No. 707,003. Patented Aug. 12, 1902.

J. P. POLLARD.

ROTARY ENGINE.

(Application filed Jan. 7, 1902.)

(No Model.) 2 Sheets—Sheet 1.

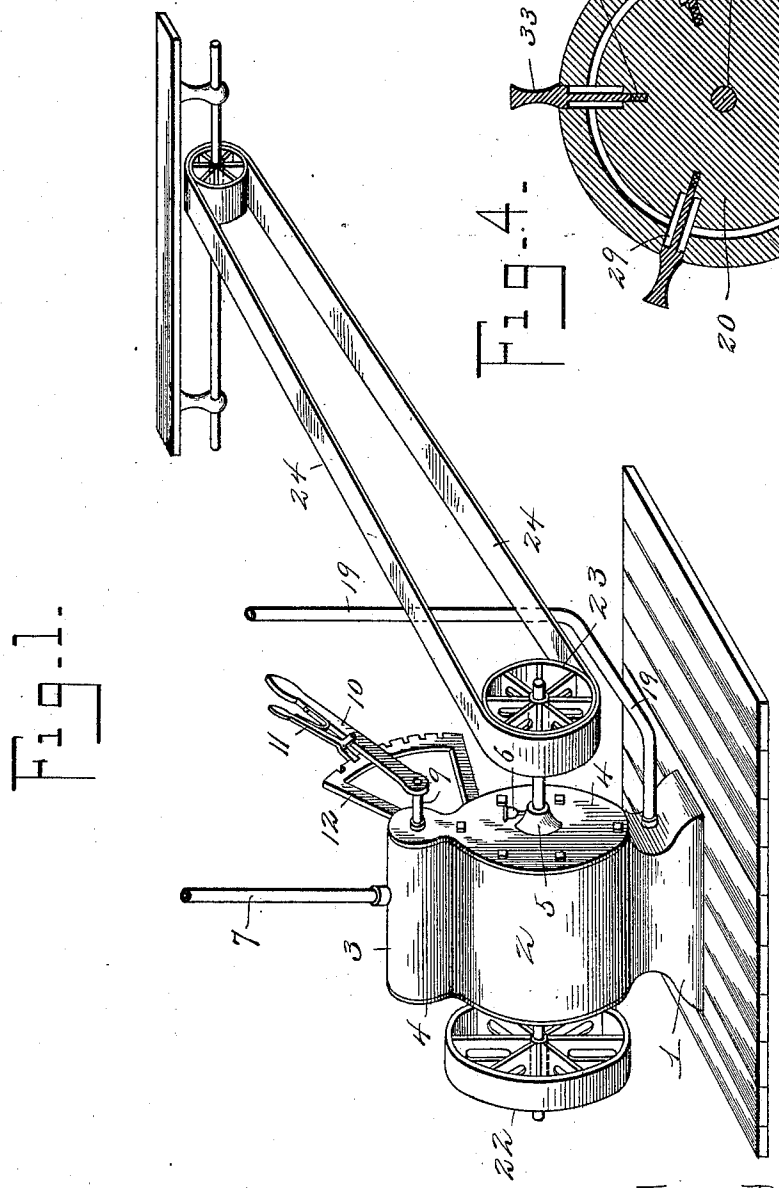


Fig. 1.

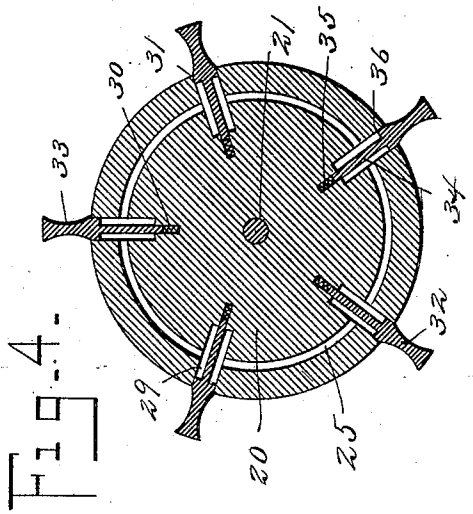


Fig. 4.

