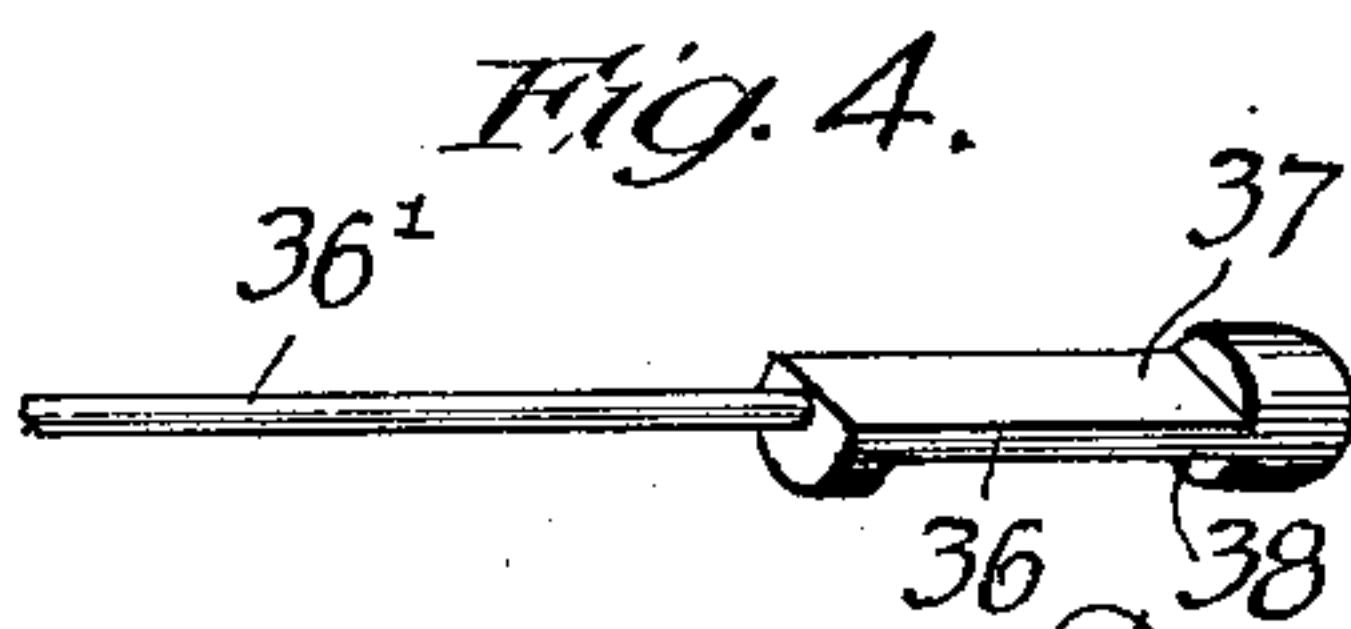
