

No. 816,288.

PATENTED MAR. 27, 1906.

D. F. BAKER.
ROTARY ENGINE.
APPLICATION FILED JULY 31, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

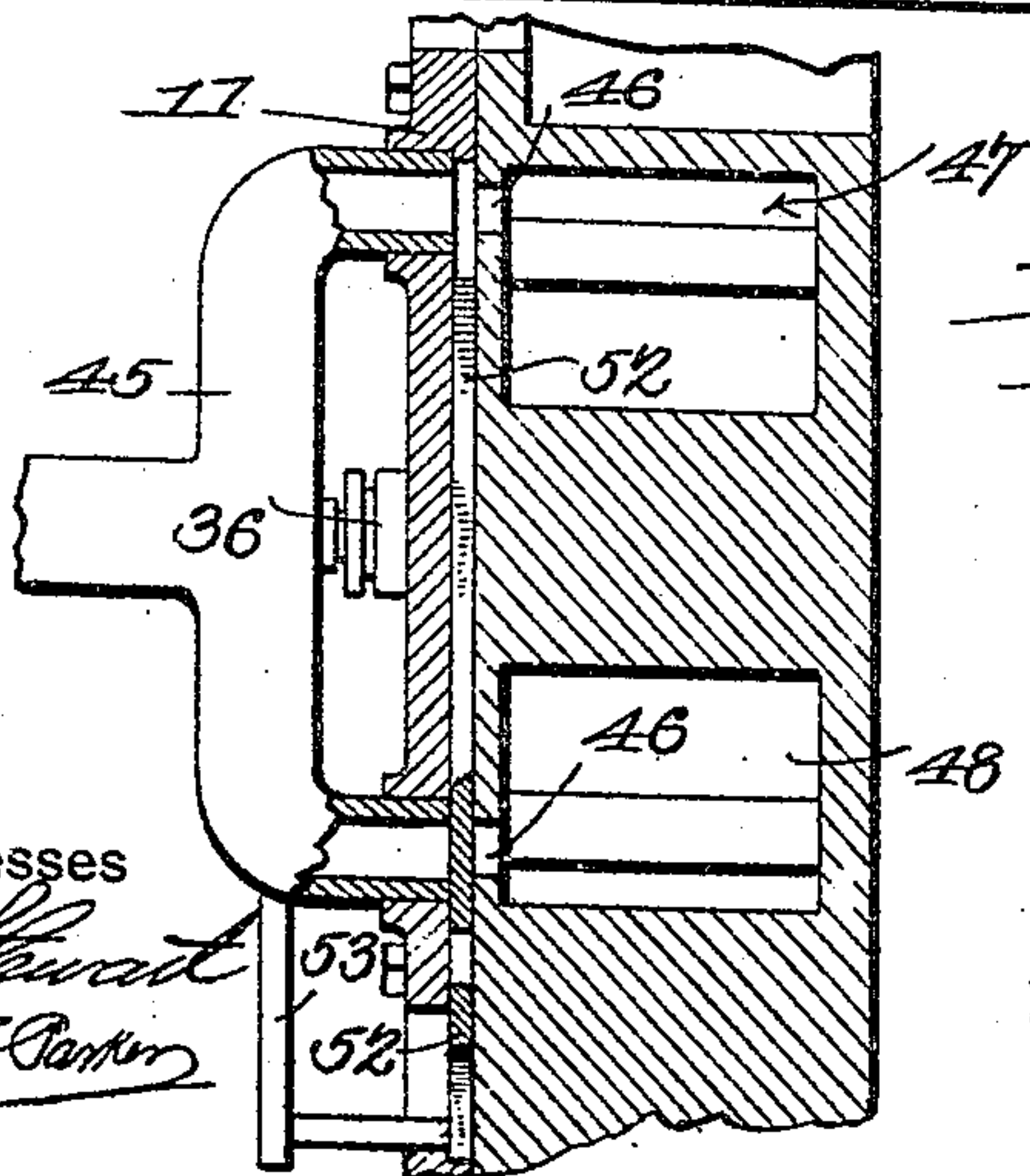
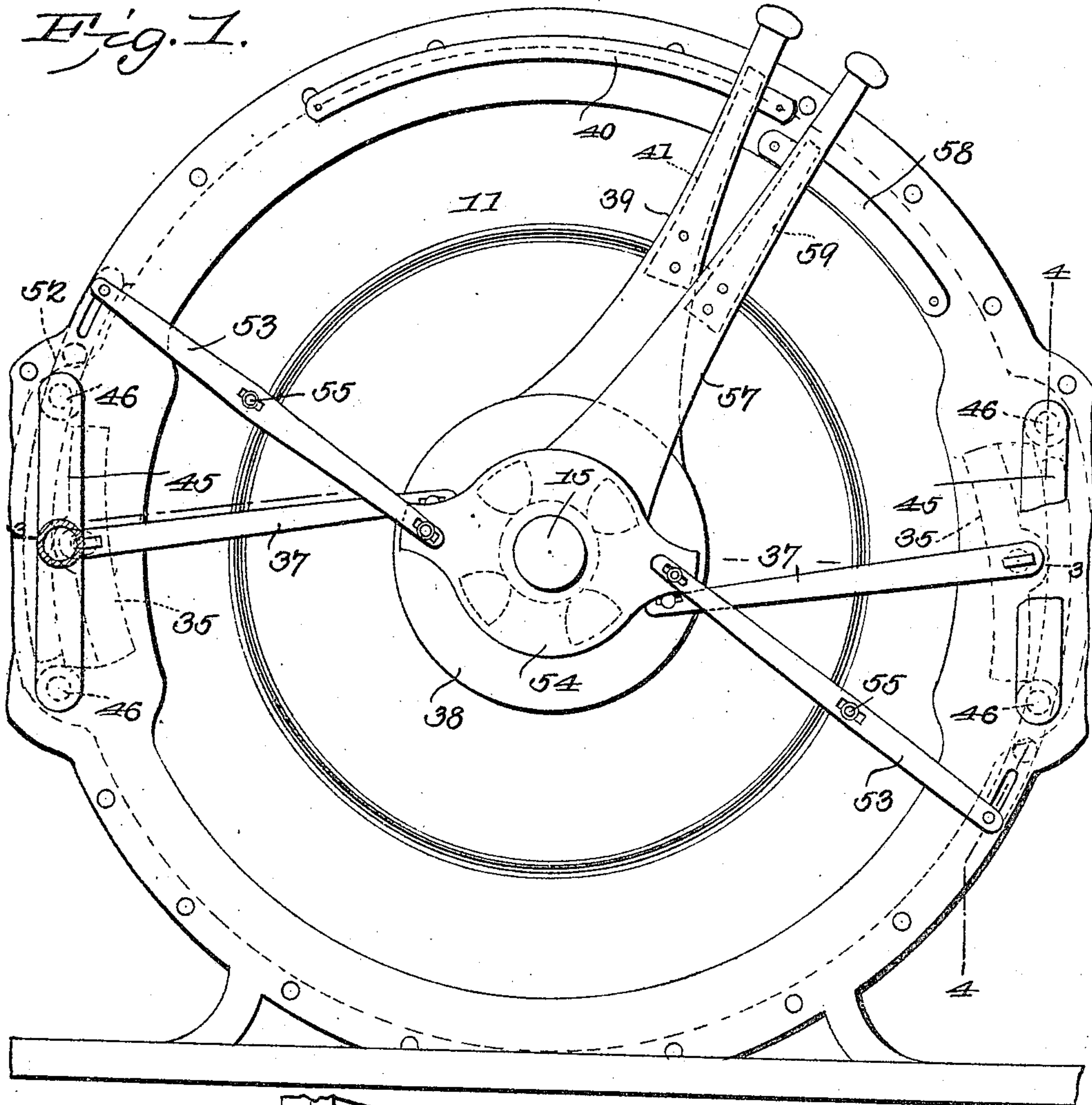


