T. JORGENSEN.

ROTARY ENGINE.

APPLICATION FILED NOV. 16, 1908.

924,556.

Patented June 8, 1909.

2 SHEETS—SHEET 1.

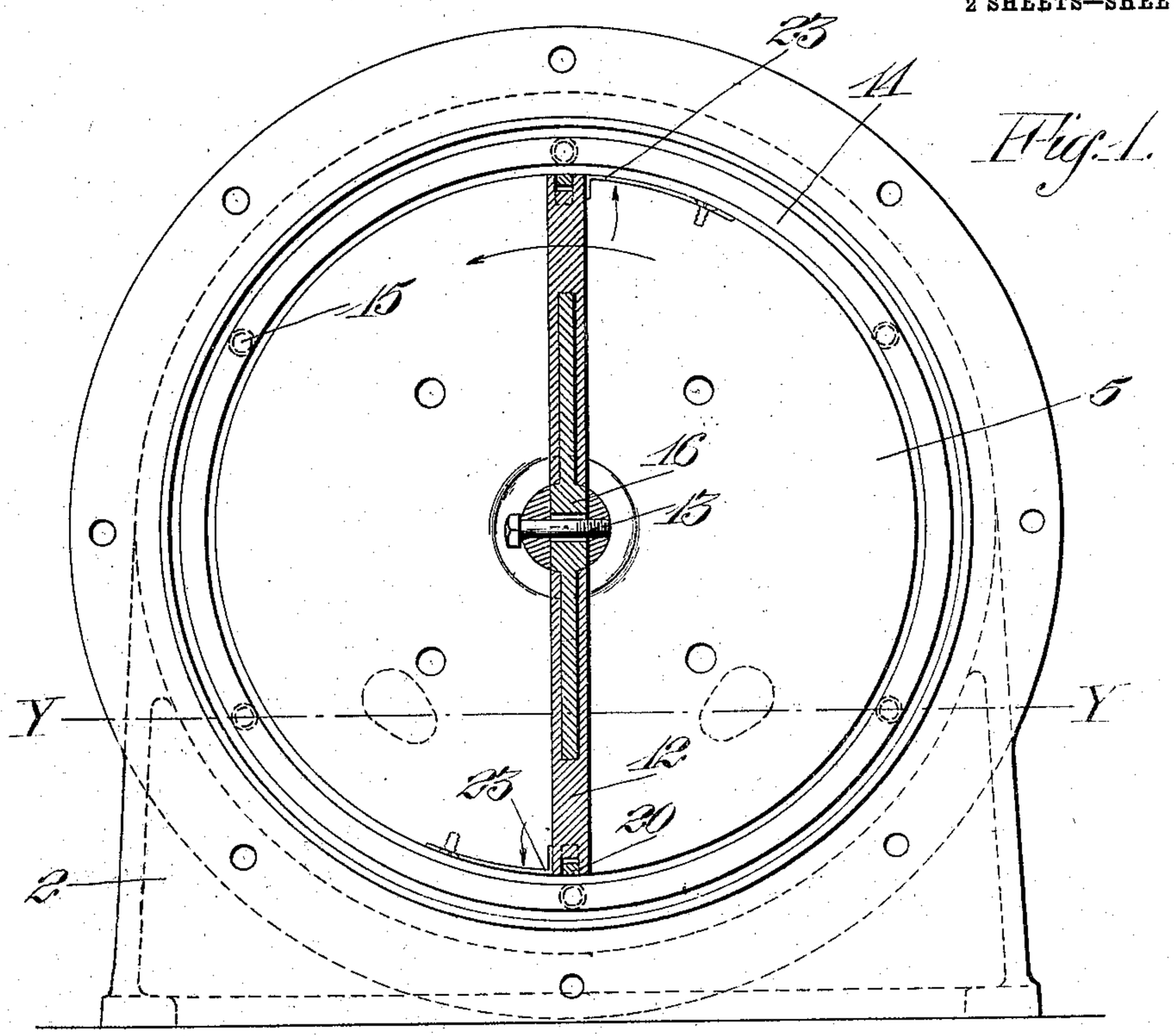

Fig. 1.