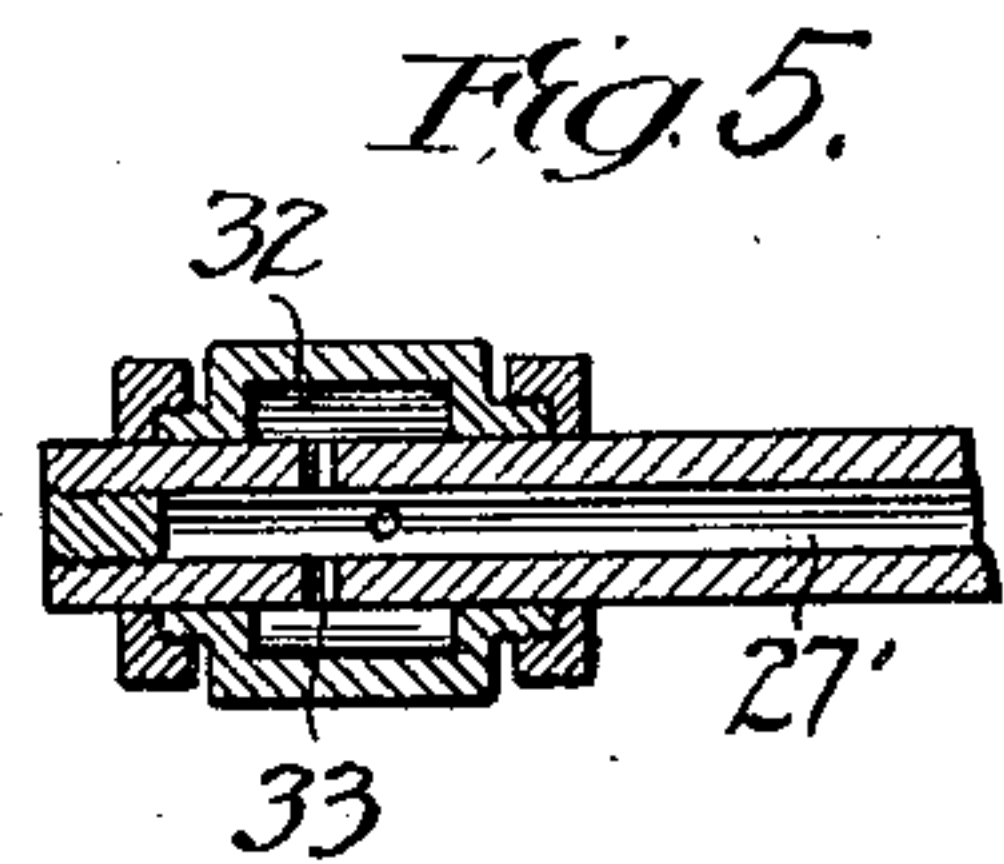
