E. P. DARGIN.

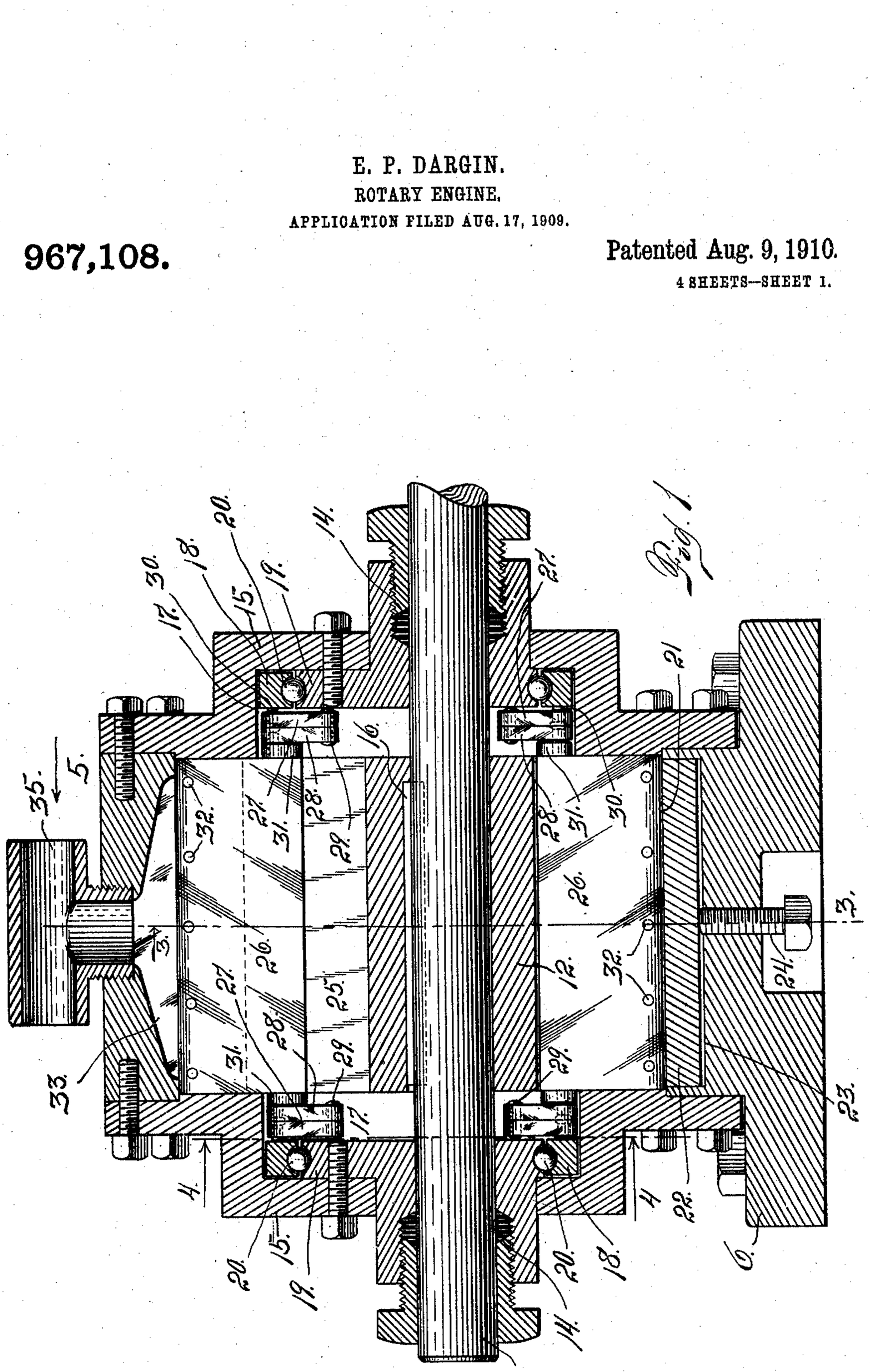
ROTARY ENGINE.

APPLICATION FILED AUG. 17, 1909.