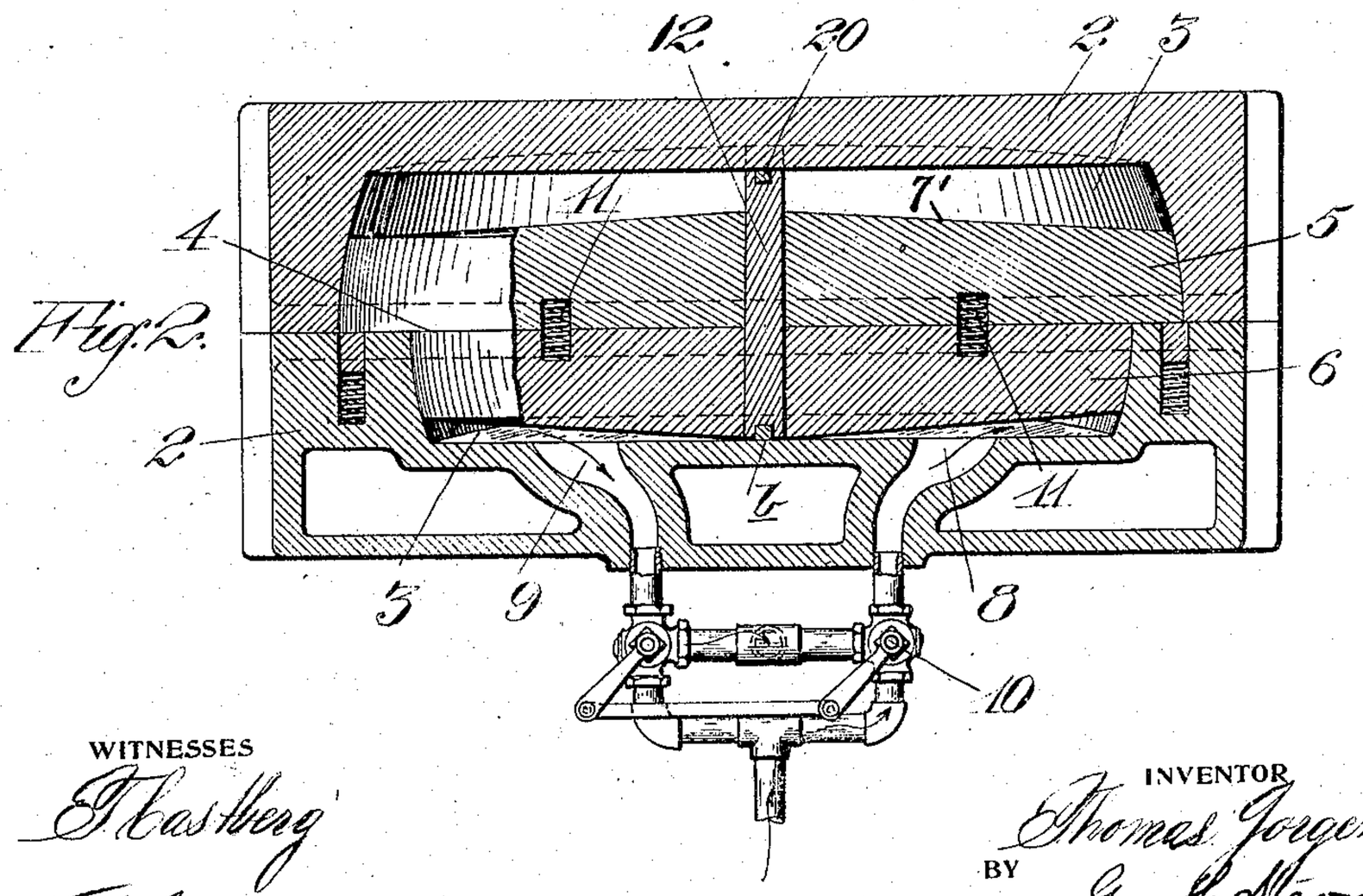

Fig. 2.

WITNESSES

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Fig. 3.

