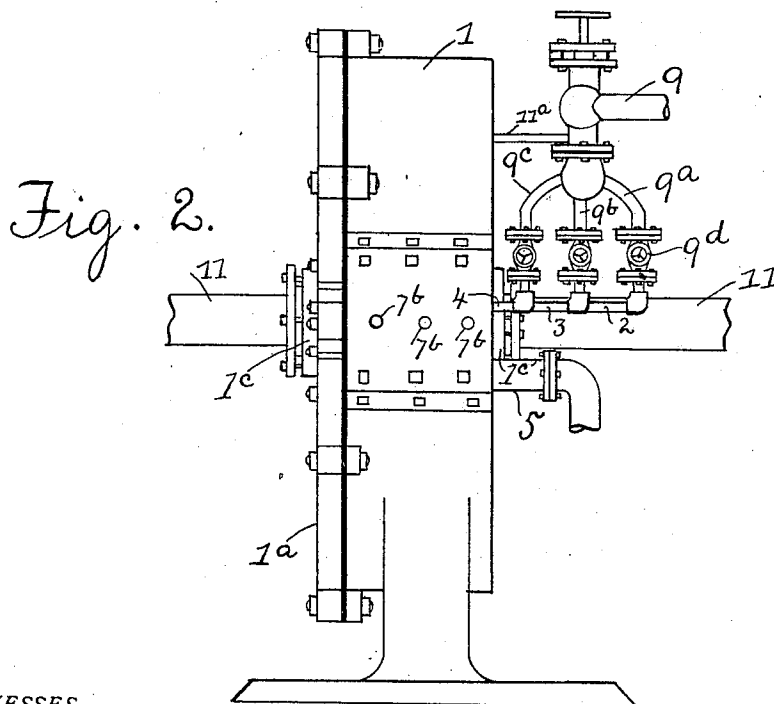
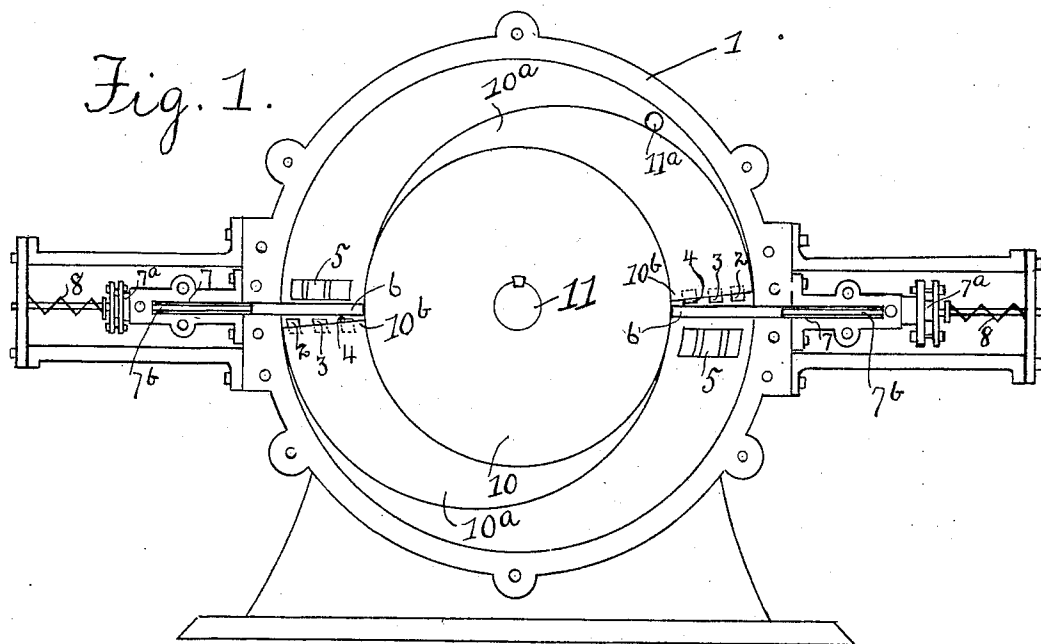


No. 832,190.

PATENTED OCT. 2, 1906.

J. S. HILLYER.  
ROTARY ENGINE.  
APPLICATION FILED DEC. 6, 1905.



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# UNITED STATES PATENT OFFICE.

JAMES S. HILLYER, OF DULUTH, MINNESOTA.

## ROTARY ENGINE.

No. 832,190.

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed December 6, 1905. Serial No. 290,566.

*To all whom it may concern:*

Be it known that I, JAMES S. HILLYER, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Rotary 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.

My invention relates to rotary engines, and has for its object the provision of a practical, simple, and economical engine in which when running the piston or pistons revolve. It consists of the constructions, combinations, and arrangements of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is an end elevation of said invention with the cover 1<sup>a</sup> of the piston-casing removed to disclose the pistons. Fig. 2 is a side elevation of said invention.