Witnesses

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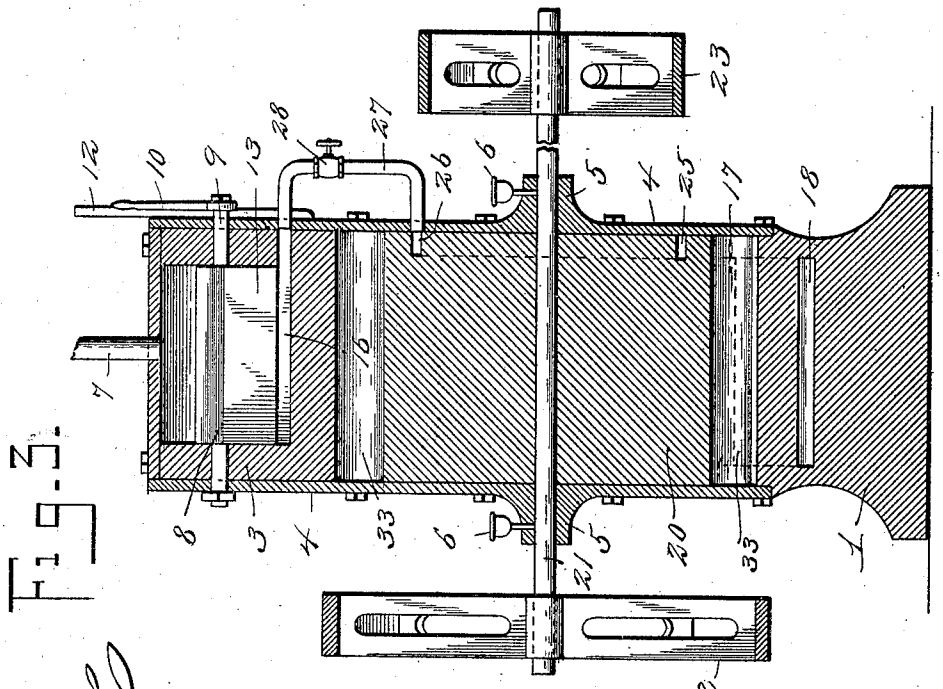


Fig. 2.

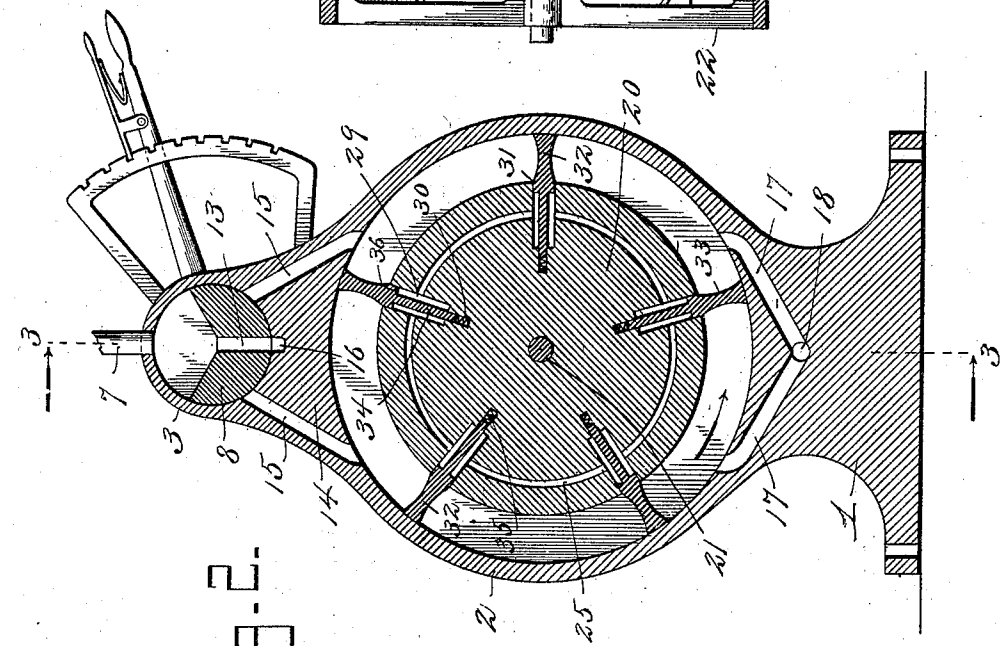


Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES PERCY POLLARD, OF SILVERLAKE, WASHINGTON.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 707,003, dated August 12, 1902.

Application filed January 7, 1902. Serial No. 88,791. (No model.)

To all whom it may concern:

Be it known that I, JAMES PERCY POLLARD, a citizen of the United States, residing at Silverlake, in the county of Cowlitz and State of Washington, have invented new and useful Improvements in Rotary Engines, of which the following is a specification.

