No. 889,875. PATENTED JUNE 2, 1908.

J. K. GERRICH.

ROTARY ENGINE.

APPLICATION FILED OCT. 30, 1907

2 SHEETS—SHEET 1.

Fig. 2.

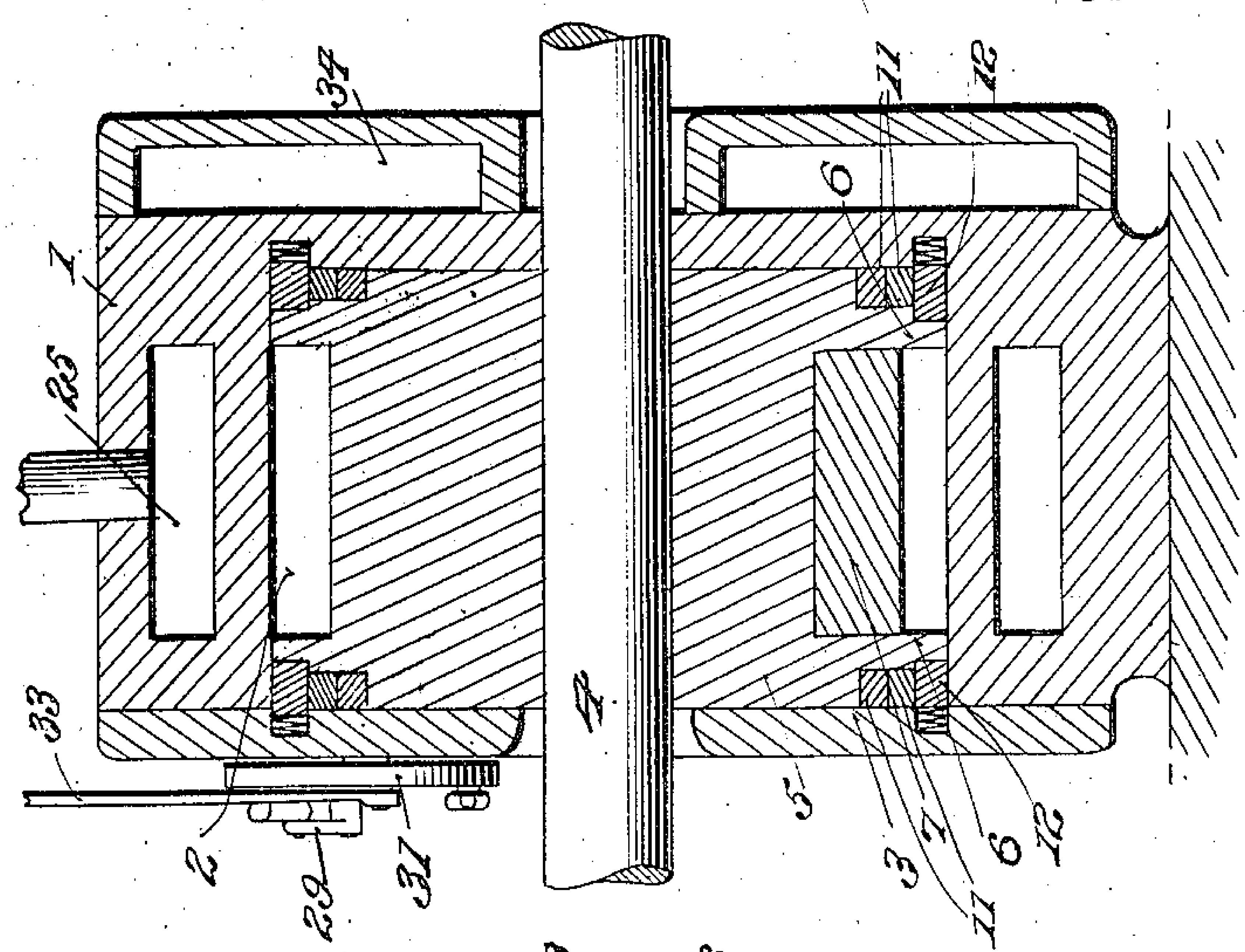
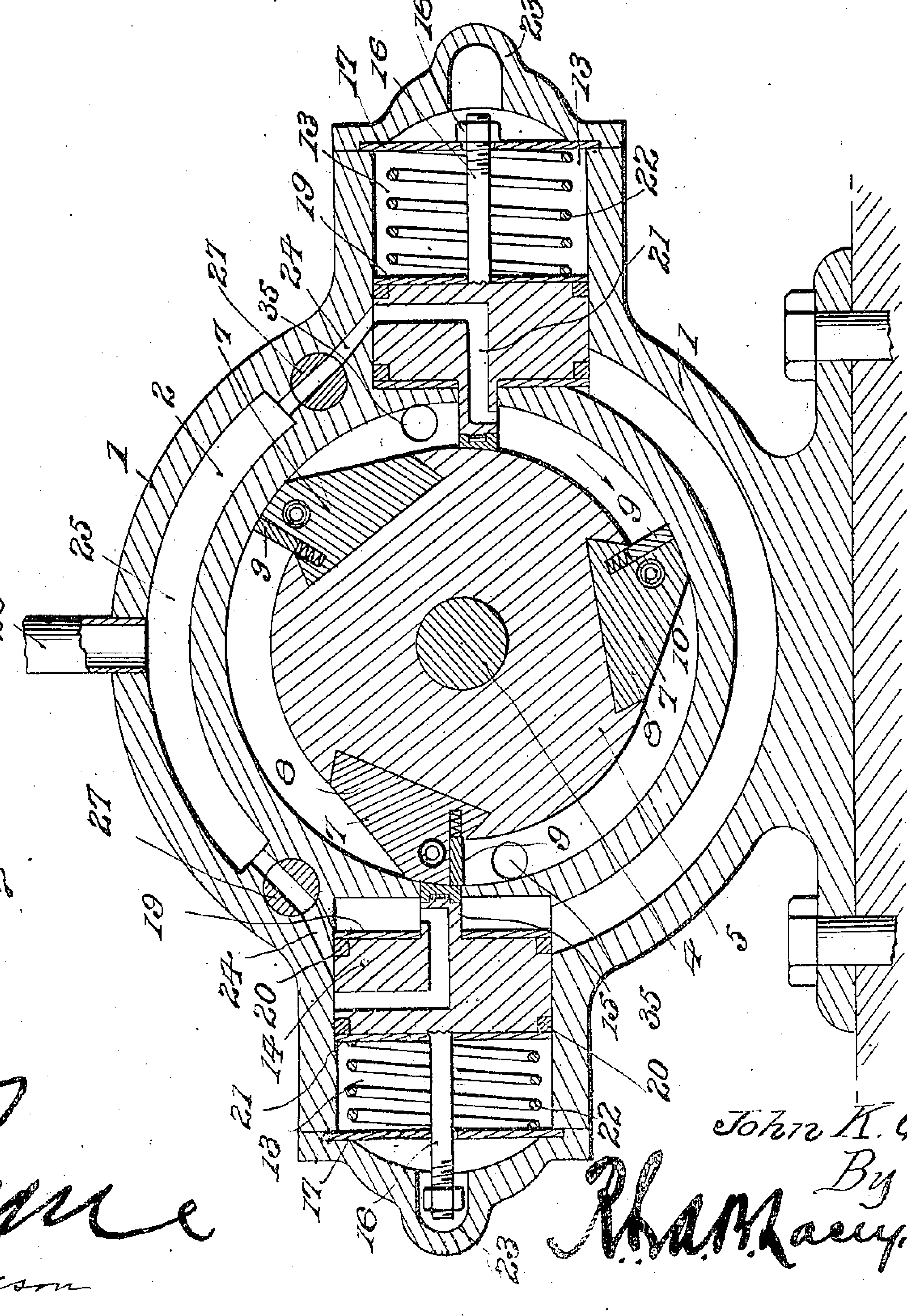


Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

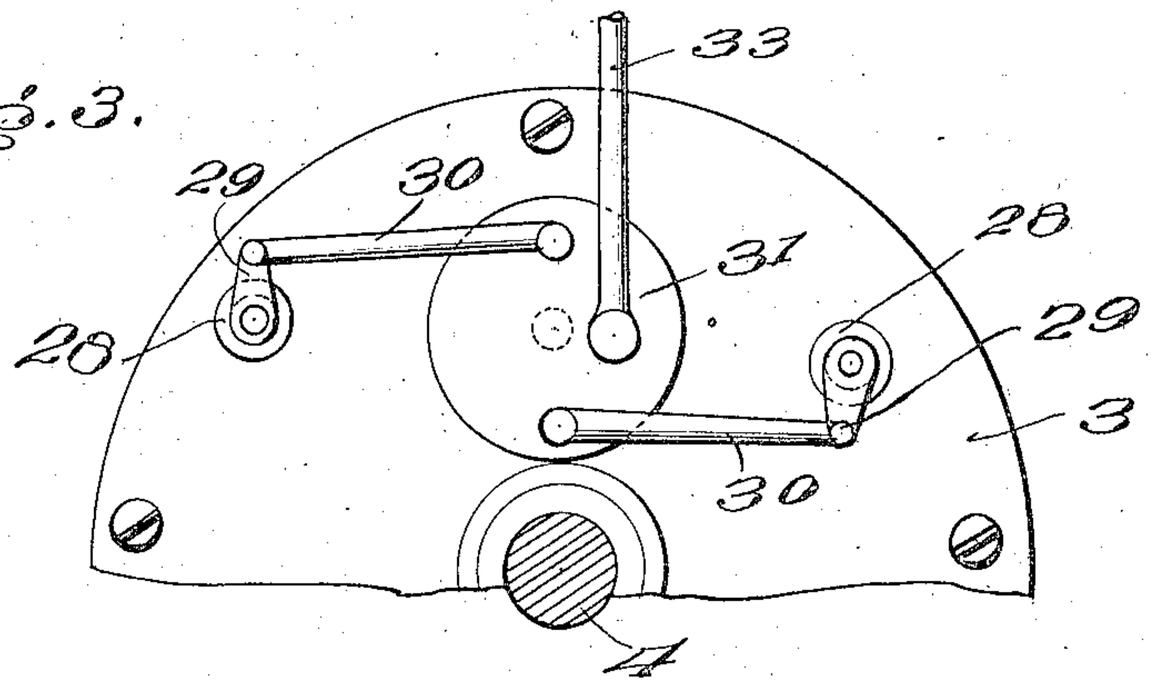

Fig. 4.

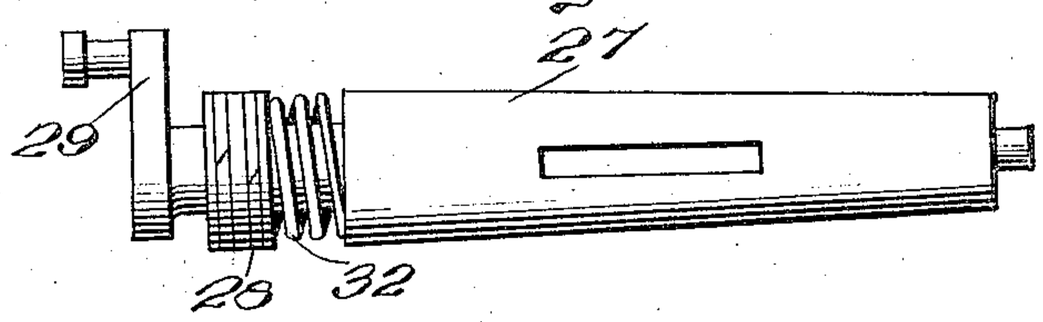

Fig. 5.

