No. 704,913. Patented July 15, 1902.

# F. A. PALLÉ.

## ROTARY ENGINE.

(Application filed Jan. 11, 1902.)

(No Model.)

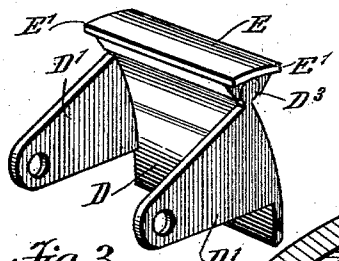



Fig. 3.

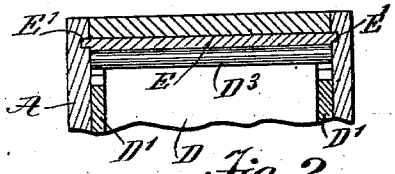



Fig. 2.

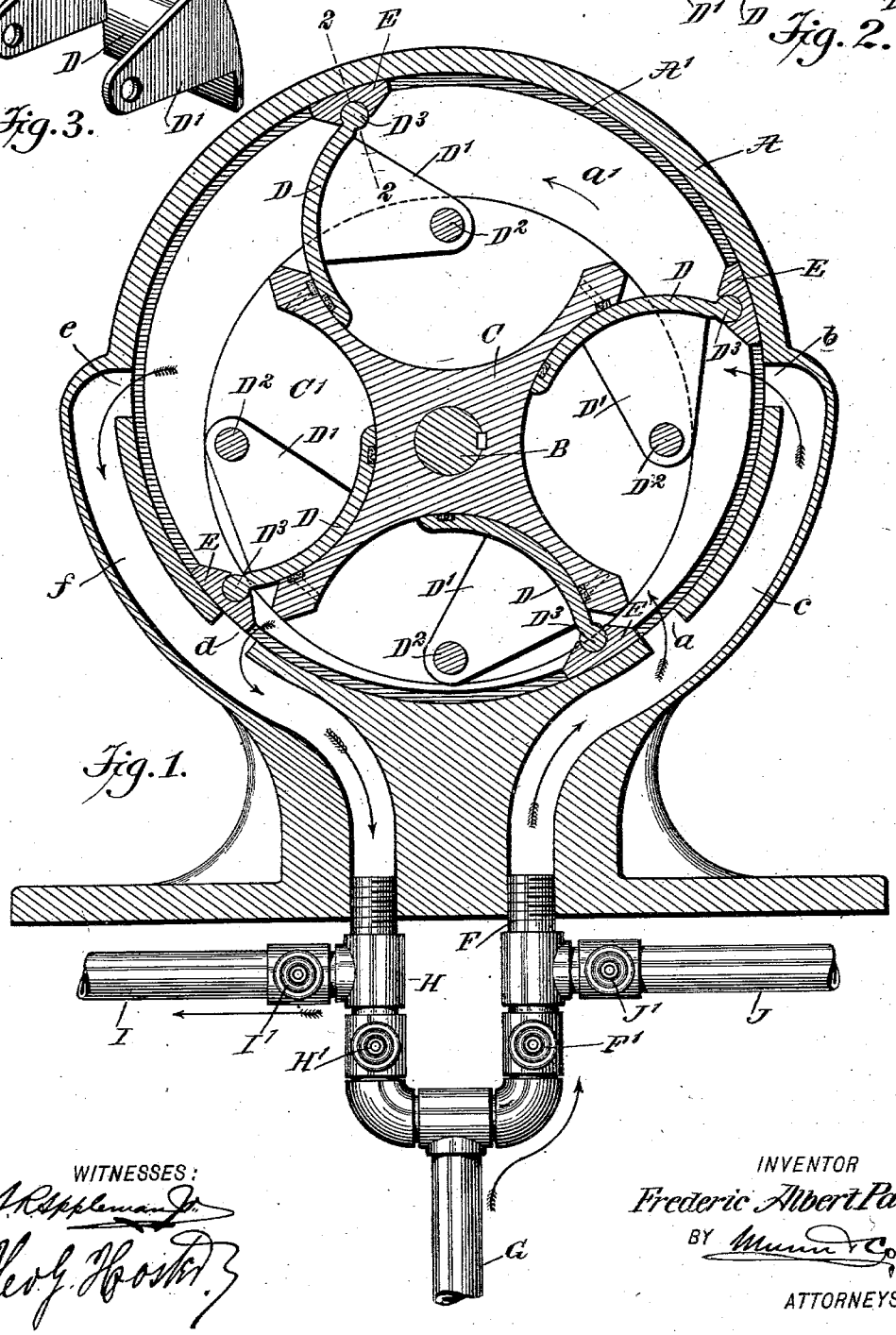



Fig. 1.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

FREDERIC ALBERT PALLÉ, OF NEW YORK, N. Y.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 704,913, dated July 15, 1902.

Application filed January 11, 1902. Serial No. 89,282. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERIC ALBERT PALLÉ, a citizen of France, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Rotary Engine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved rotary engine which is simple and durable in construction, very effective in operation, and arranged to utilize the motive agent to the fullest advantage.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all of the views.

Figure 1 is a cross-section of the improvement. Fig. 2 is a sectional side elevation of part of the same on the line 2 2 of Fig. 1, and Fig. 3 is a perspective view of one of the piston-heads and its slide.

The improved rotary engine is provided with a cylinder A, in which extends eccentrically a shaft B, carrying the piston C, provided in its peripheral face with cut-out portions C′, having segmental walls, on which fit the piston-heads D, likewise made segmental in shape and provided with side arms D′, fulcrumed at $D^2$ on the sides of the piston C, as will be readily understood by reference to Fig. 1.

The outer ends $D^3$ of the piston-heads D have a hinged connection with blocks E, mounted to slide on the inside of the rim of the cylinder A, the said blocks E being for this purpose provided at their ends with projections E′, engaging annular grooves A′, formed in the heads of the cylinder A, as plainly indicated in Figs. 1 and 2.