Fig. 4.

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2 SHEETS—SHEET 2.

Fig. 2.

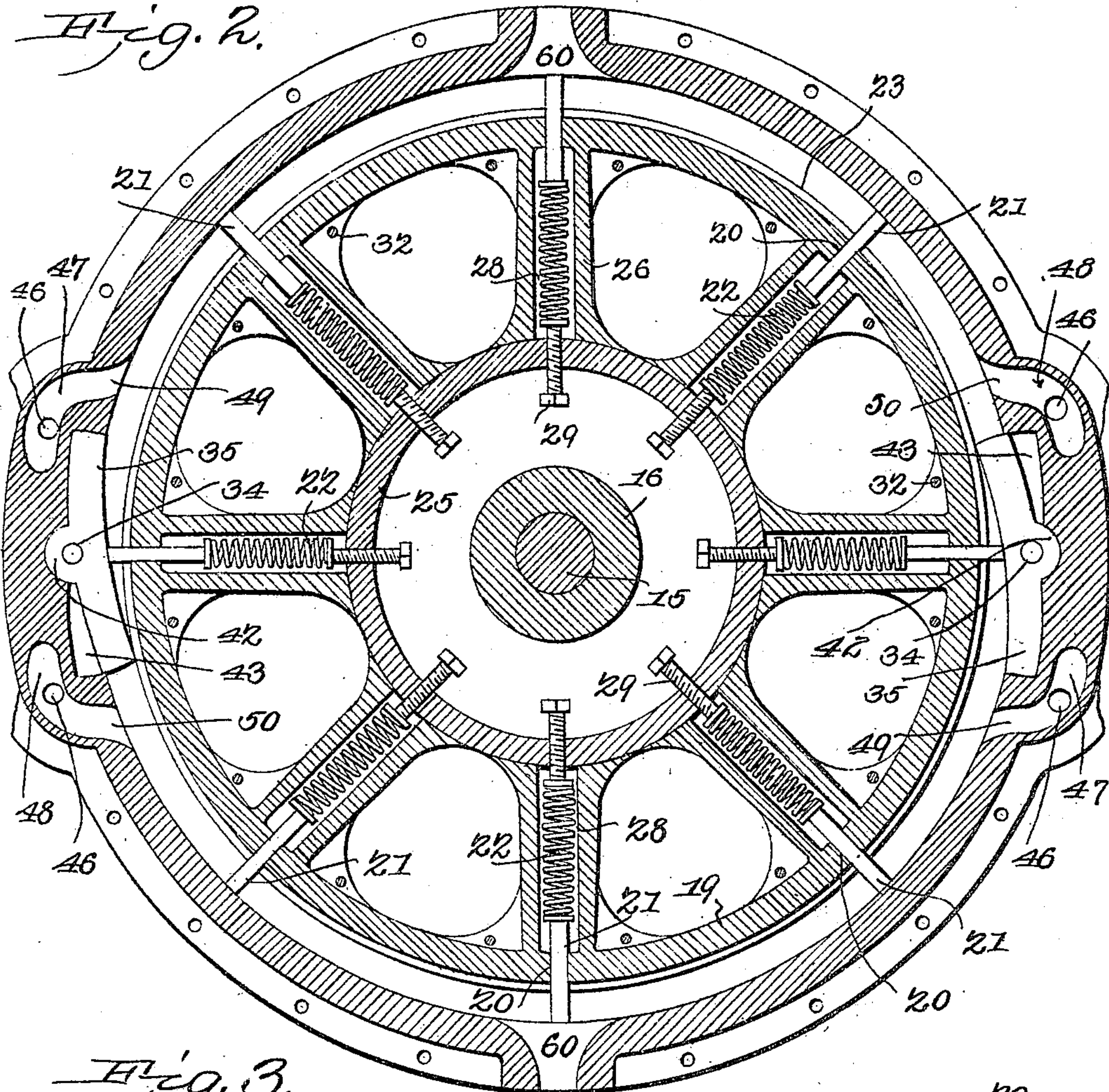
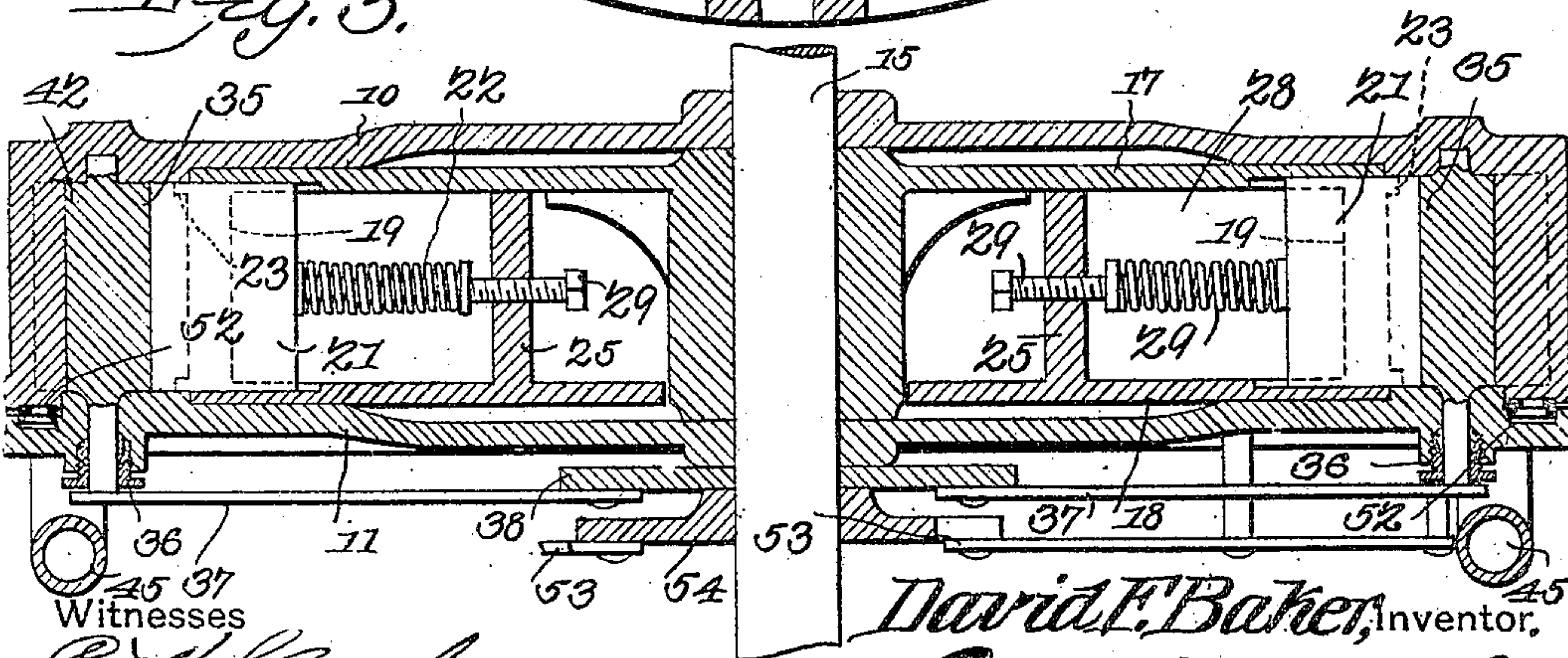


