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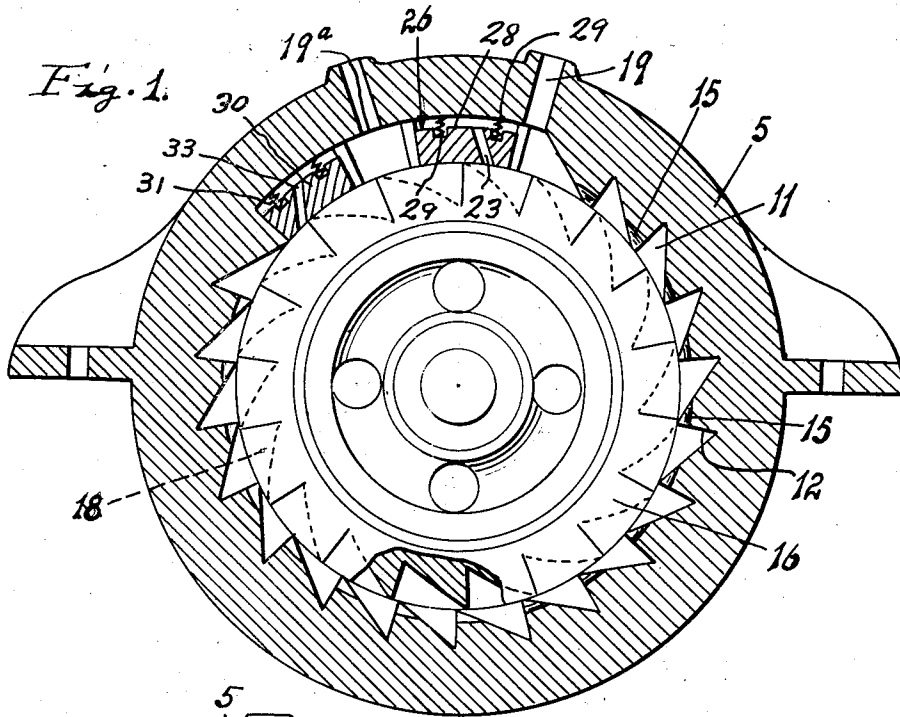
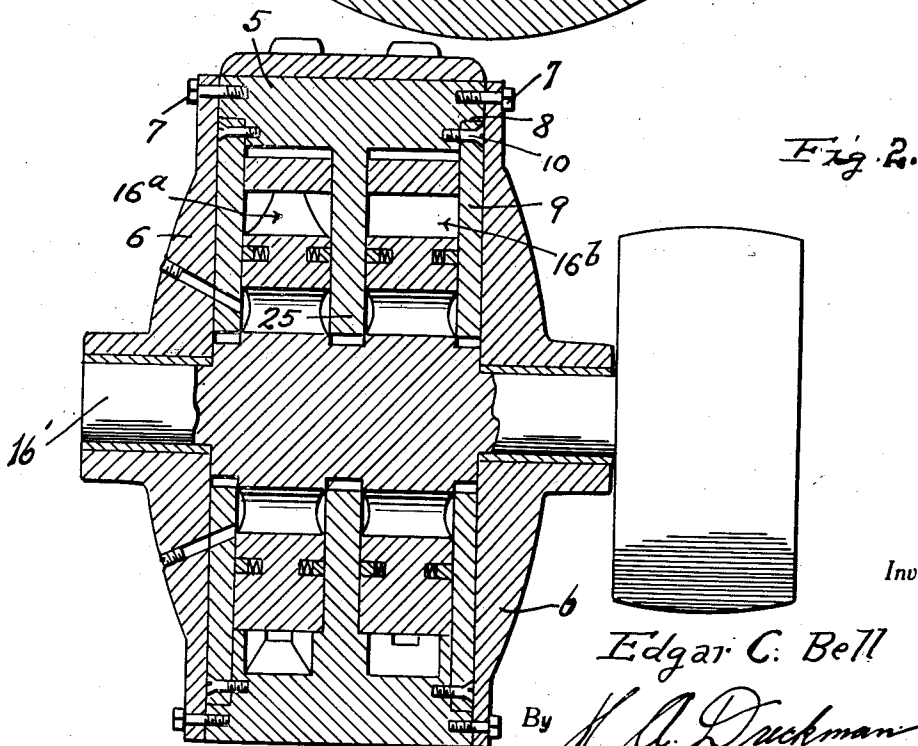
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2,084,667

