No. 805,840. PATENTED NOV. 28, 1905.

B. A. CARMODY.

ROTARY ENGINE.

APPLICATION FILED MAR. 22, 1905.

2 SHEETS—SHEET 1.

FIG. 2.

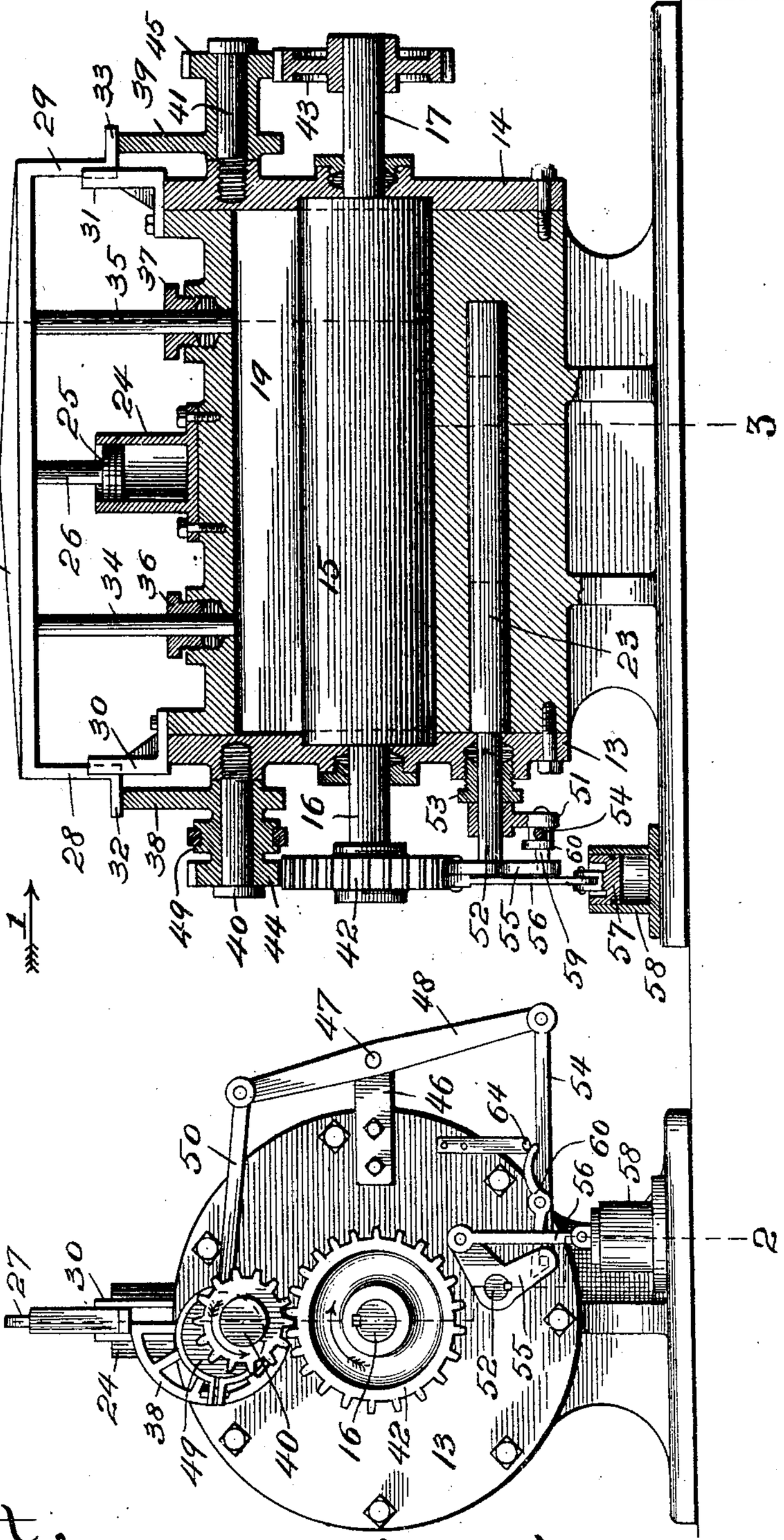

FIG. 1.

