

No. 834,260.

PATENTED OCT. 30, 1906.

J. A. CARTER.  
ROTARY ENGINE.

APPLICATION FILED MAR. 26, 1906.

2 SHEETS—SHEET 1.

Fig. 3.

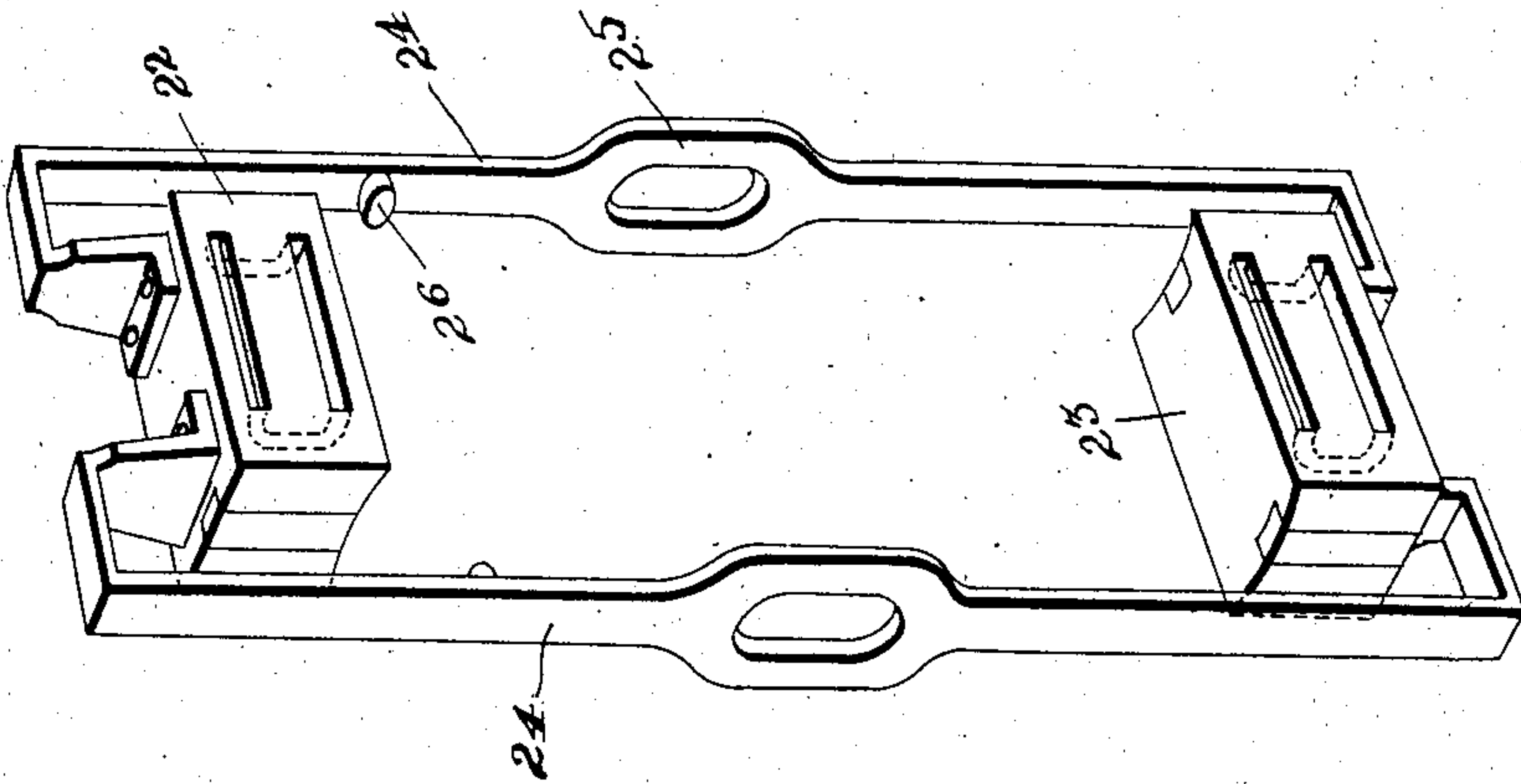
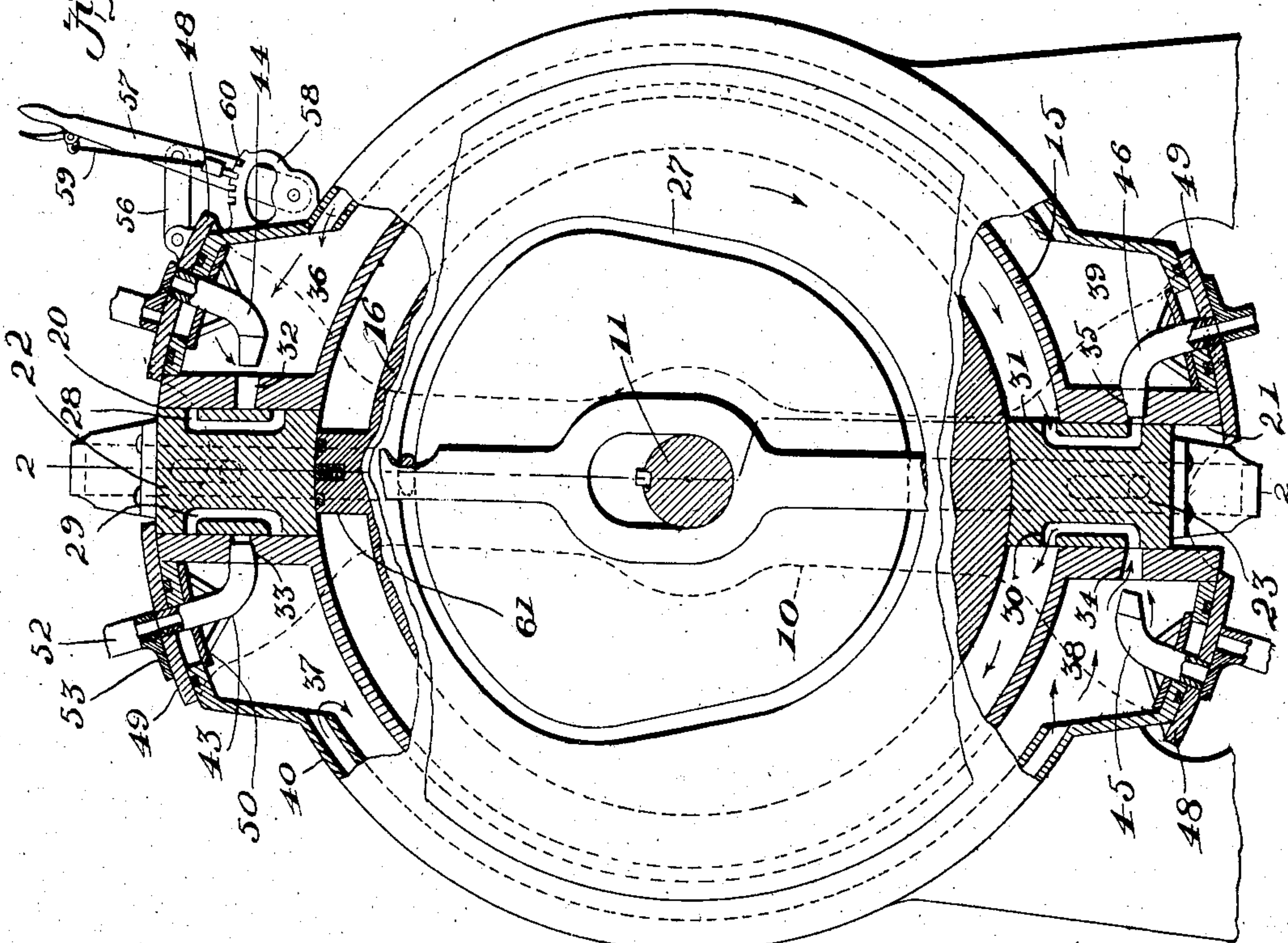


