G. A. PARKER.

ROTARY ENGINE.

APPLICATION FILED AUG. 5, 1911.

1,013,682.

Patented Jan. 2, 1912.

2 SHEETS—SHEET 1.

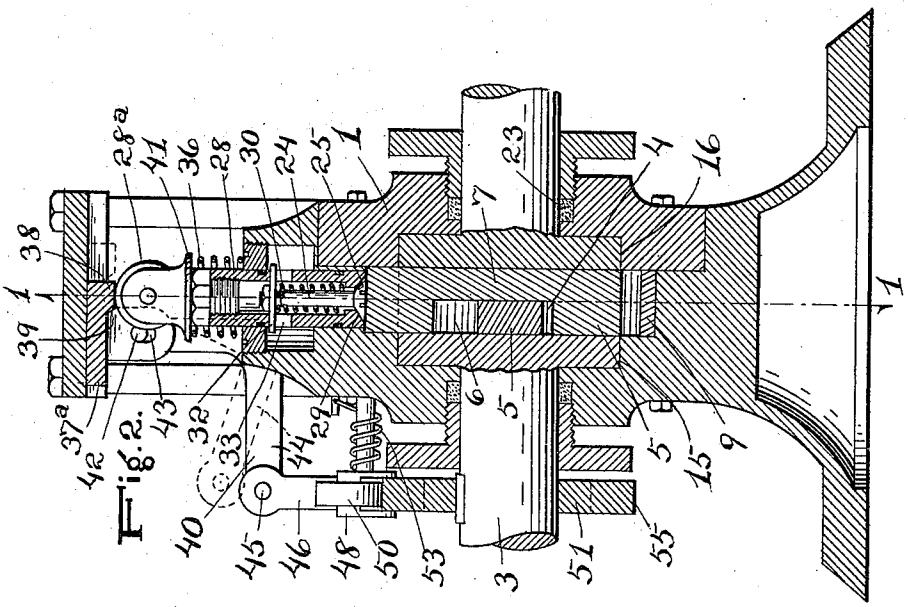

Fig. 2.

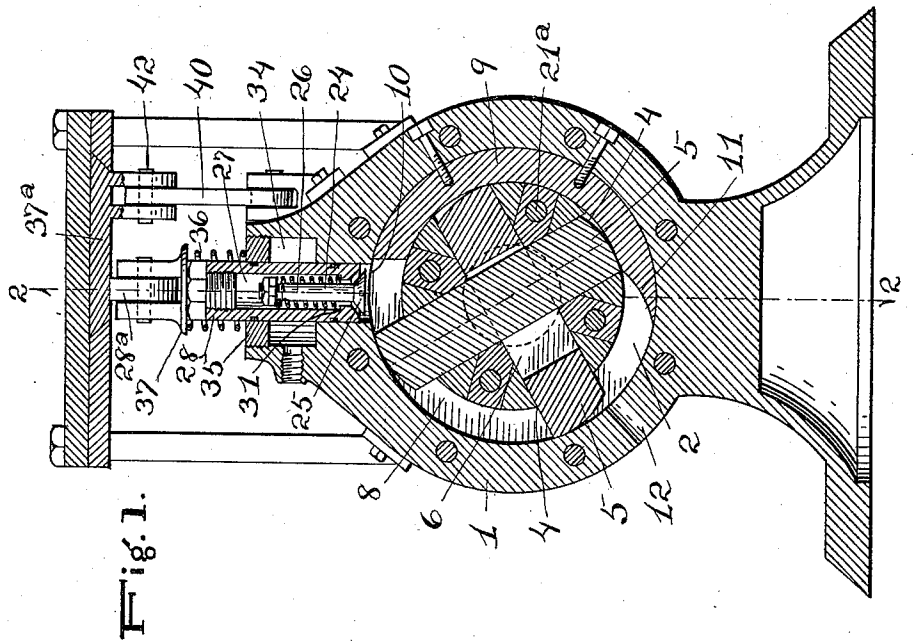

Fig. 1.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 5.

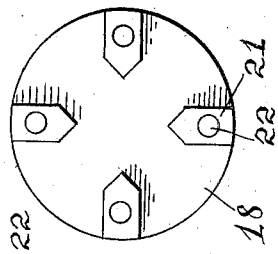


Fig. 6.