Fig. 3.



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UNITED STATES PATENT OFFICE.

DAVID F. BAKER, OF DUNDEE, OREGON.

ROTARY ENGINE.

No. 816,288.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed July 31, 1905. Serial No. 272,007.

To all whom it may concern:

Be it known that I, DAVID F. BAKER, a citizen of the United States, residing at Dundee, in the county of Yamhill and State of Oregon, have invented a new and useful Rotary Engine, of which the following is a specification.

This invention relates to rotary engines, and has for its principal object to provide a novel form of engine in which the full pressure of the steam may be utilized to the fullest extent and the parts so arranged and constructed as to permit the rapid operation of the engine without undue friction.

A further object of the invention is to provide an engine that may be readily reversed and which is equally effective in both directions, and, further, to provide a simple form of reversing and cut-off mechanism for controlling the flow of steam or other fluid under pressure to the engine and the quantity of such fluid admitted to the cylinder.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a side elevation of a rotary engine constructed in accordance with the invention. Fig. 2 is a sectional elevation of the same. Fig. 3 is a sectional plan view of the engine on the line 3 3 of Fig. 1. Fig. 4 is a detail section through the abutment-receiving recess on the line 4 4 of Fig. 1.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The cylinder of the engine is preferably formed of two main sections 10 and 11, one of which has an approximately annular flange, forming the circular wall of the cylinder proper, and both members are provided with bolting-flanges by which they may be rigidly secured together.

