

No. 876,818.

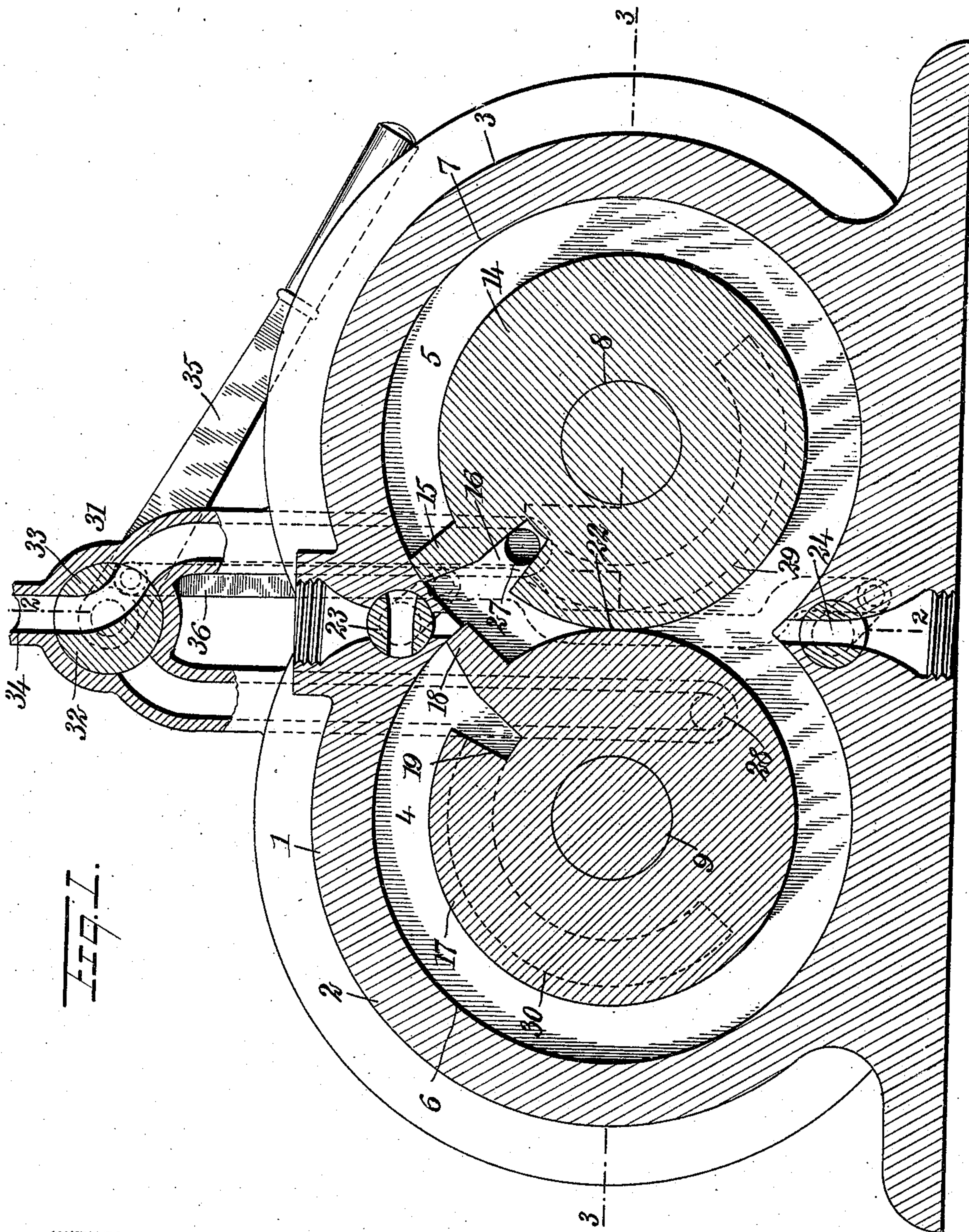
PATENTED JAN. 14, 1908.

E. E. LORD.

ROTARY ENGINE.

APPLICATION FILED APR. 12, 1907.

