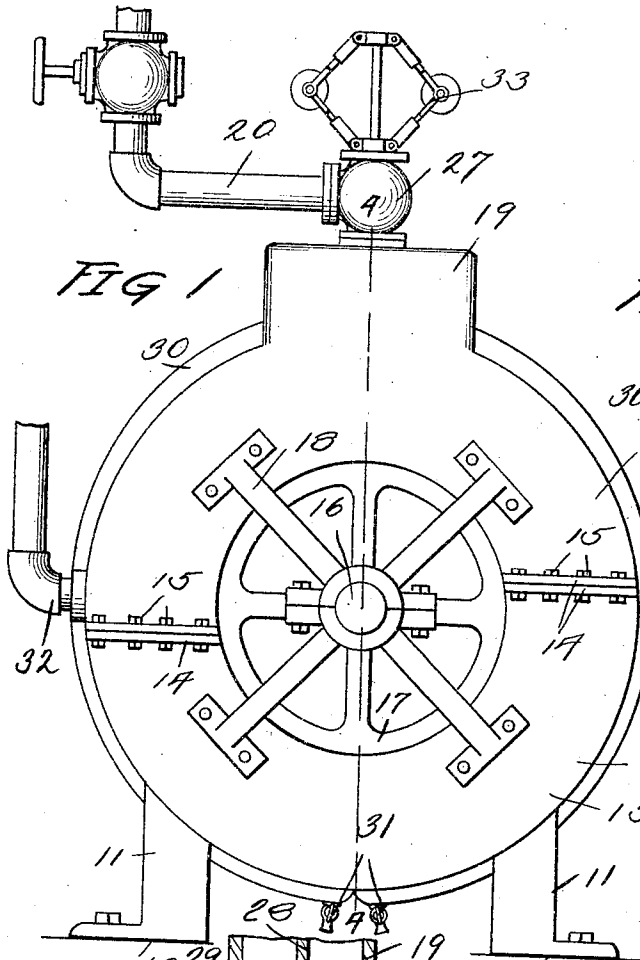
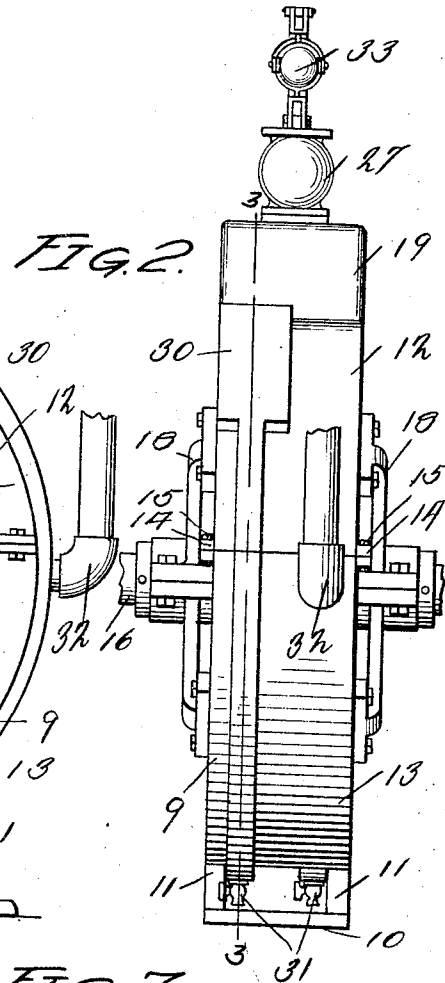
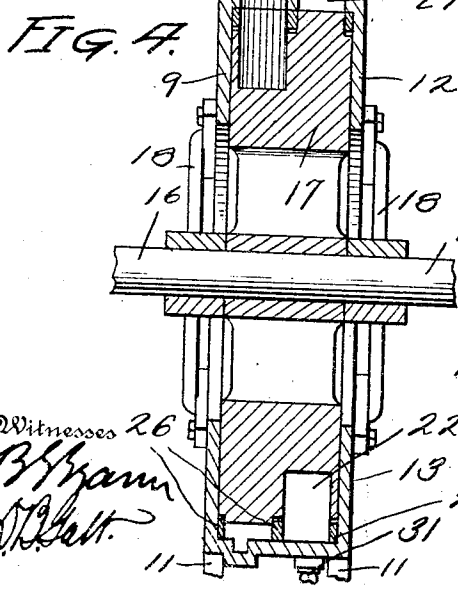
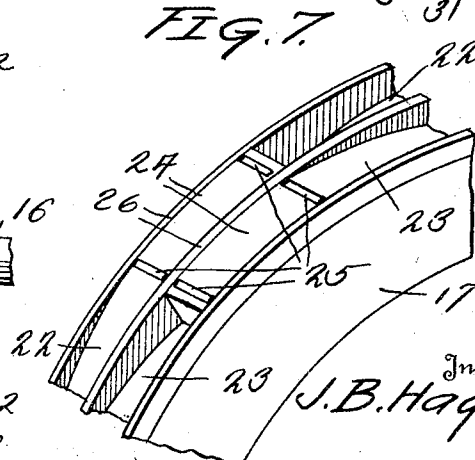


