J. P. SHEPARD.

ROTARY ENGINE.

APPLICATION FILED APR. 8, 1919.

1,332,522.

Patented Mar. 2, 1920.

4 SHEETS—SHEET 1.

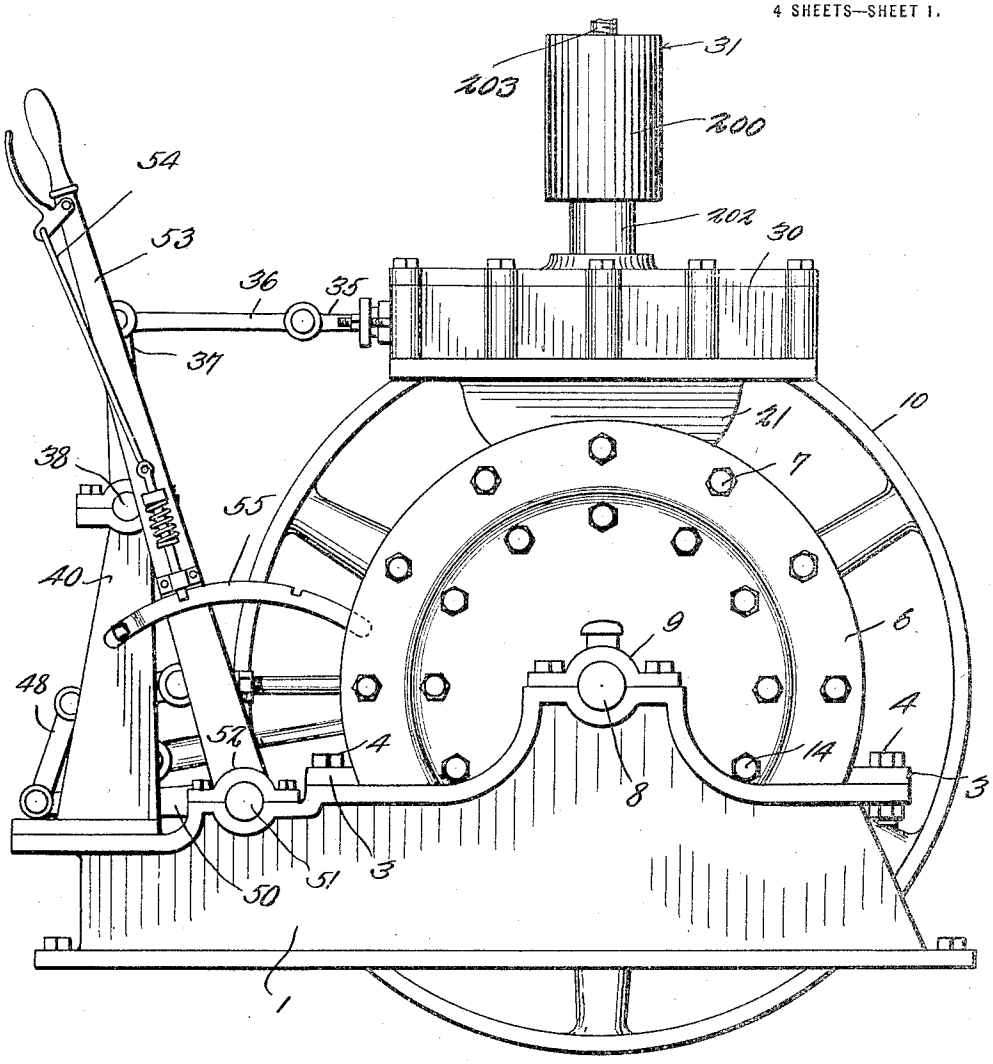


Fig. 1.