967,108.

Patented Aug. 9, 1910.

4 SHEETS—SHEET 1.



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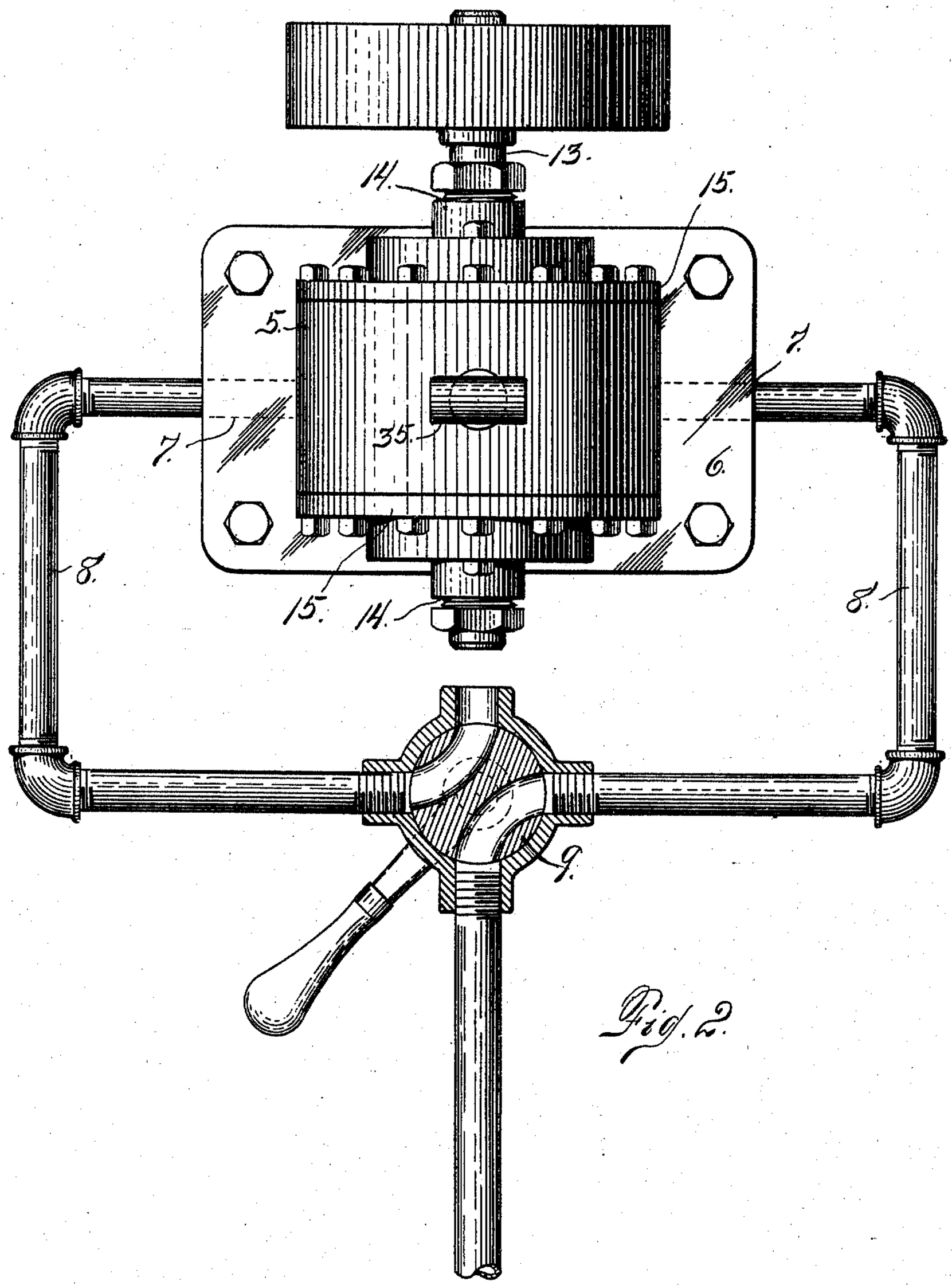

Fig. 2.