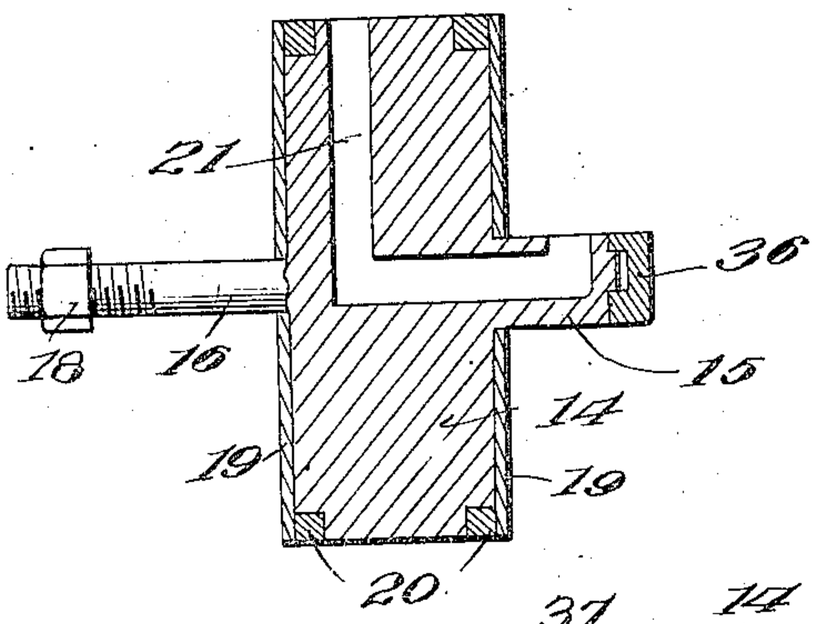

Fig. 6.

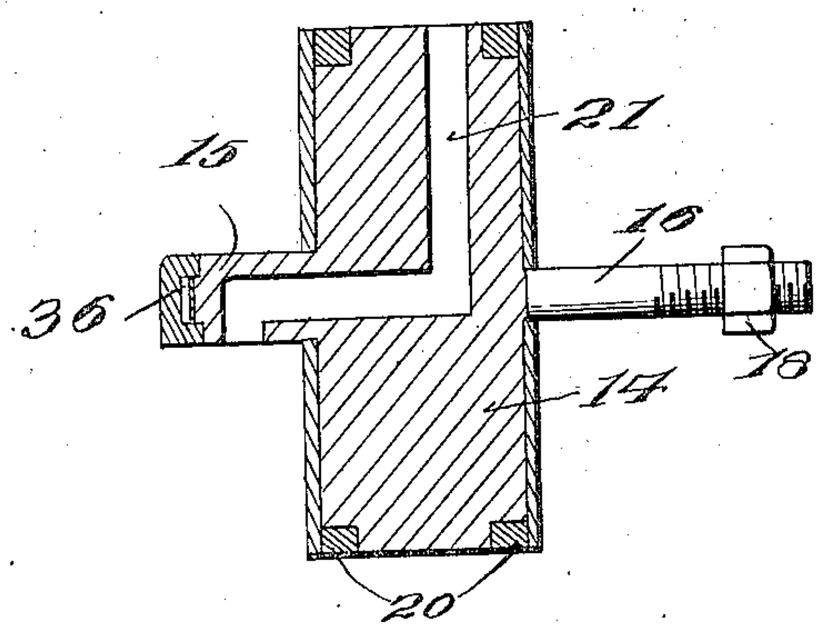

Fig. 7.

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UNITED STATES PATENT OFFICE.

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ROTARY ENGINE.

No. 889,875. Specification of Letters Patent. Patented June 2, 1908.

Application filed October 30, 1907. Serial No. 399,842.

To all whom it may concern:

Be it known that I, JOHN K. GERRICH, a citizen of the United States, residing at Hanover, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

The present invention relates to improvements in steam motors of that type in which the rotor is provided with abutments designed to coöperate with slidably mounted inlet valves, and the object of the invention is to provide a motor in which the expansive power of the steam may be utilized in the most economical manner.