Now by the arrangement described the piston-heads D are mounted to swing in and out on the piston C as the latter rotates in the cylinder, and at the same time the space between the piston and the rim of the cylinder A is closed by the corresponding piston-head having connection with the block E, sliding on the inner face of the rim of the cylinder.

Suitable packings are provided between the contacting faces of the piston-heads D and the segmental surfaces of the piston C. In one side of the rim of the cylinder A are arranged the ports *a* and *b*, opening into a channel *c*, connected with a pipe F, having a valve F′, and leading to the supply-pipe G, connected with a boiler or other suitable source of motive-agent supply. Similar ports *d* and *e* are arranged on the opposite side of the cylinder A and open into a channel *f*, connected with a pipe H, having a valve H′, and likewise connected with the supply-pipe G. From the pipe H leads an exhaust-pipe I, having a valve I′, and a similar exhaust-pipe J leads from the pipe F and is also provided with a valve J′.

Now when it is desired to run the engine in the direction of the arrow *a′*, then the valves H′ and J′ are closed and the valves F′ and I′ are opened, so that the motive agent passes from the pipe G through the pipe F into the channel *c* and from the latter by the ports *a* and *b* into the right-hand side of the cylinder to act against the piston-heads D to turn the piston in the direction of the arrow *a′*. Now for the time being two adjacent blocks E stand in the position shown in Fig. 1 to allow the motive agent to pass through both ports *a* and *b* into the cylinder to act on the advancing piston-head D to rotate the latter and to bring the lowermost block E finally over the port *a*, so that steam now passes to the piston-head only through the port *b*. The advancing lowermost block E finally cuts off the port *b*, and the steam confined in this portion of the cylinder now acts expansively until the piston reaches such position that the port *e* is opened, and steam can now escape through the said port into the channel *f* and to the pipe H, to finally pass out through the pipe I to the open air.

