W. C. BOSLEY.

ROTARY ENGINE.

APPLICATION FILED FEB. 3, 1910.

1,034,682.

Patented Aug. 6, 1912.

2 SHEETS—SHEET 1.

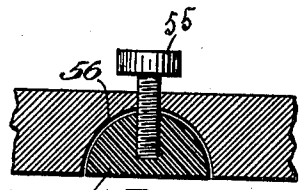

Fig 7

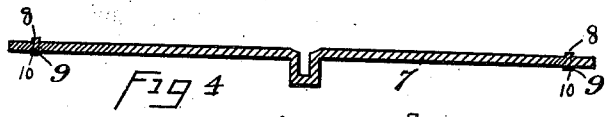

Fig 4

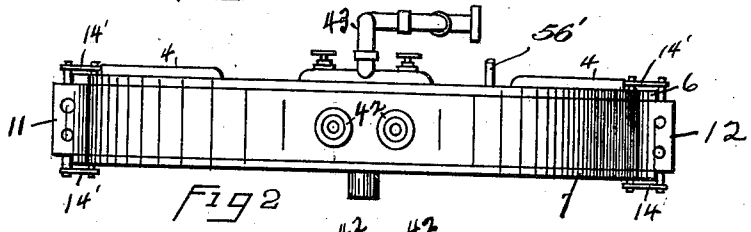

Fig 2

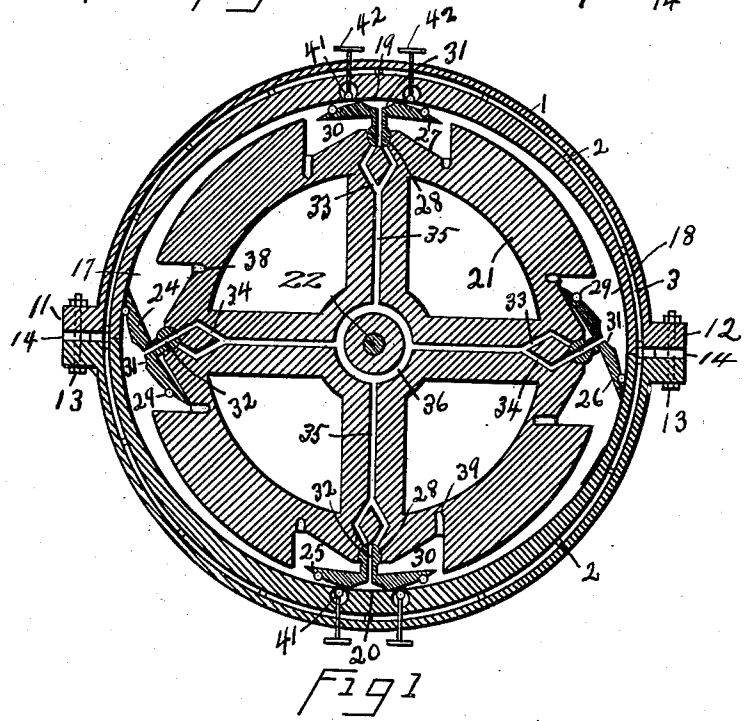

Fig 1

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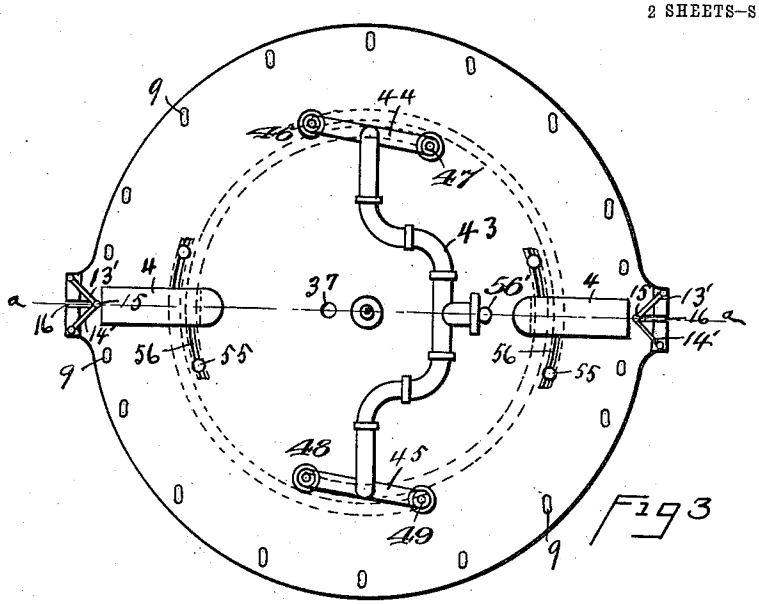

