

No. 826,453.

PATENTED JULY 17, 1906.

J. THORMÄHLEN.
ROTARY ENGINE.

APPLICATION FILED MAR. 30, 1905. RENEWED JUNE 25, 1906.

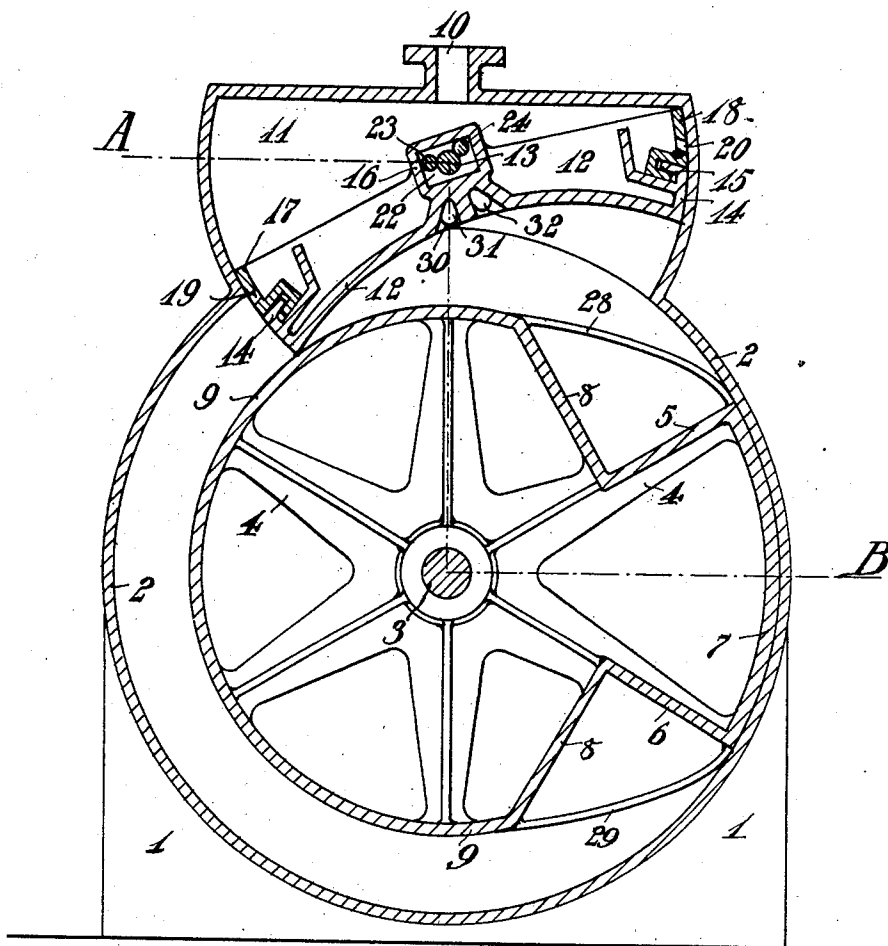


Fig. 1.

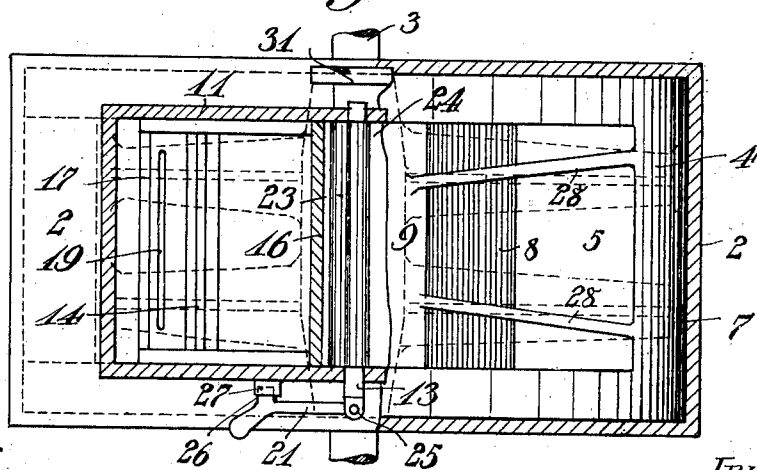


Fig. 2.

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ROTARY ENGINE.

No. 826,453.

Specification of Letters Patent.

Patented July 17, 1906.

Application filed March 30, 1905. Renewed June 25, 1906. Serial No. 323,348.