3 SHEETS—SHEET 1.



E. E. Lord

WITNESSES

H. Walker

J. D. Munn

INVENTOR

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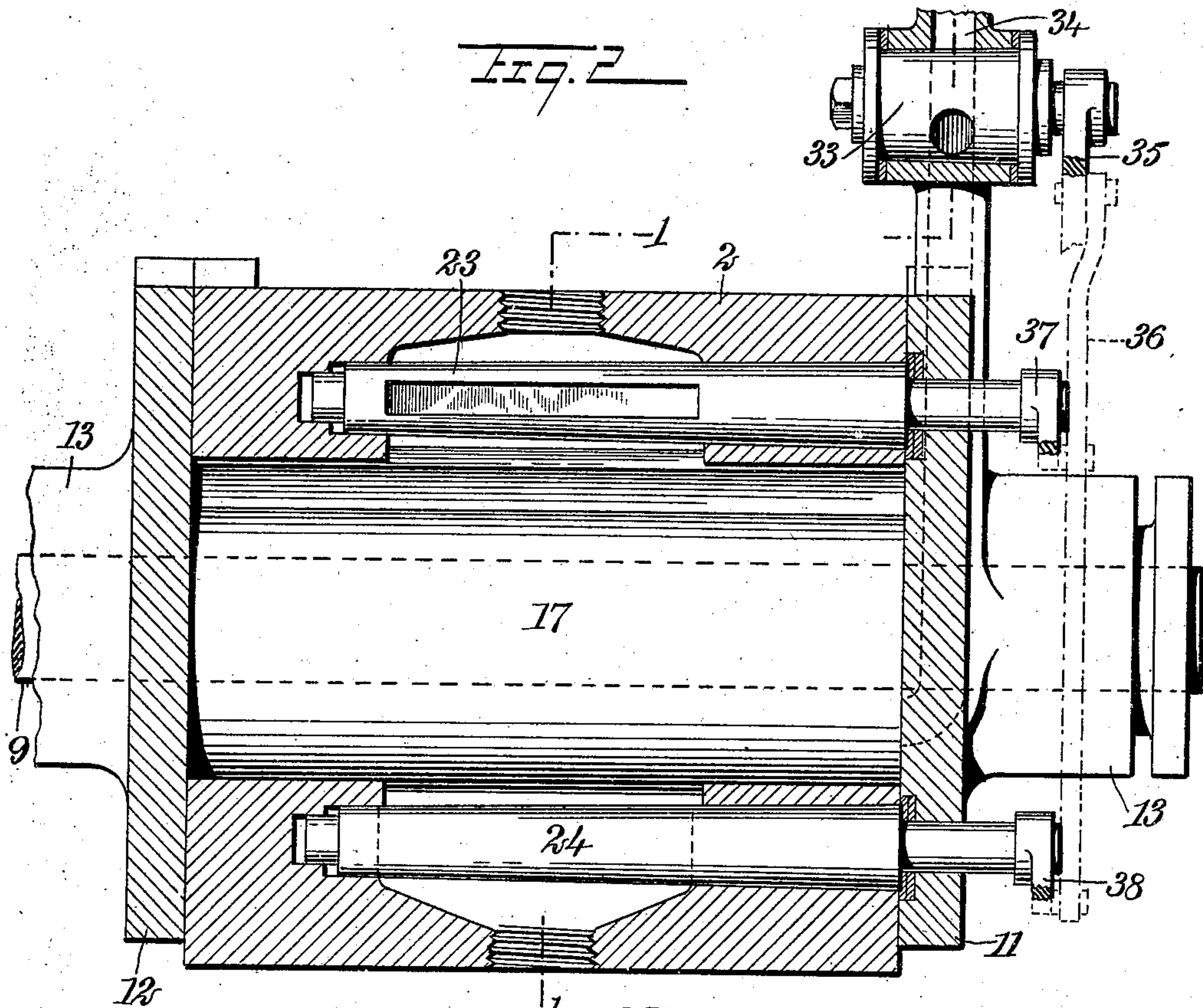
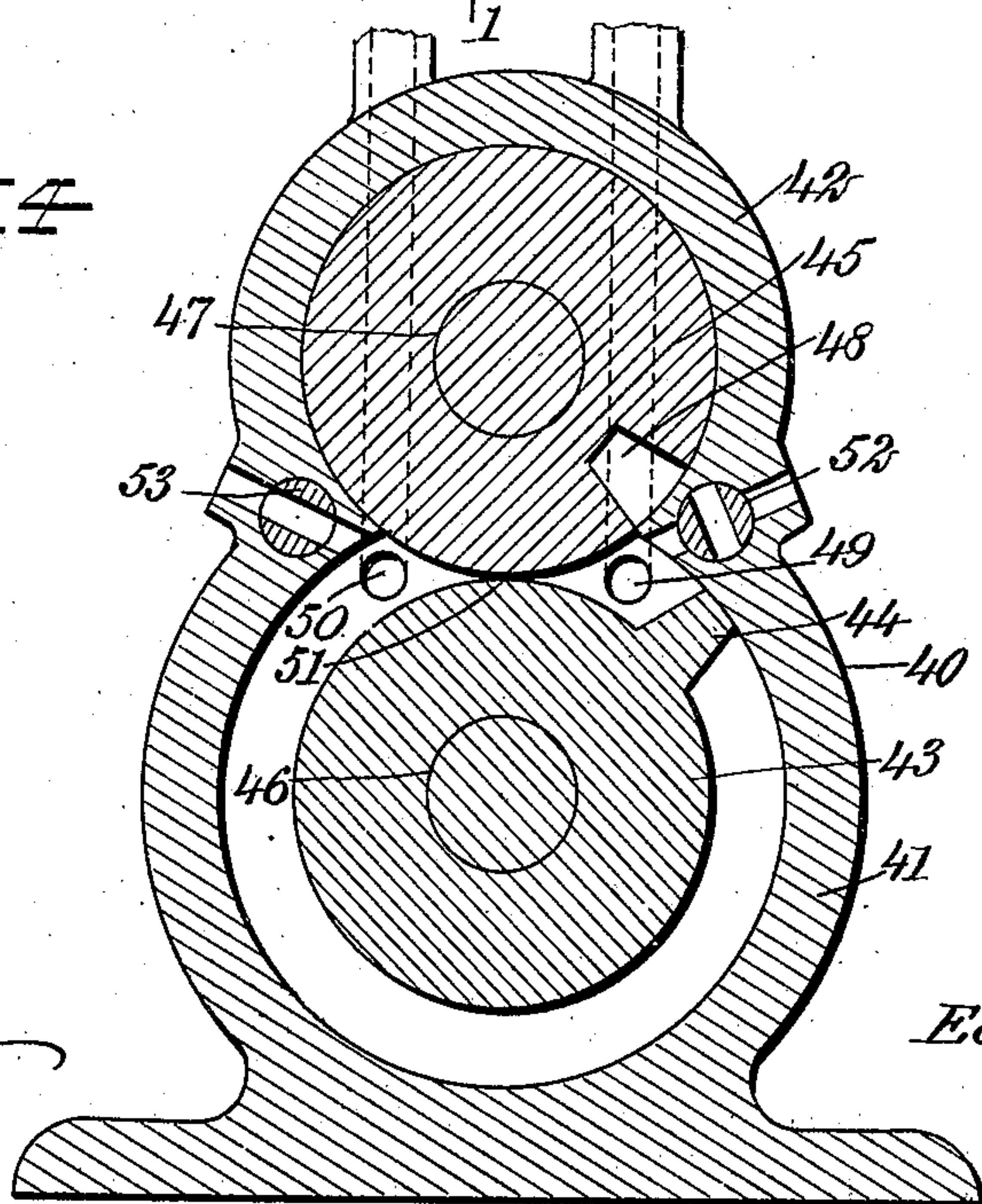


