E. J. M. MADERO.

ROTARY ENGINE.

APPLICATION FILED MAY 17, 1912.

1,048,844.

Patented Dec. 31, 1912.

2 SHEETS—SHEET 1.

FIG. 1.

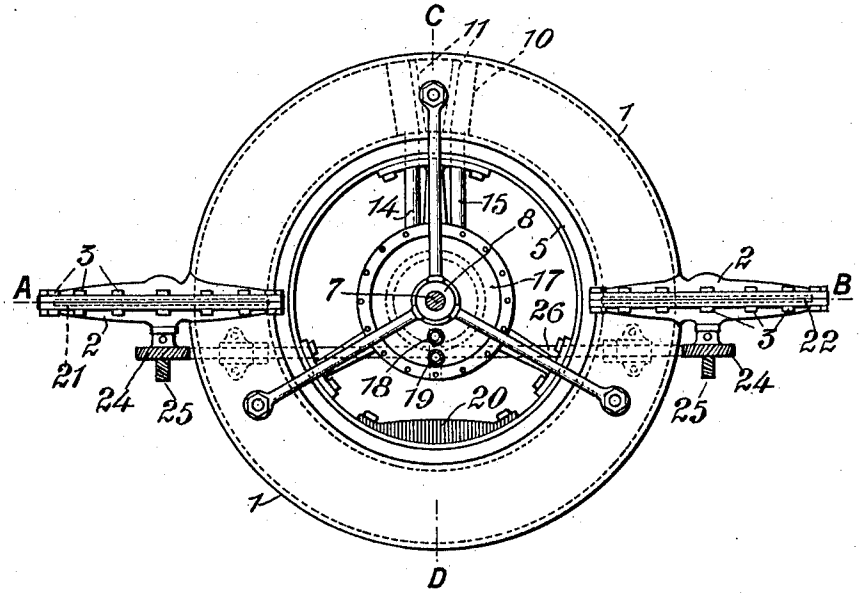

FIG. 2.

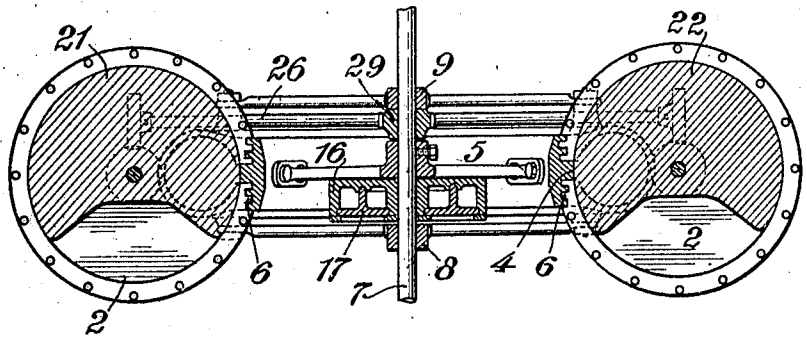

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FIG. 3.

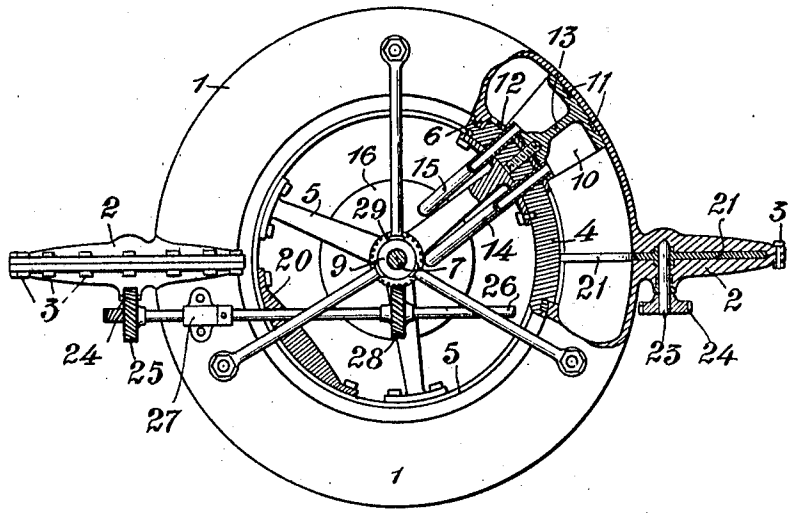
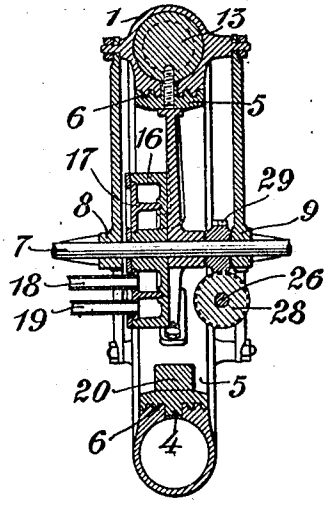


FIG. 4.