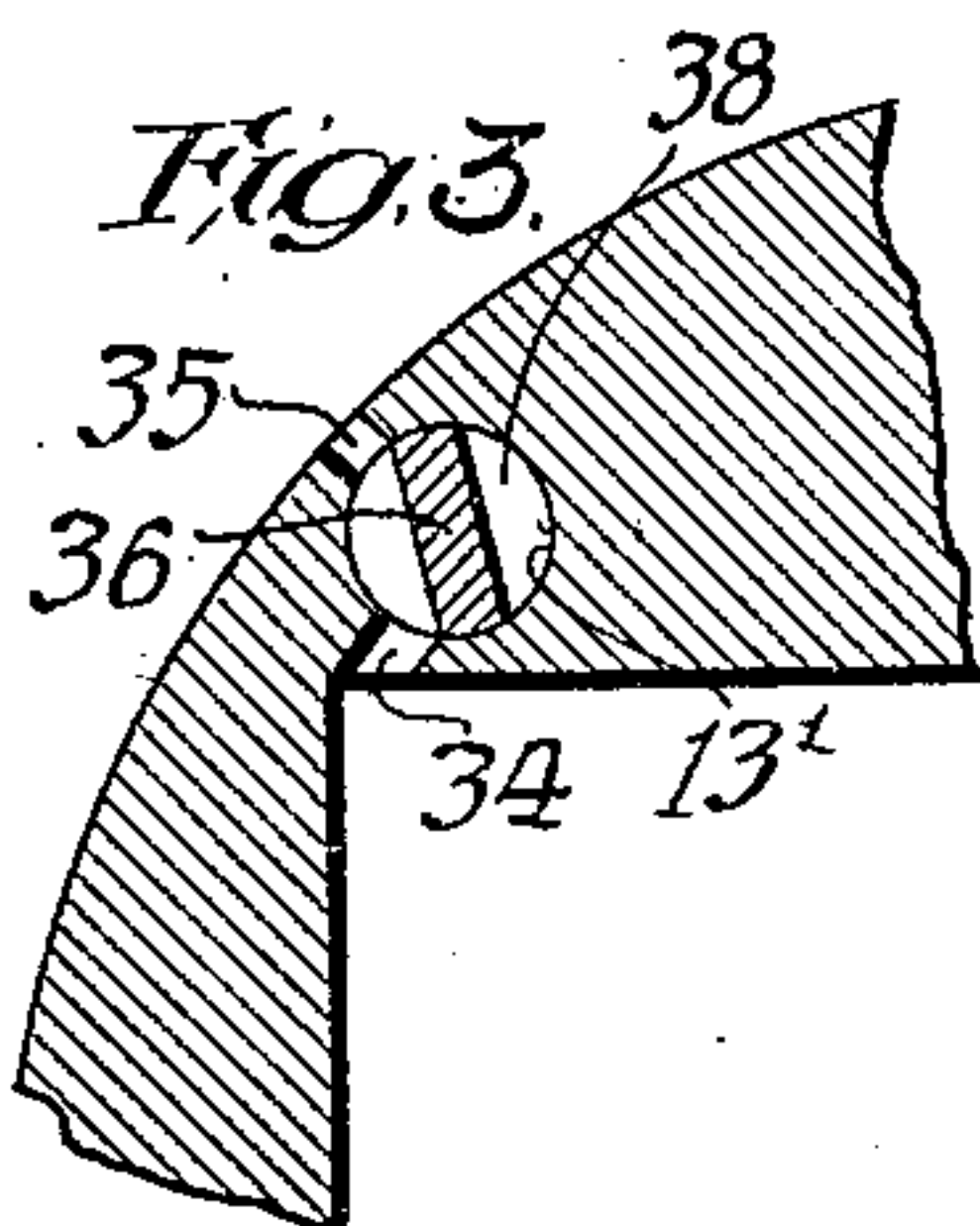
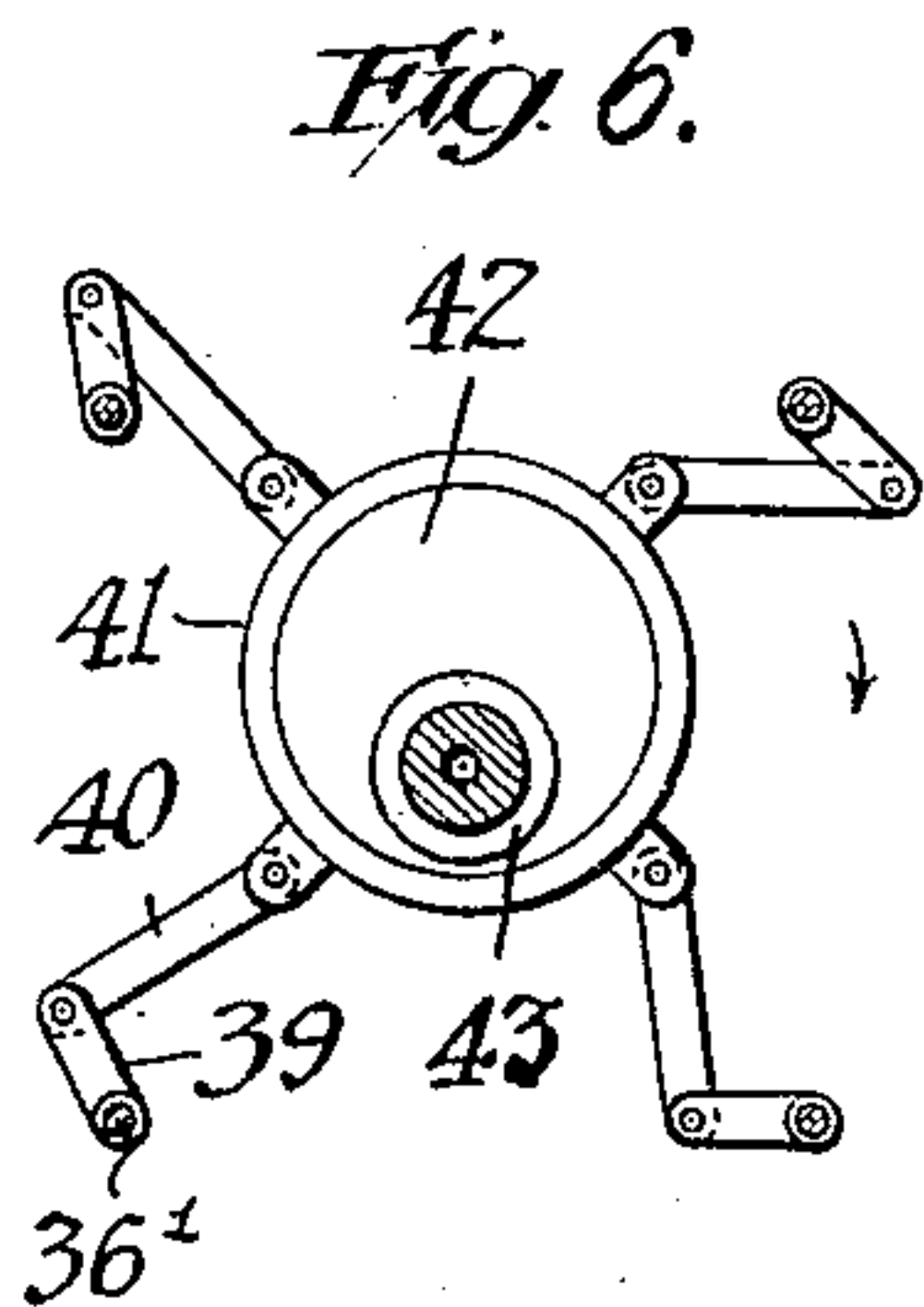