To all whom it may concern:

Be it known that I, JOHANN THORMÄHLEN, a citizen of Hamburg, and a resident of No. 77 Friedrichsbergerstrasse, Hamburg, in the Empire of Germany, have invented new and useful Improvements in Rotary Engines, of which the following is a specification.

The present invention relates to an improved construction of rotary engine.

Special objects of the invention are to simplify and cheapen the construction and to render more efficient, serviceable, and durable in operation engines of the kind referred to.

With these ends in view the invention consists in the novel combination, arrangement, and adaptation of parts, all as more fully hereinafter described, shown in the accompanying drawings, and then specifically set out in the appended claims.

In the drawings, Figure 1 shows a vertical section through the engine. Fig. 2 represents a horizontal section on line A B of Fig. 1.

Supported by a suitable base-rest 1 is the cylinder-casing 2, which carries centrally the shaft 3. To this shaft 3 is secured the piston-wheel 4 in the well-known manner, which slides with a portion of its circumference on the inner circumferential wall of the cylinder-casing 2. Suitable packing means are interposed between the sliding surfaces to insure a steam-tight fitting of the piston-wheel 4 in the cylinder-casing 2.

In order to provide effective abutment-surfaces for the motive agent, radial planes 5 6 are provided in the piston-wheel 4 adjacent to the sliding periphery 7. Said radial planes are connected, by means of the walls 8, to the drawn-in periphery 9 of the piston-wheel 4, so that between the planes 5 6 a channel is formed in connection with the side walls of the cylinder-casing 2, which terminates at both ends in pockets. According to the direction of rotation of the piston-wheel 4 either the abutment-face 5 or 6 is acted upon by the motive agent. The supply of the motive agent is effected through the pipe 10, terminating in the valve-chest 11, which latter communicates, by means of the rotary slide 12, with the interior of the cylinder 2.

The rotary slide 12 is adapted to rock on its shaft 13, which latter runs parallelly to the shaft 3. Both ends of the slide 12 carry circular flanges 14 15, adapted to move steam-

tightly in the correspondingly-shaped interior of the valve-chest 11. Between its bearing 16 and the flanges 14 15 the slide 12 is hollowed out, thus enlarging the interior of the valve-chest 11 for the reception of the motive agent. The flanges 14 15 carry on their inwardly-turned edges movable flaps 17 18, whose external surfaces are adapted to tightly fit the inner wall of the valve-chest 11. These flaps 17 18 are provided with the ports 19 20 for the passage of the motive agent to the interior of the cylinder 2. The employment of the movable flaps 17 18 obviates the use of special packing means between the flanges 14 15 and the valve-chest 11, as the tension of the motive agent acting against the flaps 17 18 insures a steam-tight fitting of the rotary rocking slide 12 in the valve-chest 11. Furthermore, these flaps 17 18 facilitate the repair of the engine through being interchangeable, and finally they admit by choosing flaps with differently-sized ports 19 20, an exact adaptation of the supply of the motive agent to the required force.

The shaft 13 of the slide 12 carries the reversing-gear, which by turning said shaft through the agency of an external crank 21 attains the reversion of the direction of rotation of the engine. The reversing-gear consists of an excenter 22, keyed on the shaft 13, which, as illustrated in the drawings, assumes the shape of two wings 23 24. The bearing of the slide 12 is sufficiently large to admit of the rotation of the excenter 22. In accordance with the position of the excenter, either the flange 14 or 15 rests on the piston-wheel, seeing that said excenter alters the point of suspension of the slide 12. The crank 21 for actuating the reversing-gear can be fixed in its two extreme positions. With reference to Fig. 2, said crank 21, which is movable around its pivot 25 in a plane rectangular to the shaft 13, is provided with a rear extension 26, adapted to enter behind or between external abutment-pieces 27 of the valve-chest 11.

Assuming the parts of the engine to be in the position shown in Fig. 1, the motive agent supplied through the pipe 10 to the valve-chest 11 enters the cylinder-space through the port or ports 19 and by acting against the radial surface 6 causes the rotation of the piston-wheel 4. While the piston

4 rotates the edge of the flange 14 slides on the retracted periphery 9 until the second radial surface 5 approaches the slide 12. Now the flange 14 has to pass over to the external periphery 7 of the piston-wheel 4. In order to insure this movement without shocks, I provide guide-rails 28 29, leading from one periphery to the other. While the flange 14 rides up the guide-rails 28, the slide 12 is turned in the valve-chest 11, and consequently the admission-port 19 of the motive agent is closed by the wall of the valve-chest 11. Now the charge of the cylinder expands till the flange 14 rides down the guide-rails 29, bridging the peripheries at the second radial face 6. By turning the slide 12 to its previous position on the retracted periphery 9 the admission-port 19 is again opened and the play of the various parts is repeated. The exhaust-opening 30 then communicates with the pipe 31, leading outward.