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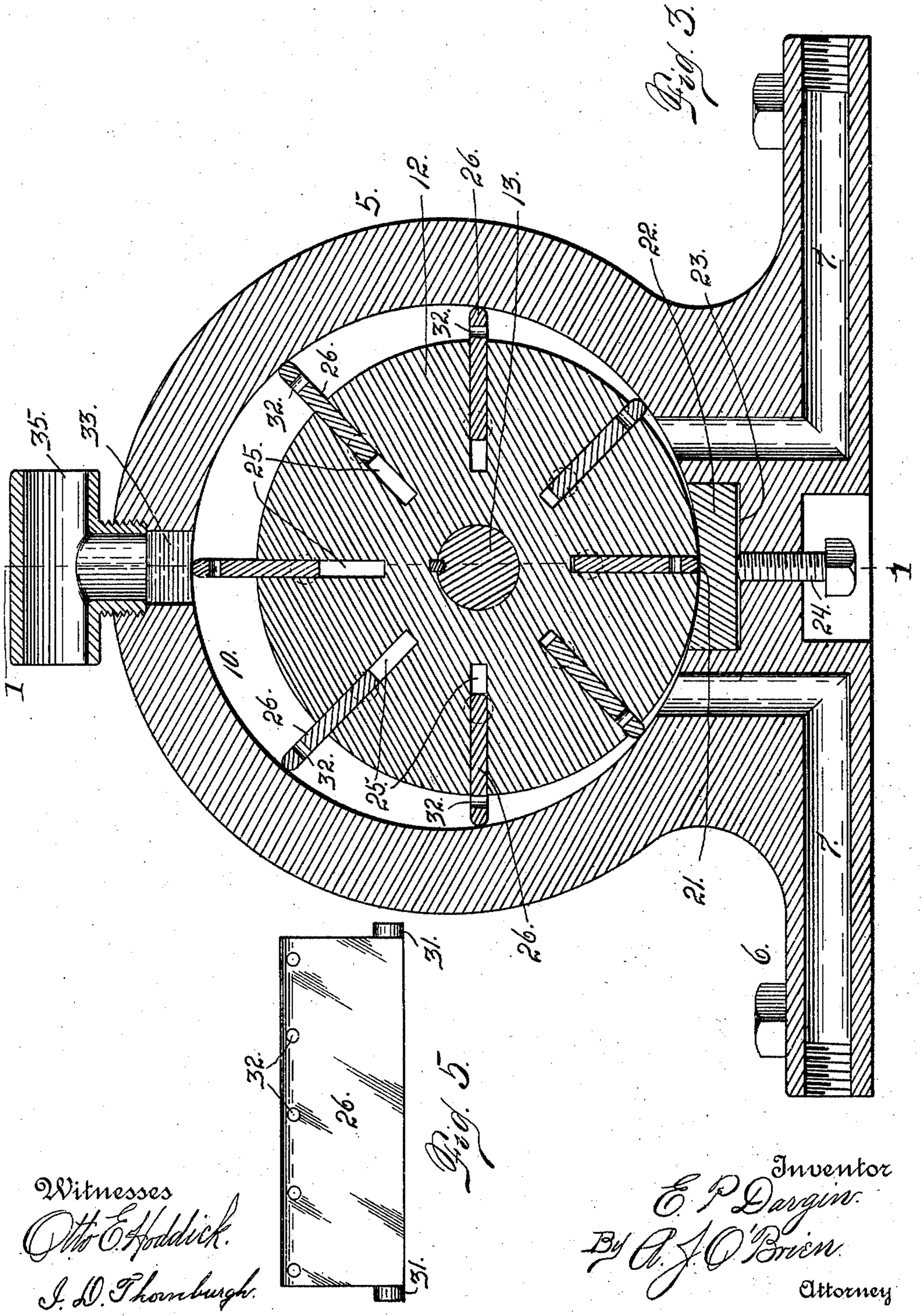

Fig. 5.