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UNITED STATES PATENT OFFICE.

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ROTARY ENGINE.

1,048,844. Specification of Letters Patent. Patented Dec. 31, 1912.

Application filed May 17, 1912. Serial No. 697,912

To all whom it may concern:

Be it known that I, EDUARDO JOSE MARIA MADERO, a citizen of the Argentine Republic, residing at Buenos Aires, Argentina, have invented certain new and useful Improvements in Rotary Engines, in which the following is a specification.

The present invention relates to rotary engines and is distinguished by the fact that none of the parts effect reciprocal rectilineous movements and that the admission and exhaust of energy initiate their action at the plunger; owing to this circumstance, the engine has no dead center and a reversal is readily obtained, in any position and direction of stroke of the plunger, by merely reversing the circulation of energy in the respective passages by means of a common distribution chamber.

The invention comprises a chamber formed by two hollow semi-circular parts so joined together that they will form a perfect circle. At each point of union, said parts have a plate provided with a circular recess and when the plates are joined, said recesses form two cavities at two diametrically opposed points; within said cavities are fitted the obturating disks, the motion of which is simultaneous and is effected by means of a set of helical gears actuated by a central shaft to which movement is imparted from the plunger.

The movement of the obturating disks is such that, when the engine is running in either direction one disk will not commence to open the port of the chamber, in order to give passage to the plunger, until the other has entirely closed the same at the opposite point. Thus one or the other of the said obturating disks obturates at the corresponding side of the opening or port of the circular chamber. This circumstance, together with the fact that the point of admission and exhaust of energy is situated within the rotary plunger, allows of the engine to yield a constant and invariable amount of force during its entire stroke or revolution, presuming, of course, that the admission of energy takes place without interruption. If it be desired, however, to have the engine working by taking advantage of expansion, it will be necessary to interrupt the admission of energy at the required instant by means of an obturating device combined with the motion of the plunger.

The plunger is conveniently secured to a fly wheel provided with circular grooves and webs which engage with annular grooves formed at each side of the central opening of the chamber in order to obtain a perfect fitting between the chamber, and the fly wheel. Steam under high pressure may be caused to circulate through said grooves for the purpose of considerably decreasing friction.

In the accompanying drawings forming part of the specification: Figure 1 is a side elevation of a rotary engine, constructed according to my invention. Fig. 2 is a horizontal section view of the same, on the line A—B of Fig. 1. Fig. 3 is a side elevation, partially in section, opposite to that of Fig. 1. Fig. 4 is a sectional elevation on the line C—D of Fig. 1.

In said drawings, 1 indicates hollow semi-circular casings, provided with flange plates 2 which are connected together by means of the bolts 3, said casings constituting an annular chamber. This casing has a slot in its inner periphery which is closed by a circular projection or boss 4 formed on a fly wheel 5, a perfect joint between the fly wheel and casing being obtained by means of webs and circular grooves 6, formed in the periphery of the fly wheel and in the casing on each side of the said slot. By means of this arrangement, the casing itself forms a bearing in which the fly wheel rotates and in order to avoid any possible yielding or shifting of the wheel which would be caused at a certain stage of the working of the engine by the pressure exerted at definite portions of the chamber, the shaft 7 which is driven by the fly wheel, is maintained in position by means of bearings 8 and 9, firmly secured at each side of the casing by means of radial arms suitably fixed to the same.

To the circular boss of projection 4 is conveniently secured a plunger or piston 10 which has keyed onto its periphery two rings 11 the width of which are somewhat greater than the thickness of the obturating disks hereinafter described. A plate 12 is inserted between the circular projection 4 and the plunger 10 and not only serves to guide the latter, but also serves to perfectly close the chamber at the point of union between the plunger and the flywheel.