Witness

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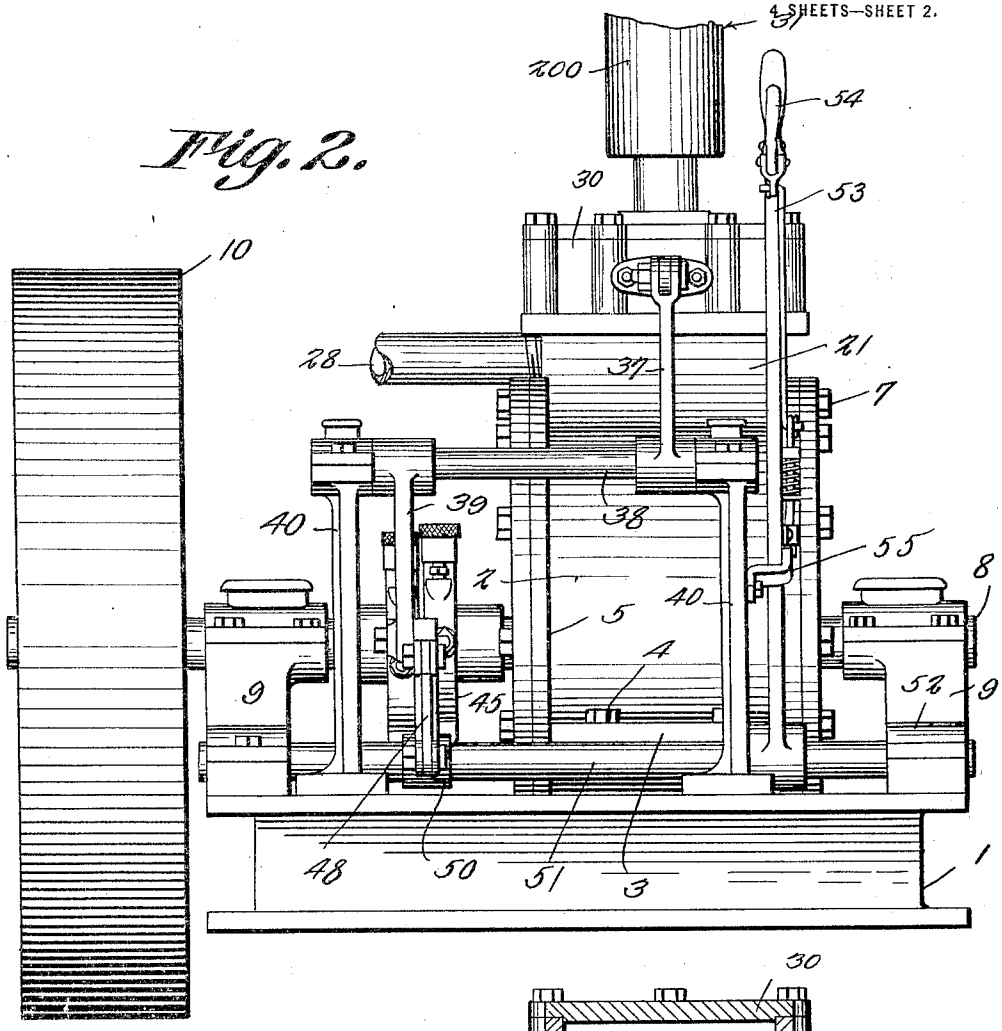
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4 SHEETS—SHEET 2.

Fig. 2.



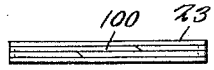


Fig. 7.

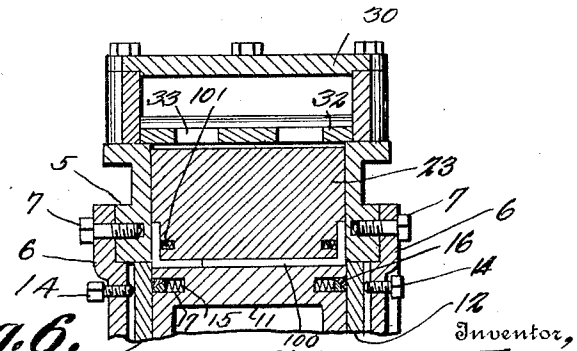


Fig. 6.