Attest,

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2 SHEETS—SHEET 2.

FIG. 3.

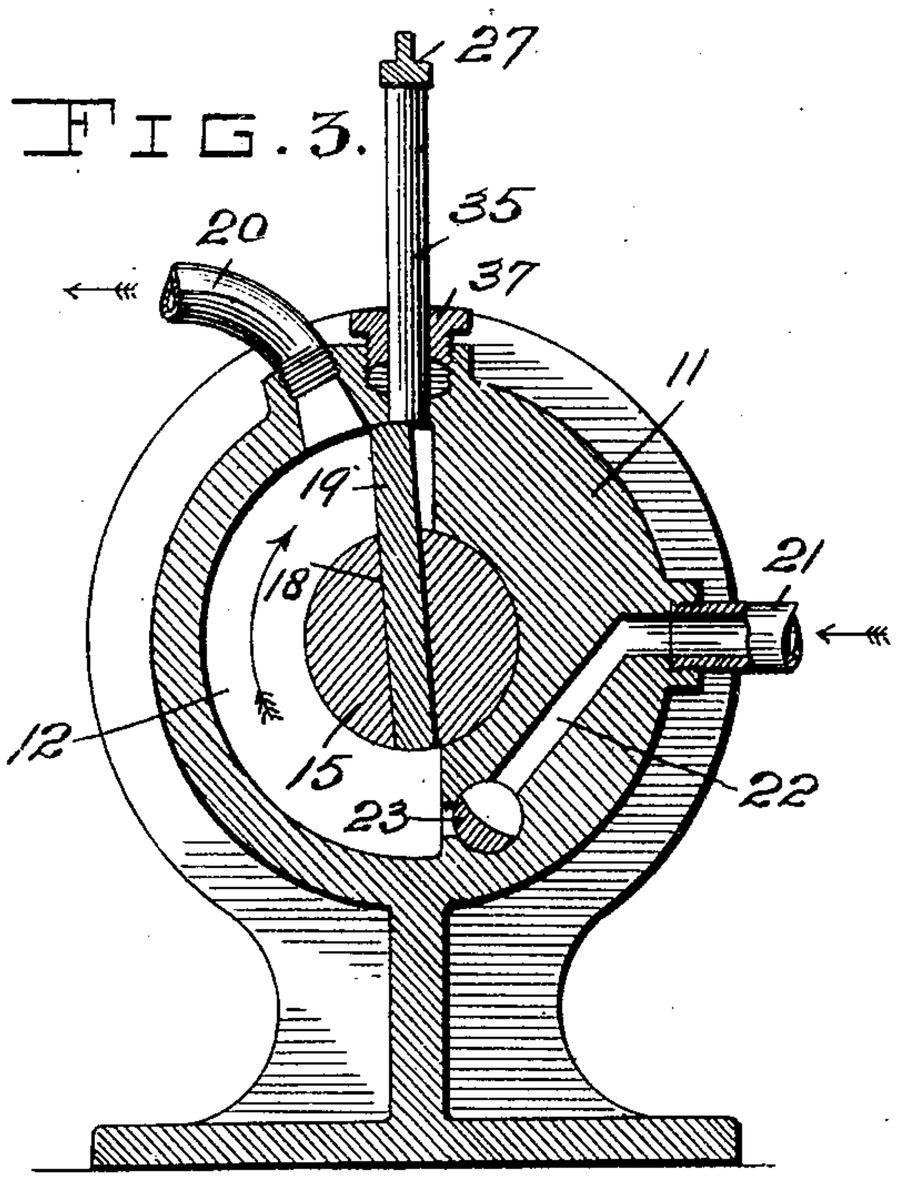


FIG. 4.

