A. BORRÁS & F. IRIARTE.

ROTARY STEAM ENGINE.

APPLICATION FILED MAR. 1, 1916.

1,220,173.

Patented Mar. 27, 1917.

2 SHEETS—SHEET 1.

Fig. 2.

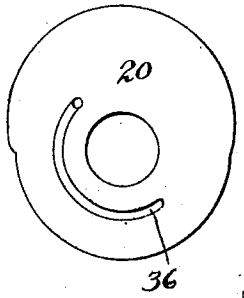


Fig. 2

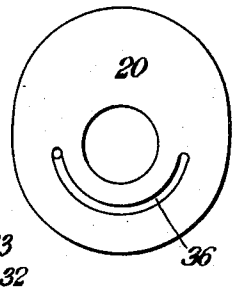


Fig. 1

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2 SHEETS—SHEET 2.

Fig. 3

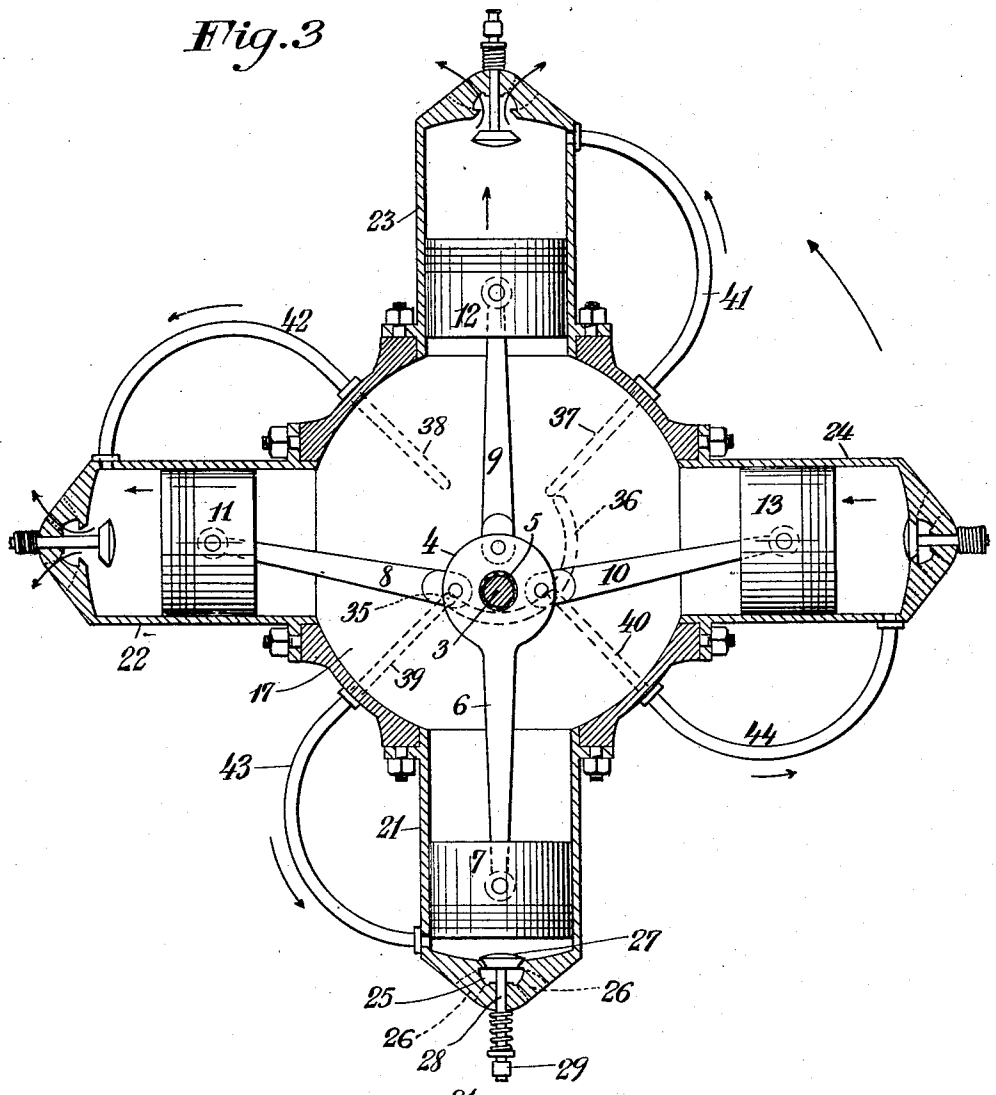
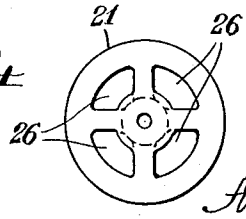


Fig. 4



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UNITED STATES PATENT OFFICE.