1,235,201.

Patented July 31, 1917.
 2 SHEETS—SHEET 1.



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Fig. 3.

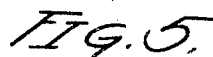
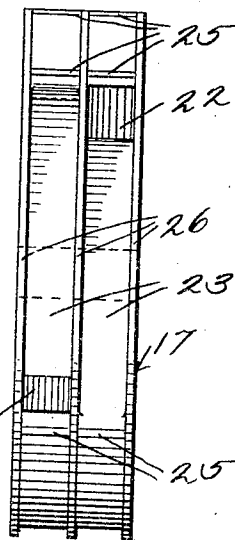
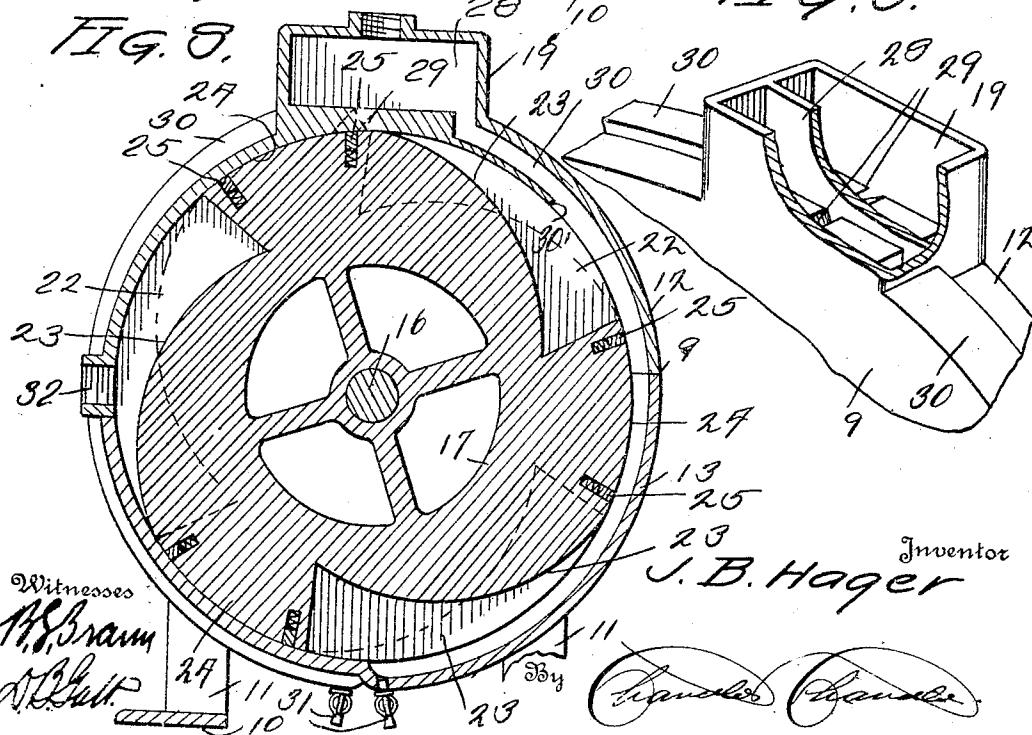


Fig. 6.



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ROTARY ENGINE.

1,235,201.

Specification of Letters Patent.

Patented July 31, 1917.

Application filed February 17, 1916. Serial No. 78,937.

To all whom it may concern:

Be it known that I, JAMES B. HAGER, a citizen of the United States, residing at Gould, in the county of Harmon, State of Oklahoma, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to rotary engines, and aims primarily to provide a device of such construction that the greatest amount of power may be derived from the amount of pressure used.

