

No. 699,241.

Patented May 6, 1902.

L. RICHNER.
ENGINE.

(Application filed Oct. 23, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 2.

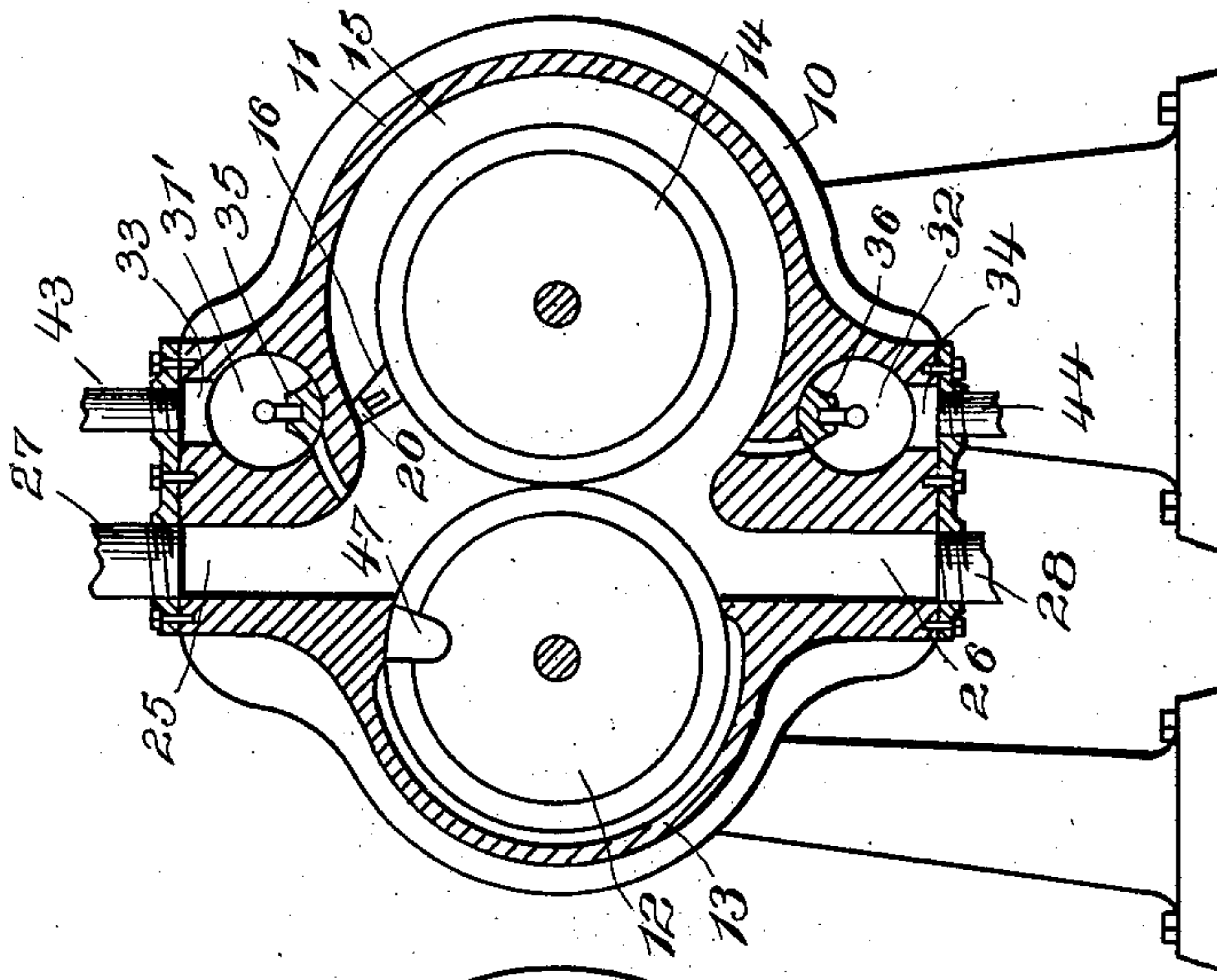
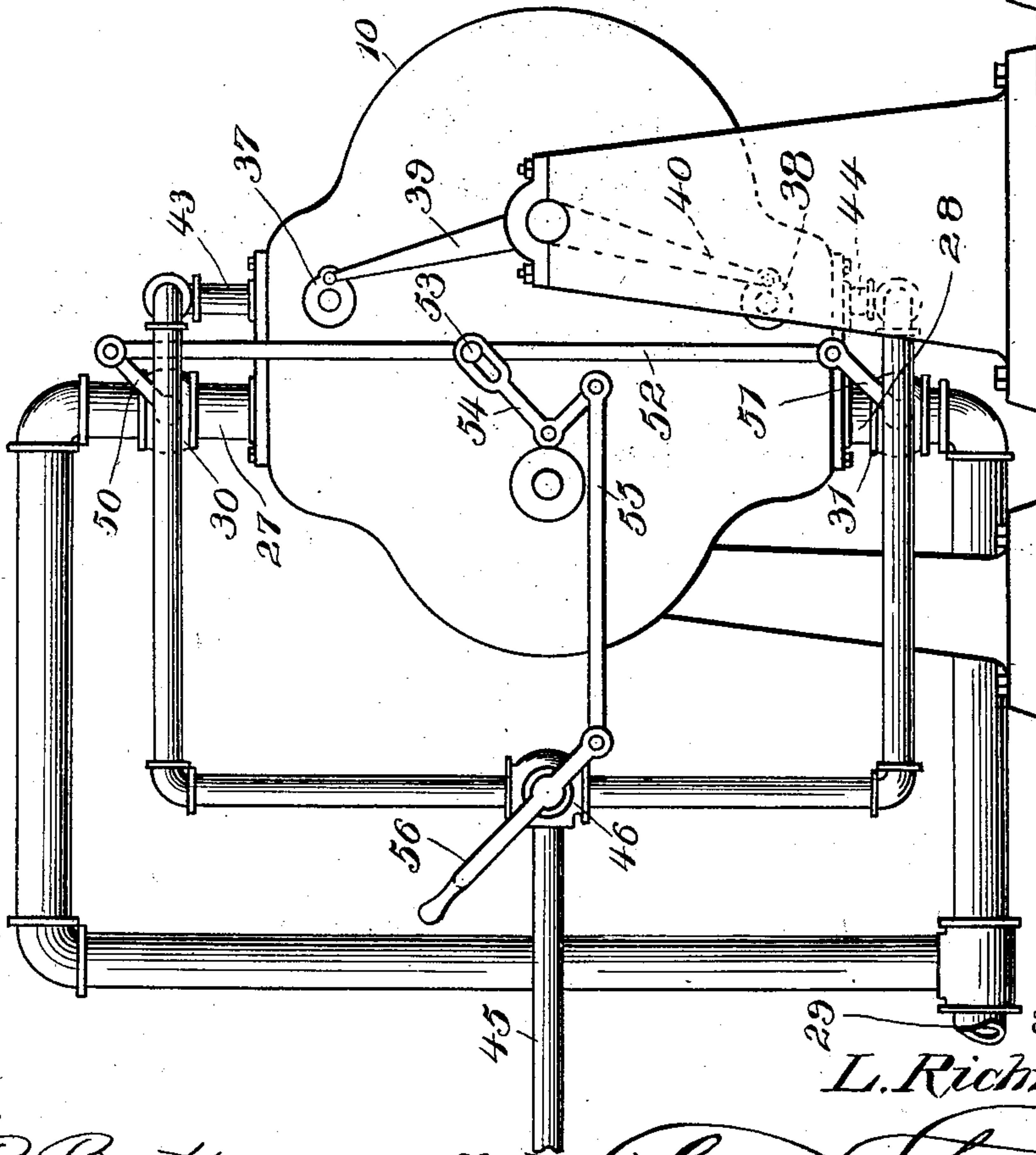