The opposite heads of the cylinder are pro-

vided with openings for the passage of a main shaft 15, on which is secured a central piston-drum 16. This piston-drum comprises two members 17 and 18, the member 17 being formed integral with the hub and having at its outer edge an annular flange 19, that constitutes the peripheral portion of the drum. The annular flange 19 is provided with a plurality of radially-disposed passages 20 for the reception of radially-movable piston-wings 21, which are moved outward by springs 22 into the annular steam-space between the periphery of the piston and the inner circular wall of the cylinder. Between adjacent piston-wings the periphery of the drum is provided with packing-segments 23, preferably formed of metal and connected by screws or bolts to the periphery of the drum proper, so that they may be readily renewed when worn. The opposite section 18 of the piston-drum is provided with an annular flange 25, arranged at a slight distance from the hub of the piston, and from this flange extend radial arms 26, terminating at the inner wall of the flange 19. These arms are provided with radially-arranged recesses 28, into which the inner ends of the piston-wings project, and within the recesses are the springs 22, one end of each spring bearing against the inner end of a piston-wing and the opposite end bearing against a screw 29, arranged in a threaded opening in the annular flange 25, the screws being adjustable in order to alter the force with which the piston-wings are moved outward into engagement with the inner circular wall of the cylinder. The two members of the piston are connected to each other by suitable bolts 32, so that independent movement of either member is prevented.

The opposite cylinder-heads are provided with bearings for the reception of one or more transversely-extending spindles 34, two of which are shown in the present instance, and on each spindle is mounted an adjustable abutment 35, the abutment being arcuate in form and its opposite edges being of a thickness equal at least to the width of the steam-space between the periphery of the drum and the adjacent wall of the cylinder. By rocking the spindle 34 either end of the abutment may be adjusted to operative position within the steam-space, while the concaved inner face of the abutment is arranged to form a continuation of the inner wall of the cylinder

and serves as a cam for forcing the piston-wings inward from the steam-space until said wings have passed beyond the active face of the abutment, this face then constituting the
 5 end wall of the steam or expansion chamber and the successive pistons forming the opposite wall thereof.

Each spindle 34 preferably extends through the side wall of the cylinder, preferably
 10 through a suitable stuffing-box 36, and to its outer end is secured an arm 37, the inner end of said arm having a pin-and-slot connection with a disk 38 that is mounted loosely on the main shaft. From this disk extends an arm
 15 39, constituting a reversing-lever, the arm being arranged to travel over a suitable locking-segment 40 and being held in any position to which it may be adjusted by the friction of a spring 41, carried by the arm in bearing
 20 against the strip, although the usual latch and notched locking-segment may be substituted for this mechanism, and by moving the arm 39 the positions of the two abutments may be reversed.

25 In order to permit movement of the piston-drum in either direction, the central portion of the abutment is provided with a transversely - extending rib 42, approximately semicircular in cross - section and fitting a
 30 corresponding recess in the curved wall of the cylinder, and the wall of said cylinder is further provided with recesses 43, into either of which the idle end of the abutment may be moved.

35 At one side of the cylinder are arranged one or more steam-chests 45, each of which may communicate through ports 46 with steam-chambers 47 48, formed in the wall of the cylinder and disposed adjacent to the op-
 40 posite end of the abutment. From the chamber 47 leads a port 49, and from the chamber 48 leads a port 50, these ports opening into the cylinder on opposite sides, respectively, of the abutment. The two ports 46 are un-
 45 der the control of an arcuate slide-valve 52, that is disposed within the steam-chest, and both valves are connected by levers 53 to a disk 54, that is loosely mounted on the main shaft. Each of the levers 53 is pivoted at a
 50 point intermediate its ends on a pin 55, projecting from one of the cylinder-heads, so that when the disk is rocked in one direction or the other the slide-valves will be simulta-
 55 neously moved in opposite directions, thus controlling the flow of the fluid to one or other of the chambers 47 48 in accordance with the direction in which the piston is to revolve. The disk 54 is provided with a projecting arm
 60 57, constituting an operating-lever and movable over a locking-segment 58, the arm having a suitable spring 59, which frictionally engages with the segment and locks the two reversing and cut-off valves in any desired po-
 65 sition, so that while the valves may be moved for the purpose of reversing the engine they

may also be adjusted to control the quantity of steam or other fluid utilized for motive power.