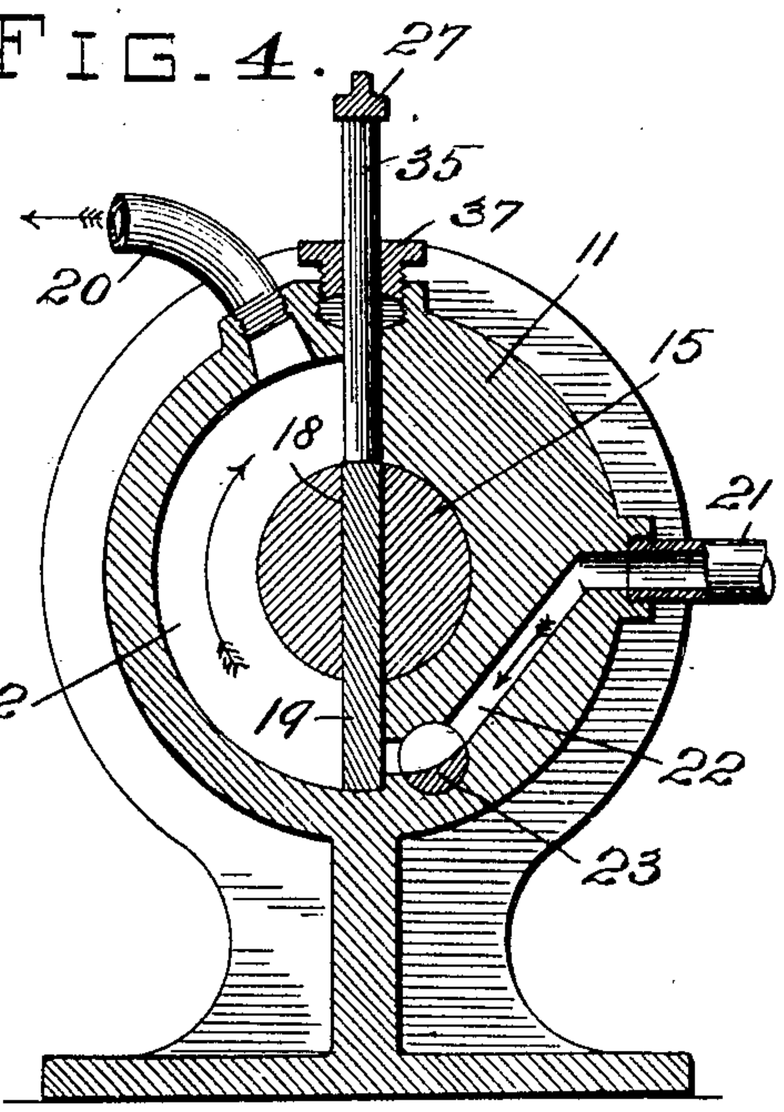


FIG. 7.