When it is desired to reverse the engine, then the valves F′ and I′ are closed and the valves H′ and J′ are opened, so that the motive agent now passes to the channel *f* and into the cylinder by way of the ports *d* and *e* in the same manner as previously described relative to the ports *a* and *b*. The exhaust

now takes place through the ports *b* and *a*, channel *c*, and pipes F and J.

I do not limit myself to the number of piston-heads D employed, as the same may be varied—that is, increased or diminished in number—without deviating from the spirit of my invention. I also do not limit myself to the particular arrangement of steam inlet and outlet, as the same can be varied and different reversing mechanisms employed to accomplish the same result.

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

1. A rotary engine, comprising a cylinder, a piston eccentric therein and having recesses in its peripheral surface, the inner walls of the recesses being segmental, piston-heads having a segmental shape and mounted to swing in the said recesses and in sliding contact with the inner peripheral wall thereof, the said piston-heads having a sliding and interlocking engagement with the cylinder, as set forth.

2. A rotary engine comprising a cylinder having an inlet and an exhaust, a piston mounted to turn eccentrically in the said cylinder and having segmental recesses in its periphery, piston-heads mounted to swing on the said piston and in sliding contact with the peripheral wall of the recessed portions, and blocks mounted to slide in the cylinder and having a hinged connection with the said piston-heads, each of the blocks having its ends projecting into annular grooves formed in the cylinder-heads, as set forth.

3. A rotary engine comprising a cylinder, a piston mounted to turn eccentrically in the said cylinder, and having cut-out portions in its peripheral surface, the inner walls of the cut-out portions being segmental, piston-heads having a segmental shape and mounted to swing in the cut-out portions and in sliding contact with the peripheral inner wall of the cut-out portions, each piston-head having side arms fulcrumed on the sides of the piston, and blocks mounted to slide on the inside of the rim of the cylinder, each block having a hinged connection with a corresponding piston-head, as set forth.

4. A rotary engine comprising a cylinder, a piston mounted to turn eccentrically in the said cylinder, and having cut-out portions in its peripheral surface, the inner walls of the cut-out portions being segmental, piston-heads having a segmental shape and mounted to swing in the cut-out portions and in sliding contact with the peripheral inner wall of the cut-out portions, each piston-head having side arms fulcrumed on the sides of the piston, blocks mounted to slide on the inside of the rim of the cylinder, each block having a hinged connection with a corresponding piston-head, and means for controlling the inlet and exhaust of the motive agent to either side of the cylinder, as set forth.

5. A rotary engine comprising a cylinder having an inlet and an exhaust, a piston eccentric in the cylinder, and having cut-out portions in its peripheral surface, the inner walls of the cut-out portions being segmental, piston-heads having a segmental shape and mounted to swing in the cut-out portions and in sliding contact with the peripheral inner wall of the cut-out portions, each piston-head having side arms fulcrumed on the sides of the piston near the periphery thereof and at the center of the cut-out portions, the piston-heads having a sliding connection with the cylinder, and blocks mounted to slide in the cylinder and having a hinged connection with the piston-heads, as set forth.

6. A rotary engine, comprising a cylinder, a piston mounted to turn eccentrically in the said cylinder, and having recesses in its peripheral surface, the inner walls of the recesses being segmental, piston-heads having a segmental shape and mounted to swing in the recesses of the piston and in sliding engagement with the peripheral inner wall of the recesses, each piston-head having side arms fulcrumed on the sides of the piston near the periphery thereof and at the center of the recesses, blocks mounted to slide on the inside of the rim of the cylinder, each block having a hinged connection with a corresponding piston-head, the said cylinder being provided with ports in its rim at opposite sides thereof, and channels leading from said ports, a pipe leading from each of said channels and connected with a supply-pipe, the said pipes being each provided with a valve, and exhaust-pipes each connected with one of the said pipes at a point between the valve and the connection of the pipe with the channel, the said exhaust-pipes being each provided with a valve, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERIC ALBERT PALLÉ.

Witnesses:

THEO. G. HOSTER,

EVERARD B. MARSHALL.