Fig. 1



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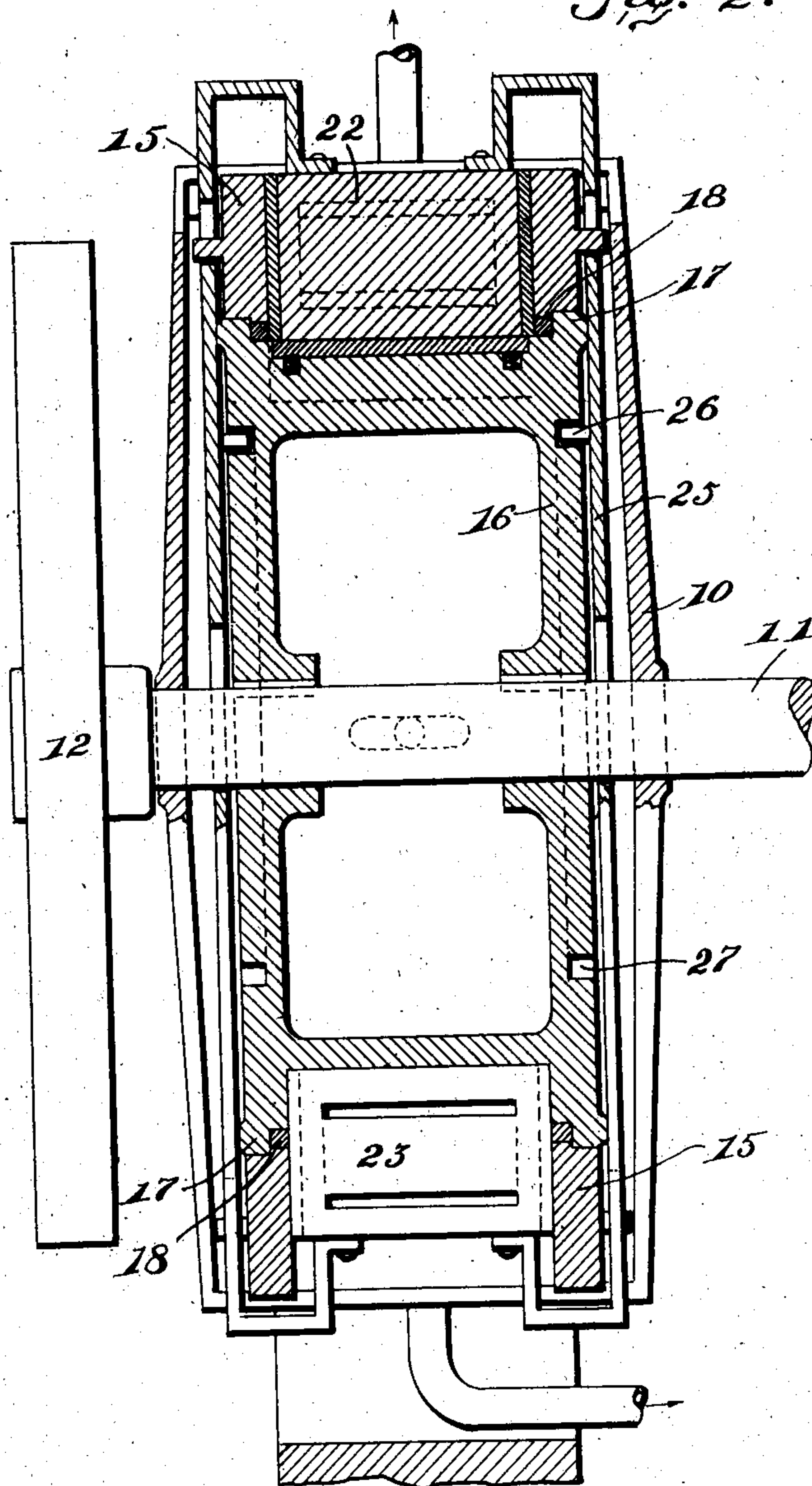
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2 SHEETS—SHEET 2.

*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

JOSEPH A. CARTER, OF BARNESVILLE, OHIO.

## ROTARY ENGINE.

No. 834,260.

Specification of Letters Patent.

Patented Oct. 30, 1906.

Application filed March 26, 1906. Serial No. 308,104.

*To all whom it may concern:*

Be it known that I, JOSEPH A. CARTER, a citizen of the United States, residing at Barnesville, in the county of Belmont and State of Ohio, 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 an engine which may be operated by steam, air, or any other fluid under pressure and in which the working force of the fluid will be utilized to the fullest extent.

