No. 841,987. PATENTED JAN. 22, 1907.

C. LECAIME.

ROTARY ENGINE.

APPLICATION FILED APR. 27, 1905.

2 SHEETS—SHEET 1.

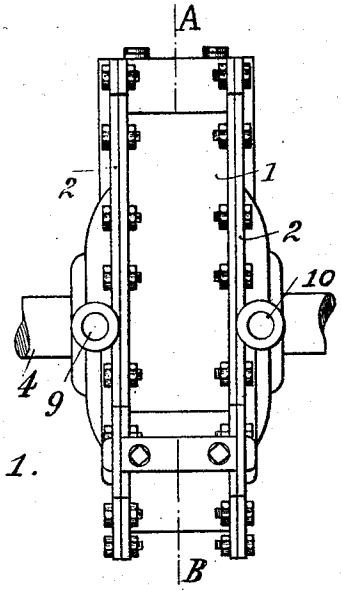


Fig. 1.

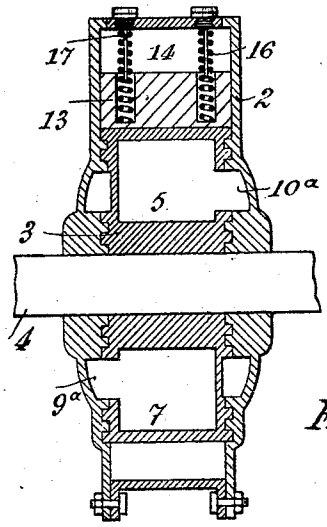


Fig. 2.

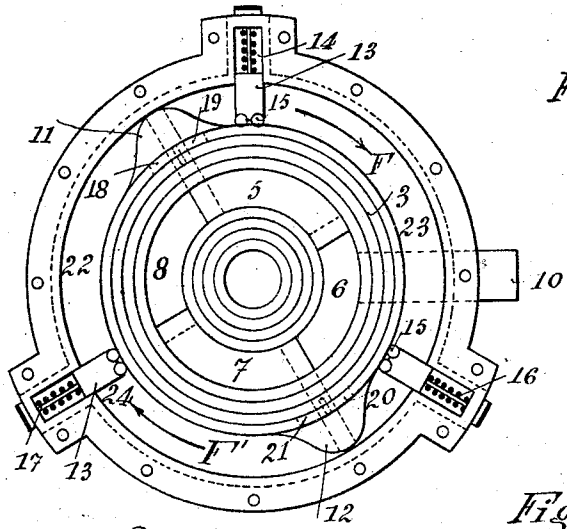


Fig. 3.

Fig. 4.

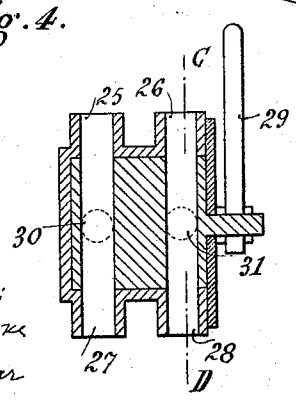
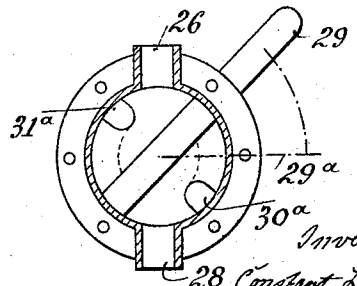


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 6.

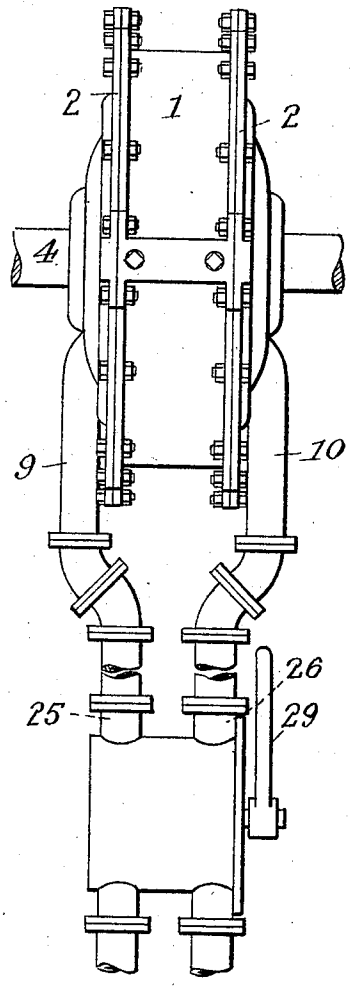


Fig. 8.

