No. 670,005. Patented Mar. 19, 1901.

F. H. PALMER.

ROTARY ENGINE.

(Application filed June 9, 1900.)

(No Model.)

Fig. 1.

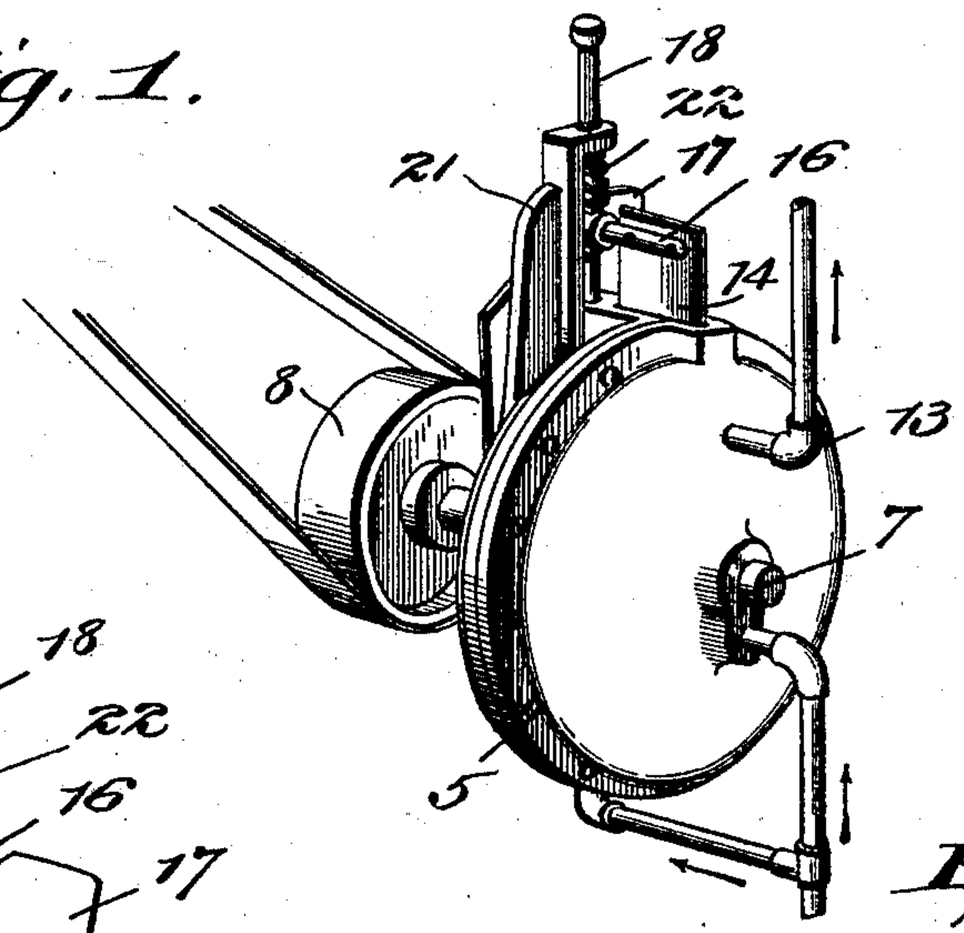


Fig. 2.