A further object of the invention is to provide in an engine employing a rotor having piston walls, improved means for directing a stream of fluid pressure against a plurality of the pistons carried by said rotor simultaneously.

A still further object of the invention is to provide in a device of the class described, improved means for selectively driving the rotor in opposite directions.

A still further and particular object of the invention is to provide a rotary engine which is of comparatively simple construction, which is composed of relatively few readily assembled parts, which is so constructed as to preclude the possibility of breakage or derangement of the various parts, which may be installed and maintained at relatively low cost, and which will prove thoroughly efficient for the purposes for which it is designed.

A further feature of advantage is the construction of a rotary engine so arranged as to obviate the possibility of the occurrence of dead centers, and which is characterized by the absence of back pressure, eccentrics, multiplicity of valve arrangements, and other complicated mechanisms common to devices of a similar character.

With these objects in view together with others which will appear as the description proceeds, the invention resides in the novel combination and arrangement of parts all as will be described more fully hereinafter, illustrated in the accompanying drawings and particularly pointed out in the claim.

The invention will be best understood by

reference to the accompanying drawings, wherein:

Figure 1, is a side elevation of an engine constructed in accordance with my invention,

Fig. 2, is an end view thereof,

Fig. 3, is a vertical sectional view taken on line 3—3 of Fig. 2,

Fig. 4, is a similar view taken on line 4—4 of Fig. 1,

Fig. 5, is an edge view of the improved rotor removed from the casing,

Fig. 6, is a fragmentary perspective view illustrating a portion of the engine casing and steam chest,

Fig. 7, is a fragmentary detail perspective of a portion of the rotor, and

Fig. 8, is a vertical sectional view on the same line as that of Fig. 3, showing the position of the rotor when under full pressure of the propelling fluid.

Referring now more particularly to the drawings, 9 indicates a cylindrical casing, which is mounted upon a suitable base or support 10 by legs 11. This casing may be formed of substantially semi-circular sections 12 and 13, the ends of the said sections being preferably arranged out of horizontal alinement, and are flanged as at 14 to permit of the sections being secured together by means of suitable bolts 15. The casing when properly assembled forms a central orifice, through which a shaft 16, supporting a rotor 17 projects, arms 18 extend from various points in the sides of the said casing to support the said shaft. The uppermost section of the casing is provided with a pressure chest 19, to which is directed steam or other fluid pressure through a pipe 20 leading from a suitable source of supply.

The rotor which I employ in attaining the objects of the invention comprises a rotatable member 17 which is mounted for rotary movement within the said casing, and is supported upon the shaft 16 as shown. To utilize the fluid pressure as a means for propelling the rotor, the latter is provided at various points throughout its circumference with pockets 22. These pockets may be formed by providing a wall extending substantially radially inwardly from the periphery of the said rotor, a channel 23 being formed in the periphery of the rotor to com-

communicate with the lowermost portion of the wall, and to connect the same by its lowermost edge with the periphery of the said rotor at a point remote from the wall.

5 These walls form the piston faces of the rotor, and extend slightly forwardly of the rotor to provide a relatively sharp angle at the base of the pocket to enable the fluid pressure to obtain sufficient purchase within

10 the pocket. I preferably arrange three of these piston faces in the periphery of the rotor, each being spaced an equal distance apart. However, it is to be understood that the number, size, and depth of the piston

15 faces or pockets may be varied. The outermost faces of the rotor contact with the casing as shown at 24, and spring pressed packing members 25 may be arranged in the said outermost surface to extend trans-

20 versely thereof to prevent the escape of the fluid pressure beyond the same.

In order that the rotor may with facility and convenience be driven in a reverse direction within the casing, the said rotor is

25 arranged in its outer periphery to provide separate peripheral faces, expansible annular packing rings 26 being seated in suitable channels in the periphery of the rotor, one adjacent each end thereof, and one inter-

30 mediate the ends, the former to prevent the escape of fluid pressure beyond the ends of said rotor, and the latter to prevent the escape of pressure from one peripheral face to the other. The channels 23, as well as the

35 piston faces in the peripheral faces of the rotor are oppositely disposed, and it is apparent that when full pressure is directed into the pockets formed in one of the peripheral faces, the said rotor will be driven

40 in the direction of the inclination of its piston faces. The application of pressure to the opposite peripheral face will drive the rotor in an opposite direction, as is obvious. A valve 27 may be arranged in the

45 pipe 20 to control the flow of fluid pressure to the chest 19, and this valve may be of such construction that the fluid may be directed into either compartment formed in the said chest by the partition 28.