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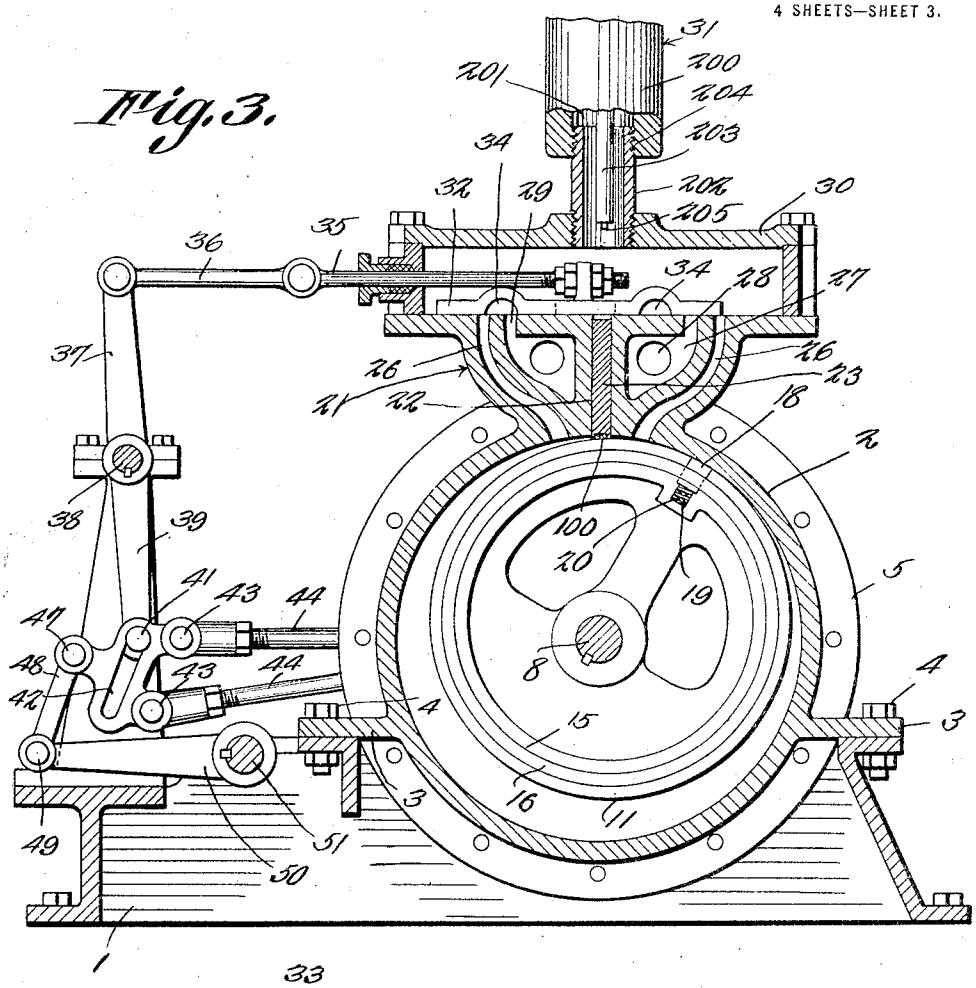
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4 SHEETS—SHEET 3.

Fig. 3.



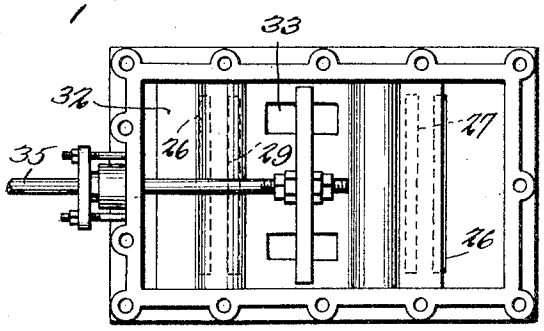


Fig. 4.

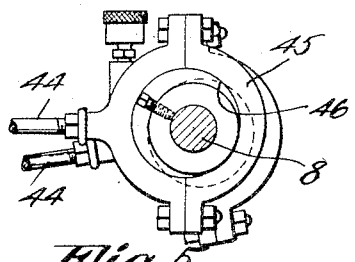


Fig. 5.