In the drawings, 1 is a piston-casing or steam-cylinder provided with steam-feed ports of any suitable number, as 2, 3, and 4, and exhaust-ports 5. Radially-disposed and radially-movable abutments 6 of any suitable number are provided in said casing and adapted to recede into the housings 7, which housings may constitute stuffing-boxes, or may be provided with stuffing-boxes 7<sup>a</sup>, through which the valve-stems 7<sup>b</sup> may extend. Any suitable means, as the springs 8, are provided for forcing said abutments into said cylinder into the paths of the hereinafter-described pistons. Said abutments preferably slide in grooves formed in the ends of said cylinder or casing. 9 is a steam-feed pipe, preferably branched, as at 9<sup>a</sup>, 9<sup>b</sup>, and 9<sup>c</sup>, in which latter construction one or more of said branches is provided with a separate or individual valve 9<sup>d</sup>, so that either or any of said ports 2, 3, or 4 may be separately closed. Within said casing is a piston-wheel 10, rigidly mounted on a power-shaft 11 and provided on its periphery with one or more rigidly-carried approximately semicrescent-shaped pistons 10<sup>a</sup>, the inner edges of which are concentric with the piston-wheel and the outer edges of which are eccentric thereto, extending at one end, as at 10<sup>b</sup>, from the periphery of the piston-wheel to the inside face of the cylinder and diminishing in depth gradually and circumferentially to zero at a suitable point on the piston-wheel, as at 10<sup>c</sup>.

Said power-shaft extends through suitable bearings or stuffing-boxes 1<sup>c</sup>, formed or mounted on said casing, and said shaft is, in any suitable manner, at its outer end or ends coupled to or engaged with any suitable machinery (not shown) which it may be desired to operate. If desired, a normally closed steam-feed port or ports may be provided, as at 11<sup>a</sup>, through which steam may be allowed to enter said cylinder to start said engine, when said pistons, if ever, stop in such position as to cover all the ports 2, 3, and 4.

In operation, the engine being started and the pistons turning in the direction of the arrow, said pistons gradually force the abutments to recede into their housings until the broad ends of the pistons pass their abutments, whereupon said abutments are again quickly thrust into the cylinder upon the zero end of the respectively succeeding pistons. The relative preceding pistons now pass and uncover the feed-ports 2, 3, and 4, either or all of which may be open, as desired. If only the ports 4 are open, the load of the engine being then assumed to be light, steam will be admitted only for an exceedingly brief period or until, as will be obvious, the shallow end of the following piston closes it. Thereafter the pressure will be from the cylinder-contained expanding steam only. If the ports 3 are also open, they will continue to admit steam after the ports 2 are closed; but upon being closed themselves by the following piston there will still remain a period in which pressure upon the preceding piston will be by the cylinder-contained steam only. If, however, the ports 2 are also open, as when the load on the engine is heavy, direct boiler-pressure of steam will be exerted upon the preceding piston approximately until said preceding piston uncovers the corresponding exhaust-port. Said piston-wheel is preferably concaved intermediate of its axis and its periphery or the inner arcs of the pistons to lessen friction.

The engine thus described is not reversible; but in order to secure a reversing movement I mount a similar or second engine (not shown) on the same power-shaft, except that the pistons of the second engine face in the opposite direction from those of the first said engine and the steam feed and exhaust ports of the second engine are on respectively opposite sides of the abutments to those of the first said engine. Now by arbitrarily withdrawing the abutments of the second engine

into their housings and locking them there and closing the ports of said second engine the first said engine can turn said shaft in one direction, and by arbitrarily withdrawing the abutments of the first said engine into their housings and locking them there and closing the ports of the first said engine (said second engine) can turn said shaft in the reverse direction.

10 Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a rotary engine, the combination of a piston casing or cylinder, provided with a radially-movable abutment and having power-supply ports at one side of said abutment and an exhaust-port at the other side thereof, a central power-shaft extending through said cylinder, a piston-wheel mounted on said shaft and adapted to rotate the same and of less radial diameter than said casing, a piston rigidly carried by said wheel and extending at one end from said wheel to the inner face of the periphery of the casing and gradually diminishing in depth from said end to zero at said wheel at its opposite end, means for arbitrarily controlling the power-supply through said power-supply port, and means for forcing said abutment inward against the periphery of said piston.

2. In a rotary engine, the combination of a piston casing or cylinder provided with a radially-movable abutment and having an exhaust-port at one side of said abutment and two or more radially-disposed power-supply ports at the opposite side of said abutment, a power-shaft extending through said cylinder, a piston-wheel mounted on said shaft and adapted to rotate the same and carrying a rigid piston on its periphery, which piston extends at one end from said wheel to the inner face of the periphery of said cylinder and gradually diminishes in depth from said end

to zero at its other end at said wheel, means adapted to force said abutment inward against the periphery or outer edge of said piston, and means for controlling the admission of power-supply through each of said supply-ports separately.

3. In a rotary engine, the combination of a cylinder, a radially-movable abutment or abutments adapted to extend through the periphery of said cylinder, a housing or stuffing box or boxes on said casing for said abutment or abutments, said casing having an exhaust port or ports formed therethrough at one side of said abutment or abutments and a power-supply port or ports formed therethrough at the other side of said abutment or abutments, and a secondary power-supply port or ports formed therethrough at a point or points beyond the first power-supply port or ports on the same side of said abutment or abutments as the first said power-supply port or ports, a power-shaft extending through said cylinder, a piston-wheel mounted upon said power-shaft and adapted to rotate the same, a piston or pistons rigidly carried by said wheel on its periphery and extending at one end from said wheel to the inner face of the periphery of said cylinder and gradually diminishing in depth to zero at its or their opposite end or ends at said wheel, means for forcing said abutment or abutments inwardly against the outer edge or edges of said piston or pistons, and means for controlling the admission of power-supply through the first said supply-ports and the said secondary supply-ports separately.

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

JAMES S. HILLYER.

Witnesses:

JAMES T. WATSON,  
W. H. SMALLWOOD.