A further object of the invention is to provide an engine in which a revoluble piston-drum provided with a radially-disposed piston-wing is mounted within a circular cylinder and coacts with a pair of diametrically-opposed radially-movable abutments that act successively for the admission of the operating fluid and its exhaust, each abutment remaining in operative position for one-half of a revolution of the piston.

A still further object of the invention is to provide a novel construction of reversing mechanism in which movable exhaust pipes or nozzles are arranged to move into and from the main inlet-ports, so that the latter may act at times for the admission of the working fluid to the engine or may serve at other times to direct the exhaust through such exhaust pipes or nozzles.

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 an elevation, partly in section, of a rotary engine constructed in accordance with the invention. Fig. 2 is a transverse sectional view of the same on the line 2 2 of Fig. 1. Fig. 3 is a detail perspective view of the radially-movable abutments and valves detached.

Similar numerals of reference are employed to indicate corresponding parts

throughout the several figures of the drawings. 55

The working parts of the engine are arranged within a suitable casing 10, that is provided with bearings for a main shaft 11 and may be provided with a suitable balance-wheel 12. The casing incloses the cylinder 15, and within the cylinder is arranged a revoluble piston-drum 16, which may be hollow for the purpose of reducing weight, and said piston-drum has peripherally-disposed flanges 17 at each of its sides, that engage in suitable recesses formed in the cylinder, one or more packing-rings 18 being interposed between each of the flanges 17 and the adjacent portion of the cylinder for the purpose of preventing the escape of the actuating fluid. 60 65 70

The inner curved wall of the cylinder is concentric with the shaft and at diametrically opposite points, preferably in the vertical plane of the axis of the shaft. Said cylinder is provided with two recesses 20 and 21, that are arranged for the reception of ported abutments 22 and 23, respectively. These abutments are rigidly connected to each other by coupling-bars 24, that extend over the outer sides of the cylinder and piston and are provided with centrally-disposed elongated slots 25, that fit over the shaft 11 in order that the bar may move freely without engaging the shaft. Projecting inward from each of the bars 24 is a lug or pin 26, that is arranged to enter a cam-groove 27, formed in the outer side of the piston-drum, there being two of said cam-grooves, and both of the bars being operated simultaneously in the same direction, so that as one of the ported abutments is moved into the cylinder the other is moved out of the cylinder. 75 80 85 90

The abutment 22 is provided with two ports 28 and 29, while the abutment 23 has two ports 30 and 31, and these ports may be made to communicate with ports 32, 33, 34, and 35. The latter ports lead, respectively, from steam-chests 36, 37, 38, and 39, and all of these steam-chests are placed in communication with each other through passages 40, steam or other fluid under pressure being supplied through a pipe 41. 95 100

Arranged in the steam-chests are exhaust-nozzles 43, 44, 45, and 46, and these nozzles are carried by a frame 48, that is provided with a number of arcuate plates 49, fitting 105



against the outer curved faces of the walls of the steam-chests, the latter being slotted for the passage of the nozzles and the escape of steam being prevented by auxiliary inner  
5 plates 50, which cover said slots.

Fitting within the outer plate 49 are escape-pipes 52, with which the outer ends of the nozzles may aline, and from the inner end of each escape-pipe extends a plate 53, by which  
10 the escape of steam through the exhaust-nozzle may be prevented. The frame 48 is connected by a link 56 to a lever 57, that is pivoted on a bracket 58, extending from the wall of the cylinder, said lever being pro-  
15 vided with a latch-bolt 59, which may be moved into engagement with a locking-rack 60 for the purpose of holding the frame 48 in any position to which it may be adjusted.

The revoluble piston-drum is provided  
20 with a single wing 61, which may be packed at the outer face and sides, and suitable packing may also be introduced between the plates 49 and the walls of the steam-chests and at the sides of the ported abutments in  
25 order to prevent the escape of the steam or the other actuating fluid.

In the construction as shown in Fig. 1 the exhaust of the nozzles 43 and 46 is arranged in the ports 33 and 35, respectively, so that  
30 said ports act as exhaust-ports, while the nozzles 44 and 46 are out of engagement with the ports 32 and 34, and these latter ports may act as inlet-ports.