This invention relates to rotary engines of that class embodying a concentric rotary piston; and one object of the same is to simplify the construction of this class of devices and render them efficient in operation by equalizing the dimensions of the several steam-receiving compartments established through the medium of wings automatically projectible from the piston and held in regular or positive contact with the wall of the piston-chamber and also to exhaust the several steam-compartments in succession in such manner that the least interference with the rotation or obstruction to said rotation of the piston will be obviated and a regularity of actuation of the drive-shaft ensue.

A further object of the present improvement is to provide means in connection with the piston whereby steam or other motive medium under pressure may be utilized to project the wings carried by the piston and regularly maintain said projection throughout the whole series of wings employed.

With these and other objects and advantages in view the invention consists in the construction and arrangement of the several parts, which will be more fully hereinafter described and claimed.

In the drawings, Figure 1 is a perspective view of a rotary engine embodying the features of the invention and shown applied in operative position, the exterior construction and arrangement being fully disclosed by this view. Fig. 2 is a transverse vertical section of the improved engine. Fig. 3 is a longitudinal vertical section of the same. Fig. 4 is a detail transverse sectional view of the piston and wings carried thereby.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The numeral 1 designates a base of any suitable form adapted to be secured to a foundation, such as flooring, as shown, and supported by said base is a cylindrical shell or casing 2, continued into an upper shell or casing 3, forming a steam-chest. The steam-chest formed by the shell or casing 3 is of a length equal to that of the shell or casing 2, the latter providing the piston-chamber, and both shells or casings are covered at their terminals by opposite heads or plates 4, the said heads being suitably bolted or otherwise secured to the parts with which they engage, and in the center of the portions thereof covering the ends of the shell or casing 2 bearings 5 are formed having suitable gravity or other lubricators 6.

Connecting with the top of the steam-chest is a feed-pipe 7, and in said chest is a rotary throttle or valve 8, having a stem 9, to which a lever 10 is attached and carries a locking-dog 11 to coöperate with a toothed segment 12, whereby the throttle or valve 8 may be maintained in the adjusted position desired. The said valve 8 is formed with a central slot 13, and in the web 14, between the piston-chamber and the chest, divergent ports 15 are formed and are adapted to connect the said chest and piston-chamber, a third port 16 being also formed in the web at a point intermediate of the ports 15 and opening out through one side of the engine structure, as clearly shown by Fig. 3, for a purpose which will be presently set forth. The slot or port 13 in the throttle or valve 8 is adapted to be thrown into communication with either of the ports 15 or the port 16, the ports 15 communicating with the upper portion of the piston-chamber and having such angle in relation to the latter as to be most effective in delivering the motive agent into said chamber to actuate the piston in reverse directions. In the base 1 are upwardly-extending divergent exhaust-ports 17, which communicate with the lower portion of the piston-chamber at points a considerable distance from each other in order to be effective in exhausting the motive agent from the several compartments formed by the piston and its related parts in conjunction with the wall of the piston-chamber. As will be obvious, the said ports 17 will tend to relieve the motive agent completely from the several compartments into which it is introduced in regular succession even after the first entrance to the nearest exhaust-port is reached, and if any

of the motive agent still remains in any one of the compartments it will be permitted to escape when the second exhaust-outlet is reached. In referring to the first and second exhaust-outlets it will be understood that those are meant which are first traversed and which will be regulated by the direction of rotation of the piston. The exhaust-ports 17 both converge to a lower common outlet 18, which has an exhaust-pipe 19, connected thereto and extended away from the engine to any suitable point.

Within the piston-chamber is a concentric rotary piston 20, fixed to a shaft 21, extending through the bearings 5, and on one end said shaft has a balance-wheel 22 and on the other end or extremity a drive-pulley or belt-wheel 23, which is adapted to be engaged by a belt 24 for driving or actuating suitable mechanism, such as a line of shafting, as shown by Fig. 1. The piston 20 is of such diameter relatively to the diameter of its chamber that ample space will exist between the circumference of the piston and the wall of the piston-chamber for practically producing successive compartments for the reception of the motive agent, and to prevent leakage either one or both of the opposite ends of the piston will be supplied with packing-rings of any approved nature and which have not been shown, as they are well understood by those skilled in the art and utilized for similar purposes. The piston is formed with an annular chamber 25, having an inlet 26 at one end of the piston, as clearly shown by Fig. 3, and connecting said inlet and the port 16 is a supply-pipe 27, having a suitable valve 28. The piston 20 is also formed with a series of radial pockets 29, opening out through the periphery thereof, the inner terminals of the said pockets communicating with slots 30, which are also radially disposed. In the pockets 29 wings 31 are movably mounted and comprise heads 32, with opposite concave faces 33 and blades 34 of materially less thickness than the heads and having portions thereof normally located in the slots 30, coil or similar springs 35 being located in said slots and bearing against the inner edges of the blades to normally hold the wings outwardly. By the differentiation of thickness between the blades and heads abutments or shoulders 36 are formed on opposite sides of each blade, the pockets 29 being wide enough to compensate for the greater thickness of the heads 32, and by this means the pockets are divided into opposite small chambers which are in direct communication with the annular chamber 25.