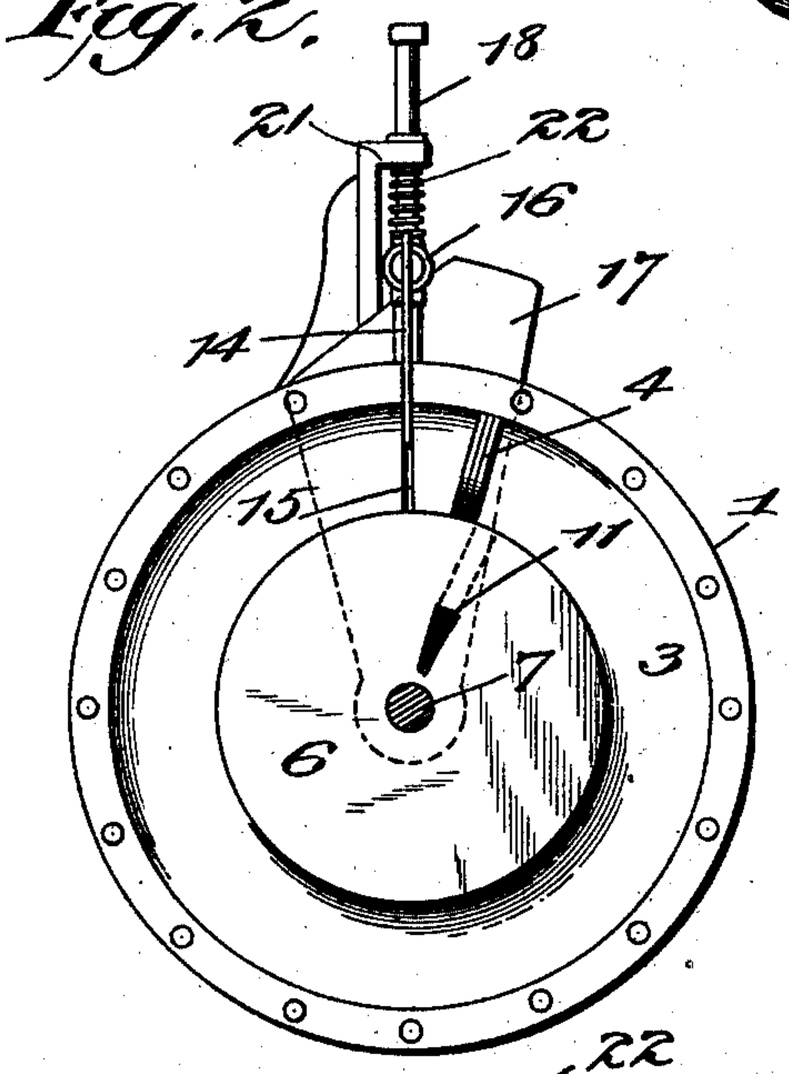


Fig. 3.

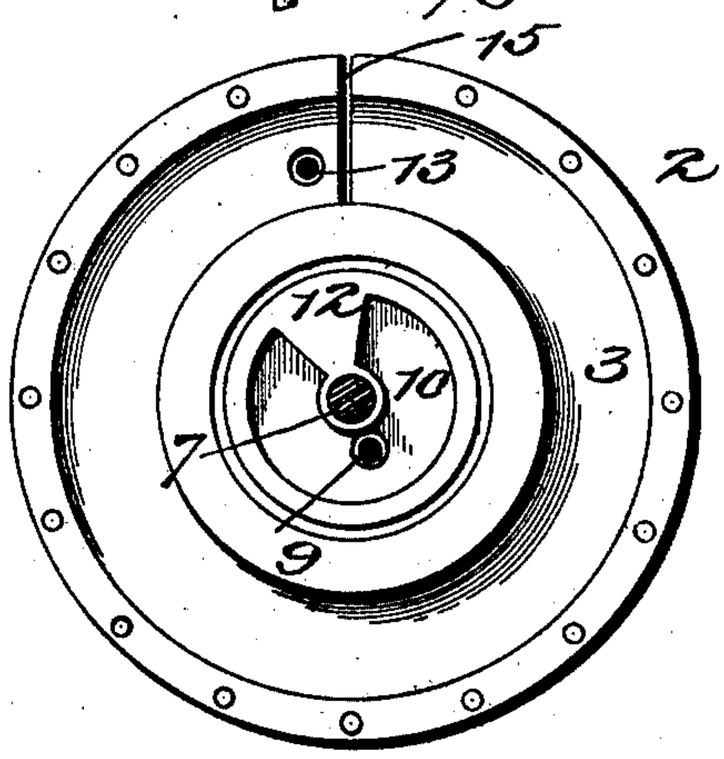


Fig. 4.