Fig. 4



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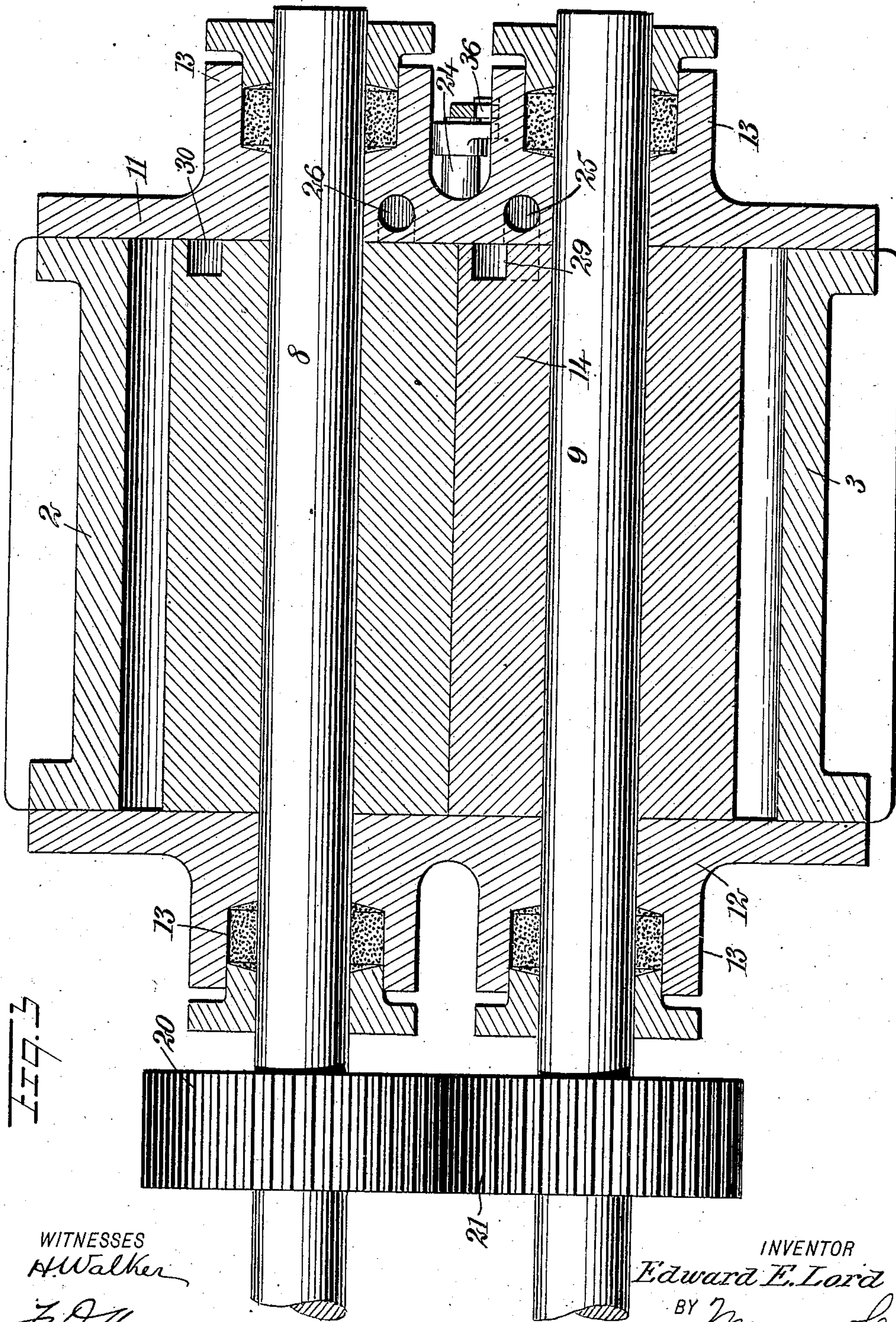
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UNITED STATES PATENT OFFICE.

EDWARD E. LORD, OF SPRINGVALE, MAINE.

ROTARY ENGINE.

No. 876,818.

Specification of Letters Patent.

Patented Jan. 14, 1908.

Application filed April 12, 1907. Serial No. 367,763.