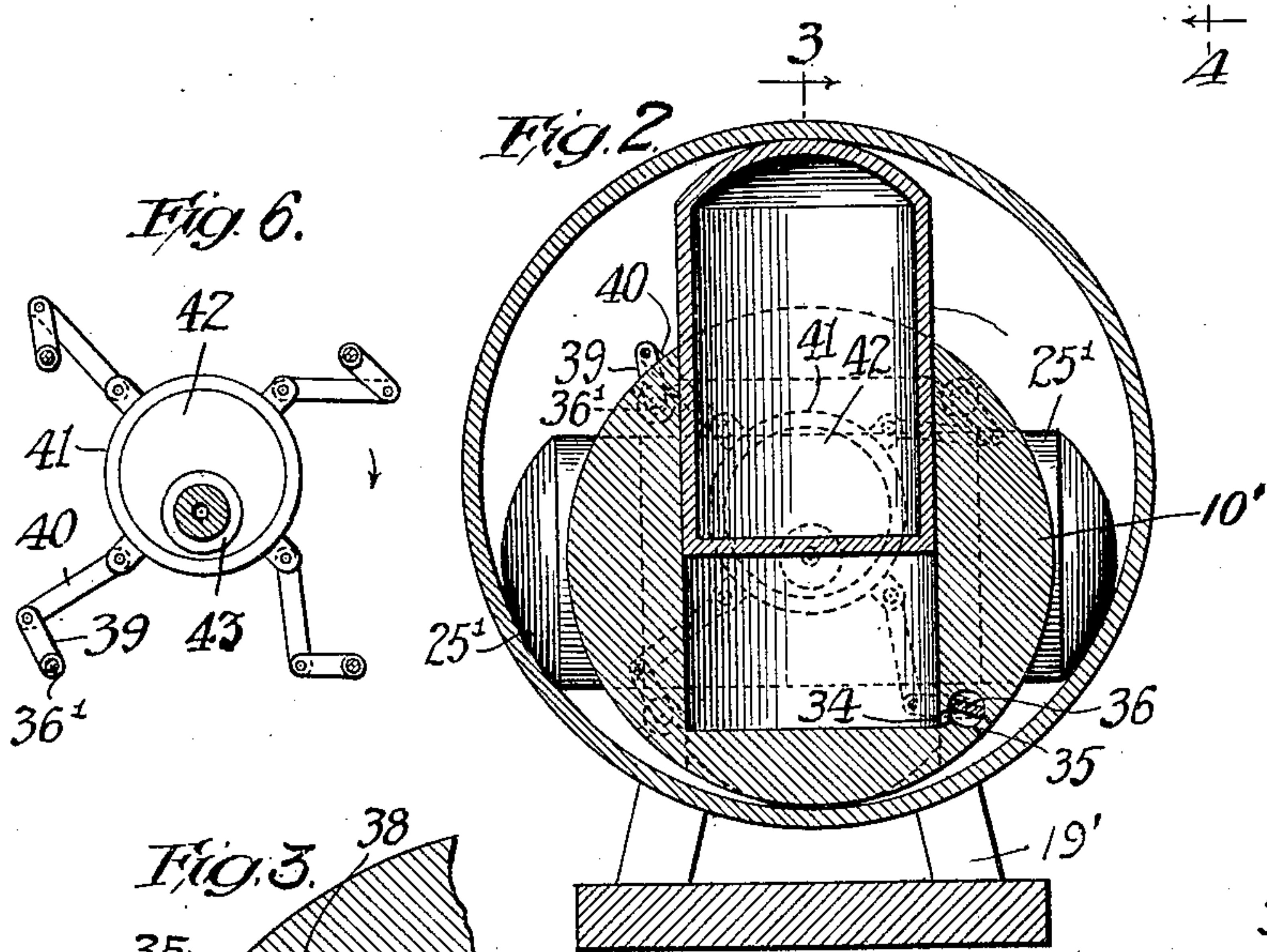