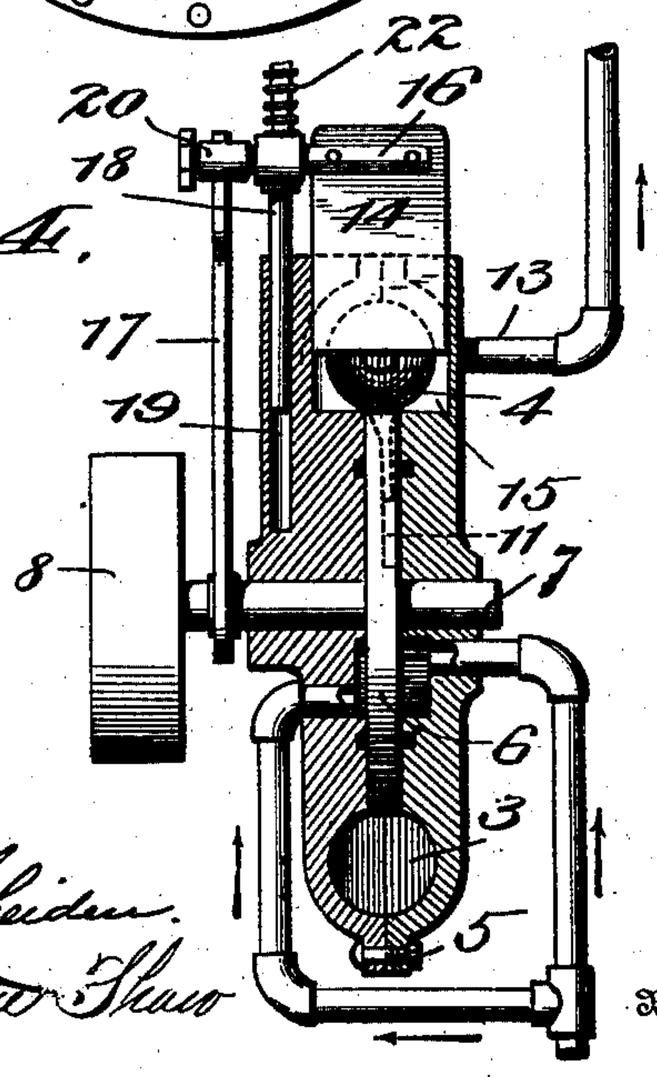
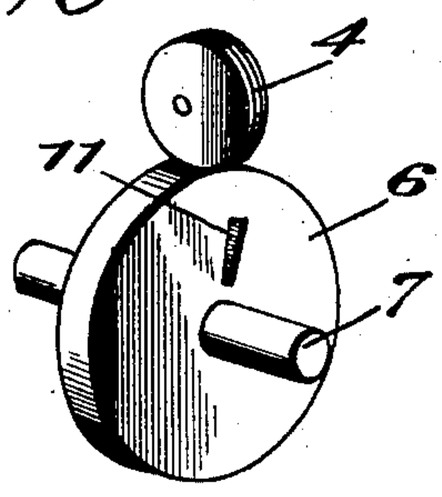


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANK H. PALMER, OF ELMA, WASHINGTON.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 670,005, dated March 19, 1901.

Application filed June 9, 1900. Serial No. 19,729. (No model.)

To all whom it may concern:

Be it known that I, FRANK H. PALMER, a citizen of the United States, residing at Elma, in the county of Chehalis and State of Washington, have invented a new and useful Rotary Engine, of which the following is a specification.

My invention relates to rotary engines, and has for its object to produce a device of this kind which will be simple, compact, and efficient; and it consists in the improved construction and novel arrangement of parts of the same, as will be hereinafter more fully set forth.

In the accompanying drawings, in which the same reference-numerals indicate corresponding parts in each of the views in which they occur, Figure 1 is a perspective view of my improved engine. Fig. 2 is a side view with one side removed. Fig. 3 is an elevation of the removed side. Fig. 4 is a transverse central sectional view through the valve, the piston-head being shown as passing underneath the same. Fig. 5 is a perspective view of the piston-head and its wheel.

In constructing my improved rotary engine I form the cylinder from two plates 1 and 2, which are preferably circular and each of which is provided upon its inner face with a semicircular groove 3, the grooves registering with each other and forming a substantially circular cylinder within which the piston-head 4 is operated. The peripheries or outer edges of the plates are secured together steam-tight in any suitable manner, as by means of clamping-bolts 5; but the central portions are at a slight distance apart for the reception of a wheel or disk 6 upon which the piston-head 4 is mounted in position to be moved around within the groove 3. The piston-head may be provided with an ordinary packing to prevent leakage of steam while the engine is being operated. The disk 6 is rigidly secured upon a shaft 7, which is journaled in the plates 1 and 2 and is provided at one or both ends with a pulley 8, which may be in the form of a fly-wheel.

The outer plate 1 is provided with a steam-inlet 9, which opens into a segmental channel 10, which communicates with a steam-passage 11 within the disk 6 during the major part of the revolution of said disk. To prevent the entrance of steam while the valve is being shifted for the entrance of a new charge of steam and the escape of the old one, a portion 12 of the inner face of the outer plate is left intact or not cut away, which will pass over the mouth of the steam-passage 11 and prevent the entrance of steam thereto. The plate 1 is further provided with an exhaust or steam outlet 13, which remains permanently open at all times.

If desired, the steam-pipe 9 may be provided with a branch 9′, which enters the casing upon the opposite side and lets the steam balance the valve by pressing upon it on the side opposite the main inlet.