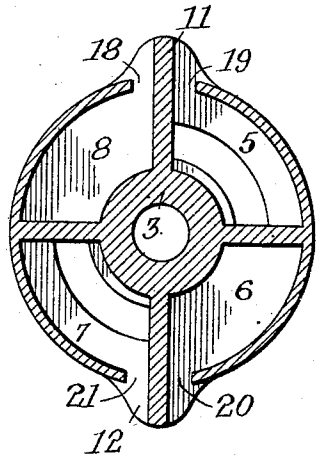
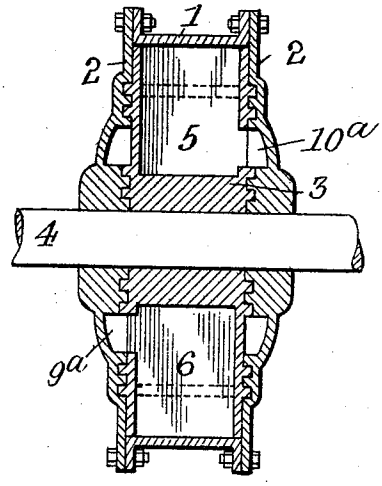


Fig. 7.



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ROTARY ENGINE.

No. 841,987. Specification of Letters Patent. Patented Jan. 22, 1907.

Application filed April 27, 1905. Serial No. 257,631.

To all whom it may concern:

Be it known that I, CONSTANT LECAIME, a citizen of the Republic of France, and a resident of Ambarès, France, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

This invention relates to an engine of continuous rotary movement which may be employed as a motor, a pump, or a ventilator.

When employed as a motor, the engine is driven directly by any appropriate motive power—such as steam, compressed air, or the like—while when used as a pump or a ventilator it is driven by a separate motor, the pump effecting its suction-stroke in the opposite sense to its movement and its delivery-stroke in the same sense.

This engine essentially comprises a cylinder which is closed at both ends by cover-plates, a piston carrying two projections being inclosed by the cylinder.

The accompanying drawings show by way of example an appropriate constructional form of the invention.

Figure 1 is a side view thereof, and Fig. 2 a vertical section on the line A B in Fig. 1. Fig. 3 is a front view of the interior of the engine, one cover-plate being taken off. Fig. 4 shows a detail for reversing the direction of the engine in vertical section, while Fig. 5 is a section on the line C D in Fig. 4. Fig. 6 is a plan view showing the reversing mechanism connected to the engine. Fig. 7 is a vertical section taken through the projections of the piston. Fig. 8 is a section of the piston taken at right angles to the shaft.

Referring first to Figs. 1, 2, and 3, 1 is the cylinder, which is closed at both ends by plates 2, between which is disposed a piston 3, mounted on a shaft 4. In this piston 3 are provided four cavities 5, 6, 7, and 8, of which one diametrically-opposed pair communicates with the inlet-orifice 9, and the other diametrically-opposed pair communicates with the exhaust-orifice 10.

The piston 3 carries two projections 11 12, on which the fluid acts, these projections enabling the engine to be rotated in one direction or the other. The space in which operates the motive fluid is divided into three portions by the aid of three closing devices, so as to constitute three cylinder-spaces, being separated from but upon the said closing devices being lifted by the projections in communication with each other.

The closing devices consist each of a guide 13, carrying at one end two pivotally-mounted rollers 15, designed to overcome the friction at the rotary movement of the piston and sliding at the other end in a groove 14, provided in the body of the engine.

The closing devices are pressed against the piston by the influence of springs 16, encircling rods 17 and intervening between the ends of the groove 14 and of the guide 13, so that the closing devices upon their contact with the projections 11 and 12 may be easily lifted against the action of the springs.

The piston 3 is provided with openings 18 19 20 21 at the base of the projections 11 and 12, respectively, which openings serve to constitute a communication between the circular cylinder 1 and the admission and exhaust orifices 9 and 10 through the cavities of the piston.

Upon the steam being introduced through the orifice 9 it passes through the passage-way 9^a, Fig. 5, into the cavities 8 and 6 and flows from there into the cylinder through the orifices 18 and 20. It then abuts against the closing devices which form the base of the cylinder, and by its pressure forces the projection 11 to move in the direction of the arrow F, and consequently the projection 12 in the same direction. As soon as the projection 12 has lifted the first closing devices with which it comes in contact the steam which is retained in the space 22 escapes through the opening 21 of the projection 12 into the cavity 7 and exhausts from there through the passage-way 10^a into the orifice 10, and so on.