During the aforescribed play of the slide 12 the port or ports 20 in the second flange 15 remain permanently closed by the wall of the valve-chest 11. By reversing the engine, by turning the shaft 13 to its second extreme position and fixing it there by means of the crank 21, the excenter 22 shifts the point of suspension of the slide 12, so that by virtue of gravity the second flange 15 turns down on the periphery of the piston-wheel 4. The motive agent now enters the cylinder-space through the port or ports 20 and acts against the radial face 5, turning the piston-wheel 4 in opposite direction. A second exhaust-port 32 in the slide 12 is adapted to communicate with the pipe 31, leading outwardly, when the supply takes place through the admission-port 20.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. A rotary engine comprising in combination, a cylinder-casing, a shaft journaled centrally in said casing, a piston-wheel keyed to said shaft, said piston-wheel moving with a portion of its periphery steam-tightly in the cylinder-casing, and provided with a pair of radial planes, a cylinder-space for the reception of the motive agent formed between the aforesaid radial planes by the retracted periphery of the piston-wheel, a valve-chest in communication with the interior of the cylinder, a rotary rocking slide steam-tightly moving in said valve-chest provided with flanges at its extremities, said flanges having the admission-ports for the motive agent to the cylinder-space, a reversing-gear acting by shifting the point of suspension of the rocking slide, means for locking the reversing-gear in its two extreme positions, means for guiding the rocking slide from one periphery to the other of the piston-wheel, a supply-pipe ad-

mitting the motive agent to the valve-chest, exhaust-openings in the rocking slide adapted to register with an outwardly-leading pipe and means for transmitting the rotation of the piston-wheel shaft, substantially as described and shown and for the purpose set forth.

2. A rotary engine comprising in combination, a cylinder-casing, a shaft journaled centrally in said casing, a piston-wheel keyed to said shaft, said piston-wheel moving with a portion of its periphery steam-tightly in the cylinder-casing, and provided with a pair of radial planes, a cylinder-space for the reception of the motive agent formed between the aforesaid radial planes by the retracted periphery of the piston-wheel, a valve-chest in communication with the interior of the cylinder, a rotary rocking slide steam-tightly moving in said valve-chest, provided with flanges at its extremities, said flanges having the admission-ports for the motive agent to the cylinder-space, a reversing-gear acting by shifting the point of suspension of the rocking slide, means for locking the reversing-gear in its two extreme positions, means for guiding the rocking slide from one periphery to the other of the piston-wheel, consisting in guide-rails bridging both peripheries, a supply-pipe admitting the motive agent to the valve-chest, exhaust-openings in the rocking slide adapted to register with an outwardly-leading pipe and means for transmitting the rotation of the piston-wheel shaft, substantially as described and shown and for the purpose set forth.

3. A rotary engine comprising in combination, a cylinder-casing, a shaft journaled centrally in said casing, a piston-wheel keyed to said shaft, said piston-wheel moving with a portion of its periphery steam-tightly in the cylinder-casing, and provided with a pair of radial planes, a cylinder-space for the reception of the motive agent formed between the aforesaid radial planes by the retracted periphery of the piston-wheel, a valve-chest in communication with the interior of the cylinder, a rotary rocking slide steam-tightly moving in said valve-chest provided with flanges at its extremities, said flanges having the admission-ports for the motive agent to the cylinder-space, a reversing-gear acting by shifting the point of suspension of the rocking slide, said reversing-gear comprising a shaft, an eccentric cam keyed on said shaft, the shaft and cam being passed through a sufficiently wide bore in the slide to permit of their rotation, means for locking the reversing-gear in its two extreme positions, means for guiding the rocking slide from one periphery to the other of the piston-wheel, a supply-pipe admitting the motive agent to the valve-

chest, exhaust-openings in the rocking slide
adapted to register with an outwardly-lead-
ing pipe and means for transmitting the rota-
tion of the piston-wheel shaft, substantially
5 as described and shown and for the purpose
set forth.

In witness whereof I have hereunto signed

my name, this 15th day of March, 1905, in
the presence of two subscribing witnesses.

JOHANN THORMÄHLEN.

Witnesses:

E. H. L. MUMMENHOFF,
I. CHRIST. HAUFERMANN.