In operation the steam or other fluid en-  
35 ters from the chest 38 through port 34 and port 30 of the abutment 23 to the steam-space of the cylinder and acts on piston-wing 61 for the purpose of revolving the piston in the direction indicated by the arrow. The  
40 exhaust-steam in advance of the piston-wing is escaping through the port 31, port 35, and exhaust-nozzle 46. The parts remain in this position until the piston-wing has traveled about ninety degrees from the position shown  
45 in Fig. 1, whereupon the cam-groove 27 of the piston will move the bars 24 to shift the positions of the abutments, and abutment 22 is moved into the steam-space, while the abutment 23 is moved out of the steam-space.  
50 Steam will then enter from the chest 36 through the ports 32 and 28 to the steam-space, while the exhaust-steam will escape through the ports 29 and 33 to exhaust-nozzle 43 and exhaust-pipe 52. The positions  
55 of the abutments are changed at each half-revolution of the piston, so that two charges of steam or other fluid are allowed to enter the cylinder during each revolution. Should it be desired to reverse the direction of rota-  
60 tion of the piston, the lever 57 is actuated in order to shift the position of the frame 48 and carry the nozzles 44 and 46 into the ports 32 and 34, respectively, so that these ports become escape-ports. At the same time the  
65 nozzles 43 and 46 are moved out of the ports

33 and 35, and these latter become inlet-ports.

I claim—

1. In a rotary engine, a cylinder, a piston-drum arranged therein, a piston-wing carried  
70 by the drum, a pair of diametrically-opposed ported abutments movable alternately into and from the steam-space of the cylinder, bars connecting said abutments, and a cam carried by the piston-drum and serving to  
75 actuate said bars.

2. In a rotary engine, the combination with a cylinder, of a piston-drum, a piston-wing carried thereby, a pair of ported abut-  
80 ments arranged at diametrically opposite points and movable alternately into the steam-space of the cylinder, a pair of bars connecting said abutments, lugs projecting from the bars, and cams carried by the pis-  
85 ton-drum and engaging said lugs.

3. In a rotary engine, an outer casing hav-  
ing shaft-bearings, a main shaft supported thereby, a cylinder within the casing, a pis-  
ton-drum mounted on the shaft and fitting within the cylinder, a piston-wing carried by  
90 the drum, a pair of diametrically-opposed abutments movable alternately into the steam-space of the cylinder, bars connecting said abutments, cams for actuating the bars, and a series of connected steam-chests, the  
95 abutments being provided with ports for placing said steam-chests in communication with the steam-space of the cylinder, and to permit the discharge of the exhaust from the  
100 cylinder.

4. In a rotary engine, a cylinder having a plurality of steam-chests, and provided with a pair of diametrically-opposed recesses, ports arranged in the walls of said recesses and communicating with the steam-chests,  
105 ported abutments slidable in the recesses, a winged piston-drum within the cylinder, means for actuating the abutments, exhaust-nozzles disposed within the steam-chests, a carrier for said exhaust-nozzles, and means  
110 for moving said carrier to adjust one or other set of nozzles into the steam-ports.

5. In a rotary engine, a cylinder having a plurality of steam-chests and provided with a pair of diametrically-opposed recesses,  
115 ported abutments slidable in said recesses, a piston-drum within the cylinder, a piston-wing carried by the drum, means for moving the abutments, tapered ports leading from the steam-chests to the abutment-recesses,  
120 and a pair of sets of exhaust-nozzles disposed within the steam-chests and simultaneously movable to adjust one set into said ports to permit the passage of the exhaust, while the opposite set is moved away from the ports to  
125 permit the passage of the fluid-pressure.

6. In a rotary engine, a cylinder having a plurality of steam-chests, the walls of which are slotted, abutment-recesses between said  
steam-chests, abutments slidably mounted  
130



in said recesses and provided with steam and exhaust ports, a winged piston within the cylinder, ports leading from the steam-chests to the walls of the abutment-recesses, plates  
5 covering the slots of the steam-chests, exhaust-pipes disposed outside said plates, and each having an extension to form a valve or cut-off, a pair of sets of exhaust-nozzles carried by said plates, and means for simulta-  
10 neously moving the plates to adjust one set of nozzles into the ports, and into alinement

with the exhaust-pipes while the opposite set is moved from the ports and out of alinement with the exhaust-pipes.

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

JOSEPH A. CARTER.

Witnesses:

E. B. GALLOWAY,  
G. A. COLPITTS.