Fig. 1.



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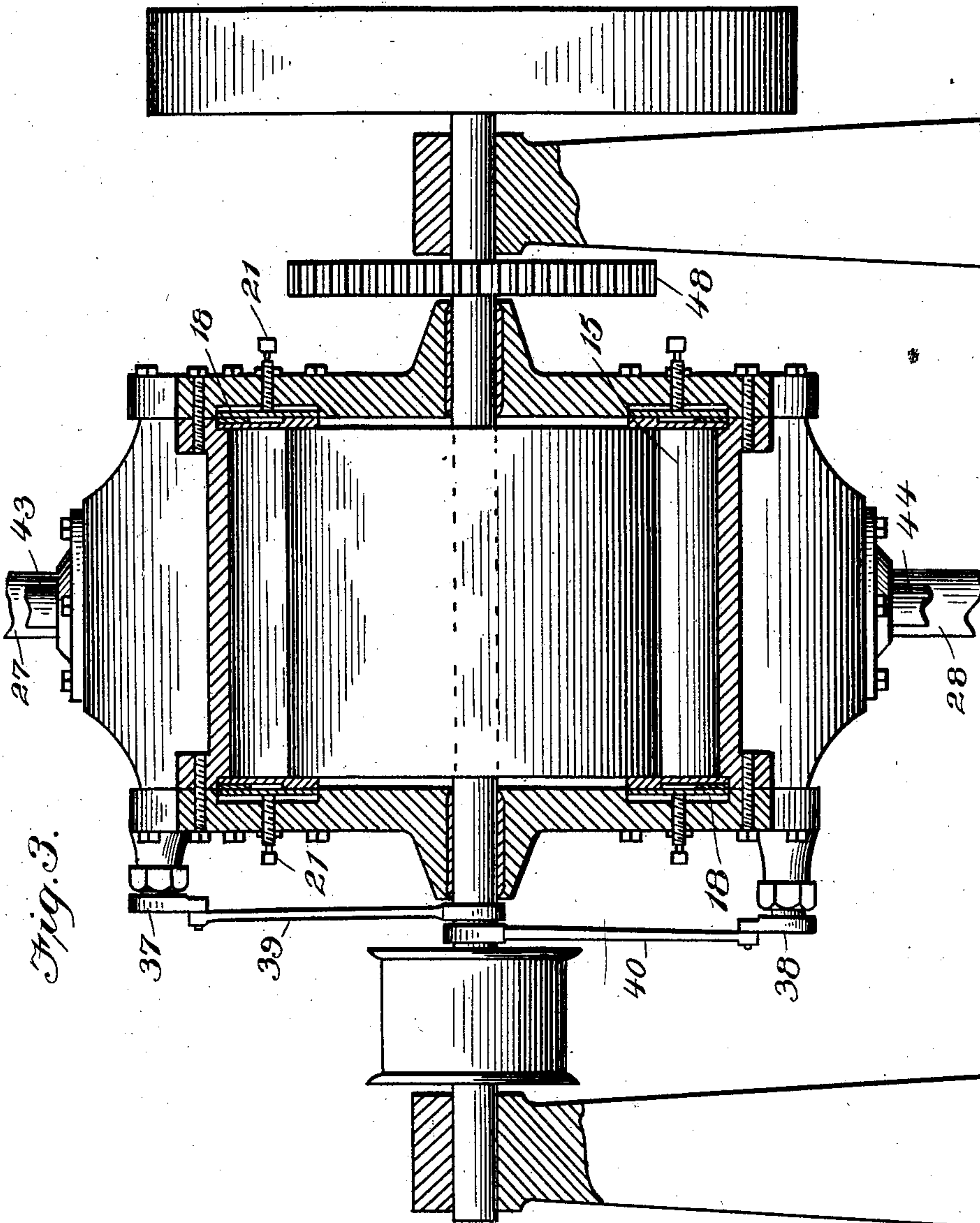


Fig. 3.