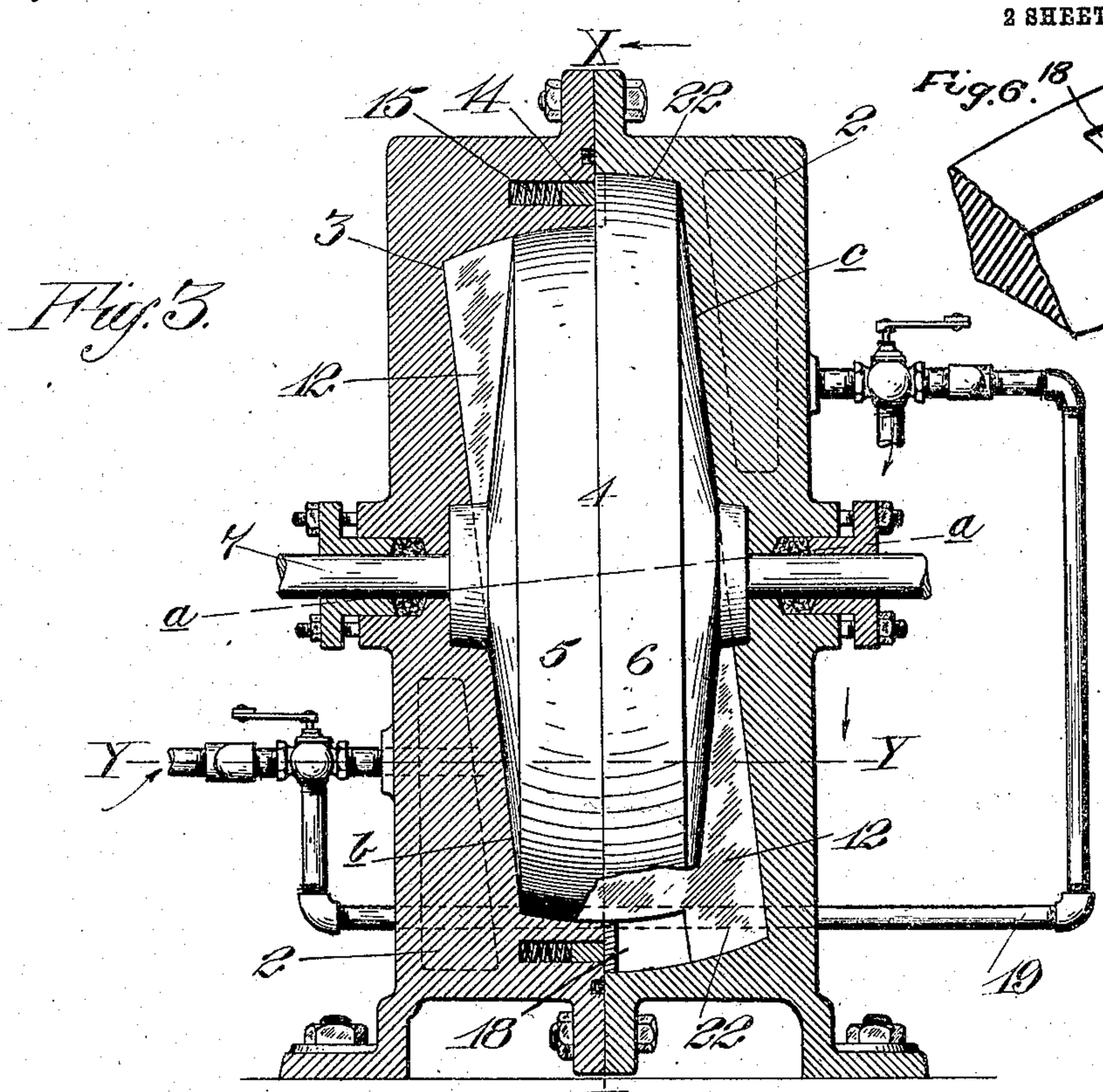


Fig. 6.

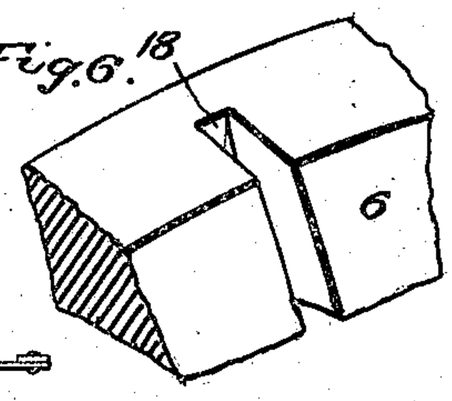


Fig. 4.