ANTONIO BORRÁS AND FERNANDO IRIARTE, OF BUENOS AIRES, ARGENTINA.

ROTARY STEAM-ENGINE.

1,220,173. Specification of Letters Patent. Patented Mar. 27, 1917.

Application filed March 1, 1916. Serial No. 81,318.

To all whom it may concern:

Be it known that we, ANTONIO BORRÁS and FERNANDO IRIARTE, citizens of the Republic of Portugal and Argentina, respectively, and both residents of the city of Buenos Aires, Argentina, have invented certain new and useful Improvements in Rotary Steam-Engines, of which the following is a specification.

Our invention relates to an improvement in rotary steam engines and has as its object the provision of an economical and efficient source of power as will appear in the following specification:

We shall describe our invention with reference to the accompanying drawings, which illustrate one way of practising the same, the features thereof being more particularly pointed out hereinafter in the claims.

In the drawings, Figure 1 is a vertical sectional view of an engine illustrating our invention; Fig. 2 is a plan view of the steam control and exhaust actuating cam detached; Fig. 3 is a vertical sectional view of the engine, removed from the standards, along the line A—B of Fig. 1, parts being omitted and Fig. 4 is a top plan view of one of the exhaust ports on a slightly enlarged scale.

Similar numerals of reference indicate similar parts throughout the several views.

1 indicates a fixed bearing mounted on standards 2, 2 and having an offset or eccentric portion 3 intermediate its ends. 4 indicates a plate or disk revolubly mounted on eccentric portion 3 of fixed bearing 1, ball bearing 5 being interposed between said disk and bearing to lessen friction. Disk 4 carries a piston rod 6, preferably integral therewith, pivotally connected to piston head 7. 8, 9 and 10 respectively indicate piston rods pivotally connected to disk 4, piston rods 6, 8, 9 and 10 being respectively located as to their points of attachment to disk 4 equidistant from each other. Piston rods 8, 9 and 10 are pivotallv connected at their outer ends to piston heads 11, 12 and 13 respectively. 14 indicates a plate revolubly mounted on bearing 1 between collars 15 and 16, and 17 indicates a second plate revolubly mounted on bearing 1 on the opposite side to plate 14 and provided with a hub 18 surrounding bearing 1. 19 indicates a spring on bearing 1 normally tending to urge the outer face of plate 17 against the inner face of fixed cam plate 20 carried by standard 2. 21, 22, 23 and 24 indicate piston cylinders bolted respectively to plates 14 and 17. Each of said cylinders is provided at its outer end with an exhaust port 25 communicating outwardly through channels 26 (Fig. 4). Exhaust ports 25 are adapted to be controlled by valves 27 carrying stems 28 projecting outwardly through the ends of the cylinders and are actuated to be opened by rock arms 29 pivoted in bearings 30 on the respective cylinders, the rock arms being in turn actuated by rods 31 pivoted at one end to one end of the rock arms and carrying a roller 32 at the other end bearing against the face of cam plate 20 and urged against said face by spring 33. 34, 34 indicate ball bearings for lessening friction. 35 indicates a pipe for conducting steam under pressure from a suitable source (not shown) through cam plate 20 to channel 36 cut in the inner face of the cam plate. Channel 36 as shown (Fig. 2) extends but a portion of the distance across said face preferably less than half a circle, for the purpose hereinafter set forth. 37, 38, 39 and 40 respectively indicate conduits in plate 17, diametrically opposite each other, and communicating respectively with pipes 41, 42, 43 and 44 carried by plate 17 and the respective cylinders and in turn communicating with said cylinders at the outer ends thereof. 45, 45 indicate secondary or branch conduits from each of said main conduits 37, 38, 39 and 40 respectively for exerting steam pressure on packing rings 46 seated in channels in the outer face of plate 17 and in which channels the rings have a slight in and out play. The inner faces of packing rings 46 are provided with a groove or channel 47 extending throughout their length in communication with secondary or branch conduits 45 so that steam pressure may be evenly exerted against the packing rings at all points, to force the same against the inner face of cam plate 20 and thus prevent the escape of steam between plate 17 and cam plate 20. 48 indicates a pulley bolted or otherwise secured to the outer face of plate 14. It will be noted that the length of channel 36 is such that (Fig. 3) it will be normally in communication with but two of adjacent conduits 37, 38, 39 and 40 at the same time, while it will be in communication with three of them just as it leaves one and reaches the next but one.