ROTARY ENGINE

Filed Sept. 10, 1935

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

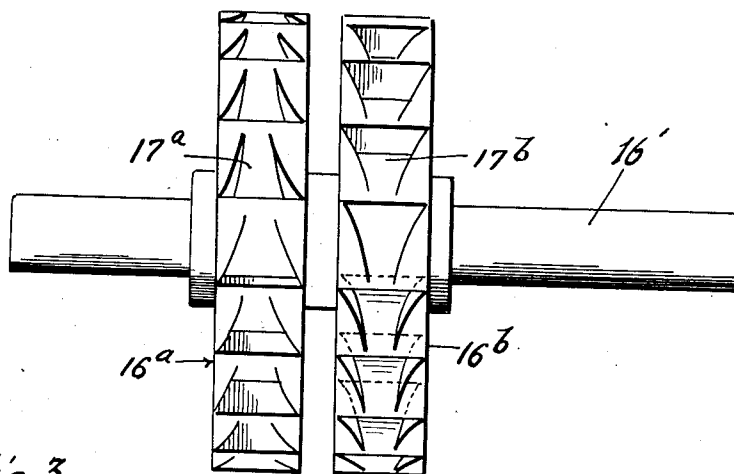
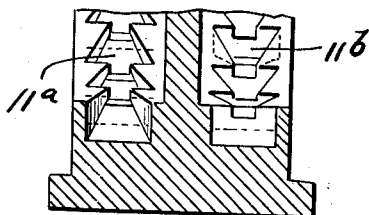


Fig. 3.

Fig. 4.



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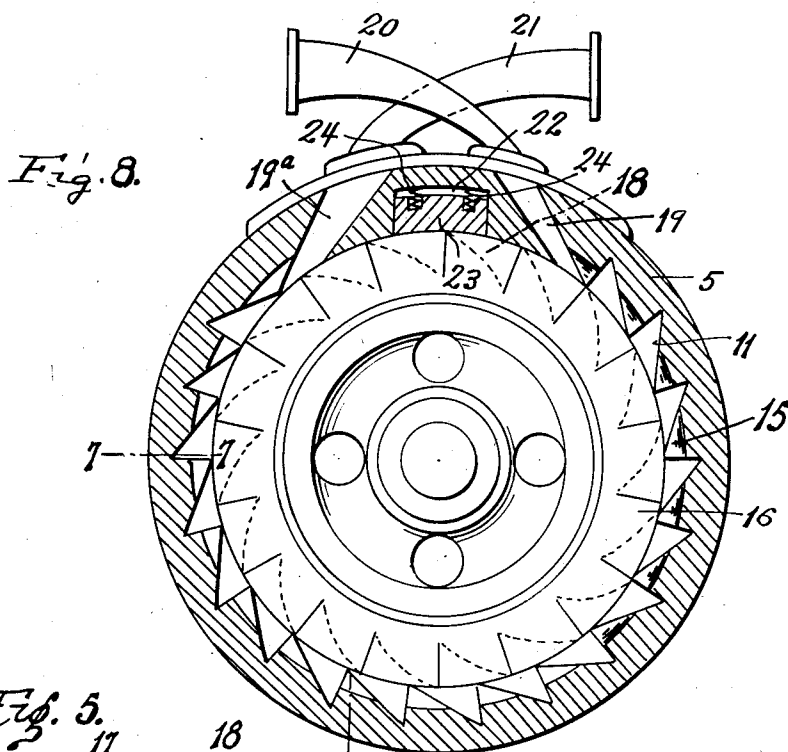
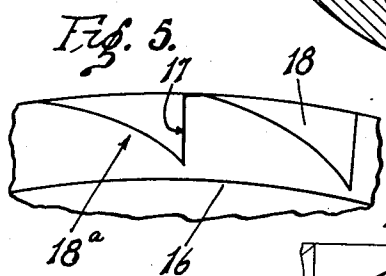
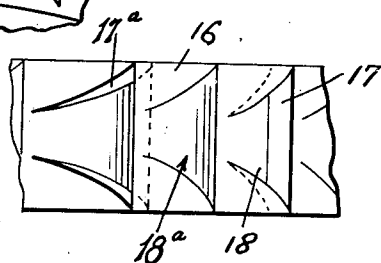
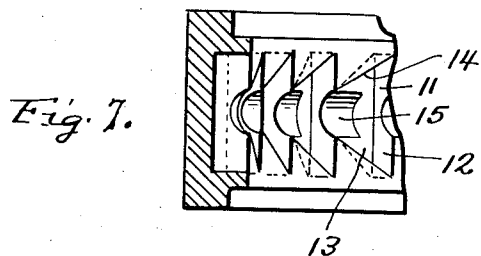
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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ROTARY ENGINE