Assuming that the engine be now suddenly stopped in the position as indicated in Fig. 3 and that its direction be reversed, then the steam retained in the spaces 22 and 24 flows freely through the orifice 9 in taking the same way as it did when entering the cylinder, while the steam being now introduced through the orifice 10, which formerly served as the exhaust-orifice, passes through the passage-way 10^a into the cavities 5 and 7 and flows from there into the cylinder through the openings 19 and 21, whereupon the projection 11 is moved from space 22 to

space 24 and the projection 12 from space 24 to space 23—that is, in the direction of the arrow F'.

The admission of steam to the piston and from there to the circular cylinder being continuous, no dead-point occurs during the working of the engine.

To constitute a double or even a triple expansion engine, one adjoins to the engine one or more engines of larger dimensions, into which the high-pressure steam escaping from the first engine flows as low-pressure steam.

For using the rotary engine as a pump or a ventilator the same has simply to be driven by a separate motor. Its suction will be effected in the opposite sense to its direction and its delivery of the liquid or the air in the same sense, the closing devices in this case serving as valves.

To obtain the reversing of the direction of the engine being employed as a motor, it is necessary to change the sense of introducing the steam or the fluid under adopted pressure, which will be facilitated by employing the apparatus which is represented in Figs. 4 and 5.

This apparatus is connected to the orifices 9 and 10 of the engine through the medium of pipes, and it is situated in any convenient distance thereof. It comprises an outer cylinder with four openings 25, 26, 27, and 28, and an inner cylinder fitted therein with four openings, this cylinder being adapted to be turned within the outer cylinder by a lever 29 and forming a reversible passage-way for the motive fluid.

In the position shown in Fig. 4 the openings of the outer cylinder correspond with two of the openings in the inner cylinder. The steam arriving from a generator at 25 passes through opening 27 and orifice 9 into the engine and escapes through orifice 10 and openings 28 and 26.

In the position shown in Fig. 5 the openings of the inner cylinder are covered by the walls of the outer cylinder, so that the fluid is prevented from passing through the apparatus, whereby the engine is stopped in due course. When the lever 29 is moved to the position 29^a, the opening 30, communicating with 25, runs along the interior of the inner cylinder and terminates at 30^a opposite to the opening 28. The steam passes from 25 to 28 and enters the engine at 10, which now turns in the reverse sense. The steam leaves the engine at 9 and escapes through 27, 31, and 26. The two ways therefore cross each other in the form of an **X** in the interior of the inner cylinder, the steam arriving always at 25 and escaping at 26.

Having now particularly described and ascertained the nature of this said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a rotary engine the combination with a cylinder having inlet and exhaust chamber, of a piston rotatably mounted in the cylinder and having upon opposite faces concentric rings which engage the sides of the cylinder contiguous thereto, projections extending radially from the periphery of the piston to the surrounding cylinder, interior chambers formed within the piston, ports connecting the chambers of the piston with the registering peripheral cylinder-spaces, ports connecting opposite chambers of the piston with the inlet-chamber of the cylinder, ports connecting the other opposed chambers of the piston with the exhaust-chamber of the cylinder and spring-pressed abutment-blocks supported by the cylinder and having rollers which engage the periphery of the piston.

2. A rotary piston comprising peripheral ring, side walls, a hub, projections extending radially outward from the ring, partitions extending radially from the hub to the peripheral ring, ports extending from the chambers formed by the partitions through the peripheral ring, ports extending from certain of the chambers formed by the partitions through one side of the piston, and ports extending from the other chambers through the other side of the piston.

3. A rotary piston comprising a peripheral ring, a hub, side walls having concentric rings projecting therefrom, outwardly-extending radial projections each composed of curved side plates and a connecting-web, diametrically-opposed partitions extending radially from the hub to the peripheral ring and forming chambers within the piston, ports located at each side of the radial projections and extending from the interior chambers through the peripheral ring, ports extending from diametrically-opposed chambers through one side of the piston and ports extending from the other diametrically-opposed chambers through the other side of the piston.

In testimony whereof I affix my signature.

CONSTANT LECAIME.

In presence of—

VICTOR TRIVORT,
H. C. COXE.