As shown in Fig. 3, the plunger is divided transversely by a partition 13 which forms

the faces against which the energizing medium acts. Passing through the inner periphery of the plunger and at each side of said partition 13, are ducts 14 and 15, for the admission and exhaust of said medium according to the direction in which the engine is running. Said ducts or passages communicate with supply and exhaust pipes 18, 19, through the respective channels of a distribution chamber 16, which rotates with the fly wheel and which bears at its fore part a stationary cover 17, through which said pipes project. This permits of disposing within the plunger itself the ports for the admission and exhaust of the medium, notwithstanding the rotatory motion of the plunger.

A counterweight 20 is fixed to the fly wheel to counterbalance the weight of the plunger, at the point opposite to the center and to cause a rotary movement to take place without eccentricity and therefore without giving rise to vibration.

The flange plates 2, when connected, form recesses in which are movably mounted the obturating disks 21 and 22. Said disks are arranged diametrically opposite at each side of the chamber and are fixed to respective shaft 23 driven by helical gear wheels 24. Both wheels are driven in the same direction by other similar wheels 25, mounted on a common shaft 26 maintained in position by bearings 27 and driven by helical gear wheel 28 which gears with a similar wheel 29 of the same diameter fixed to the main shaft 7. By means of this arrangement the number of revolutions made by the plunger is exactly the same as that of the disks. The relation between the plunger and the disks is such, that in either direction of running of the engine, at the instant in which the plunger is going to pass the point where one of the disks is situated, this latter will present its cut out part before the opening of the chamber and will therefore permit the passage of the plunger, while the opposite disk will keep said opening closed until, at its turn, it arrives at the stage to leave the same open.

The working of the engine is as follows: Supporting the engine to be in the position shown in Fig. 1, which as will be seen by referring also to Fig. 2, is precisely the instant in which the chamber is closed at both parts by the disks 21 and 22, it follows that if an energizing agent is admitted through the passage 14, the passage 15 be left open for exhaust, pressure will be exerted against the disk 21 and the corresponding face of the partition 13, by which the motion of the plunger is initiated and continued toward the right. If the energizing agent be admitted through the passage 15, the motion will be in the reverse direction.

Owing to the form in which the movement of the obturating disks is combined with that of the plunger and to the fact that the admission and exhaust of energy have their initial point of action at the said plunger, the engine has no dead center in any position in which motion is started or reversed.

It is clear that all movements of the engine being rotatory, the latter may work at a low or high rate of speed, without causing vibration and without any of its parts being exposed to fracture such as are caused by speed in engines of other types.

As hereinbefore stated, the motive power developed by the engine is constant during the entire revolution or stroke of the plunger if the admission of energy be carried out without interruption. When it is desired to have the engine work partially by energy and partially by expansion of the same, it will be necessary to obturate the admission duct at the convenient moment which may be readily done by means of any valve device, acted upon by the engine. Steam pressure or that produced by the combustion of gases, may be used for working the engine.

I claim:

1. A rotary engine comprising an annular piston chamber, a piston revoluble therein, rotatable obturating members at opposite points of the chamber, a shaft mounted axially of the chamber connected with and rotated by said piston, a shaft mounted transversely of the axial shaft, and gearing connecting the transverse shaft to the disks and to the axial shaft to actuate said members.

2. A rotary engine comprising an annular piston chamber, a piston revoluble therein, rotatable obturating members at opposite points of the chamber, a shaft mounted axially of the chamber connected with and rotated by said piston, a shaft mounted transversely of the axial shaft and gearing connecting the transverse shaft to the disks and to the axial shaft, adapted to impart a complete rotation of the members at each revolution of the piston.

3. A rotary engine comprising an annular piston chamber, a piston revoluble therein, radial obturating disks mounted in the chamber at opposite points and having openings for the passage of the piston, a shaft mounted axially of the chamber connected with and rotated by the piston, actuating shafts carrying said disks, and a shaft mounted transversely of the axial shaft geared to the latter and to the actuating shafts.

4. A rotary engine comprising an annular piston chamber, a piston revoluble therein, radial obturating disks mounted in the chamber at opposite points and having openings for the passage of the piston, a shaft mounted axially of the chamber connected

with and rotated by the piston, actuating shafts carrying said disks, worms on the actuating shafts, a shaft mounted transversely of the axial shaft, worms on the transverse shaft meshing with the aforesaid worms, and a worm on the axial shaft intermeshing with a worm on the transverse shaft.

Signed at Buenos Aires, Argentina, this 26th day of March, 1912.

EDUARDO JOSE MARIA MADERO.

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