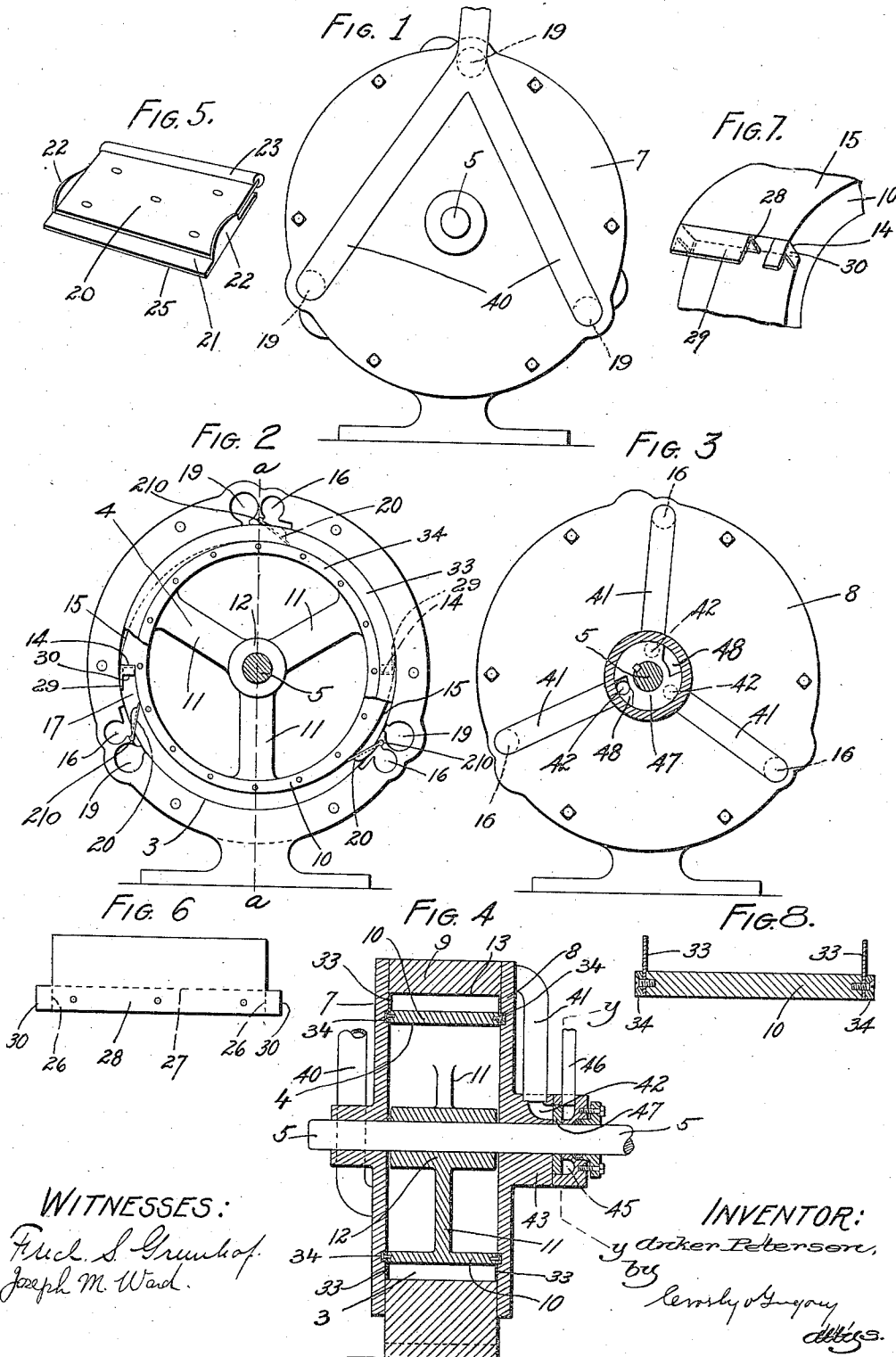


A. PETERSEN.
ROTARY ENGINE.

APPLICATION FILED MAY 8, 1908. RENEWED SEPT. 12, 1912.

1,060,021.

Patented Apr. 29, 1913.