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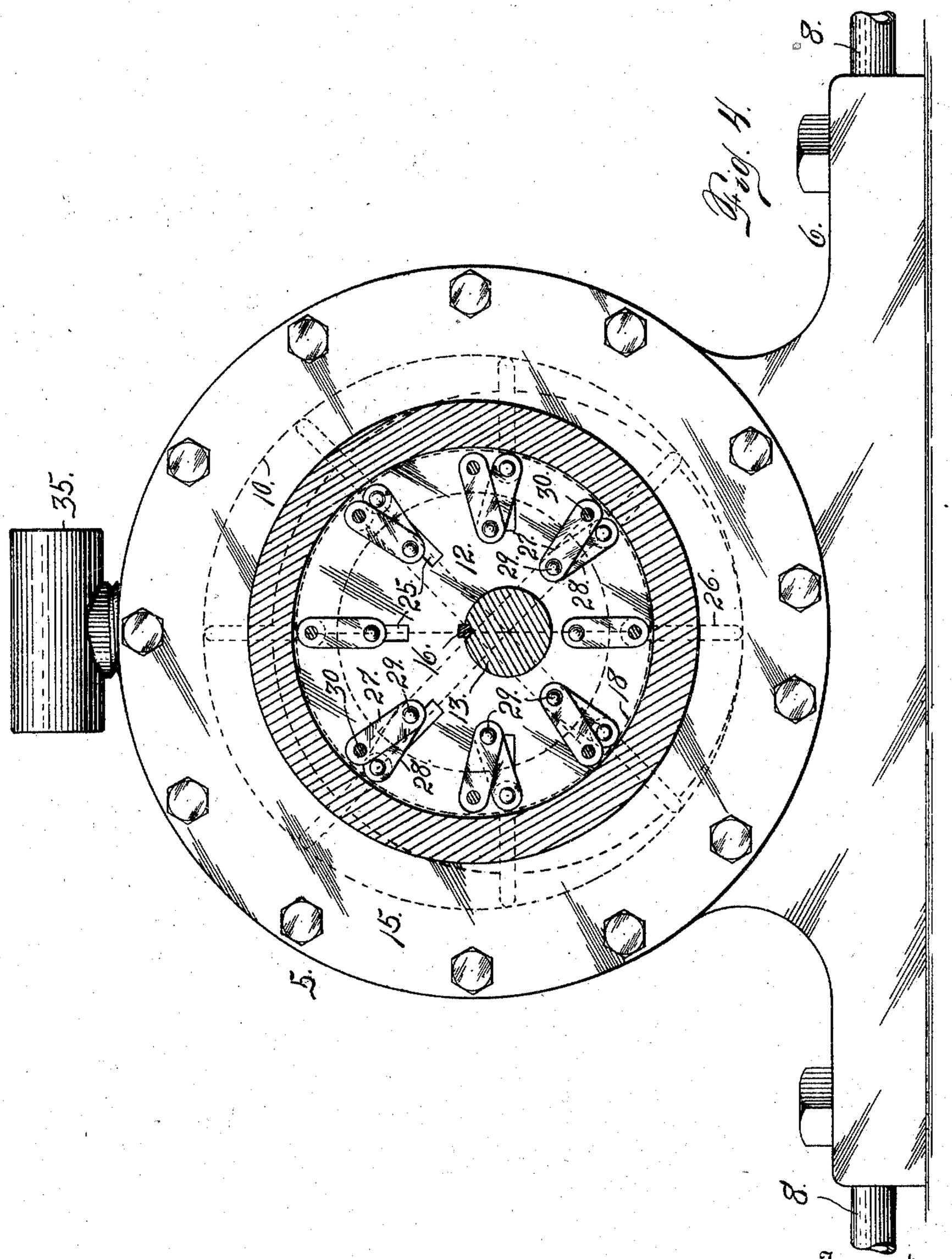

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UNITED STATES PATENT OFFICE.

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ROTARY ENGINE.

967,108. Specification of Letters Patent. **Patented Aug. 9, 1910.**

Application filed August 17, 1909. Serial No. 513,295.