The invention further contemplates a steam motor which will run at a uniform speed and which is extremely sensitive so that the speed and power can be controlled as may be required by suitably increasing or decreasing the steam supply.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a longitudinal sectional view through the motor. Fig. 2 is a transverse sectional view through the same. Fig. 3 is a side elevation of the upper portion of the motor showing the valve operating mechanism. Fig. 4 is a detail view of one of the plug valves. Fig. 5 is a sectional view through one of the slide valves. Fig. 6 is a similar view through the opposite slide valve. Fig. 7 is a sectional view through one of the slide valves on a plane at right angles to that of the preceding figure.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to the drawings the numeral 1 designates the casing of the steam motor, the said casing being formed with a cylindrical chamber 2 having one end thereof closed by a removable plate 3. Journaled within the casing 1 is a shaft 4 and rigid with this shaft is a rotor 5 designed to rotate within the cylindrical chamber 2. An annular flange 6 is located at each end of the rotor 5, the ends of the flanges loosely engaging the interior walls of the chamber 2, while the body portion of the rotor has a diameter somewhat less than that of the chamber 2. Projecting from the periphery of the rotor 5 at suitable intervals are the abutments 7 which in the present instance are shown as formed of separate pieces and dovetailed to the rotor. Each of these abutments 7 has a radial face and a cam face 8, a spring actuated plunger 9 being slidably mounted upon the radial face so as to bear yieldingly against the walls of the chamber 2 and form a steam tight joint with the same. A transverse opening is shown as extending through each of the abutments 7 and arranged within these openings are the springs 10 opposite ends of which bear against the packing rings 11 arranged at opposite ends of the rotor so as to receive therewith and form a steam tight joint between the rotor and the walls of the chamber. Surrounding these packing rings 11 are the outer packing rings 12 carried by the casing 1, the said packing rings being spring pressed against the rotor and engaging rabbeted portions of the flanges 6 projecting from the rotor.

Recesses 13 are formed at opposite ends of the casing 1 and constitute chambers for the slide valves 14. Each of these slide valves is formed with a transversely disposed flattened head 15 designed to project within the chamber 2 and bear yieldingly against the rotor 5, and also with a stem 16 passing loosely through a plate 17 closing the recess 13 and capped by a nut 18. The body portion of the slide valves 14 are shown in the present instance as of cylindrical shape and are slidably mounted within the valve chambers 13, a plate 19 being located at each end of the body portion of the valve and the edges of the body portion of the valve being rabbeted to receive the rings 20 which are held in position by the plates and serve to prevent the escape of the steam around the outlets. A steam passage 21 is formed in each of the slide valves 14, one end of the passage opening upon one side of the head 15 while the opposite end opens upon one side of the cylindrical body portion of the valve. Interposed between each of the slide valves 14 and the plate 17 closing the mouth of the valve chamber is a coil spring 22 surrounding the stem 16 and normally operating to hold the head of the valve in a yielding engagement with the rotor. It may be here mentioned that the outer end of the stem operates freely

within a hollow cap 23 arranged over the plate 17 and that the said stem coöperates with the plate to guide the valve in its movements.

The steam passages 21 within the slide valves 14 are adapted to communicate with steam passages 24 formed in the casing 1 and leading from the steam chamber 25 in the upper portion of the casing, the said chamber being in communication with the steam inlet 26. The passage of the steam through each of the passages 24 is controlled by a rotating plug valve 27, the said plugs being tapered and spring pressed inwardly so as to always form a tight joint. The journal at the outer end of each of the plug valves 27 passes loosely through a nut 28 threaded within the mouth of the opening for receiving the valve and is provided with a crank 29 connected by a link 30 to an eccentric portion of a disk 31 rotatably mounted upon the exterior of the casing 1. As shown in the drawings the springs 32 are interposed between the nuts 28 and the plug valves 27 and tend to normally force the same inwardly and to hold them firmly upon their seats. An operating rod 33 is also connected eccentrically to the disk 31 and is designed to coöperate with a governor or throttle-lever of any conventional construction for operating the two plug valves 27 and controlling the admission of steam from the steam chamber to the slide valves.