Fig 3

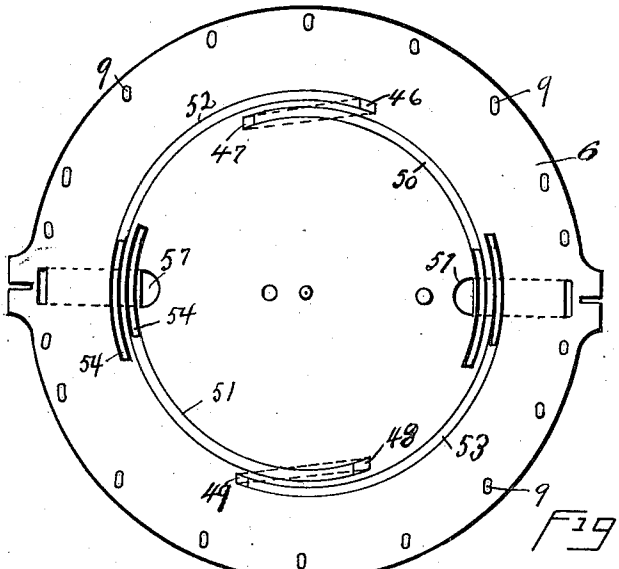

Fig 5

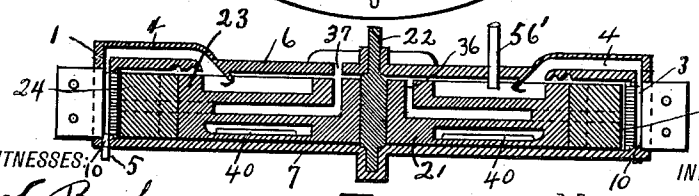

Fig 6

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UNITED STATES PATENT OFFICE.

WILLIAM C. BOSLEY, OF HOUSTON, TEXAS.

ROTARY ENGINE.

1,034,682. Specification of Letters Patent. Patented Aug. 6, 1912.

Application filed February 3, 1910. Serial No. 541,755.

To all whom it may concern:

Be it known that I, WILLIAM C. BOSLEY, citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to new and useful improvements in rotary engines.

The object of the invention is to provide an engine of the character described comprising a stationary jacket and a rotor revoluble therein with a maximum degree of power and a minimum of friction.

A still further feature resides in the provision of means whereby the friction between the jacket and rotor may be regulated.

With the above and other objects in view, my invention has particular relation to certain novel features of construction and operation, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:—

Figure 1 is a sectional view of the engine. Fig. 2, is a side elevation thereof. Fig. 3, is a plan view of the complete engine showing the means for the introduction of the motive and cooling fluids thereto. Fig. 4, is a sectional view of the bottom plate. Fig. 5 is a plan view of the inner side of the top plate. Fig. 6 is a sectional view of the engine taken on the line *a*—*a* of Fig. 3. Fig. 7 shows a sectional view of the piston designed to operate in the groove shown in the inner side of the top plate, shown in Fig. 5.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures, the numeral 1 refers to the jacket, which is composed of an outer and inner casing secured together by ties or binders 2. Between these casings is a suitable water chamber 3 for the circulation of water to cool the engine when used as an internal combustion engine, and the ties 2 do not extend the full width of the chamber so as not to entirely close the same, in order that the water may have free circulation thereabout. Inlet and outlet pipes to and from this chamber are indicated, respectively, by the numerals 4 and 5. Top and bottom plates 6 and 7 are secured upon the jacket, as shown in Fig. 6. These plates each have an annular inwardly projecting rim 8 which coincides with and projects into the water chamber and they are further provided with a plurality of similar and similarly located perforations 9 which are designed to receive bolts 10 which pass through both plates and the water chamber and are designed to secure said plates upon the jacket. These bolts are smaller, in diameter, than the width of the chamber so as not to obstruct the water circulation and the perforations in the plates 6 and 7 are slightly oblong so as to allow a lateral movement of the jacket sections, relative to the plates in the manner and for the purpose presently to be described.

The cylinder is made in two sections, which are secured together by means of joints 11 and 12, and in case the cylinder is found not to be properly adjusted relative to the rotor, the cylinder sections may be taken apart by the removal of bolts 13, which secure said sections together and the packing 14, may be increased or decreased until the cylinder chamber is of a proper size to permit the rotor to revolve therein without undue friction. This adjustment of the cylinder will be necessary in order to accommodate it to the rotor under different degrees of expansion due to different degrees of heat, and in order to keep the plates 6 and 7 concentric with the cylinder chamber I have provided the sets of links 13′ and 14′, the members of each set being respectively secured to the jacket section, at one end and to the stud 15, at the other. These studs are laterally movable in oblong slots 16, in the plates 6 and 7. There are four of these sets of links, two on each end of the engine, and as the cylinder chamber is enlarged by the interposition of the packing the studs 15 move in their slots 16 and the links 13 and 14 operate to move the casing sections equally from each other so that the plate centers coincident with the chamber center.