To all whom it may concern:

Be it known that I, ERNEST P. DARGIN, a citizen of the United States, residing at the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Rotary Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in rotary engines, my object being to provide an efficient construction of this class which shall at the same time be comparatively simple, as well as reliable and durable in operation.

I will proceed to describe the invention in detail, reference being made to the accompanying drawing, in which is illustrated an embodiment thereof.

In this drawing: Figure 1 is a central, vertical section taken through my improved rotary engine on the line 1—1, Fig. 3. Fig. 2 is a top plan view of the engine shown on a smaller scale. Fig. 3 is a central, vertical section taken on the line 3—3, Fig. 1. Fig. 4 is a section taken on the line 4—4, Fig. 1, looking toward the right, or in the direction of the arrows. Fig. 5 is a detail view of one of the piston blades.

The same reference characters indicate the same parts in all the views.

Let the numeral 5, designate the cylinder which is provided with a base 6, carrying two passages 7, utilized as induction passages for the introduction of the motive fluid to the operating chamber of the cylinder. Conduits 8, are connected with these passages and the passage of fluid through the said conduit is controlled by a valve 9, which may be adjusted to allow the motive fluid to pass through either conduit according to the desired direction of the piston's rotation.

Within the chamber 10, of the cylinder, is eccentrically mounted a piston 12, which is fast upon a shaft 13, which protrudes through stuffing boxes 14, with which the heads 15, of the cylinder are equipped. The piston is made fast to the shaft by means of a key 16, or in any other suitable manner.

Each head of the cylinder is offset from the body of the chamber forming a space 17, within which is located a ring 18, journaled on a bearing 19, antifrictional balls 20, being interposed between the ring and its bearing. This ring is mounted coaxially with the chamber of the cylinder and eccentric to the shaft 13, and its piston.

The piston 12, is tangential to the inner surface of the cylinder chamber at a point 21. The point of contact between the cylinder and piston is constantly maintained by means of an adjustable block 22, located in a recess 23, formed in the base of the cylinder. This block is maintained in proper relation with the piston for the aforesaid purpose by means of suitable adjusting devices as set bolts 24.

Within the piston 12, is formed a series of pockets 25, in which are slidably mounted blades 26, extending the entire length of the chamber of the cylinder, each blade having a width equal to the depth of its pocket in the piston so that when the blade is at the point of contact between the cylinder and piston, it will be entirely concealed within its pocket.

In order that the blades may have their outer extremities constantly in engagement with the inner wall of the piston chamber, they are connected with the ring 18, in a manner that will now be described: At each extremity of each blade, is a toggle composed of two members 27 and 28, which are pivotally connected at 29, or at their inner extremities. These various toggles are all located within the offsets 17, of the cylinder heads. The toggle members 27, are pivotally connected at their outer extremities with wrist pins 30, connected with the ring 18; while the toggle members 28, are connected at their outer extremities with wrist pins, or projections 31, with which the extremities of each blade 26, are provided, the said projections of the blades protruding into and traveling in the offsets 17, of the heads; while their exposed body portions occupy the working space of the cylinder chamber outside of the piston.

As illustrated in the drawing, each piston blade is provided with a number of small orifices 32, which are caused to protrude into the working space of the piston chamber after the blade has traveled a predeter-

mined distance beyond the inlet for the motive fluid, whereby the said fluid is allowed to pass through these orifices forward of the blade and other blades in succession, whereby it acts expansively simultaneously upon all of the blades between the point of its passage through the orifice of the first blade and the exit port. In this way the motive fluid may be caused to act simultaneously upon a very extensive piston blade area, since by virtue of this principle, an indefinite number of piston blades may be employed. If for instance a motive fluid of sixty pound pressure is introduced into the supply port of the engine it will exert an equal pressure against the surface of the blades 26 of the piston until the piston has revolved far enough to enlarge the chamber between the piston and the casing, the pressure decreasing, whereby an amount of the fluid passes through the perforations 32 with force enough to exert a diminishing pressure upon each of the succeeding blades relative to the enlarged chamber between the piston and the casing.

