which, however, the front case is removed and the piston carrier is removed. Fig. 5, is an elevation as in Fig. 3 with the piston blades shown in a position different to that shown in Fig. 3. Fig. 6, is a perspective view of a piston blade. Fig. 7, is a perspective view of a piston guide. Fig. 8, is an end elevation of a piston guide. Fig. 9, is a side elevation of a piston guide.

The engine comprises a cylinder bored from three centers, one of which is central to the oval-like chamber of the piston and the other two centers are centric to this first-mentioned center and are centric to parts of the cylinder which are symmetrically arranged with respect to a middle horizontal line.

The cylinder 1 is mounted on a base 2 and is closed in by an end plate 3 and an end plate 4 in a single engine such as is shown in the drawings. The end plate 3 is provided with a circular groove 5 concentric with the center 6 of the cylinder; this groove serves as a race for the piston blade guides as will be hereinafter explained. Within the groove is a circular surface 7 upon which is secured a circular bearing hub 8 concentric with the center 9, which center 9 is concentric to the curved cylinder wall 10 at one end of the oval chamber of the cylinder. A second hub member 11 is secured to the hub member 8 with the surface of one of said hub members partly overlying the

other, the hub member 11 being for the most part of its surface so far removed from the face 7 of the end plate 3 that a ring terminal 13 of one of the piston blades can freely rotate around its hub 8 with a part of the ring underlying the hub 11. The ring 14 of the second piston blade engages the hub 11 and through a part of its extent overlies the hub 8 and can freely rotate on its own hub. The piston blade 14^a extends as an arm from the ring 14 and has a radial sweep around that part of the cylinder 10 which is concentric with the center 9^a and continues in rotation in a complete circle around the center 9^a, sweeping close to the surface *a, b, c*, and sweeping clear from the surface *d, e, f*. The piston blade 15 projects from the ring 13 and sweeps in close proximity to the circular surface *d, e, f*, and clear from the surface *a, b, c*. The terminal end of the piston blade is broad to extend from the plate 3 to the plate 4. The broadened end is connected to the hub by a thin arm 14^a and extends from a point intermediate the surface terminals of the end 14^b. The end 15^a of the second piston blade is also broadened to extend fully between the plates 3 and 4 and the arm 15^b which connects this piston terminal with the ring 13 springs from the head close to the surface which sweeps the side terminal adjacent to surface 3. A carrier member 16 circular in form and having a radius equal to the radius of the arc from *a* to *d* and *c* to *f* engages over the hubs and inner part of the piston arms and is provided throughout the most part of its periphery with a flange that engages closely against the face of the end member 3. It is bored near its margin with circular apertures in which engage the guide members 17 and 17^a. These are circular members capable of oscillatory motion in their sockets; they are alike and each comprises the circular segments 18 and 19 springing from a tie member 20 which engages in the groove 5. The tie member is circular along that surface which may be considered a continuation of the surface of the segments 18 and 19 and also has an arched surface 21 which engages against the outer wall of the groove 5 but this surface is of shorter radius than the radius of the outer wall of the groove 5 in order that the guide 17 may oscillate in the groove. The surface 21 passes through the center of the surfaces of the segments 18 and 19. Above

the tie member 20 is a slot 22 cut diametrically through the guide. The head 14^b of the piston guide reciprocates through this slot. The piston head is preferably provided with grooves 14^c to furnish a steam packing or water packing between this surface and the surface of the cylinder adjacent to which it revolves.

The shaft on the engine is made fast to the carrier member 16 and revolves with the carrier member; provision is made for the introduction of steam at two places diametrically opposite with the inlet port 23 controlled by oscillating valve 24 and with the inlet port 25 controlled by oscillating valve 26. The exhaust port 27 and the exhaust port 28 open into an exhaust chamber 29 which conducts the exhaust steam to a discharge pipe 30. The oscillating valves 24 and 26 are actuated by a link connection 31 to the crank 32 on the shaft and cranks 33 and 34 on the respective shafts of the oscillating valves. The piston blades maintain a position that is nearly diametrically opposite with respect to the axis of the main shaft; each one maintains its proper radial direction from its own center of rotation.

What I claim is:—

1. In a rotary engine, a packing member comprising segments of cylinders adapted to oscillate in a cylindrical cavity and to engage slidably a piston arm engaging between said segments, and a tie uniting said segments, said tie being provided with arched surfaces whereby it is adapted to oscillate in a guide race, substantially as described.

2. In a rotary engine, a packing member comprising segments of cylinders adapted to oscillate in a cylindrical cavity and to engage slidably a piston arm engaging between said segments, and a tie uniting said segments, said tie being provided with arched surfaces whereby it is adapted to oscillate in a guide race, a casing and a groove in said casing the walls of which are adapted to engage said arched surfaces to define the position of said packing member.

In testimony whereof, I sign this specification in the presence of two witnesses.

WILLIAM M. HOFFMAN.

Witnesses:

STUART C. BARNES,
VERA PILLMAN.