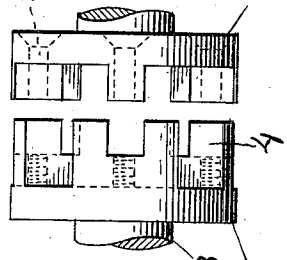


Fig. 4.

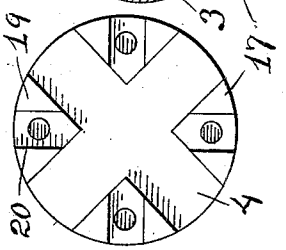


Fig. 9.

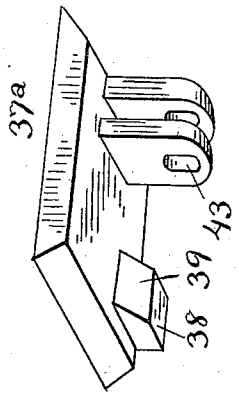


Fig. 7.

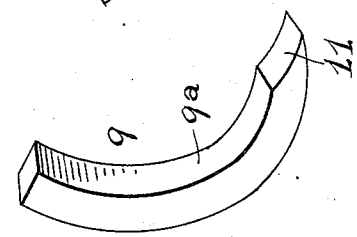


Fig. 3.

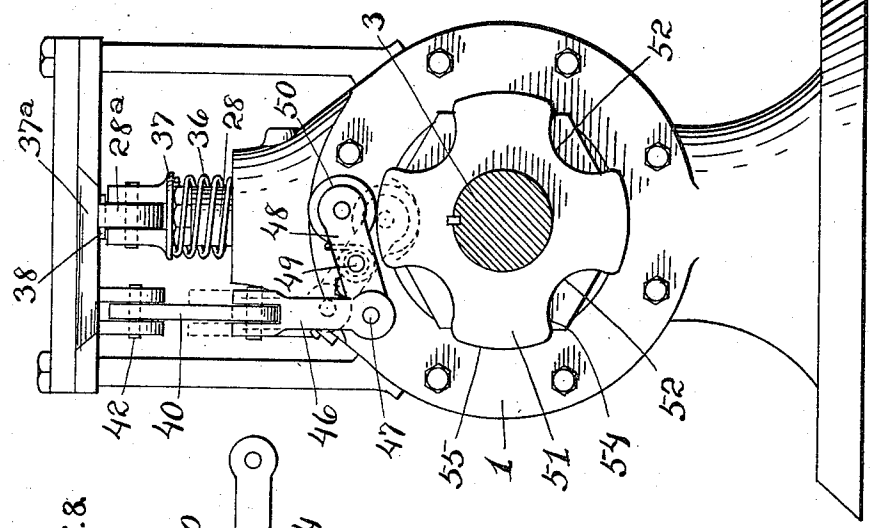
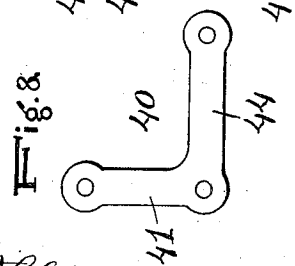


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE A. PARKER, OF BROCKTON, MASSACHUSETTS.

ROTARY ENGINE.

1,013,682. Specification of Letters Patent. Patented Jan. 2, 1912.

Application filed August 5, 1911. Serial No. 642,537.

To all whom it may concern:

Be it known that I, GEORGE A. PARKER, a citizen of the United States, resident of Brockton, in the county of Plymouth and State of Massachusetts, have made a certain new and useful Invention in Rotary Engines; and I 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 appertains to make and use the invention, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a central vertical section of the invention, taken on the line 1—1, Fig. 2. Fig. 2 is a similar view, taken on the line 2—2, Fig. 1. Fig. 3 is a side view of the invention. Figs. 4 and 5 are detail inside face views of the parts of the slotted portion of the shaft. Fig. 6 is a detail side view of these parts, in position to be moved into engagement with each other. Fig. 7 is a detail perspective view of the arc strip. Fig. 8 is a detail side view of the bell crank lever. Fig. 9 is a detail perspective view of the slide.

The invention relates to rotary engines, having for its object to provide a simple and powerful engine adapted for use in pumping and for other purposes.