To cause the rotation of the piston-head within its cylinder by the entrance of steam, I provide a valve 14, which is movable back and forth in radially-arranged channels 15, which are cut transversely in the plates adjacent to the exhaust-opening 13. The valve 14 comprises a flat plate the inner edge of which is adapted to be moved into virtual contact with the periphery of the disk 6, and thereby completely close the cylinder or groove 3 after the piston-head has passed that point. The outer edge of the valve extends radially beyond the outer edges of the plates and is provided with a laterally-extending arm 16, which lies in the path of a sector-shaped blade 17, which is rigidly secured to the fly-wheel 8. The arm is provided with a guide-rod 18, which is movable back and forth within a suitable socket 19, and, if desired, the portion of the arm which projects beyond said guide-rod in the path of the blade may be provided with an antifriction-roller 20. A brace-arm 21 is secured at its inner end to one of the plates and at its outer end is disposed beyond the outer end of the socket 19 and formed with a perforation in line with said socket to receive the rod 18, which reciprocates therethrough as the valve is operated. Thus said arm 21 forms an additional support for the guide-rod 18 of the valve. The valve may be returned to its normal position in any suitable manner; but I prefer to extend the rod 18 out beyond the arm 16 a sufficient distance for the reception of a coiled spring 22, which will engage with the arm 16 and force it inward as soon as the blade 17 has passed beneath the same. The blade 17

and piston-head are arranged in such positions relatively to each other that just before the piston-head reaches the flange the blade engages with the arm 16 and quickly forces it outward, so that by the time the piston-head reaches the valve-seat the valve will have been withdrawn and the piston-head continues its rotation unobstructed. At the same time the steam-passage 11 in the wheel 6 passes to the rear of the uncut-away portion at the center of the plate 1, and steam is prevented from entering the cylinder until after the piston-head has moved past the valve-seat and the valve has been returned to its normal position.

By constructing the engine in this manner it is evident that it can be made very compact and strong and that steam can be admitted to the rear of the piston-head during nearly the entire revolution of the same, thereby securing an effective action of the steam except at a very short period during the revolution of the piston-head, when the momentum of the fly-wheel will carry the parts forward without stoppage or detriment to the operation of the engine. As the exhaust is permanently open as soon as the piston-head passes beyond the same, which it does just before it passes the valve-seat, the steam that is behind it and has driven it forward will pass out of the exhaust, and thereby prevent any back pressure against the forward movement of the piston-head under the impulse of the new charge which has been admitted between it and the valve.

The engine is supplied with steam through an ordinary steam-pipe, which may be provided with an ordinary valve or cut-off, (not shown,) and the exhaust-steam may be discharged through any suitable pipe.

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

1. In a rotary engine, the combination, with two plates provided with inlet and exhaust ports and having their inner faces provided with a circular groove, the inlet being provided with a branch, the main inlet being in one plate and the branch in the other, of a shaft journaled in said plates, the outer end of which is provided with means for transmitting power, a disk upon said shaft between the plates, said disk being between the two inlets whereby the steam-pressure upon the sides thereof is equalized, a piston-head secured to the disk in position to be moved around the groove, a reciprocatory valve arranged to be moved radially across said groove, and means for automatically shutting off the entrance of steam to said groove during the movement of said valve, substantially as described.

2. In a rotary engine, the combination with two plates provided with inlet and exhaust ports, and having their inner faces provided with a circular groove and a radially-arranged valve-seat extending transversely of the groove, of a shaft journaled in said plates and carrying a piston-head moving in said groove, a reciprocatory valve, the outer end of which carries an arm, a guide-rod secured to said arm, a socket formed in one of the plates for said guide-rod, a brace-arm secured to one of the plates and formed with a bearing for said guide-rod and disposed beyond the outer end of the socket, a sector-shaped blade secured to the shaft in position to engage with the arm of the valve, and a spring for forcing the arm inwardly, said spring being located between the bearing of the brace-arm and the valve-arm, substantially as described.

3. In a rotary engine, the combination with two plates provided with inlet and exhaust ports, and having their inner faces provided with a circular groove, and a radially-arranged valve-seat extending transversely of the groove, of a valve in said seat, the outer end of which carries an arm, a guide-rod secured to and projecting upon both sides of the arm, the outer end of the arm projecting beyond the rod, a socket formed in one of the plates for said guide-rod, a brace-arm carried by one of the plates and having a bearing for the guide-rod disposed beyond the outer end of the socket, a spring upon the outer end of the rod, an antifriction-roller upon the end of the valve-arm beyond said rod, and a sector-shaped blade connected with the shaft in position to engage with said antifriction-roller, substantially as described.

FRANK H. PALMER.

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