The operation of the device as illustrated is as follows: Assuming the starting position to be that shown in Fig. 3, wherein

steam pipe 35, through channel 36 is in communication with conduits 39 and 40 and thence through pipes 43 and 44 respectively with steam cylinders 21 and 24, piston head 7 being at its outward limit of movement, piston head 13 having started on its return, piston head 12 just beginning its outward stroke, and piston head 11 having started on its outward stroke, the exhaust ports of cylinders 22 and 23 being open and the engine rotating in the direction of the arrow (Fig. 3).

The resultant of the upward stroke of piston 7 and the inward stroke of piston 13 drives the engine in the direction of the arrow or anti-clockwise. In the rotation of the engine, cylinder 21 will receive steam until it comes nearly into the position of cylinder 23 and just before cylinder 21 passes out of communication with steam channel 36, cylinder 22 passes into communication with said steam channel through pipe 42 and conduit 38. The piston in cylinder 22 has now reached its limit of outward movement corresponding to the position of piston 7 in cylinder 21 as shown in the drawing. The face of cam plate 20 is so adjusted relative to the exhaust that as cylinder 21 in its rotation passes out of communication with steam channel 36 its exhaust will open and remain open until it reaches almost the position shown in the drawing when it will close preparatory to the admission of steam again. The operation of the engine will be obvious without further description. The result of the successive operations described will be to drive the engine in the direction of the arrow.

It is obvious that the details of arrangement and of construction as shown may be greatly varied without departing from the spirit of our invention and we do not restrict ourselves to such details further than the scope of the accompanying claims demands.

We claim:

1. In a rotary steam engine a shaft, an eccentric portion thereon, a plurality of piston rods rotatably mounted on said eccentric portion, rotatable plates on said shaft adjacent said eccentric portion, cylinders carried by said plates, pistons carried by said piston rods adapted to work in said cylinders, steam conduits to each of said cylinders, a fixed cam plate provided with a channel in its inner face normally in communication with two adjacent steam conduits, a steam inlet through said cam plate to said channel and means for exhausting said cylinders controlled by said cam plate.

2. In a rotary steam engine a shaft, an eccentric portion thereon, a plurality of piston rods rotatably mounted on said eccentric portion, rotatable plates on said shaft adjacent said eccentric portion, cylinders carried by said plates, pistons carried by said piston rods adapted to work in said cylinders, steam conduits to each of said cylinders, a fixed cam plate provided with a channel in its inner face normally in communication with two adjacent steam conduits but adapted to come into communication with a third conduit before passing out of communication with the rearmost conduit of said two adjacent conduits, a steam inlet through said cam plate to said channel and means for exhausting said cylinders controlled by said cam plate.

3. In a rotary steam engine, rotating cylinders, steam conduits thereto and rotating therewith, a fixed plate provided with a channel in its face normally in communication with two adjacent steam conduits and a steam inlet through said plate to said channel.

4. In a rotary steam engine, rotating cylinders, steam conduits thereto and rotating therewith, a fixed plate provided with a channel in its face normally in communication with two adjacent steam conduits but adapted to come into communication with a third conduit before passing out of communication with the rearmost conduit of said two adjacent conduits and a steam inlet through said plate to said channel.

5. In a rotary steam engine, rotating cylinders, steam conduits thereto and rotating therewith, a fixed cam plate provided with a steam channel in its face in communication with at least two adjacent steam conduits, a steam inlet through said plate to said channel and means for exhausting said cylinders controlled by the cam surface of said cam plate.

In testimony whereof we have signed this specification.

ANTONIO BORRÁS.
FERNANDO IRIARTE.

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