(No Model.)

M. H. BEYER.

ROTARY ENGINE.

No. 593,078. Patented Nov. 2, 1897.

FIG. 1.

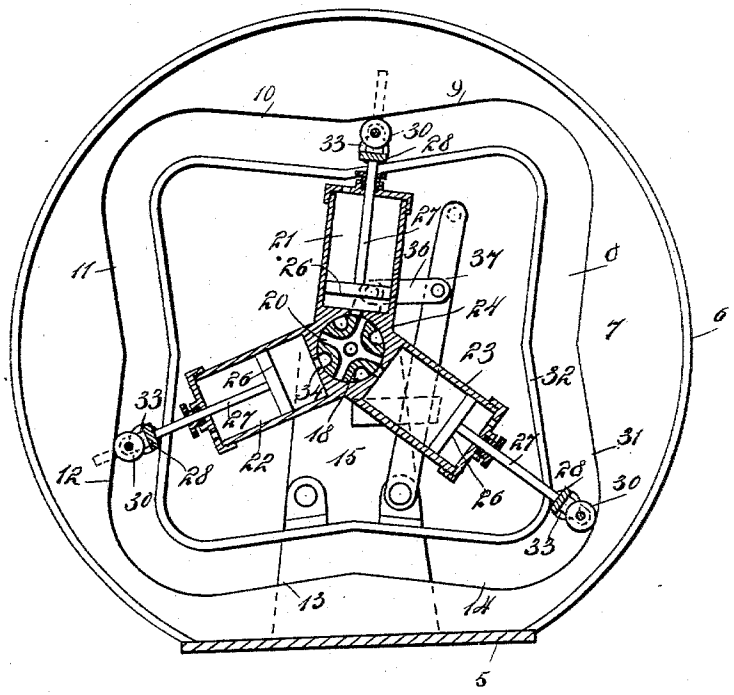


FIG. 3.

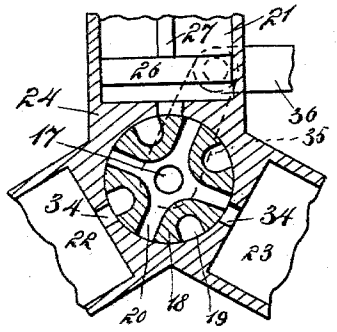


FIG. 2.

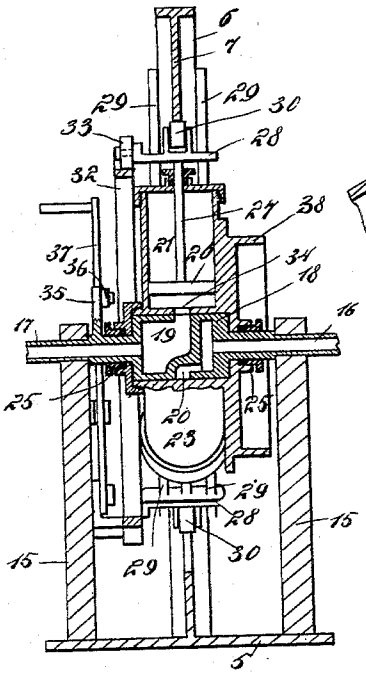
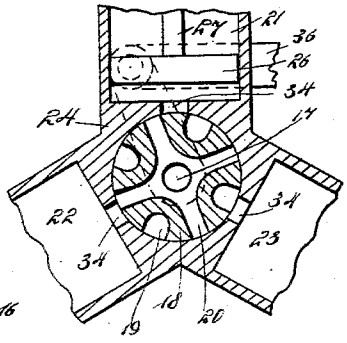


FIG. 4.



WITNESSES:

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MATTHEW HENRY BEYER, OF ORANGE, NEW JERSEY, ASSIGNOR OF ONE-HALF TO JOSEPH C. BEYER, OF SAME PLACE.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 593,078, dated November 2, 1897.

Application filed March 11, 1897. Serial No. 626,997. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW HENRY BEYER, of Orange, in the county of Essex and State of New Jersey, have invented a new and Improved Rotary Engine, of which the following is a full, clear, and exact description.

This invention employs cylinders mounted to turn around a common center and having pistons exerting their force against cammed surfaces, so that the force of the pistons reacts on the cylinders to turn the same, whereby motive power may be derived from the turning of the cylinders.

This specification is the disclosure of one form of my invention, while the claims define the actual scope of my conception.

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 sectional view of the invention, taken across the axis of the cylinders. Fig. 2 is a sectional view taken through the axis of the cylinders, and Figs. 3 and 4 are detail sectional views illustrating the valve devices and the means for revolving the same.

A base-plate 5 carries an annular rim 6, provided with a web or inwardly-projecting plate 7, having its inner edges formed with cammed surfaces 8, 9, 10, 11, 12, 13, 14, and 31.

Standing on the base-plate 5 are two standards 15, in the upper portions of which the hollow trunnions 16 and 17 are respectively revolubly mounted. The trunnions 16 and 17 are rigidly attached to the respective ends of a drum 18, having four steam-feed ports 19 respectively communicating with the hollow trunnion 17, through which trunnion steam is fed to the engine. The drum 18 also has four steam-exhaust ports 20 communicating with the trunnion 16, whereby said trunnion serves to carry off the exhaust-steam. Three cylinders 21, 22, and 23 are rigidly joined to each other at their inner ends by a boxing 24, so that the cylinders will be disposed radially on the boxing and at equidistant points around a circle struck from the center of the boxing. The boxing 24 is mounted to turn freely on the drum 18, and the connection is made steam-tight by means of packing-glands 25, encircling the trunnions 16 and 17, respectively.