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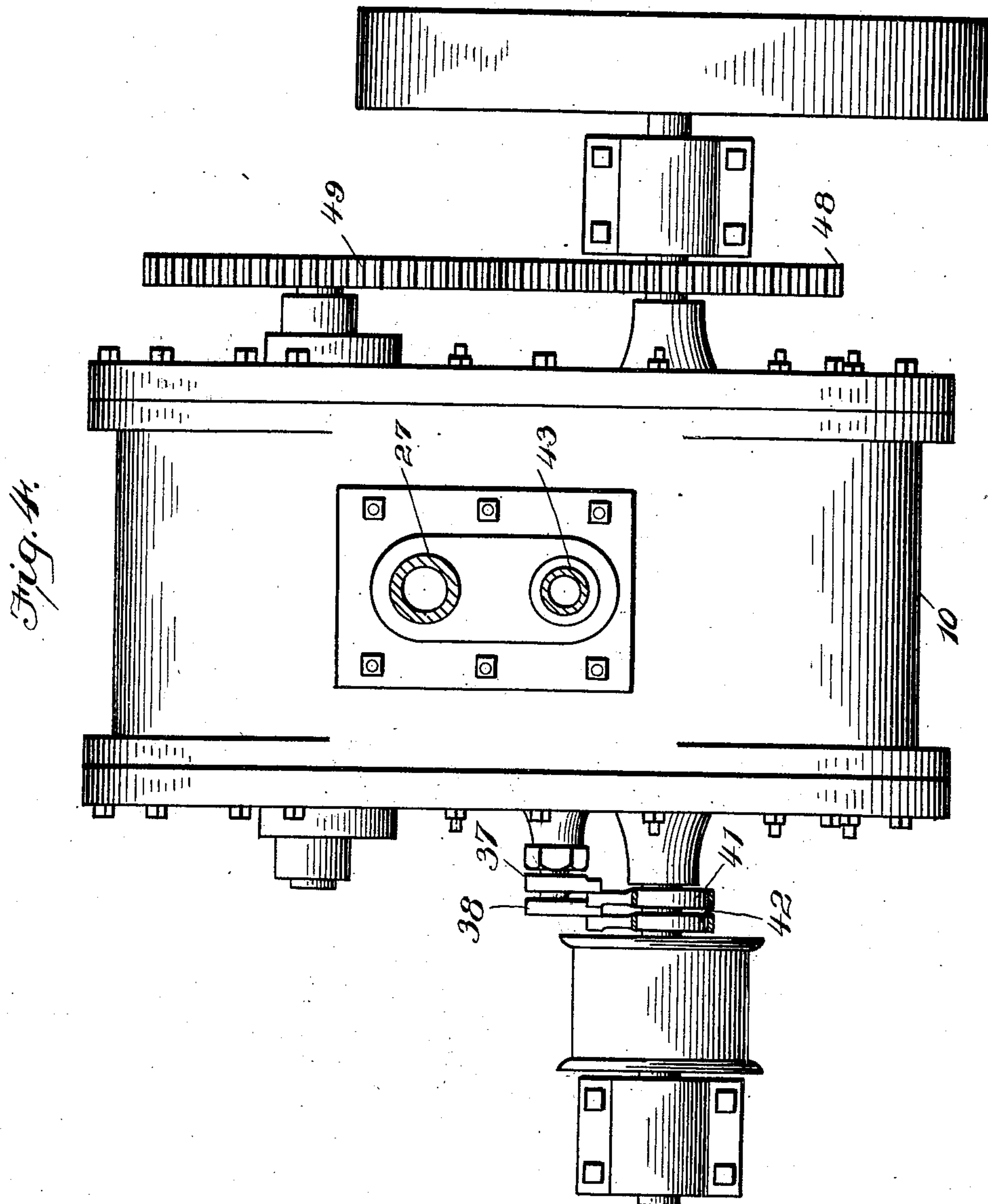
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UNITED STATES PATENT OFFICE.

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SPECIFICATION forming part of Letters Patent No. 699,241, dated May 6, 1902.

Application filed October 23, 1901. Serial No. 79,618. (No model.)

To all whom it may concern:

Be it known that I, LEVI RICHNER, a citizen of the United States, residing at Crawfordsville, in the county of Montgomery, State of Indiana, have invented certain new and useful Improvements in Engines; and I do hereby 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.

This invention relates to rotary engines; and it has for its object to provide a construction of this nature which will possess a high efficiency and which will operate by expansion of the motive fluid as distinguished from an impact-engine.

A further object of the invention is to provide a construction which will be simple of construction and wherein there will be a simple and efficient reversing mechanism, other objects and advantages of the invention being understood from the following description.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a side elevation showing the complete engine with the reversing mechanism thereof. Fig. 2 is a vertical section of the engine, taken in a plane at right angles to the main shaft of the engine. Fig. 3 is a vertical section taken in the plane of the main shaft of the engine, the piston being in elevation. Fig. 4 is a top plan view of the engine.

Referring now to the drawings, there is shown an engine comprising a casing 10, in which is formed a major cylinder 11 and a minor cylinder 13, the curvatures of which intersect, so that the cylinders communicate, and in the minor cylinder is disposed a cylindrical rotary abutment 12, which fits its cylinder snugly and is packed so as to prevent leakage of steam under working conditions, the periphery of the abutment projecting slightly into the curvature of the major cylinder.