The contour of the cylinder chamber in which the rotor operates, is shown in transverse section in Fig. 1, and it is to be observed that this chamber is slightly oblong the opposing ends presenting arcs of equal circles as at 17 and 18. These arcs do not cut each other, but interposed between their extremities, on each side, are arcs of equal circles which have the same circumference

as that of the rotor. These last mentioned arcs are designated by the numerals 19 and 20, and it will thus be seen that the cylinder chamber has its inner surface provided with four cam shaped projections, two of which oppose the other two, as is shown in Fig. 1, and as the rotor is circular and concentric with the cylinder chamber it is to be observed that opposing crescent shaped steam chambers are provided between the rotor and the ends of the cylinder chamber as at the points 17 and 18. The rotor is designated by the numeral 21, and is a circular member secured upon the shaft 22. This rotor includes a bottom plate, four oppositely disposed spokes and an annular upstanding rim 23, and is designed to have free rotatable play in the cylinder chamber. It is provided with four piston blades, 24, 25, 26, and 27, secured in the rim 23 by means of ball and socket hinges 28, shown in detail in Fig. 1. These blades are, preferably, crescent shaped, as shown, and are provided at each end, with rollers 29 to minimize their friction with the chamber walls, and the corresponding portions of the rim are provided with recesses 30, which receive the wings of the blade as it swings back and forth on its hinge. Each blade has a centrally located transverse groove 31 upon its external surface which communicates with a radial passageway 32 leading from the groove 31 through the ball of the blade and which may in turn communicate with either of two passageways 33 and 34, accordingly as the blade is inclined one way or the other, as shown in Fig. 1. These passageways 33 and 34 unite in a common passageway 35 which follows the spoke down to the chamber 36 and communicates with the free air through outlet 37, Fig. 6. The numerals 38 and 39 designate, respectively inlet ports carried by the rotor rim and communicating with the respective recesses underneath the blade wings as is also shown in Fig. 1. The bottom plate of the rotor also carries radiating wings 40 as shown in Fig. 6, and for a purpose to be hereinafter set forth.

The inward projections or cams carried by the inner wall of the casing, are provided with transverse rollers 41, which are radially adjustable by means of hand screws 42. These adjustable projections are provided in order to accommodate the cylinder wall to the side of the rotor designed to be operated therein, and to prevent any passage of steam from one of the crescent shaped chambers to the other.

In Fig. 3 I have shown a plan view of the engine with the system of pipes for introducing steam into the same, wherein the numeral 43 refers to the main supply pipe from which lead inverted U shaped pipes 44 and 45, the first of which communicates with ports 46 and 47 of plate 6 and the latter of which communicates with ports 48 and 49 of said plate. Each of these pipes is controlled by means of suitable valves as shown in Fig. 3. The ports 46 and 49 of plate 6 are in the path of ports 38 of the rotor and in a like manner the ports 47 and 48 of plate 6 are in the path of ports 39 of the rotor, and it is further to be observed that the ports 38 and 39, of the rotor, are located so that the ports 38 will communicate only with ports 46 and 49 of plate 6 and the ports 39 will communicate only with ports 47 and 48 thereof.

Upon the under side of plate 6 I have provided arcuate grooves 50 and 51 which extend, respectively, from ports 47 and 48 slightly more than a quadrant's distance around the plate and are arcs of the circle described on said plate by ports 38; also arcuate grooves 52 and 53, of the same length as grooves 50 and 51, extending respectively from ports 41 and 49 slightly more than a quadrant's distance in the same direction and coinciding with the circle described upon the plate 6 by ports 39 of the rotor. The grooves 50 and 51 extend to the left from their ports 46 and 49 and the grooves 52 and 53 extend in the opposite direction, from their respective ports, and in each groove I have provided a cutoff 54 which conforms to the exact shape of the groove and which are held in place by means of thumb screws 55 which pass through arcuate slots 56, in plate 6 and engage with said piston, as shown in Figs. 3 and 7. By means of this arrangement the cut offs may be moved in their grooves and the grooves are thus lengthened and shortened at will, and the time of the steam pressure thus lengthened or shortened at will.