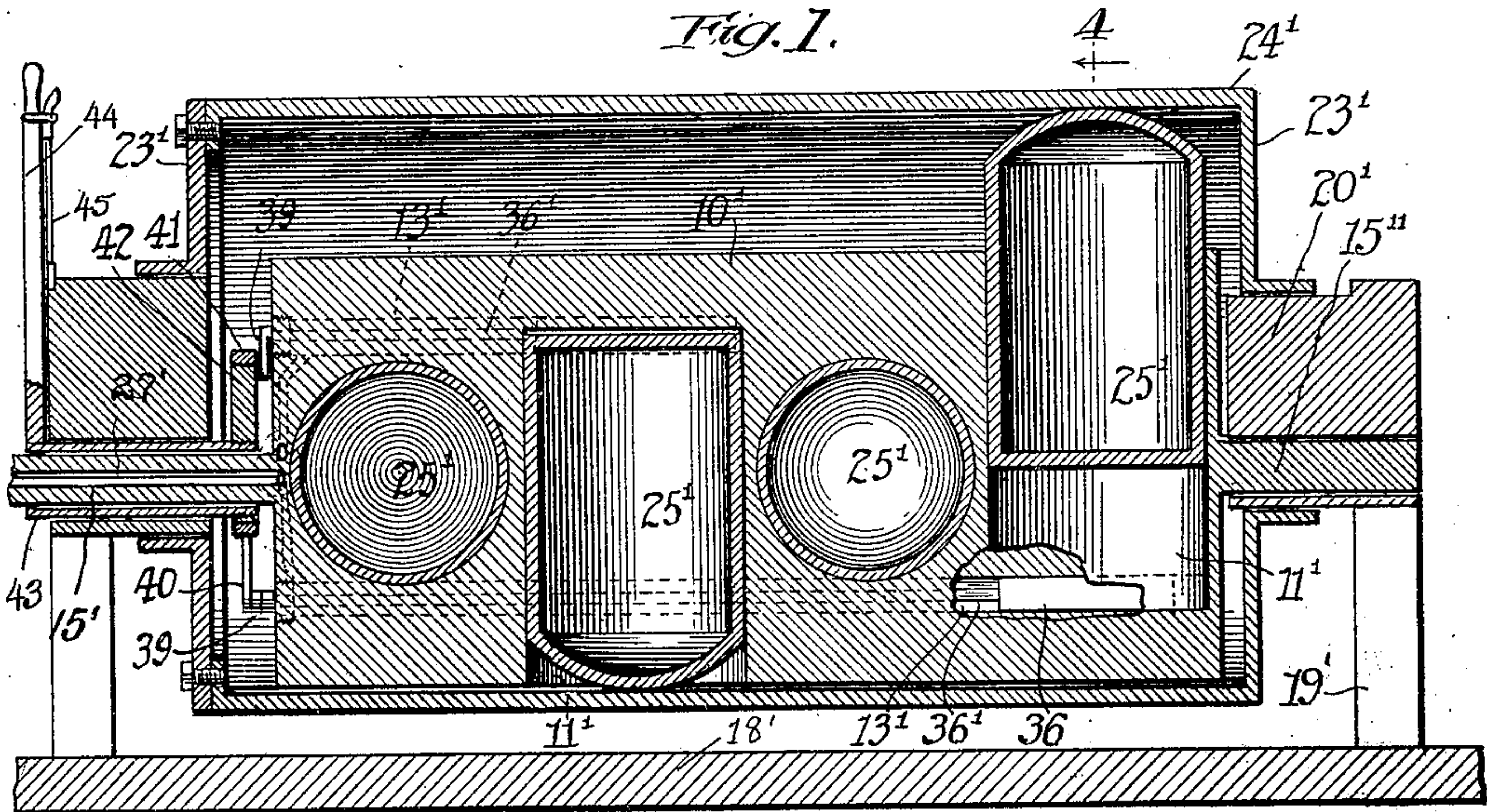