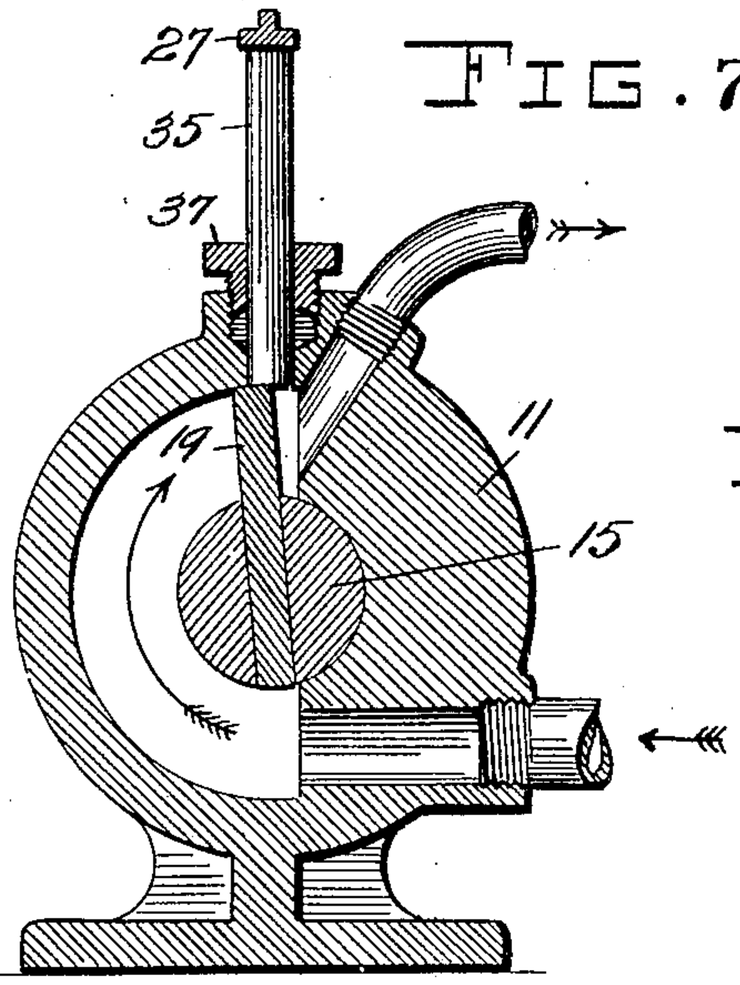


FIG. 5.

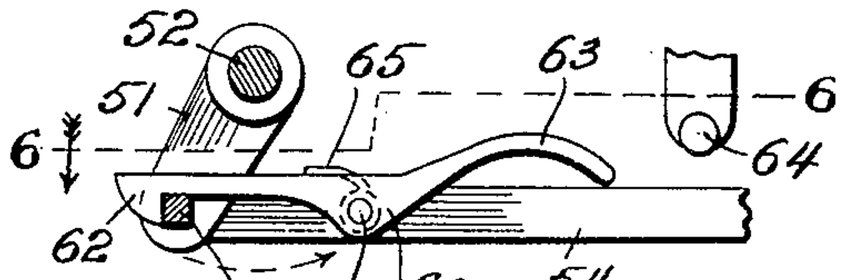


FIG. 6.

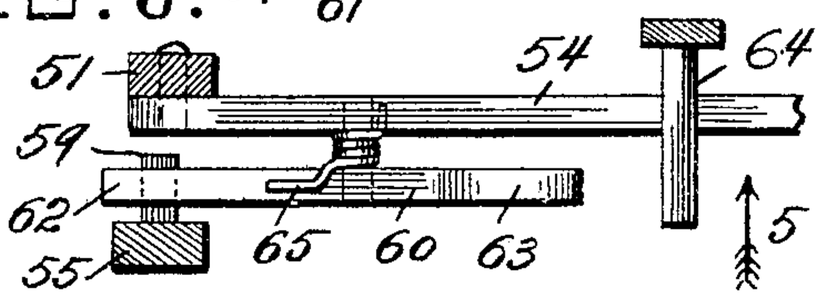


FIG. 8.

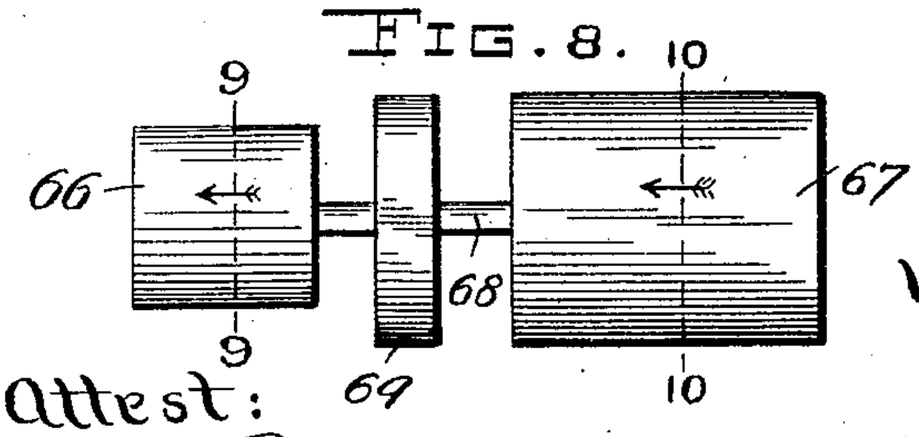


FIG. 9.

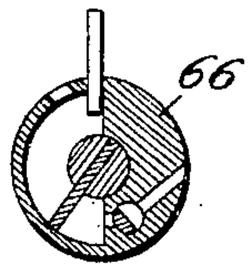
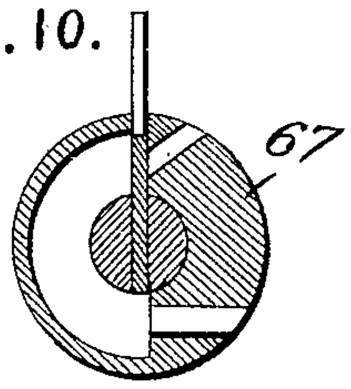


FIG. 10.