An annular exhaust chamber 34 is located at one side of the casing and communicates with the cylindrical chamber 2 within the casing through the exhaust ports 35, one of the exhaust ports being provided for each of the slide valves 14. If found desirable it will be readily apparent that one of these exhaust chambers can also be placed upon the opposite side of the casing and a steam jacket thereby provided upon both sides of the motor.

The heads 15 of the slide valves 14 have the extremities thereof provided with the packing members 36 which are spring pressed toward the rotor and serve to take up the wear and to produce a tight joint with the rotor. In a similar manner the head of each of the slide valves is provided at its two ends with spring pressed packing members 37 operating in an identical manner.

In the operation of the motor the rotor 5 is designed to revolve in the direction indicated by the arrows upon the drawing and as the same revolves the cam faces 8 of the abutments thereon are brought successively into engagement with the slide valves 14 so as to move the same inwardly. When the valves are thus forced back the steam passages therein are thrown out of registry with the steam passages 24 in the casing and the supply of steam completely shut off. As soon however as the abutment has moved beyond the slide valve 14 the latter is forced outwardly into engagement with the rotor by means of the coil spring 22 and live steam delivered through the slide valve into the space between the head of the valve and the radial face of the abutment. The expansion of this steam presses against the abutment and causes the rotor to revolve, the steam after being utilized being exhausted through the ports 35 into the chamber 34. By suitably operating the valves 27 through the medium of the operating rod 33 the supply of steam to the slide valves can be regulated and the speed and power of the motor controlled in the desired manner. In the present instance the rotor is shown as provided with three of the abutments 7 while two of the slide valves 14 are mounted within the casing 1 upon opposite sides thereof, such arrangement having the advantage of preventing the formation of dead centers and enabling the motor to be started from any position of rest.

Having thus described the invention, what is claimed as new is:

1. In a rotary engine, the combination of a casing, a rotor mounted within the casing, an abutment carried by the rotor, a slide valve mounted within the casing and provided with a head adapted to coöperate with the abutment, the said slide valve being formed with a passage for the fluid medium, and spring pressed packing members at the end and sides of the head of the valve.

2. In a rotary engine, the combination of a casing provided with a cylindrical chamber and also with a valve chamber, a rotor mounted within the cylindrical chamber, an abutment carried by the rotor, and a cylindrical slide valve mounted within the valve chamber and provided with a transversely disposed flattened head adapted to project within the cylindrical chamber to coöperate with the abutment upon the rotor, the said valve being formed with a passage for the fluid medium.

3. In a rotary engine, the combination of a casing provided with a cylindrical chamber and also with a valve chamber, a rotor mounted within the cylindrical chamber, an abutment carried by the rotor, a cylindrical slide valve mounted within the valve chamber and provided at one end with a transversely disposed flattened head adapted to project within the cylindrical chamber to coöperate with the abutment upon the rotor and at its opposite end with a stem, the said valve being formed with a passage for the fluid pressure medium, and a plate closing the valve chamber and coöperating with the stem to guide the valve in its movements.

4. In a rotary engine of the character described, the combination of a casing, a rotor mounted within the casing, abutments carried by the rotor, slide valves mounted upon the casing for coöperating with the abut-

ments, plug valves for controlling the admission of fluid pressure to the slide valves, a disk mounted upon the casing, crank arms carried by the plug valves, means connecting the crank arms to eccentric portions of the disk, and means for operating the disk to control the plug valves.

5. A rotary engine comprising a casing, a rotor mounted within the casing means for revolving the rotor, and concentric packing rings at the ends of the rotor, one of the packing rings being carried by the casing and the opposite packing ring by the rotor.

6. In a rotary engine of the character described, the combination of a casing, a rotor mounted within the casing, a packing ring carried by the rotor and adapted to engage the casing, a second packing ring surrounding the first mentioned packing ring and carried by the casing for engaging the rotor, an abutment upon the rotor, and a slide valve coöperating with the abutment.

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

JOHN K. GERRICH. [L. S.]

Witnesses:
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HARRY L. MILLER.