The steam entering the cylinder travels with a greater momentum than the revolutions of the piston, and of course, would pass through the perforations 32 in the blades 26 and exert pressure upon each of the succeeding blades. Owing to the greater amount of surface of the blades against which the fluid is to come into contact, all of it would not pass through the relatively small perforations in said blades.

As shown in the drawing, the cylinder is provided with an exhaust port 33, located wholly opposite the point of contact 21, between the cylinder and piston, from which leads an exhaust conduit 35.

From the foregoing description, the operation of my improved rotary engine will be readily understood. Assuming that the live motive fluid enters the piston chamber through the right hand passage 7, it will act upon the outer extremity of the blade 26, located just in advance of the induction passage. The pressure of this fluid upon the said blade will start the piston and its shaft, and as the piston travels in its chamber in the direction indicated by the arrow in Fig. 3, the blades continue to move outwardly, maintaining its position in contact with the inner surface of the piston chamber. When it has traveled a predetermined distance, its perforations 32, are exposed within the space of the piston chamber between the piston and the cylinder, allowing the live motive fluid to pass through the said perforations and enter the said space in advance of the said blade, the said fluid also passing through the perforations of the other blades in succession and thereby acting expansively and advantageously upon all of the blades between the point where the fluid originally passed through the blade perforations, and the exhaust port.

When it is desired to reverse the rotary motion of the piston, the motive fluid will of course be allowed to enter the piston chamber on the opposite side of the point of contact 21, or through the induction passage 7, farther to the left referring to Fig. 3.

The reason for the toggle connection between the ring 18, and the piston blades, is that the latter occupy a position radial with reference to the center of the piston; while the points where the toggle arms 27, are connected with the ring 18, lie in lines radiating from the center of the cylinder chamber in which the piston is eccentrically mounted. Hence the blades are connected with the toggle members 28, while the ring is connected with the members 27. It therefore follows that these points of connection between the members 28, and the blades, and the members 27, and the ring, only coincide when any two oppositely located blades occupy vertical positions or positions directly in line with the point of contact 21, and the top of the cylinder. At all intermediate locations, the points, where the blades are connected with one set of toggle arms, and where the ring is connected with the other set of toggle arms, are slightly out of alinement; hence the necessity for the movement permitted by the toggle members, as is best illustrated in Fig. 4 of the drawing.

Having thus described my invention, what I claim is:

1. A rotary engine comprising a cylinder, a piston eccentrically mounted therein and tangential thereto, the piston having a series of pockets radially-disposed with reference to the piston's center, blades slidably mounted in the said pockets, the latter having a depth equal to the width of the blades, a ring coaxially mounted with reference to the cylinder in the periphery of a recess portion of the cylinder head, and a toggle connection between each blade and the ring, said connection comprising two toggle members pivotally connected together, the outer extremity of one member being connected with the ring; while the outer extremity of the other member is connected with the blade to compensate for the variation in radial alinement between the radial blades and predetermined points in the blade-carrying ring, substantially as described.

2. A rotary engine consisting of a cylinder, provided with a piston eccentrically mounted therein and tangential thereto, a series of blades radially arranged and located in pockets formed in the piston and in which the blades are freely slidable, the said blades having perforations to permit the motive fluid to pass therethrough to a position forward of the blades after the latter have reached a predetermined position of

travel, and means for feeding the live motive fluid to the piston chamber, for the purpose set forth.

3. The combination with a cylinder, having a rotary piston eccentrically mounted therein and tangential thereto, the piston having radially-disposed blades, the said blades being freely movable in pockets with which the piston is provided, the said blades having perforations at a predetermined distance from their extremities to allow the live motive fluid to pass therethrough, for the purpose set forth.

4. A rotary engine consisting of a cylinder said cylinder provided with an eccentric piston mounted thereon, a series of blades radially arranged within pockets formed in said piston, the said blades provided with a plurality of perforations to permit the motive fluid to pass therethrough after the said blades have reached a predetermined point of travel to contact with the successive forward blades, as means of distributing fluid pressure on a plurality of blades between the supply and exhaust ports of said engine.

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

ERNEST P. DARGIN.

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