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UNITED STATES PATENT OFFICE.

BARTHOLOMEW A. CARMODY, OF ST. LOUIS, MISSOURI.

ROTARY ENGINE.

No. 805,840. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed March 22, 1905. Serial No. 251,459.

To all whom it may concern.

Be it known that I, BARTHOLOMEW A. CARMODY, a citizen of the United States, and a resident of St. Louis, Missouri, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in rotary engines; and it consists of the novel features herein shown, described, and claimed.

In the drawings, Figure 1 is an end elevation as seen looking in the direction indicated by the arrow 1 in Fig. 2. Fig. 2 is a longitudinal vertical section as indicated by the line 2 2 of Fig. 1 and looking in the direction indicated by the arrow. Fig. 3 is a cross-section as indicated by the line 3 3 of Fig. 2 and illustrating an operation. Fig. 4 is a view analogous to Fig. 3 and showing the parts in different positions. Fig. 5 is a detail of the trip mechanism for operating the inlet-valve as seen looking in the direction indicated by the arrow 5 in Fig. 6. Fig. 6 is a horizontal section on the line 6 6 of Fig. 5 and looking downwardly, as indicated by the arrow. Fig. 7 is a view analogous to Figs. 3 and 4 and showing the pump instead of the engine. Fig. 8 is a diagrammatic view showing how the engine and pump may be connected. Fig. 9 is a cross-section through the engine and taken on the line 9 9 of Fig. 8. Fig. 10 is a cross-section through the pump and taken on the line 10 10 of Fig. 8.

Referring to the drawings in detail, the casing 11 has a semicircular chamber 12 extending from end to end, the ends of the chamber being closed by end plates 13 and 14. The rotary piston-head 15 is rotatably mounted through the axial center of the casing 11, the ends of the piston being reduced to form the spindles 16 and 17, said spindles extending through stuffing-boxes forming bearings in the heads 13 and 14. A slot 18 is formed through the head 15, said slot being as long as the chamber 12, and the sliding flange 19 is mounted in this slot, said valve being just wide enough to reach from the periphery of the head 15 through the head to the inner face of the concentric portion of the chamber 12. An exhaust-pipe 20 leads from the upper part of the chamber 12. A supply-pipe 21 leads to the casing 11, and the steam-port 22 leads from the supply-pipe through the thick part of the casing to the lower end of the chamber 12. A rotary valve 23 is mounted parallel with the head 15, crosswise of the port 22, so that when the flange is turned one way the passage to the chamber 12 is open, as shown in Fig. 4, and when the valve is turned a quarter-revolution the passage 22 is closed, as shown in Fig. 3.

A vacuum-piston casing 24 is mounted vertically upon the center of the casing 11. The vacuum-piston 25 is mounted in the casing 24, and the piston-rod 26 extends upwardly from the piston. A bar 27 is mounted upon the upper end of the piston-rod 26, and guide-arms 28 and 29 extend downwardly from the ends of this bar in the guideways 30 and 31, rigidly fixed upon the ends of the casing 11. Cam-fingers 32 and 33 extend outwardly from the lower ends of the arms 28 and 29. The valve-shifters 34 and 35 extend from the bar 27—one on each side of the piston-rod 26—through the stuffing-box bearings 36 and 37 into the upper part of the chamber 12. Eccentric cams 38 and 39 are mounted upon trunnions 40 and 41, extending from the end plates 13 and 14, said cams being in position to engage the fingers 32 and 33 and raise the bar 27, thereby raising the piston 25 and creating a vacuum in the casing 24, so that when the piston is elevated the fingers 32 and 33 will snap from the peripheries of the cams, allowing the action of the vacuum to shoot the valve-shifters 34 and 35 into the chamber 12 and push the valve 18 through the valve-head 15, as illustrated in Figs. 3 and 4. Gears 42 and 43 are fixed upon the spindles 16 and 17 and mesh with gears 44 and 45, fixed upon the trunnions 40 and 41 and secured to the cams 38 and 39, said gears 42 and 43 being twice as large as the gears 44 and 45, so as to shift the valve 18 twice at each revolution of the head 15.