The invention consists in the novel construction and combinations of parts, as hereinafter set forth.

In the accompanying drawings, illustrating the invention, the numeral 1 designates the engine cylinder, having a chamber 2, and 3 is the engine shaft, journaled in the heads of said cylinder and having rectangular angularly disposed radial passages or slots 4, 4 opening into said chamber and intersecting each other.

5, 5 are slidable bar pistons working in said passages and having each a central cut away portion or recess 6, within which fits the central reduced portion 7 of the opposite piston in a lap-joint manner, the recesses of the pistons being longer than the width of the pistons, and the length of each piston being equal to the combined diameter of the slotted portion of the shaft and the width of the space 8 between said slotted portion of the shaft and the inner concave superfices of the cylinder chamber, whereby each piston is allowed a slidable movement in its slot, which will withdraw one end portion thereof within the passage 4 and project the opposite end thereof from the opposite end of said passage across the space 8, which constitutes the expansion chamber of the cylinder, this protruded portion of the piston forming the abutment against which the expanding gases of the ignited charge act to rotate the engine shaft. Or steam may be used as the motive power.

Fitting and secured within the chamber of the cylinder is an arc strip 9, which terminates at one end at the margin of the gas inlet 10 of the cylinder and at its opposite end 11, which is of cam-beveled character, near the margin of the gas outlet 12 of the cylinder. This arc strip has an inner concave surface 9^a, which is in contact with the slotted portion of the shaft.

The sliding pistons are arranged preferably at right angles to each other as shown, and an explosive gaseous mixture being admitted to the cylinder chamber and ignited by means not shown, or steam being admitted, the expanding gases or steam will act against the protruded end portion of the sliding piston next adjacent to said inlet and force the shaft around about one-quarter of a turn, when the protruded end portion of the other piston will pass the gas inlet and, a new charge of steam or gas being admitted, the engine shaft will be forced around another quarter turn, by which time the protruded end portion of the first piston will have passed the gas outlet to discharge the exhausted gases or steam, and, a little afterward, into engagement with the cam end portion of the arc strip, whereby this protruded portion will be forced within the passage 4 and the opposite end of the piston forced outward from the opposite side of the shaft into position for the next charge of gases to act thereupon, the operation or rotation of the shaft being in this way continuous. The slotted portion of the shaft within which work the pistons is preferably of larger diameter than the shaft proper, as shown, and turns neatly in recesses 15 and 16 of the cylinder heads, said recesses being of less diameter than that of the chamber 2 of the cylinder.

It is preferred to form the slotted enlarged portion of the shaft in two parts 17 and 18, in one part 17 of which the passages or slots 4, 4 are formed, with the exception of the passage walls at one side and the intersecting corners, said part 17 having in

the sector-shaped portions 19 thereof recesses 20, arranged in alined couples at right angles to each other and within which fit the lugs 21 of the opposite part 18. This part 18 closes the passages 4, 4 at one side, the other walls of said passages being located in the part 17 as stated. Connecting screws 21[a] for the two parts 17 and 18 are engaged with perforations 22 of the lugs 21. In this way, the sliding bar pistons may be conveniently engaged with their slots or passages in the engine shaft when the parts are assembled. Stuffing boxes for the engine shaft are shown at 23.

The gas inlet opening 10 is provided with a valve 24 having a tapered head 25 and a stem 26 of less diameter than and engaging the aperture 27 of a casing 28. This casing is provided at its outer end with a roller 28[a], the tapered marginal inner end portion 29 of the casing forming the valve seat against which fits said head to close said aperture. The head of the valve is normally in position against said seat with the valve aperture of the casing closed. A coiled spring 30 surrounds the valve stem, bearing at one end against a cross bar 32 threaded upon the outer end portion of the valve stem, said cross bar extending at each side and having movement at its ends in slots 33 of the casing. A gas inlet chamber 34 is provided in the cylinder, said chamber having communication with the slots 33 of the valve casing and being closed at the outside preferably by a screw cover 35. A coiled spring 36 surrounds the outer portion of the valve casing and bears at one end against said cover and at its opposite end against a shoulder 37 of the casing, said spring acting to move the valve casing outward to open the valve. In order to thrust the valve casing inward to close the valve again a slide 37[a] is provided, said slide having at one side a projection 38 having a cam approach 39. Upon movement of the slide the roller of the valve case rides up on the cam approach and comes to rest upon said projection, to move the casing inward and close the valve, the spring 36 being at the same time put under tension. Upon the reverse movement of the slide the roller will ride down from the projection 38, the valve casing will move outward under the influence of its spring, and the cross bar 32 will take a bearing upon the outer wall of the gas inlet chamber, and upon further outward movement of the valve casing the valve will open. The movement of the slide is accomplished by means of a bell crank lever 40, one arm 41 of which is pivoted to the slide at 42 in a slot 43, and the other arm 44 of which is pivoted at 45 to one end of a link 46, the opposite end of said link having a pivotal connection 47 with one end of a lever 48, fulcrumed intermediately of its length at 49, the opposite end of said lever carrying a roller 50 which bears upon a cam wheel 51 mounted preferably upon the engine shaft.