At a point some distance beyond the steam-ports, generally about ninety degrees, are ar- 70
 ranged exhaust-ports 60, through which the operating fluid may escape after its work is accomplished, leaving the piston-wings free from pressure during their inward move-
 ment under the influence of the cam-shaped 75 abutments.

In the operation of this engine steam is admitted through the ports 50 when the parts are adjusted in the manner shown in Fig. 2, while all flow of steam to the chamber 47 is 80
 cut off. The steam or other fluid issues through port 50 and acts on the successive piston-wings 21, each piston-wing being acted upon by direct pressure until the succeeding wing moves beyond the operating-face of the 85
 abutment, and after this the dead steam between two adjacent wings may exhaust through the port 60.

It will be observed that during the rotation of the engine the piston-wings are free to 90
 move inward each time they approach the abutment, and as the wings at this time are not under pressure they will move inward freely without resistance and without mate-
 95 rial wear.

To reverse the engine, it is merely necessary to change the positions of the two arms 39 and 57.

An engine of the character described may be employed for power purposes generally, 100
 and its size may be increased or diminished in accordance with the work to be performed, while the exterior of the casing may be provided with any suitable connecting means to permit the proper mounting of the engine. 105

Having thus described the invention, what is claimed is—

1. The combination in a rotary engine, of a sectional piston-drum having inner and outer concentric flanges, the outer flange being pro- 110
 vided with radially-disposed openings, piston-wings guided in said openings, springs tend-
 ing to thrust the wings outward, and screws extending through threaded openings in the inner flange and bearing against the inner 115
 ends of said springs.

2. In a rotary engine, a piston formed of a pair of members provided with spaced concentric flanges, the outer flange being carried by one section, and the inner flange by the 120
 other section, radially-disposed arms carried by one of the sections and provided with spring-receiving recesses, piston-wings ex-
 tending through openings in the outer flange and into said recesses, springs bearing against 125
 the inner edges of the piston-wing, and screws carried by the inner flange and forming ad-
 justable supports for said springs.

3. The combination in a rotary engine, of a concentric piston-drum having radially-mov- 130

able wings, an abutment pivotally mounted in a recess in the wall of the cylinder, steam-chambers formed in the wall of the cylinder on opposite sides of the abutment, ports leading from the chambers to the steam-space of the cylinder, and means for controlling the passage of steam to one or other of the chambers.

4. The combination in a rotary engine, of a cylinder having an abutment-receiving recess and provided with spaced steam-chambers, an abutment pivotally mounted in said recess, means for controlling the admission of steam to one or other of the steam-chambers, means for adjusting the abutment to present either of its ends into the steam-space end of the cylinder, and a piston arranged within said cylinder.

5. The combination in a rotary engine, of a cylinder having an abutment, a pair of steam-chambers arranged on opposite sides of the abutment, a slide-valve for controlling the admission of steam to said chambers, a slide-

valve-operating means, means for adjusting the position of the abutment, and a revoluble piston-drum arranged within the cylinder.

6. The combination in a rotary engine, of a cylinder, a main shaft, a piston mounted thereon and provided with radially-movable piston-wings, a pair of pivotally-mounted abutments arranged within the cylinder, a disk mounted on the shaft and operatively connected to both abutments to permit simultaneous adjustment of the same, a pair of steam-chambers arranged on each side of the abutments, controlling-valves for said steam-chambers, a valve-operating disk mounted on the shaft, and means for connecting said disk to the valves.

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

DAVID F. BAKER.

Witnesses:

I. M. WOODS,
A. P. OLIVER