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Application September 10, 1935, Serial No. 39,916

6 Claims. (Cl. 253—51)

This invention relates to a rotary engine, the prime object of which is to so construct the rotor and stator that the greatest amount of power is derived from the fluid pressure.

5 A further object of the invention is to provide a rotary engine having improved means for directing a stream of steam, compressed air, water or other fluid pressure against abutments carried by the rotor and the wall of the rotor casing simultaneously and driving the rotor selectively in either of two directions.

10 Still another object is to provide an improved engine of the character stated, characterized by simplicity of construction and low maintenance cost.

15 Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description and the appended claims.

20 In the drawings:

Figure 1 is a sectional view through one form of rotary engine embodying the features of the present invention.

25 Figure 2 is a transverse sectional view taken substantially at right angles to Figure 1.

Figure 3 is an elevation of the rotary assembly.

Figure 4 is a detailed sectional view through the casing of the engine.

30 Figure 5 is a fragmentary longitudinal sectional view of the periphery of the rotor.

Figure 6 is a fragmentary plan view of the periphery of the rotor.

Figure 7 is a fragmentary sectional view taken on line 7—7 of Figure 8.

35 Figure 8 is a sectional view of another form of the invention.

A consideration of the drawings will show that in the preferred embodiment of the invention, the rotary engine consists broadly in the provision of a suitable circular casing in which is mounted a rotor. The latter is provided on its periphery with a plurality of pockets, and the casing is provided on its inner wall with a plurality of pockets. The latter pockets cooperate with the pockets in the rotor to insure a positive and efficient drive of the rotor when fluid pressure is directed against abutments formed by the walls of the pockets on the rotor, and the wall of the casing respectively, as will be better appreciated as the description proceeds.

50 In Figures 1-7 inclusive, there is illustrated a rotary engine constructed in accordance with the present invention, and particularly adapted for use as a steam or compressed air engine.

55 The form of invention illustrated in Figure 8 is

particularly adapted for use as a hydraulic engine.

Describing first the form of the invention illustrated in Figures 1-7 inclusive, it will be seen that there is provided a suitable casing which includes an annular or peripheral wall 5, and end walls 6-6 secured to the wall 5 by stud bolts 7. The peripheral wall 5 of the casing is provided on its inner side with a circular series of pockets 11. Each of these pockets is preferably formed by providing a wall 12 extending substantially radially and inwardly to the inner peripheral edge of the wall 5. A pair of side walls 13 converge as they proceed from the wall 12, and the bottom wall 14 is tapered and extends from the base of the wall 12 to the inner circular edge of the wall 5 at a point remote from the wall 12, all of which is best shown in Fig. 7. Further, as the bottom wall of each pocket approaches the inner peripheral or circular edge of the casing wall 5, said bottom wall is transversely curved and cut away, as at 15.

The purpose of the cut 15 is to admit fluid pressure simultaneously to all of the pockets 11. In this connection, it will also be noted that each bottom wall of the pocket 15 extends from its wall 12 to the periphery or inner circular edge of the wall 5 at the point where the wall 12 of the next adjacent pocket merges with the inner peripheral or circular edge of the wall 5.

30 Suitably journaled within the casing is a rotor, indicated generally by the reference numeral 16. This rotor is provided on its periphery with a circular series of pockets 18, which are substantially the same in construction as the aforesaid pockets 11. The end walls 17 of the pockets 18 extend transversely from one side edge to the other of the rotor and also extend radially outwardly to the peripheral edge of the rotor, forming abutment faces for the rotor, it being understood that the shapes of the pockets 18 are such as to enable the fluid pressure to obtain sufficient purchase within the pockets.