In the major cylinder 11 is mounted the cylindrical piston 14 of the engine, of such diameter as to cause it to impinge with its periphery against the periphery of the abutment while being located concentric with its cylinder. The result is an interspace 15, which forms the expansion-chamber of the engine,

and through this expansion-chamber is adapted to travel the piston-head 16 in the form of a radiating rib or lug extending longitudinally of the periphery of the piston and of such dimensions as to fit snugly in the expansion-chamber. Between the ends of the piston and the heads of the cylinder are disposed packing-rings 18, there being three rings at each end, and the inner ring of each group is split, so that it may be forced outwardly by steam-pressure. The head is provided with the packing-strip 20, while against the rings impinge set-screws 21, which when screwed inwardly act to move the packing-rings against the ends of the piston and abutment to compensate for wear.

The ends of the expansion-chamber terminate in or communicate with exhaust-passages 25 and 26, which extend vertically in opposite directions, and with these passages are connected the exhaust-pipes 27 and 28, which are in turn connected with a common or trunk pipe 29, the exhaust-pipes 27 and 28 being provided with valves 30 and 31, respectively, having turning plugs and located directly adjacent to the engine-casing.

In the casing and adjacent to the ends of the expansion-chamber are formed the cylindrical steam-chests 31' and 32, from which lead ports 33 and 34 to the opposite ends of the expansion-chamber and at opposite sides of the line of contact between the piston and abutment. In each steam-chest is disposed an oscillatory cut-off valve 35 and 36, respectively, having crank-disks 37 and 38, to which are pivoted eccentric-rods 39 and 40, having straps at their opposite ends which are engaged with the eccentrics 41 and 42 on the piston-shaft. Thus as the piston rotates steam will be admitted only at the proper times.

Connected with the steam-chests are the steam-feed pipes 43 and 44, which are connected with a common feed-pipe or supply-pipe 45 through the medium of a three-way valve 46, by operation of which either steam-chest may be connected with the supply-pipe.

In the face of the abutment is a longitudinal groove 47 of such dimensions that as the abutment and piston are rotated in opposite directions, due to the engaged gears 48 and 49, respectively, upon their respective shafts, the piston-head will enter the groove or slot,

when it would otherwise strike the face of the abutment and be stopped thereby. Thus if steam be admitted from the upper chest and the lower exhaust be open the piston will be
 5 rotated to the right, (see Fig. 2,) the steam expanding to rotate the piston and exhausting through the lower exhaust-pipe. If steam be admitted through the lower chest, it will exhaust through the upper exhaust-pipe, and
 10 the engine will be driven in a reverse direction.

To properly set the exhaust-valves when the inlet-regulating valve is set, the exhaust-valves have their turning plugs provided with
 15 cranks 50 and 51, connected by rod 52, having a pin 53, which is received in the slotted end of a bell-crank lever 54, pivoted on the engine-casing, and this lever is in turn connected by rod 55 with one end of the hand-
 20 lever 56 of the three-way inlet-valve. Thus when the three-way valve is operated the exhaust-valves are correspondingly set.

The piston-shaft is provided at one end with a belt-pulley and at the other with a fly-wheel,
 25 as shown.

What is claimed is—

1. A rotary engine comprising a casing having a major and a minor cylinder which communicate, a cylindrical abutment in the minor
 30 cylinder and projecting into the major cylinder, said abutment having a longitudinal facial groove, a cylindrical piston in the major cylinder having head adapted to mesh with the groove, said abutment and piston

lying in mutual peripheral contact, exhausts 35 at opposite sides of the line of contact of the piston and abutment, valves for controlling the exhausts, steam-chests having ports communicating with the major cylinder at opposite sides of the line of contact of the piston 40 and abutment, cut-off valves in the chests operatively connected with the piston, a steam-supply connected with the chests and having a three-way valve for communicating the supply with the chests interchangeably, and connections 45 between the three-way valve and exhaust-valves for correspondingly operating the latter from the former.

2. A rotary engine comprising a casing having two cylinders therein which communicate, 50 a rotary abutment in one cylinder having a longitudinal facial groove, a cylindrical piston in the other cylinder in peripheral contact with the abutment and having a longitudinally-extending head contacting with the 55 wall of its cylinder and adapted to mesh with the groove of the abutment, separate steam-chests, separate exhausts, a steam-supply, a valve for connecting the chests with the supply interchangeably, and means connected 60 with the said valve for closing the exhausts interchangeably.

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

LEVI RICHNER.

Witnesses:

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