To all whom it may concern:

Be it known that I, EDWARD E. LORD, a citizen of the United States, and a resident of Springvale, in the county of York and State of Maine, have invented a new and Improved Rotary Engine, of which the following is a full, clear, and exact description.

This invention relates to rotary engines, and the object of the invention is to produce an engine of this class which is simple in construction and which will use the steam economically.

A further object is to construct the engine so that it can operate without the use of a special valve mechanism.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical longitudinal section through an engine constructed according to my invention, taken substantially on the line 1—1 in Fig. 2; Fig. 2 is a vertical cross section taken on the line 2—2 of Fig. 1; Fig. 3 is a horizontal cross section taken on the line 3—3 of Fig. 1; and Fig. 4 is a vertical cross section similar to Fig. 1, but showing a modified construction for the engine.

Referring more particularly to the parts, 1 represents the case of the engine, which consists of two barrels 2 and 3, presenting piston chambers 4 and 5 which are in communication, as shown. The side walls 6 and 7 of these piston chambers are disposed circumferentially about the axes of shafts 8 and 9 which are rotatably mounted in the end walls or heads 11 and 12 of the engine. At the points where the shafts 8 and 9 pass through the heads 11 and 12, suitable stuffing boxes 13 are provided, as indicated.

Within the piston chamber 5 a piston drum 14 is rotatably mounted, the same being rigidly carried by the shaft 8. The diameter of this drum is much less than the diameter of the chamber, as indicated, so that an annular steam space is provided about the drum. The piston drum is provided with a laterally projecting head 15 which closes this

annular space, and this head extends longitudinally of the drum. Adjacent to this head 15 a recess 16 is provided in the face of the drum, for a purpose which will appear more fully hereinafter. In the chamber 4 a similar piston drum 17 is provided, and the circumferential faces of these two drums 14 and 17 are adapted to abut normally against each other, as shown in Fig. 1. Like the drum 14, the drum 17 is provided with an outwardly projecting piston head 18, which is similar to the head 15, and adjacent to this head a recess 19 is formed in the piston drum 17. The shafts 8 and 9 are arranged to rotate at the same velocity by means of gear wheels 20 and 21 of equal diameter, which mesh with each other as shown in Fig. 3. The piston drums are arranged in such a position on the shaft that when the head 15 is passing the drum 17, it will pass into the recess 19; at the same time the piston head 18 will pass into the recess 16. In this way the piston drums may rotate continuously without injury to the piston heads, and at the same time the surface of the drums are normally in contact at the point 22, as indicated in Fig. 1.

In the upper portion of the case between the barrels 2 and 3, an exhaust valve 23 is located, which may open communication between the interior of the case and the outer air; at a corresponding point on the lower side of the case, a similar exhaust valve 24 is provided.

The head 11 is provided with an inlet passage 25 and with a corresponding inlet passage 26. The inlet passage 25 opens into the interior of the chamber 5, in a circular admission port 27, as shown in Fig. 1. Similarly, the inlet passage 26 opens out upon the piston chamber 4 at an admission port 28. These admission ports 27 and 28 are disposed so that they are normally covered by the ends of the drums, but are arranged so that they are uncovered by the recesses 16 and 19 as they pass.

In the face of the drum 14 adjacent to the admission port 27, I provide a circumferential admission groove 29; this groove is disposed about the axis of the shaft 8 as a center, so that as long as the groove is in communication with the admission port 27, steam may be admitted to the piston chamber. A simi-

lar admission groove 30 is provided in the drum 17.

The inlet passages 25 and 26 are extended upwardly to form a Y-connection 31, as indicated in Fig. 1, and this Y-connection is formed in the valve or cock 32, the said valve comprising a plug 33 having a curved port adapted to admit steam from the inlet connections 34 through either of the inlet passages 25 or 26. In the relation shown in Fig. 1, the valve 32, which constitutes a throttle valve, admits steam to the inlet passage 25. This valve is controlled by means of a lever 35, and this lever is connected by a link 36 with the valves 23 and 24 by means of short arms 37 and 38 provided on the valves, as indicated in Figs. 1 and 2. The arrangement is such that when the steam is being admitted to the inlet passage 25, the valve 23 will be closed, while the valve 24 is open. If the lever 35 is thrown upwardly and over to the left so as to open communication from the inlet pipe 34 to the inlet passage 26, the valve 23 will be opened and the valve 24 closed.