In connection with the above, it will be noted that—as shown—the pockets 11 and 18, as well as their respective end walls 12 and 17, are oppositely disposed and it is apparent that when full pressure is directed into the pockets, the rotor will be driven in the direction of the inclination of the bottom walls of the pockets 18, that is, clockwise—as viewed in Fig. 1.

45 Fluid pressure entering the casing 5, as will be subsequently described, enters substantially all of the pockets 11 because of the cuts 15, and the pressure is exerted against the walls 17 and

12, thus driving the rotor in the same manner as a piston head is driven away from the cylinder head in a reciprocating engine.

The side walls 17a and bottom walls 18a of the pockets 18 diverge towards the end walls 17, thus providing an expanding chamber for the fluid pressure. This construction adds materially to the efficiency and proper operation of the engine.

Pressure is delivered to the rotor thru an intake port 19 provided in the wall 5 of the casing. This port 19 is disposed at an angle so as to project steam angularly against the walls 17 of the pockets 18, as these pockets pass into communication with the port 19. The steam passes successively thru the cuts 15 into the successive pockets 11 and in this manner the steam passes thru the engine to discharge thru the exhaust port 19a provided in the wall 5, and this port is arranged at an angle, as shown.

Suitable manifolds 20 and 21 are provided for the respective ports 19 and 19a.

In the form of the invention shown in Figs. 1 and 2, an integral rib 25 is formed with the casing 5. This rib projects inwardly and forms a partition which extends between a pair of rotors 16a and 16b, shown in Fig. 3. These rotors are fixed on a shaft 16' which extends thru the casing and is suitably journaled in bearings integrally formed with the walls 6 of the casing.

In Fig. 3, the pockets 17a and 17b of the rotors 16a and 16b, respectively, are oppositely disposed so that on application of pressure on one rotor, the shaft 16' will be driven in one direction while the application of pressure to the other rotor will drive the shaft in the reverse direction. Thus, I provide a reversible engine adapted to be driven by steam or compressed air—as may be found more desirable.

It will be evident that the rotors in my engine may be compounded for additional power, if desired.

Adjacent the ports 19 and 19a, I provide an internal chamber 26. This chamber is arcuate and extends between the ports 19 and 19a and also somewhat in advance of the port 19a.

A pair of choke blocks 28 and 30 are arranged in the chamber 26. The block 28 is positioned between the ports 19 and 19a and the block 30 is arranged at the side of the port 19a, as shown in Fig. 1. These blocks 28 and 30 are held in yieldable engagement with the periphery of the rotor thru the medium of springs 29 and 31, respectively. Also, each of the blocks is provided with a port 33 extending therethru.

In the form of invention shown in Figs. 1 and 2, steam or compressed air is delivered thru the port 19 and into the pockets 11 and 18, and the steam will expand against the abutment walls of the pocket and will drive the rotor in the desired direction. When in operation, all of the pockets are filled with steam, from the port 19 to the choke block 28. Thus, driving pressure is constantly exerted thruout practically the entire circumference of the rotor. The blocks 28 and 30 will effectively prevent the discharging steam from working back to mingle with the incoming steam, or the compressed air—as the case may be.

Further, it will be noted that any steam in the pockets of the rotor, as these pockets pass under the respective blocks 28 and 30, will escape thru the ports 33 of the blocks and will press against the tops of these blocks, thus assisting in

holding the same tightly against the periphery of the rotor.

To provide steam-tight chambers in the casing, end plates 9 are fitted in grooves in the opposite sides of the wall 5 and these plates are secured in position by countersunk screws 10.

In Fig. 8, I have illustrated a hydraulic engine and the construction of the rotor and casing is the same as previously described, however to prevent the water which discharges thru the exhaust port 19a from seeping back to mingle with the incoming water, I have provided a chamber 22 between the ports 19 and 19a. A choke block 23 is slidably mounted in the chamber and springs 24 bear against the block to urge the same against the periphery of the rotor. The inner face of the block is arcuate so as to conform to the face of the rotor.