Witness

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4 SHEETS—SHEET 4.

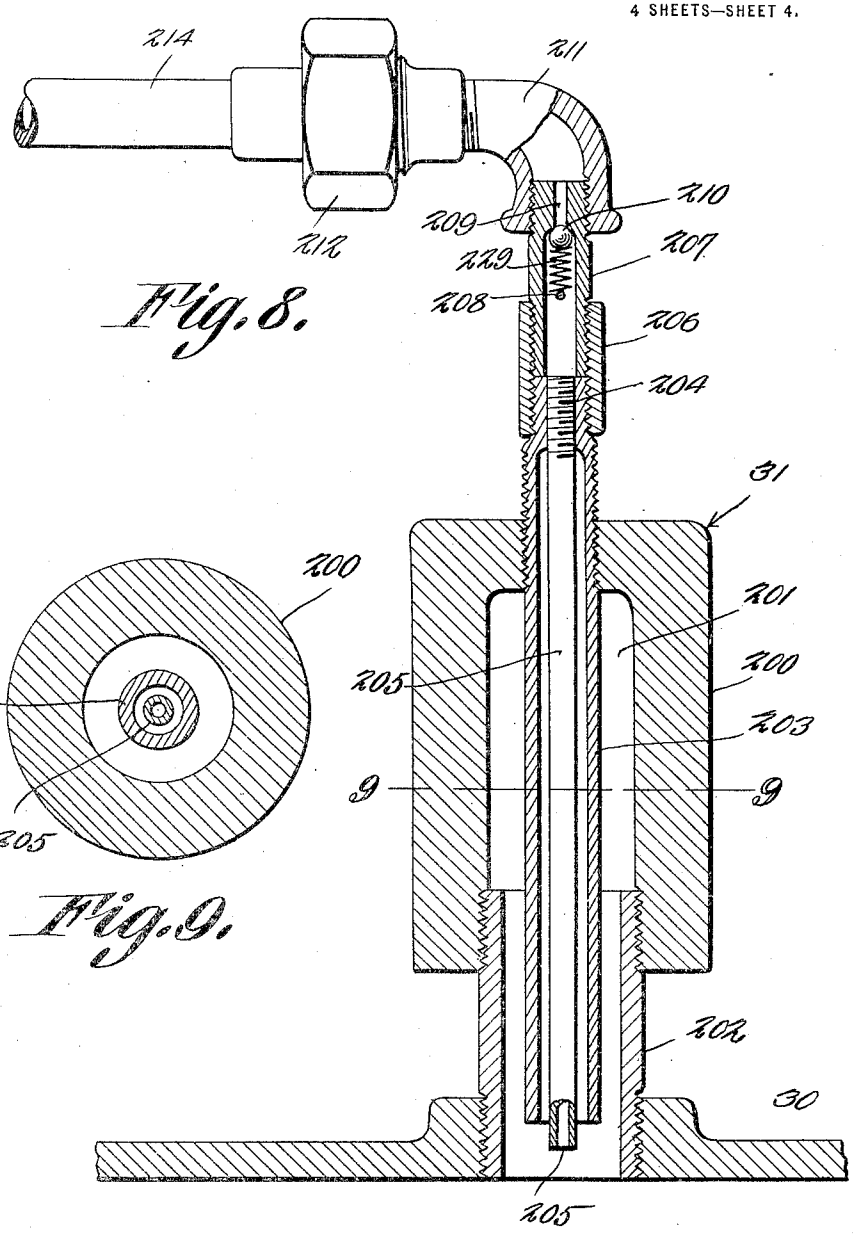


Fig. 8.

Fig. 9.

Witness

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UNITED STATES PATENT OFFICE.

JAMES P. SHEPARD, OF ELIZABETH, WEST VIRGINIA, ASSIGNOR OF ONE-HALF TO W. P. EGAN, OF PARKERSBURG, WEST VIRGINIA.