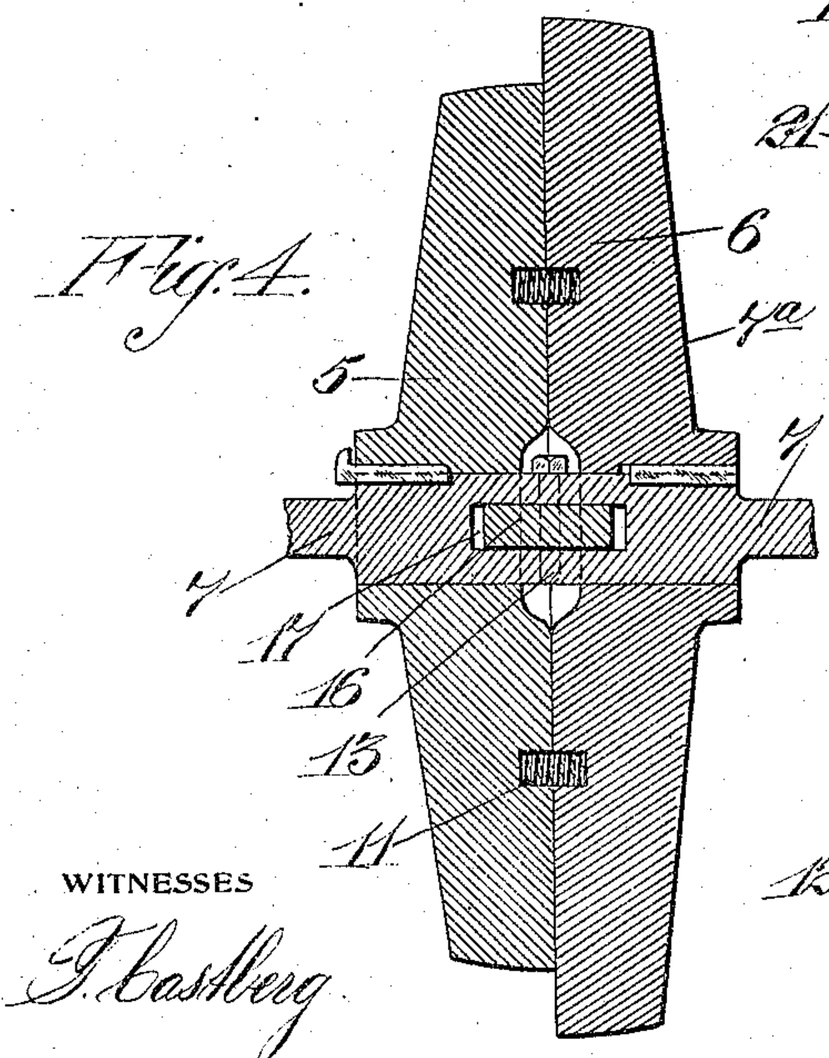
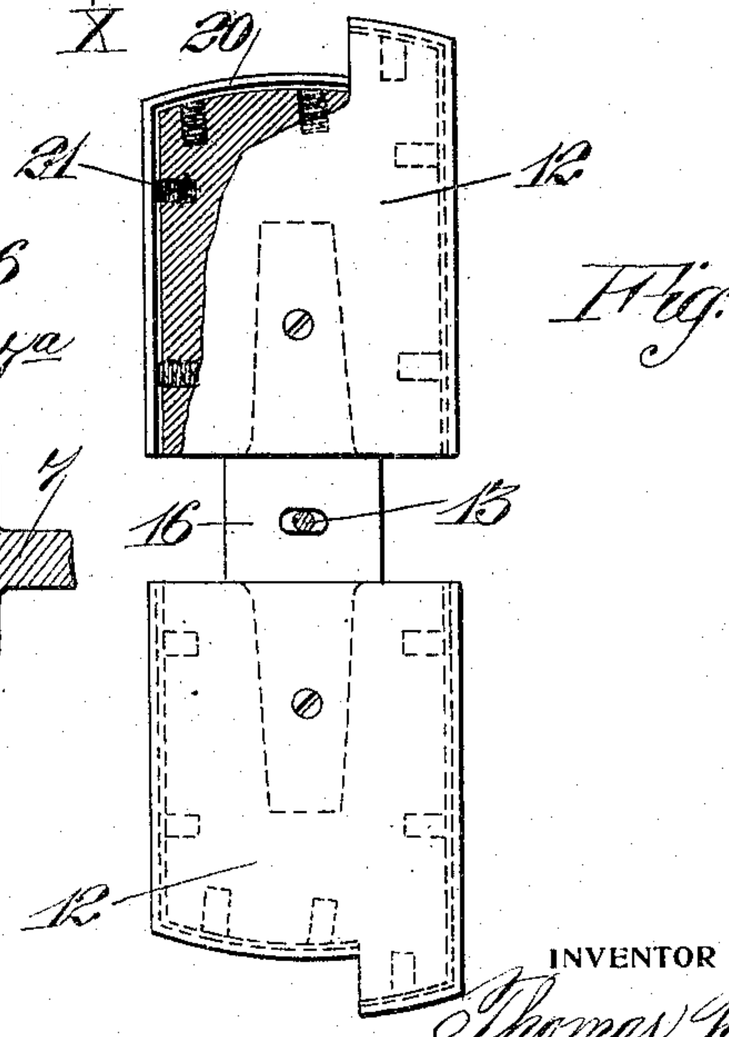


Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS JORGENSEN, OF MARTINEZ, CALIFORNIA.

ROTARY ENGINE.

No. 924,556. Specification of Letters Patent. Patented June 8, 1909.

Application filed November 16, 1908. Serial No. 462,883.

To all whom it may concern:

Be it known that I, THOMAS JORGENSEN, citizen of the United States, residing at Martinez, in the county of Contra Costa and State of California, have invented new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to motors, and particularly that class of motors designated "rotary engines".

It is desirable to devise an engine of this character which will be simple in operation and construction; which will be valveless and which, when desired, may be run upon the compound system.

Among the other objects of my invention may be mentioned the provision of a structure with a minimum number of independent and movable parts, and also the provision of a motor in which a minimum amount of packing to prevent leakage or loss of pressure is required.

My invention consists of the parts, the construction and the combination of parts, or their equivalents, as set forth in the specification and accompanying drawings, in which—

Figure 1 is a view taken on line *x*—*x* of Fig. 3, looking in the direction of the arrow. Fig. 2 is a horizontal section on the line *y*—*y* of Fig. 3 looking down. Fig. 3 is a vertical transverse section through the motor, the rotor being in elevation. Fig. 4 is a detail transverse section through the rotor. Fig. 5 is a detail showing the abutment member. Fig. 6 is a detail view in perspective showing a portion of the rotor member 6 with its tie 18.

The mode of construction and operation, as shown in the accompanying drawings, illustrates one form in which my invention may be embodied, and comprises a separable casing 2 in which is formed a suitable steam chamber 3, and within which rotates a suitable piston or rotor 4, which as here shown comprises two disk-shaped members 5 and 6, one of which, 6, is splined upon a shaft 7, to which the other member 5 of the rotor may be rigidly secured.

I have provided small spring-like members 23 which are secured to the peripheral surfaces of the members 5 and 6, and are adapted to serve as packing members against the inner surface of the chamber 3, and prevent the escape of steam around the edge of the rotor 4.

The shaft 7 has suitable journals in the casing 2, and projects from the side thereof in such a manner as to afford means from which power may be transmitted in any desirable manner.

The disks 5 and 6 are provided with plane surfaces adapted to be set face to face, and the outer sides of the disks 5 and 6 are shown as being in the shape of truncated cones 7′.

The rotor 4 is designed to have rotation in the journals of the casing 2 upon an approximately horizontal axis, and the rotor revolving in a vertical plane at right angles thereto.

The steam chamber 3 is cylindrical in form, and its axis is at a slight inclination to the axis of the rotor 4, as shown at *a*—*a* Fig. 3.