It will be noted that in the case of the steam or compressed air engine, the pressure is retained in the casing 5 and consequently against the rotor 16 over substantially the entire circumference of the rotor, that is, the choke block 30 prevents the pressure from freely exhausting from the casing and only that pocket in the rotor which is directly over the exhaust 19a will exhaust steam. The only steam exhausted is in the pocket in the rotor which passes under the exhaust and the pressure in the balance of the pockets of the casing is retained. The pockets in the casing are under constant pressure and consequently no pressure will be exhausted from the engine until the rotor has turned so as to bring a previously filled pocket under the exhaust.

Having described my invention, I claim:

1. A rotary engine including a casing having an intake port and an exhaust port, said ports being spaced apart, said casing being provided with a series of pockets on the inner surface thereof and extending around the casing from one side of the intake port to one side of the exhaust port, a rotor mounted in the casing, provided on its periphery with a circumferential series of pockets for cooperation with the pockets in the wall of the casing, said pockets in the rotor each including a radially extending end wall and side and bottom walls diverging from the periphery of the rotor to said end wall, and pressure check means between the intake and exhaust ports.

2. A rotary engine including a casing having an intake port and an exhaust port, said ports being spaced apart, said casing being provided with a series of pockets on the inner surface thereof and extending around the casing from one side of the intake port to one side of the exhaust port, a rotor mounted in the casing, provided on its periphery with a circumferential series of pockets for cooperation with the pockets in the wall of the casing, said pockets in the rotor each including a radially extending end wall and side and bottom walls diverging from the periphery of the rotor to said end wall, pressure check means between the intake and exhaust ports, a second pressure check means adjacent the exhaust port, said pockets in the casing having inter-communicating cuts whereby pressure is transmitted from one pocket to another, said cuts providing a free exhaust.

3. A rotary engine including a casing, having an intake port and an exhaust port, said ports being spaced apart, said casing being provided with a circumferential series of pockets on the inside thereof, and extending around the casing from one side of the intake port to one side of the exhaust port, each of said pockets having

side walls and a bottom wall, said side walls converging in the direction of the rotation of the rotor and said bottom wall tapering inwardly, a rotor mounted in the casing provided on its periphery with a continuous circumferential series of pockets for cooperation with the pockets in the wall of the casing, each of said last named pockets including side walls, a bottom wall and an end wall, the side and bottom walls tapering from the end wall to the periphery of the rotor.

4. A rotary engine including a casing, having an intake port and an exhaust port, said ports being spaced apart, said casing being provided with a circumferential series of pockets on the inside thereof and extending around the casing to one side of the intake port to one side of the exhaust port, each of said pockets having side walls and a bottom wall, said side walls converging in the direction of the rotation of the rotor and said bottom wall tapering inwardly, a rotor mounted in the casing provided on its periphery with a continuous circumferential series of pockets for co-operation with the pockets in the wall of the casing, each of said last named pockets including side walls, a bottom wall and an end wall, the side and bottom walls tapering from the end wall to the periphery of the rotor, the taper of the walls of the last named pockets being opposite to the taper of the first named pockets.

5. A rotary engine including a casing, having an intake port and an exhaust port, said ports being spaced apart, said casing being provided with a circumferential series of pockets on the inside thereof and extending around the cas-

ing to one side of the intake port to one side of the exhaust port, each of said pockets having side walls and a bottom wall, said side walls converging in the direction of the rotation of the rotor and said bottom wall tapering inwardly, a rotor mounted in the casing provided on its periphery with a continuous circumferential series of pockets for cooperation with the pockets in the wall of the casing, each of said last named pockets including side walls, a bottom wall and an end wall, the side and bottom walls tapering from the end wall to the periphery of the rotor, said pockets in the casing having intercommunicating cuts whereby fluid pressure is transmitted from one pocket to another.

6. A rotary engine including a casing, having an intake port and an exhaust port, said ports being arranged in spaced relation, said casing being provided with a circumferential series of pockets on the inside thereof extending around the casing from one side of the intake port to one side of the exhaust port, said pockets having inter-communicating cuts whereby fluid pressure is transmitted from one pocket to another, said pockets including side and bottom walls, said walls diverging from said cuts, a rotor mounted in the casing provided on its periphery with a continuous circumferential series of pockets for cooperation with the pockets in the wall of the casing, said last named pockets including a radial end wall, a pair of side walls and a bottom wall, said last named side walls and bottom wall diverging from the periphery of the rotor to an end wall.

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