ROTARY ENGINE.

1,332,522. Specification of Letters Patent. Patented Mar. 2, 1920.

Application filed April 8, 1919. Serial No. 288,435.

To all whom it may concern:

Be it known that I, JAMES P. SHEPARD, a citizen of the United States, residing at Elizabeth, in the county of Wirt and State of West Virginia, have invented a new and useful Rotary Engine, of which the following is a specification.

The device forming the subject matter of this application is a rotary engine, and one object of the invention is to provide novel means for controlling the admission of fluid and the exit of the exhaust. Another object of the invention is to improve the means for operating the rotor. A further object of the invention is to improve the igniter head.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains. Typical forms, merely are shown, and, within the scope of what is claimed, a mechanic may work changes without departing from the spirit of the invention.

In the drawings:—Figure 1 is a side elevation showing an engine embodying the invention; Fig. 2 is an end elevation of the engine; Fig. 3 is a vertical section of the engine, wherein parts appear in elevation; Fig. 4 is a plan of the chest, the lid being removed; Fig. 5 is an elevation showing the eccentrics; Fig. 6 is a section taken through the chest and parts therebelow; Fig. 7 is an elevation showing one of the packings; Fig. 8 is a sectional detail showing the igniter; and Fig. 9 is a cross section on the line 9—9 of Fig. 8.

As shown in the drawings, the engine includes a base 1 to which the ring 2 of a stator is secured by feet 3 and bolts 4. The ring 2 has flanges 5 to which outer side plates 6 are attached by securing elements 7. A main shaft 8 is journaled in the side plates 6 and in bearings 9 on the base 1, the shaft carrying a fly wheel 10.

A rotor 11 is mounted eccentrically on the shaft 8 and coöperates with the inner surface of the stator ring 2. At its sides, the rotor 11 coöperates with inner plates 12 advanced by set screws 14 threaded into the plates 6, the plates 12 being located within the stator ring 2. The outer sides of the rotor 11 are provided with grooves 15 wherein annular packings 16 are located, the packings being advanced by springs 17 to coöperate with the plates 12. An abutment 18 is slidable radially in the stator 11 and is advanced against the stator ring 2 by springs 19 located in a seat 20 in the rotor.

The stator ring 2 includes a neck 21 having a slot 22 in which an abutment 23 slides. Packings 100 extend across the lower edge of the abutment 23 and part way along the edges of the abutment, the packings being under the control of springs 101, and serving to make a tight joint between the inner edge of the abutment and the periphery of the rotor 11.

Inlet ports 26 are formed in the neck 21 on opposite sides of the abutment 23, and there are exhaust chambers 27 in the neck between the inlet ports and the abutment. The chambers 27 have side exhaust ports 28 and top entrance ports 29.

A chest 30 is mounted on the neck 21 and carries an igniter 31 hereinafter described. A slide valve 32 reciprocates in the chest 30 on the inner end of the neck 21 and is provided with openings 33 admitting fluid into the slot 22, on top of the abutment 23 and into the passages 24. Consequently, the abutment 23 is held in contact with the periphery of the rotor 11. The slide valve 32 is supplied on its under side with passages 34, adapted at times to form a communication between the inlet ports 26 and the entrance ports 29 of the exhaust chambers 27, as the slide valve reciprocates. The slide valve 32 is operated by a stem 35 pivoted to a link 36, the link being pivoted to an upright arm 37 on a shaft 38 journaled in bearing standards 40 on the base 1, the shaft having a depending arm 39. The shaft 38 and the arms 37 and 39 operate like a lever, and may be alluded to by that name.

The lower end of the arm 39 carries a wrist pin 41 coöperating with a link 42 fulcrumed on the upper end of a connection 48, as indicated at 47, the lower end of the connection being pivoted at 49 to an arm 50 on a shaft 51 journaled in bearings 52 on the base 1 and carrying a lever 53 having a latch mechanism 54 adapted to coöperate with a segment 55 extended between one standard 40 and the stator. The link 42 is pivoted at 43 to rods 44 carrying straps 45 surrounding eccentrics 46 on the shaft 8.