L. O. GILLILAND.
ENGINE.

APPLICATION FILED OCT. 31, 1908.

999,777.

Patented Aug. 8, 1911.



Witnesses
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UNITED STATES PATENT OFFICE.

LEE O. GILLILAND, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO REINHOLD REICHARDT, OF CHICAGO, ILLINOIS.

ENGINE.

999,777.

Specification of Letters Patent.

Patented Aug. 8, 1911.

Application filed October 31, 1908. Serial No. 460,406.

To all whom it may concern:

Be it known that I, LEE O. GILLILAND, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Engines, of which the following is a specification.

My invention relates to improvements in rectilinear piston rotary engines, and has for its general object to provide an engine of high speed, power and efficiency, low weight, small size and simple construction.

My novel construction applies to engines wherein there is provided a rotatable body, and a surrounding ring eccentrically mounted for independent rotation, one of said elements carrying radially-movable free pistons coöperating with the proximate surface of the other element, whereby reciprocation of the pistons in their cylinders causes rotation of both eccentrically related elements in the same direction; and a particular object of the invention is to provide such an engine which will have the structural advantages of great simplicity and practicability.

More particular objects of my invention will become apparent to those skilled in the art from the following description taken in conjunction with the accompanying drawings, wherein I have shown two embodiments of my invention.

In the drawings; Figure 1 is a central vertical section of a modified embodiment of my invention, wherein the several cylinders are arranged on different peripheral lines; Fig. 2 is a transverse vertical section therethrough; Figs. 3 and 4 are details of a valve construction; Fig. 5 is a sectional detail of a steam pipe connection; Fig. 6 shows a valve-operating mechanism.

In each embodiment of my invention I provide a rotatable body provided with a plurality of radial cylinders, in which are arranged for reciprocation free pistons arranged for contact at their outer ends with a surrounding ring, preferably likewise mounted for rotation, but eccentrically to the axis of rotation of the body, so that said ring receives on its inner face the outward thrust of the pistons, and means being provided for admitting and exhausting steam or other expansive medium to and from the cylinders at suitable points in the reciprocation of the respective pistons, whereby

rotation in the same direction is imparted to both the body and the surrounding ring.

In the structure shown, the body 10' is longitudinally extended and the cylinders 11' are arranged in different peripheral lines each one extending beyond the center of the body for relatively great length of stroke. On account of their large size the pistons are preferably made hollowed. The body 10' is supported at its opposite ends on shaft 15', 15'' carried by blocks 20', mounted on standards 19' projecting from a base 18'. The exterior surfaces of the blocks 20', eccentric to the body shaft, afford support to the cylindrical frame 23' the overhanging or surrounding ring portion 24' whereof surrounds the body 10'. Steam is admitted to the cylinders 11' through a passage 27' in the shaft 15', at its outer end communicating with a steam chest 32 through apertures 33 in the shaft, and at its inner end opening to steam passages 13' extending radially and then longitudinally toward the respective cylinders, each such longitudinal passage 13' having a steam inlet port 34 to the corresponding cylinder 11' and an exhaust port 35 to the exterior of the body. The inlet and outlet ports for each cylinder are controlled by a valve 36, preferably cylindrical in a general form, having one side cut away as at 37, to receive steam from the passage 13' and its other side channeled as at 38, so that when turned to proper position it may open communication between the passage 13' to either such port. Such construction *per se* I do not claim as any part of my invention and show the same merely as a convenient valve construction of well known type. The several valves 36 have on their stems 36' crank arms 39, connected by links 40 with a rotatable eccentric strap 41 mounted on eccentric 42, carried by a sleeve 43 surrounding and rotatably adjustable on the shaft 15' and extending out beyond the bearing block 20' so as to be adjustable from the outside of the frame by a lever 44, provided with a latch 45 for retaining it in adjusted positions.

It will be seen that in general the operation of the device is as follows: The independently and eccentrically mounted body and overhanging ring are rotated unidirectionally by the operation of the free pistons in the manner described. The valve

links carry the eccentric strap in rotation, but are moved thereby with reference to the shaft center to oscillate the valves, so as to regulate the cut-off according to the rotary adjustment of the eccentric. Obviously the engine may be reversed by throwing the adjusting eccentric from one side of the line of shaft centers to the other, when the body and ring will rotate together in the reversed direction.

It will be observed that an engine embodying my invention is of very few parts, readily made and easily assembled, and with little liability to get out of order.

While I have herein described a single embodiment of my invention, it will be apparent that changes in the details thereof might be made within the scope of the appended claim.

Having described my invention, what I claim is:

In an engine, a rotatable cylindrical casing, an integral cylindrical structure, 10', eccentrically mounted therein for rotation with the rotatable casing, said structure 10' providing a plurality of cylinders, each said

cylinder extending from one side of the structure through the center thereof to a suitable distance from the opposite side, and said several cylinders being arranged each on a different side of the structure; said structure being further provided with longitudinal extensions (15'—15'') integral with the body of the structure affording support therefor; pistons, 25', freely mounted in the cylinders and arranged in the operation of the engine to abut against the interior surface of the rotatable casing; there being steam passageways from each said cylinder bored in the integral structure 10' and one extension thereof to the exterior, said passageways opening from the structure 10' for exhaust; and a steam chamber communicating with said steam passageways, exterior to said extension for supply.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

LEE O. GILLILAND.

In the presence of—

GEO. T. MAY, Jr.,

MARY F. ALLEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."