The rim 6, with its web or flange 7, encircles the cylinders and their coacting parts. Each cylinder carries a piston 26, to which rods 27 are respectively connected. The rods 27 are slidable through the heads of the respective cylinders, and each rod carries a cross-head 28 at its outer end. The cross-heads 28 respectively slide on parallel guide-bars 29, carried two on the head of each cylinder and projecting, respectively, outward from the cylinders. The cross-head 28 carries on its face an antifriction-roller 30. The rollers 30 run around the cammed edges of the web or flange 7, engaging successively the cams 8, 9, 10, 11, 12, 13, 14, and 31. Rigidly attached to one of the bearings 15 is a rim 32, having a cammed surface undulating in conformity with the undulations of the edge of the web or flange 7 and located inward from said edge. Running on the outer face of the rim 32 are antifriction-rollers 33, respectively carried on the cross-heads 28. The rollers 33, running on the rim 32, serve to move the rods 27 and their attached pistons outward, according to the position of the rollers on the rim 32, while the action of the rollers 30 on the flange or web 7 is in an opposite direction. By these coacting cams each piston is held positively to a fixed course of movement.

The inner end of each cylinder is provided with a port 34. The ports 34 are arranged in the same circumferential line as are also the ports 19 and 29, so that the port 34 of each cylinder registers successively with the ports 19 and 20, which latter ports are disposed alternately with relation to each other, so that each cylinder is first in engagement with a steam-feed port and next in engagement with a steam-exhaust port. Fixed to the trunnion 17 is an arm 35, to which a link 36 is pivoted. The link 36 is in turn pivoted to a lever 37, fulcrumed on the bearing 15, which carries the rim 32. The lever 37 has an operating-handle, whereby it may be shifted to turn the trunnions 16 and 17 and the drum 18 in the bearings 15. The lever 37 and the link 36

serve to hold the trunnions 16 and 17 and the drum 18 rigidly in the bearings 15, so that the cylinders and their attached parts may turn thereon. By means of the lever 37, however, the parts 16, 17, and 18 may be shifted axially to a slight degree, whereby to change the disposition of the ports 19, 20, and 34 with relation to each other, so that the engine will be reversed.

Steam being fed to the engine through the trunnion 17 enters the ports 19 of the drum 18. The arrangement of the ports is such that one port 34 is always in register with one port 19. When, therefore, steam expands within the ports 19, one cylinder will be filled and the piston 26 thereof will be forced outward. This causes the roller 30, which is attached to that piston that has been actuated, to engage with one of the cammed surfaces on the flange or web 7, whereupon the cylinders and the parts attached thereto will turn a partial revolution on the drum 18. This partial revolution of the cylinders will cause that port 34 which has been first registered with a port 19 to be moved into registry with an exhaust-port 20 and will bring the next port 34 into registry with a feed-port 19. This will cause the next cylinder to become charged with steam, whereupon the roller 30 of such next cylinder will be caused to act against one of the cammed surfaces on the web 7 and the cylinders will be given a further turn. This operation continues until the supply of steam is stopped. The reversal of the engine is effected by simply drawing the lever 37 to move the drum 18, as indicated in Figs. 3 and 4, whereupon the relation of the ports is changed and the rollers 30 act on the web 7 to turn the cylinders in an opposite direction. The rollers 30 serve no function in propelling the engine. They are means simply for returning the cylinders upon the exhaust thereof. To facilitate this, the head of each cylinder is provided with an orifice for the free circulation of air.

Power may be taken from the engine by a belt operating on the pulley 38, fixedly carried by the cylinders.

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

1. The combination with a base, two standards mounted on the base, a drum having two hollow trunnions, the trunnions being mounted in the standards and the drum having feed and exhaust ports respectively communicating with the trunnions, a boxing mounted to turn on the drum, a plurality of cylinders radiating from and rigidly secured to the boxing, the boxing having ports for the cylinders, such ports moving successively over the ports of the drum, a piston within each cylinder, a rod attached to each piston, the rods working through the outer heads of the cylinders, a cross-head attached to the outer end of each rod, two rollers carried by each cross-head, an interior cam surrounding the cylinders and having one roller of each cross-head working against the cam, a rim running concentrically with the cam and engaged by the remaining roller of each cross-head, an arm attached to one of the trunnions of the drum, a link pivoted to the arm, and a lever to which the link is also pivoted.

2. The combination of a base, two standards rising from the base, a drum having two hollow trunnions, the hollow trunnions being respectively mounted in the standards, the drum having inlet and outlet ports respectively communicating with the hollow trunnions, a boxing turning around the drum, cylinders carried by the boxing, pistons carried in the cylinders, an endless interior cam surrounding the pistons and from which the cylinders are driven, an arm attached to one of the trunnions, a link pivoted to the arm, and a lever fulcrumed on one of the standards and pivoted to the link.

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Witnesses:
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