The inclination of the walls of the steam chamber 3 coincides exactly with the angularity of the cone surfaces 7′ of the rotor 4, in such a manner that as the rotor revolves it has a constant line contact, as shown at *b*—*c*, with the walls of the chamber 3.

The peculiar angular disposition of the chamber 3, with relation to the rotor 4, provides suitable steam chambers upon each side of the rotor 4, and as shown at 8 is an inlet port communicating with one side of the chamber 3, and upon the same side as the port 8 of the casing, is an outlet port 9 for the escape of steam.

The inlet and outlet of the steam may be controlled by any suitable system of valves, such as shown at 10, whereby the steam may be reversed in its direction, so that the direction of rotation of the motor may be reversed; but it will be seen that these valves form no operative combination with the motor proper, and only afford a means of reversing the inflowing steam.

The rotor 4, which as before mentioned, is composed of two individual members 5 and 6, and these members are adapted to be thrust apart by suitable springs 11, located at suitable points between the facing surfaces of the members 5 and 6.

The function of the springs 11 is to thrust the members 5 and 6 outwardly, and into intimate contact with the walls of the casing at the points *b*—*c*. Obviously, during the continuous rotation of the rotor, the disk members 5 and 6 will always be in intimate contact at their conical surfaces 7′ with the walls, at the points *b*—*c* in the steam chamber.

A means comprising a loosely mounted floating vane or abutment member 12, is provided, and is adapted to oscillate or slide in a suitable slot formed transversely across the

rotor 4, in such a manner that as the rotor is revolved, the abutment 12 will be carried around thereby, and will continuously oscillate back and forth approximately upon a pivot 13 in the shaft 7, between the walls *b*—*c* of the steam cylinder 3.

As shown in Fig. 3, the steam cylinder at the left hand side of the casing, is of smaller diameter than that portion in the right hand side of the casing, and its peripheral walls are shown as being concentric with the pivotal point 13, about which the abutment 12 oscillates. Thus, it will be apparent that as the rotor is revolved, the angularity of the walls of the chamber 3, will cause the abutment 12 to slide transversely through its bearing in the rotor 4, at each rotation of the rotor. For instance, in Fig. 2, the rotor is shown as standing in a position midway between the inlet port 8, and the exhaust port 9, and when it is in this position, the pressure of the steam is effective against the upper portion of the vane 12, as shown in Fig. 3, to rotate the piston 4, and by reason of the contact at point *b* with the cone 7′, the steam cannot pass in this direction, and is directed upwardly between the surfaces of the chamber 3 and the cone 7′, and abuts against the surface of the vane 12, and is thereby prevented from escaping directly to the exhaust port 9. The continued rotation of the rotor 4 carries the blade or vane 12 around until it reaches the point *b* of the casing, when it will then be flush with the surface of the cone 7′ on one side, and is projected through the side of the coöperative piston member 6 in the lower portion of the other side of the piston chamber 3, as clearly shown.

The steam ports on the right hand side of the casing as shown in Fig. 3, are disposed above the horizontal axis of the rotor, while those on the left hand side of the casing are disposed below the shaft.

The peripheral surfaces of the members 5 and 6 of the rotor 4, and of the piston or vane 12, are spherical in form, and designed to conform closely to the inner peripheral surface of the chamber 3, which is also spherical in contour. In this way the vane 12 may reciprocate freely back ahd forth through the rotor 4 as it is carried around.

The vane 12 is always disposed between the inlet passage 8 and the discharge passage 9 in such a manner that there is never a direct communication between the two, and further the conical walls 7′ of the rotor are always in close contact at the points *b* so that the steam cannot escape past this point and be lost, but must always travel up and around, and impinge against the vane 12 before it can reach the exhaust port 9; on the opposite side, at the point *c*, a similar seal is always maintained. As the vane 12 travels in its orbit constantly in contact with the walls of the cylinder 3, it will be oscillated back and forth in such a manner as to alternately be interposed in the upper portion of the steam cylinder 3 at each revolution, and simultaneously into the lower portion of the steam cylinder 3 on the right hand side of the machine, and when it is desired to make the engine of a compound type, it is only necessary to connect the exhaust ports of the smaller portion of the steam chamber 3 with the inlet port of the larger side of the chamber 3 by suitable connections shown at 19. In this manner advantage is taken of the expansibility of the steam.