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ROTARY ENGINE.

1,060,021.

Specification of Letters Patent.

Patented Apr. 29, 1913.

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To all whom it may concern:

Be it known that I, ANKER PETERSEN, a subject of the King of Denmark, residing at Winthrop, county of Suffolk, and State of Massachusetts, have invented an Improvement in Rotary Engines, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to rotary engines and has for its general object to provide a construction of rotary engine which is comparatively light but which is capable of developing a maximum horse power.

More particularly the invention relates to the manner of packing the steam chamber to prevent leakage of steam between the rotor and the casing, and the manner of introducing steam to the steam chamber and cutting off the steam therefrom.

Other features of my invention will be apparent from the following description of a form of my invention which I have herein selected for the purposes of illustration, it being understood, however, that the invention is not limited to the embodiment herein illustrated.

In the drawings, Figure 1 is a side view of an engine embodying my invention; Fig. 2 is a side view of the engine with one of the heads of the casing removed; Fig. 3 is a section on line *y-y*, Fig. 4, looking to the left; Fig. 4 is a vertical section on the line *a-a*, Fig. 2; Fig. 5 is a perspective view of the swinging valve or abutment; Fig. 6 is a view of the blank from which is made the packing lip attached to the radial face of the rotor; Fig. 7 is a fragmentary perspective view showing the manner of packing the space between the rotor and the casing; Fig. 8 is an enlarged sectional view through the rim 10.

The engine comprises a casing of suitable construction provided with a central cylindrical chamber 3 within which operates a rotor 4 that is fast to the driving shaft 5. While the casing may be made in any suitable way, I prefer for convenience sake to make it of the two heads 7 and 8 between which is situated the body 9 in the form of a ring which surrounds the rotor. The heads 7 and 8 may be secured to the body 9 in any suitable way so as to make a tight joint therebetween. While the rotor may

have any suitable construction, I prefer to use a rotor having an annular rim 10 which is supported by spokes 11 extending from a hub 12 secured to the shaft 5. The rotor is shaped so that there exists between it and the interior face 13 of the body 9 one or more steam spaces into which the steam is introduced as will be more fully hereinafter described. The rim 10 of the rotor extends across the chamber 3 from one head 7 to the other head 8, as plainly seen in the drawings. The exterior of the rim is shaped to present one or more (two in the present embodiment of the invention) substantially radial faces 14, said faces forming one side of the steam spaces of the engine. While the exterior surface of the rotor is concentric throughout the greater portion of its periphery, it is made eccentric at points 15 immediately adjacent the radial faces 14. The body of the casing is provided with one or more (three in this embodiment of my invention) steam inlet ports 16 through which the steam is admitted to the steam spaces 17, and said body is also provided with one or more (three in this embodiment of my invention) exhaust ports 19 which are situated adjacent the inlet ports 16. Situated between each inlet port and the corresponding exhaust port is a valve or abutment 20 which is pivoted to the casing at 210 and which bears against the periphery of the rotor. These abutments are designed so as to be very light in construction and yet effective in preventing any escape of steam back past them to the exhaust ports. In the preferred form of my invention the abutments are made from thin pieces of sheet metal bent into the shape shown in Fig. 5. Each abutment is provided with the body 21 from the sides of which extend side flanges 22, the body and side flanges being bent into shape from a piece of thin flexible sheet metal. The body is secured to a journal member 23 which is pivoted in the body 9. Because the body 21 of the abutment is of thin metal it will hug tightly the periphery of the rotor and prevent the escape of any steam back past said abutment. The side flanges 22 being of flexible sheet metal hug the sides of the steam space and prevent any leakage of steam at these points. In order that the abutment may withstand any pressure to which it is subjected I may stiffen the body 21

with a stiffening member of thicker material but the stiffening material does not extend to the edge 25 of the body, and said body therefore presents a thin flexible flange at its edge and also at its sides which by their engagement with the rotor and the sides of the steam space effectively prevent the leakage of steam.