Before the rotary engine, heretofore set forth, is in condition for practical operation it is necessary that a portion of the motive agent be permitted to pass from the chest to the chamber 25 and from the latter to the divided pockets 29 for engagement with the shoulders 36 to positively and reliably throw out the wings 31, so that the outer terminals of their heads 32 will be held in firm engagement with the wall of the piston-chamber to avoid leakage of the contents of one compartment, which is formed between each pair of wings, and the next adjacent compartment or compartments. To permit the motive agent to pass into the chamber 25, the throttle or valve 8 is turned until the slot 13 therein coincides and communicates with the port 16, and from the latter port the said motive agent passes through the supply-pipe 27 into the inlet 26 of the said chamber 25. As the motive agent enters the annular chamber 25 it expands or flows into the divided pockets, and by this means the pressure or force exerted on the wings is equalized in all the pockets, and as a consequence the wings will be projected equally. The pressure in the annular chamber 25 and the several pockets will be maintained by augmenting the supply of the motive agent when found necessary; but the admission of the motive agent to the said annular chamber and pockets will only be required at long intervals, and the engine need not be stopped except at stated periods to arrive at this result. It will be seen that after the steam or other motive agent passes through the left port 15, as shown by Fig. 2, the piston 20 will be revolved in the direction of the arrow and the compartments between the several wings will be successively filled with the motive agent and exhausted through the ports 17. The concave faces 33 of the heads 32 assist in practically holding the motive agent and facilitate the actuation of the piston by producing a more effective impact, and as in analogous engines the successive charges of the motive agent entering the compartments in its unimpaired strength or force will overcome any tendency of the piston to lag or vary in its rotation.

A further advantage resulting from the improved construction is that springs, which are unreliable and variable, are not depended upon to maintain the wings in projected position, the springs 35 acting solely to initially project the said wings into operative position and do not serve to hold the wings in that close contact with the wall that is necessary to form tight compartments.

If the throttle or valve 8 is turned so that the opening or slot 13 therethrough coincides with the right port 15, as shown by Fig. 2, the piston will be reversed, as will be obvious to any one skilled in the art to which this invention pertains. It is also proposed to apply packing-rings and packing devices at all points found necessary, and the wings will be supplied with such packings as are found necessary to maintain them in motive-tight relation to the parts with which they engage without in the least impeding their operation.

Different motive agents can be employed in operating the improved engine, and the latter may be used for driving various kinds of machinery. In view of the precaution taken to avoid leakage of the motive agent

from the compartments a greater power and regularity of rotation of the piston will result.

Having thus fully described the invention, what is claimed as new is—

1. In a rotary engine, the combination of a shell or casing, a piston concentrically mounted therein and having an annular chamber communicating with radial pockets, wings mounted in the said pockets and having abutments and blades dividing said pockets and movably extending into the body of the piston at a distance inward from the inner terminals of the pockets, and means for supplying a motive agent to the said chamber and the compartments formed between the wings.

2. In a rotary engine, the combination of a shell or casing comprising a piston-chamber and a chest for the reception of the motive agent, the chest having ports communicating with the piston-chamber and the latter also provided with exhaust-ports, a piston concentrically mounted in the said piston-chamber and having an annular steam-chamber inwardly from the periphery thereof and communicating with radial pockets opening outwardly through the periphery of said piston to receive a motive agent, a valve in the chest, and wings radially mounted in the piston and held projected by the motive agent and provided with means confined within the pockets for engagement by the motive agent entering the latter from the said annular chamber.

3. A rotary engine having a piston with an annular chamber and radial pockets in communication with said chamber, wings mounted in said pockets and having portions dividing the latter, and means for introducing a portion of the motive agent to the said chamber and divided pockets.

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

J. PERCY POLLARD.

Witnesses:
F. G. BARNES,
JOS. O'NEILL.