I have shown at 14, an annular packing-ring adapted to be thrust against the plane surface of the rotor member 6 by suitable springs 15 to prevent loss of pressure at this portion of the steam chamber; and I have also provided suitable packing bars 20 mounted in slots formed in the edges of the vane 12, which bars 20 are actuated upon by small springs 21 of any suitable character, inserted in the body of the vane 12, and forces the bar 20 into steam tight engagement with the walls of the steam chamber 3. The ends of the abutment 12 are shown as curvilinear in shape so as to conform with the inner periphery of the chamber 3, and are of such length as to properly seat in the separate portions of the chamber 3, and shown as having projections 22 for this purpose. This abutment vane 12 is shown as composed of two removable members secured upon the central stem 16 which is adapted to pass through a suitable slot 17 formed in the shaft 7, and through which it may have free oscillation.

The rotor members 5 and 6 are united to each other by a tie 18 at the point where the slot is formed in the rotor through which the vane 12 is reciprocable or oscillatable.

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

1. In a rotary engine, a casing having an internal diagonally disposed circular chamber, a central shaft, a two-part rotor carried by the shaft within the chamber, and a vane or piston movable in the rotor to follow the contour of the chamber.

2. In a rotary engine, the combination of a casing having a central shaft, a two-part rotor carried thereby, a chamber in the casing arranged diagonal to the shaft, and within which chamber the rotor is turnable, and a vane or piston movable in the rotor in the plane of the axis thereof and adapted to follow the interior wall of said chamber with said axis, as a center of oscillation.

3. In a rotary engine, a casing having an internal diagonally disposed circular chamber, a central shaft, a two-part rotor carried by the shaft within the chamber, said rotor having surfaces of revoluble contact with the interior surface of the chamber, a vane or

piston movable in the rotor to follow the contour of the chamber, and having a center of oscillation about the axis of the rotor, and means for causing the edge of the piston to follow and form a close joint with the interior of the chamber.

4. In an engine of the character described, a casing having a central shaft, a chamber diagonal to the shaft having conical surfaces, a two part rotor carried by the shaft having conical faces of contact with the interior sides of the chamber, means by which said contact is maintained, a vane or piston, a radial channel in the rotor in the plane of the axis in which the piston fits, said piston having its center of oscillation at the axis, and means forming fluid-tight joints at the surfaces of contact.

5. In an engine of the character described, a casing having a central shaft, a chamber diagonal to the shaft having conical inner surfaces, a two-part rotor with separating springs and faces co-acting with those of the chamber, said rotor and shaft having slots or channels, a vane or piston fitting said slots, and oscillating therein, with its edges in contact with the inner surfaces of the chamber, the periphery of the chamber and the piston ends having a curvature of contact, of which the axis of oscillation is the center.

6. In an engine of the character described, a casing having a central shaft, a chamber diagonal to the shaft having conical inner surfaces, and a periphery of spherical curvature, a two-part rotor with separating springs, and outer faces coacting with those of the chamber, said rotor and shaft having slots or channels, a vane or piston fitting said slots and oscillating therein, with its edges in contact with the inner surfaces of the chamber, and its ends with the spherical periphery and packing plates whereby fluid tight moving joints are formed.

7. In an engine of the character described, a casing having a central shaft, an internal chamber diagonal to the shaft having conical inner faces, said chamber having two diameters, a two-part rotor with conical outer faces, separating springs whereby said faces form fluid tight joints with the inner faces of the chamber, a vane or piston, said rotor and shaft having slots or channels through which said piston passes, and within which it oscillates to form surfaces of contact with the interior of the chamber, said piston having two lengths fitting the two diameters of the chamber, means for admitting the fluid under pressure to act by direct pressure upon the smaller portion of the piston, and means whereby the exhaust from this portion of the chamber may be admitted to the larger chamber to act upon the larger diameter of the piston.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

THOMAS JORGENSEN.

Witnesses:

ERNEST ABBOTT,

FRANCIS JOSEF GEISLER.