50 In order that the pressure may be delivered to the rotor, ports 29 are located in the bottom wall of the chest, one communicating with each of the peripheral faces of the rotor, and the said ports being preferably inclined at such angle as to project a

55 stream of fluid angularly and forwardly against the piston faces with which it communicates. A duct 30 communicates with each end of the chest 19 to extend around

60 the periphery of the casing substantially half way, one of said ducts being arranged over each of the peripheral faces, and the same ducts extending in the direction of inclination of the piston faces which it over-

65 lies. Each of the ducts 30 communicate

with the interior of the casing at a point 30' spaced from the port 29 a distance substantially equal to the distance between one of the walls forming a piston head and the beginning of the channel 23 in advance there-

70 of, and the said ducts are open to the interior of the casing for the remainder of their forward extent. Upon reference to Fig. 2 of the drawing, it will be seen that each

75 duct 30 is of substantially a width equal to that of the underlying peripheral face up to the point 30', and is narrowed for the remainder of its extent. It is also to be observed that the narrowed extent of the duct

80 forms a channel and is in communication with the interior of the casing, and drain cocks 31 may be arranged in said ducts at their lowermost points. It will thus be seen that

85 each socket continues to receive steam pressure from the channel to make up for condensation as long as it moves past said channel. To carry off the fluid after it has been

90 utilized to drive the rotor, exhaust pipes 32 are arranged at opposite points in the rotor casing, one of said pipes communicating with each of the peripheral faces of the

Upon reference particularly to Fig. 3 of the drawing, it will be seen that upon the introduction of steam or air pressure to the

95 chest 19, the said pressure will at once be directed through the port 29 into the pocket 22 in angular direction to engage the inclined wall thereof, and simultaneously the pressure will be forced through the duct 30

100 at the point 30' to be delivered against the next adjacent piston face in advance of the first mentioned pocket. It is also apparent that the pressure will continue beyond the last named piston faces through the re-

105 stricted channel of the duct 30 to be delivered to the other pocket in the lowermost point of the rotor casing. It is thus apparent that the fluid pressure delivered to the chest 19 will be utilized to operate simul-

110 taneously upon each of the piston faces arranged on the rotor, whereby the greatest possible amount of power will be derived from the pressure expended. When the rotor has been moved from its initial posi-

115 tion to such point that the inclined wall of the pocket is adjacent the point 30', the pressure delivered at such point will engage within the pocket to accelerate the movement of the rotor. As the pockets arrive

120 successively at the point of connection of the exhaust pipe 32, the dead pressure within the same will be expelled through the said pipe. By restricting the duct 30 throughout the major portion of its extent, it is ap-

125 parent that the pressure within the same will be permitted to escape beyond the spring pressed packing members 25 for introduction to the pockets beyond the same. It is also apparent that the packing rings 26 will

130

prevent the escape of the fluid element beyond the ends of the rotor, and from one of the peripheral faces to the other. When it is desired to drive the rotor in a reverse direction, the valve 27 may be operated to cut off the supply from the above mentioned portion of the chest 19, to direct the flow of fluid into the opposite compartment, whereupon an operation similar to that above described will be carried out in reverse order.

A conventional form of governor 33 is illustrated and it is to be understood that the same may be connected to regulate or control the amount of fluid pressure admitted to the chest 19. By the use of a device constructed in accordance with the above description, it is seen that the objects of the invention may be adequately and effectively attained, and while the present disclosure is that of the preferred embodiment of the invention, it is apparent that the same is susceptible to various changes in the minor details of construction, and I reserve to myself the right to make such changes as I may see fit without departing from the spirit of

the invention or exceeding the scope of the claim.

I claim:

A rotary engine including a casing having a channel extending around one side thereof and open to said casing throughout its extent, a chest having a port opening into said casing and a second port opening into said channel the channel and first port being in spaced relation and a rotor mounted in said casing and having pockets therein, the spacing of the pockets and length of the channel being such that two of the pockets may communicate with said channel at once, the spacing of the first port from the channel being such that each pocket receives a charge of fluid under pressure from the chest prior to its moving to position to communicate with the channel.

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

JAMES B. HAGER.

Witnesses:

H. T. SUMMERS,
A. F. HAGER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."