It will appear from the foregoing that when the piston heads 15 and 18 occupy the position in which they are indicated in Fig. 1, a space is formed between them which is closed at the point 22 by the abutting drum faces. Into this space steam is admitted through the admission port 27, and this steam expands, rotating the drums in opposite directions. The steam continues to expand until the heads 15 and 18 uncover the exhaust valve 24, whereupon exhaust will take place. When the end of the groove 29 passes over the admission port 27, the steam is, of course, cut off and expansion begins at this point.

When the engine is to be reversed, the lever 35 is thrown into the opposite position, projecting over the barrel 2. With this arrangement, steam is admitted at 28 and the piston drums are rotated in the opposite direction. The valve 24 is, of course, under these conditions, closed, and the valve 23 is open. Cut off takes place when the end of the groove 30 passes the opening 28, and expansion begins at this point and continues until the piston heads uncover the exhaust valve 23. In this form of the invention, it will be understood that the work is equally divided between the two piston drums.

In Fig. 4 I illustrate a modified construction of the invention, in which all of the work is done by one drum. Referring to this figure, I provide a case 40 having a lower barrel 41 and an upper barrel 42. In the lower barrel there is mounted a piston drum 43, which is of less diameter than the barrel, as indicated, and this drum is provided with a laterally projecting piston head 44 which crosses the annular space surrounding the

drum. In the upper barrel 42 an abutment drum 45 is rotatably mounted, and this drum completely fills the space within the upper barrel. Its lower portion projects into the interior of the lower barrel, and its circumferential face normally rests against the circumferential face of the drum 43. The shafts 46 and 47 of the two drums are geared together in the manner described in connection with the preferred form. The abutment drum 45 is provided with a recess 48 which is adapted to receive the piston head 44 as the drums revolve. In the head or end wall of the case admission openings 49 and 50 are provided, the former of which is disposed toward the right, while the latter is disposed at the left of the point 51, at which the faces of the drums meet. Near these admission ports 49 and 50 exhaust valves 52 and 53 are provided in the wall of the case. In Fig. 4 the parts are shown in the relation which they assume when the piston drum 43 is rotating toward the right. As the piston head 44 passes toward the right after uncovering the admission port 49, a space is formed behind it and between the drums, as indicated into which the live steam is admitted; the exhaust port 52 is closed. This steam, therefore, expands and rotates the piston drum 43, as will be readily understood, until the piston head 44 uncovers the exhaust port 53, when the steam escapes to the atmosphere. It should be understood that the port 50 for this direction of rotation, is closed above by a valve similar to the valve 52 described in connection with the preferred form. If rotation is to take place in the opposite direction, the exhaust valve 53 is closed and the exhaust valve 52 open. With this arrangement, steam is admitted through the port 50 and the port 49 is closed. This will evidently rotate the piston drum 43 in the opposite direction. With this arrangement the steam may be expanded to a greater ratio than with the preferred form.

It will be evident, in connection with either form, that the point of cut-off may be made later in the stroke by increasing the length of the grooves in the ends of the piston drum, and vice versa.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

In a rotary engine, in combination, a case having two communicating barrels, piston drums mounted in said barrels rolling upon each other and having projecting heads adapted to inclose a part of the interior of said barrels above and below the axes of said drums, steam passages leading to said barrels for driving said piston drums in forward or reverse direction, exhaust valves disposed respectively above and below said axes, a two-way admission valve in alinement with

said exhaust valves and admitting to either
of said steam passages, a lever attached to
said admission valve for operating the same,
levers attached to said exhaust valves for
5 operating the same, and a link pivotally at-
tached to all of said levers.

In testimony whereof I have signed my

name to this specification in the presence of
two subscribing witnesses.

EDWARD E. LORD.

Witnesses:

FRED ERNEST HANSON,
GEORGE A. GOODWIN.