In order to prevent the leakage of the steam past the radial faces 14 of the rotor, I provide the edge of each face with a thin flexible lip or flange which engages the inner surface 13 of the body. This lip or flange may conveniently be made from a blank such as shown in Fig. 6 which after being cut from a piece of sheet metal is bent along the dotted lines 26, 27 thereby to form a sheet metal member of the shape shown in Fig. 7. The body 28 of this sheet metal member is then secured to the radial face 14 by any suitable means, such as screws, with the flange 29 projecting forwardly from said face and the two wings 30 standing parallel with the side faces of the rotor. This member is made from thin flexible sheet metal and when it is thus applied to the rotor the flange 29 and wings 30 fit tightly against the inner face 13 of the body and the side faces of the heads, and thus form steam-tight joints at this point.

For preventing the escape of steam around the edges of the rim 10 of the rotor, said rim is provided at each side with a radially-extending flange of thin flexible material. These flanges may conveniently be made from rings 33 of thin sheet metal which are secured to the rim 10 to extend radially therefrom, as seen best in Fig. 4. I have shown each of these packing rings 33 as secured in place by means of a retaining ring 34 which is screwed to the rim 10 and in the present embodiment the heads 7 and 8 are each provided with annular grooves to receive the retaining rings 34. The thin flexible flanges or packing rings 33 fit tightly against the inner faces of the heads 7 and 8 and effectively prevent the leakage of steam around the rim 10.

It will be seen that in my invention all places where the steam is liable to leak between joints is thoroughly protected by means of thin flexible sheet metal packing members which effectively prevent the escape or leakage of steam.

The exhaust ports 19 connect with exhaust pipes 40. Each inlet port 16 has leading thereto a steam pipe 41 which leads into a port 42 formed in the hub 43 of the head 8. Said hub has formed therein an annular steam chamber 45 into which leads a steam inlet pipe 46. The shaft has fast thereon a valve 47 of the shape shown in Fig. 3, said valve being formed of a disk having the two ports 48. These ports are so arranged that as the valve rotates, said ports pass over

and become alined with the ports 42 and thus steam is admitted to the steam pipes 41 in succession.

With the construction of valve herein shown the steam will be admitted to each steam pipe 41 twice during each rotation of the shaft.

I have illustrated only one embodiment of my invention, and hence am not limited to the precise construction shown.

In order to illustrate the construction, the flanges 25, 29 and 33 have been shown in the drawings as thicker in proportion to the other parts than they would actually be constructed in building an engine. It will be understood that these flanges are very thin and flexible so that they will readily hug the sides of the steam space and prevent the leakage of steam.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a rotary engine, the combination with a casing provided with a cylindrical chamber having flat ends or sides, of a rotor situated concentrically with the said chamber and having a diameter less than that of the chamber thereby to leave a steam space within the chamber exterior to the rotor, and thin flexible sheet metal packing rings secured to the rotor and extending outwardly therefrom beyond the periphery thereof and lying flatly against the flat sides of said steam space whereby said rings are subjected to the pressure of the steam, the flexibility of said rings being sufficient to cause them to fit the sides of the chamber tightly thereby to prevent leakage of steam.

2. In a rotary engine, the combination with a casing provided with a chamber having an annular groove in each side thereof, of a rotor within the casing, thin flexible metal packing rings secured to the sides of the rotor and lying flatly against the sides of the chamber, and retaining rings 34 securing the packing rings to the rotor and operating in the grooves in the casing.

3. In a rotary engine, the combination with a casing provided with a cylindrical chamber, of a rotor within the chamber forming between it and the inner face of said chamber a steam space, said rotor having a substantially radial fixed face forming one end of said steam space, and a thin flexible flange extending forwardly both from the outer edge of said face and the ends thereof, said flanges overlying the sides of the steam space and being subjected to the pressure of the steam therein and by their engagement with said sides preventing the escape of steam past the said face of the rotor.

4. In a rotary engine, the combination with a casing having a chamber, of a rotor within the casing and an abutment carried

by the casing and movable to permit the rotor to turn, said abutment having a thin flexible flange or edge which bears against the face of the rotor, and thin flexible sheet
5 metal wings which overlie the sides of the steam space.

In testimony whereof, I have signed my

name to this specification, in the presence of two subscribing witnesses.

ANKER PETERSEN.

Witnesses:

LOUIS C. SMITH,

THOMAS J. DRUMMOND.

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