The igniter 31 includes a relatively heavy body 200 having a chamber 201. A nipple 202 connects the lower end of the body 200

with the chest 30. The upper end of a first tube 203 is threaded into the top of the body 200, the first tube extending downwardly into the nipple 202. A second tube 205 is located within the first tube 203, the upper ends of the tubes 203 and 205 being threaded together as indicated at 204. A coupling 206 is threaded on the outer end of the first tube 203 and into the coupling 206 a casing 207 is threaded, the casing being provided intermediate its ends with a stop pin 208 and having, at its upper end, a reduced inlet port 209. A ball valve 210 coöperates with the port 209 and is held in place by a spring 229 supported on the stop pin 208. By means of an elbow 211 and a union 212, the casing 207 is connected to a supply pipe 214.

In practical operation, the body 200 of the igniter 31 is highly heated, by any suitable means, the first tube 203 and the second tube 205 being heated also, to some extent. Volatile liquid fuel is fed in pulsations through the pipe 214, under pressure. The fuel traverses the port 209, the casing 207 and the tube 205 and, between the body 200 and the tube 203, and between the tubes 203 and 205, the fuel is turned into gas after the fuel has traversed the tube 205. The gas, under high pressure, enters the chest 30 whereupon the fluid or gas under pressure in the chest 30 operates as hereinafter described. The valve 210 is adapted to open with respect to the inlet port 209, when there is sufficient pressure in the supply port 214, but if, during the pulsations of the pump which supplies the liquid fuel to the pipe 214, the pressure in the chest 30 becomes sufficiently great, then the valve 210 will close with respect to the port 209.

Referring to the operation of the engine shown in the drawings, and noting Fig. 3, it will be understood that fluid entering the stator from the chest 30 by the right-hand port 26 is received between the abutments 23 and 18 and causes the rotor 11 to turn clock-wise. At an appropriate time, the slide valve 32 moves to the right far enough so that the right hand passage 34 communicates with the right hand port 26 and the right hand entrance port 29 of the exhaust chamber 27. Then the fluid is exhausted through the right hand port 26, the corresponding passage 34 and the port 29 into the right hand chamber 27, and out of the port 28. The engine may be reversed by rotating the shaft 51 through the medium of the lever 53, the arm 50 operating the link 42 by way of the connection 48, whereupon the link 42, coacting with the wrist pin 41, the arm 39, the shaft 38, the arm 37, the link 36 and the stem 35, will effect a shifting of the valve 32, in a way clearly understood by those skilled in the art. The eccentrics 46 on the shaft 8 coöperate with the straps 45 and the rods 44 to swing the link 42, and to reciprocate the slide valve 32, by way of the parts 39, 38, and 37.

Having thus described the invention, what is claimed is:—

1. In a device of the class described, a stator having a slot and provided with exhaust chambers located on opposite sides of the slot, the stator having inlet ports disposed outwardly of the chambers, the chambers having entrance ports and exhaust ports; a rotor journaled in the stator, an abutment slidable in the slot and coöperating with the rotor; a slide valve mounted to reciprocate on the stator and controlling the inlet ports, the slide valve controlling the entrance of the exhaust chambers, the valve having passages communicating with the inlet ports and the entrance ports at times during the travel of the valve, and having an opening admitting pressure on the abutment; and a reversing mechanism connected with the valve.

2. In a device of the class described, a stator; a rotor journaled in the stator; a slide valve controlling the passage of fluid to the rotor; a shaft; a lever; means for mounting the shaft for rotation; means for fulcruming the lever intermediate its ends; means for connecting one end of the lever with the valve; eccentrics mounted to move with the rotor; rods coöperating with the eccentrics; a link whereunto the rods are pivoted; a wrist pin on the other end of the lever and coacting with the link; a connection on which the link is fulcrumed; and an arm on the shaft, the connection being pivoted to the arm.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JAMES P. SHEPARD.

Witnesses:
J. H. Smith,
S. C. Lockhart.