The numeral 56′ refers to a water pipe which enters the cylinder chamber through plate 6 and is provided to supply water to the rotor pan. The centrifugal force of the rotor aided by the wings 40 throws the water against the rotor rim and tends to force the same up said rim.

Projecting from plate 6 and depending closely within the rim are scoops 57 which are designed to catch up the water forced up the rim and conduct the same to the chamber between the outer and the inner shell of the water jacket from which it is drawn off through pipe 5.

When it is desired to start the engine the valves controlling the ports 47 and 48 may be opened and the steam will enter ports 39 of the rotor through which it will enter the steam chamber behind the piston blades. The rotor is thus started in the usual direction and the steam pressure continues until the grooves 52 and 53 have been passed by ports 39 of the rotor, when the steam will be cut off and a closed steam chamber formed

wherein the steam already introduced may expand and force the rotor to continue its rotation. By moving the cut offs 54 in their respective grooves the relative time of steam introduction, and the steam expansion may be regulated at the will of the operator.

When it is desired to reverse the engine the steam may be cut off from the ports 47 and 48 by suitable manipulation of the valves controlling said ports, and allowed to enter ports 46 and 49 by opening the valves controlling said ports and passes along the grooves 50 and 51 and enters the ports 38 of the rotor and thence to the steam chambers behind the piston blades, and will operate, in the manner just described, to reverse the rotor, the steam pressure continuing until the ports 38 have passed beyond the grooves 50 and 51.

In Fig. 1 I have shown the piston blades in a position they will occupy during the reverse movement of the rotor. It is readily obvious that the portion of each steam chamber in front of the piston blades will be filled with spent steam. To permit the escape of this steam I have provided the exhaust passageways 33, 34, and 35 which form a continuous passageway, when the blade is in a reverse position, through which the steam passes to chamber 36 and thence to the free air through outlet 37. When the rotor is revolving in the other direction the position of the blade is reversed and the passage ways 32, 33, and 35 form a continuous passage way for the exhaust to pass to chamber 36. A free and automatic exhaust for the spent steam is thus provided irrespective of the direction of the new movement of the rotor.

What I claim is:—

1. A rotary engine including an engine casing, a rotor mounted within said casing and revoluble relative thereto, a plurality of inwardly extending projections carried by the inner wall of said casing and disposed to project against said rotor the portions of said casing intermediate said projections being so shaped as to form crescent shaped chambers with said rotor, a plurality of oscillating two winged blades hingedly secured upon the outer surface of said rotor movable in both directions and the wings disposed to alternately span said chambers, a motive fluid inlet through which the motive fluid may be introduced into said casing and on either side of said blades, valves controlling said inlet, a central chamber carried by said rotor, radiating conduits communicating with said chamber and also with the chamber in front of said blades whereby the spent steam may be conducted from the chamber in front of said blades to said central chamber, said central chamber being provided with an outlet port leading therefrom.

2. A rotary engine including a casing a rotor mounted within said casing and revoluble relative thereto, opposing inwardly extending projections carried by the inner wall of said rotor, the portions of said casing intermediate said projections being so shaped as to form crescent shaped chambers with said rotor, a plurality of two winged piston blades hingedly secured to the rotor and disposed to rock in either direction and the wings thereof alternately span said chambers, a motive fluid inlet through which the motive fluid may be introduced into said casing and on either side of said blades, a means for controlling said inlet, a central chamber carried by said rotor and communicating with the free atmosphere, a plurality of radiating conduits communicating with said central chamber and also arranged to communicate with the chambers spanned by said piston blades whereby the spent motive fluid of said chambers may be conducted to the free atmosphere.

3. A rotary engine including a casing and a rotor mounted within said casing and revoluble relative thereto, opposing inwardly extending radially adjustable projections carried by the inner wall of said casing, the portions of said casing intermediate said projections being so shaped as to form crescent shaped chambers with said rotor, a plurality of two-winged piston blades secured to said rotor by means of a hinged connection, each blade being disposed to rock in either direction on its hinge and the wings thereof to alternately span said chambers, and each wing having a centrally located transverse groove upon its external surface, a motive fluid inlet through which the motive fluid may be introduced into said casing and either before or behind all of said blades simultaneously, a means for controlling said inlet, a central chamber in said rotor and communicating with the free atmosphere, a plurality of radiating conduits, one for each piston blade, communicating with said central chamber and also communicating through a conduit extending through each of said blades and the transverse groove of said blade, with the respective chambers spanned by said piston blades through which the spent motive fluid of said chambers may be conducted to the central chamber of the rotor and thence to the free atmosphere.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM C. BOSLEY.

Witnesses:
A. S. CALDWELL,
J. E. BOYD.