As the engine shaft and cam wheel thereupon are rotated the roller 50 will fall in depressions 52 of the cam wheel, under the influence of a coiled spring 53 upon the lever fulcrum, and ride up on the cam sides 54 of said depressions upon raised portions 55 of said wheel to put the coiled spring 53 under tension, there being four depressions and four raised portions arranged alternately upon said wheel, whereby the lever will be actuated four times for each rotation of the engine shaft to thrust the valve casing inward, and open the valve four times for each engine shaft rotation. The actuation of the valve casing is timed to take place when each sliding piston has passed the inlet opening 10 approximately as shown for one end portion of one of the sliding pistons in Fig. 1 of the drawings. The valve casing may be thrust inward to open the valve one or more times for each rotation of the engine shaft, according to the number of raised portions and depressions furnished upon the cam wheel and the number of sliding pistons used.

The engine may be built with one or more sets of sliding pistons and expansion chambers upon the same shaft, with the pistons arranged at different angles, whereby a power impulse may be given the shaft for as many degrees in the circle of rotation as found desirable.

My invention is of simple nature, capable of economical manufacture and composed of few parts easily assembled, and will be found to give good results for the power expended.

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

1. A rotary engine, having in combination a cylinder provided with an expansion chamber, a rotary shaft having intersecting angularly related diametric slots adapted for registration with said chamber, sliding diametric pistons working in and of greater length than said slots, means for operating said pistons in the rotation of said shaft, a gas chamber, a passage connecting the same with said expansion chamber, a hollow reciprocatory casing in said passage, said casing having communication with the gas and expansion chambers, a valve normally closing the communication of said casing with said expansion chamber, means for retracting said casing and thrusting the same forward a plurality of times for each rotation of the engine shaft, and means for opening said valve upon the retraction of said casing.

2. A rotary engine, having in combina-

tion a cylinder provided with an expansion chamber, a rotary shaft having intersecting angularly related diametric slots adapted for registration with said chamber, sliding diametric pistons working in and of greater length than said slots, means for operating said pistons in the rotation of said shaft, a gas chamber, a passage connecting the same with said expansion chamber, a hollow reciprocatory casing in said passage, said casing having communication with the gas and expansion chambers, a valve normally closing the communication of said casing with said expansion chamber, means for retracting said casing and thrusting the same forward a plurality of times for each rotation of the engine shaft, including a cam wheel having alternate projections and recesses and a lever having alternate engagement with said recesses and projections, and means for opening said valve upon the retraction of said casing.

3. A rotary engine, having in combination a cylinder provided with an expansion chamber, a rotary shaft having intersecting angularly related diametric slots adapted for registration with said chamber, sliding diametric pistons working in and of greater length than said slots, means for operating said pistons in the rotation of said shaft, a gas chamber, a passage connecting the same with said expansion chamber, a hollow reciprocatory casing in said passage, said casing having communication with the gas and expansion chambers, a valve normally closing the communication of said casing with said expansion chamber, a reciprocatory slide having a projection, a bell crank lever having pivotal connection with said slide, a cam wheel having alternate recesses and projections, a spring-acting lever having a roller adapted for alternate engagement with said recesses and projections, and a link connection between said lever and said bell crank lever.

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

GEORGE A. PARKER.

Witnesses:
OSCAR CALKINS,
GEORGE W. FOLSOM, Jr.,
JOHN H. TURNER.