A pivot-block 46 is secured to the end plate 13 and carries a pivot 47. A walking-beam 48 is mounted upon the pivot 47. An eccentric 49 is rigid and integral with the gear 44, and an eccentric-rod 50 connects the eccentric 49 to the upper end of the walking-beam 48. A link 51 is loosely mounted upon the spindle 52, extending through the stuffing-box 53 from the valve 23, and a connecting-rod 54 connects the lower end of the link to the lower end of the walking-beam 48, the function of the link being to hold the connecting-rod in a substantially horizontal position. A bell-crank lever 55 is keyed upon the spindle 52, and a connecting-rod 56 connects the upper end of the

bell-crank lever to the piston 57, mounted in the vacuum-piston casing 58. A tooth 59 extends inwardly from the lower arm of the bell-crank lever. A lever 60 is mounted upon the pivot 61, rigidly secured to the connecting-rod 54, there being a pawl 62 upon one end of the lever to engage the tooth 59 and there being a cam 63 upon the other ends of the lever to engage the trip 64, said trip being rigidly mounted. A spring 65 connects the rod 54 to the lever 60, the tension of the spring being exerted to snap the pawl 62 into engagement with the tooth 59.

The parts are assembled so that when the valve 19 is up, as in Fig. 3, the valve 23 is closed, the piston 57 is down in the casing 58, and the pawl 62 is out of engagement with the tooth 59. Then as the engine continues to move the eccentric 49 moves the lower end of the walking-beam to carry the pawl 65 toward the tooth 59 the beveled end of the pawl will slide over the tooth until the pawl snaps down behind the tooth. Then the direction is reversed and the piston 57 is elevated and the valve 23 opened until the cam 63 engages the trip 64 and unhooks the pawl 62 from the tooth 59. Then the vacuum in the casing 58 will cause the piston 57 to descend, thereby closing the valve 23. At this time a quantity of steam is behind the valve 19, and the expansion of the steam will drive the valve from the position substantially as shown in Fig. 4 to the position shown in Fig. 3. In the engine construction the valve 23 cuts off the steam and allows it to expand, and it is obvious that this cut-off valve is not necessary in the pump construction as shown in Fig. 7.

In Fig. 8 the cylinder 66 represents the engine-casing. The cylinder 67 represents the pump-casing. The shaft 68 represents the driving-shaft, and the pulley 69 represents the means of transmitting power from the engine to other parts of the works. The pump and engine constructions are the same with the exception of the cut-off valve 23.

I claim—

1. In a rotary engine, a cylindrical casing, which casing is provided with semicircular chamber; a rotary piston longitudinally disposed within said casing; a valve arranged to slide through the piston, and means located on the exterior of the casing for reversing the position of the valve every time the piston has completed a half-revolution, substantially as specified.

2. In a rotary engine, casing in which is formed a semicircular chamber, an inlet-valve located at the lower end of said chamber, and there being an outlet-port at the upper end of said chamber; a rotary piston longitudinally arranged in the casing, and being provided with a diametrically-arranged slot; a plate arranged to slide through the slot in the piston; a plurality of arms projecting through the casing at the upper end of the chamber therein, and means whereby said arms are moved inwardly and outwardly corresponding to the rotation of the piston and the position of the valve therein, substantially as specified.

3. In a rotary engine, a casing provided with a semicircular chamber, an inlet-valve at the lower end of said chamber, and there being an outlet-port at the upper end of said chamber; a rotary piston arranged longitudinally in the casing and being provided with diametrically-arranged slot; a plate arranged to slide through said slot; a pair of arms arranged to move vertically through the top of the casing and engage the edge of the plate; a shaft to which said arms are fixed, means whereby said shaft is moved, and means whereby said shaft is quickly returned after it has been elevated, substantially as specified.

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

BARTHOLOMEW A. CARMODY.

Witnesses:

ALFRED A. EICKS,

EDW. M. HARRINGTON.