Dec. 13, 1932. J. L. KEMPTHORNE 1,890,612

ENGINE

Filed April 1, 1931

Fig. 1

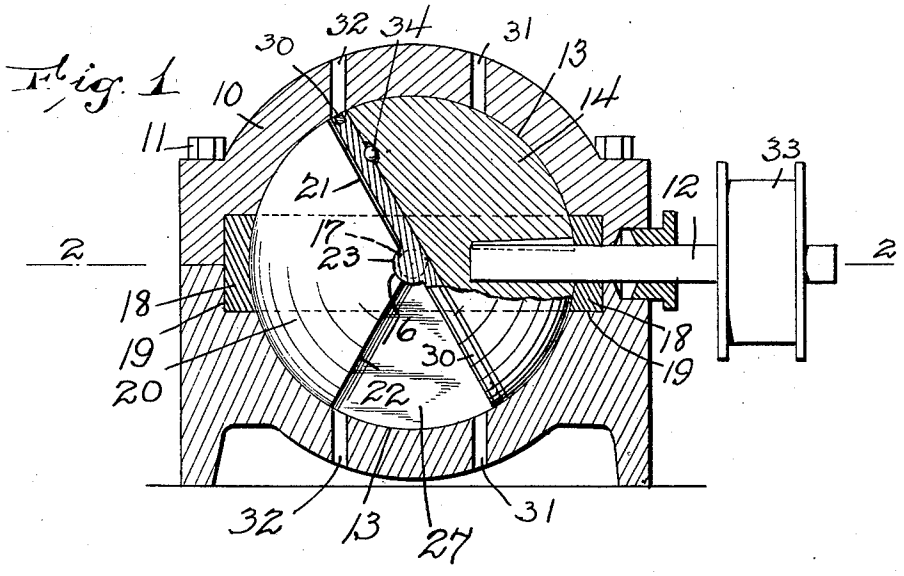
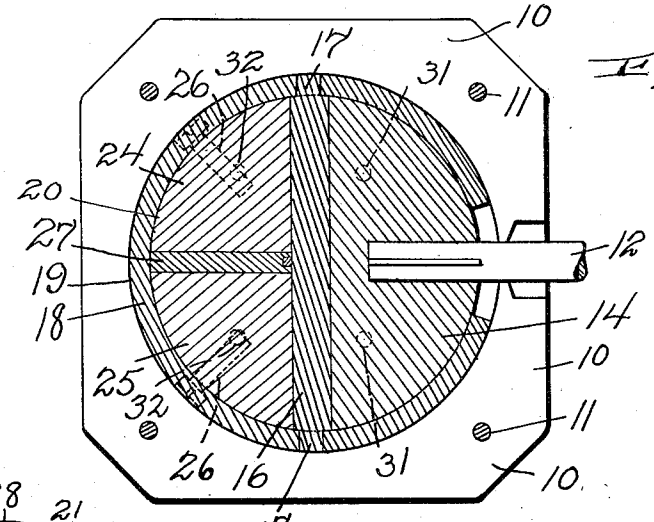


Fig. 2



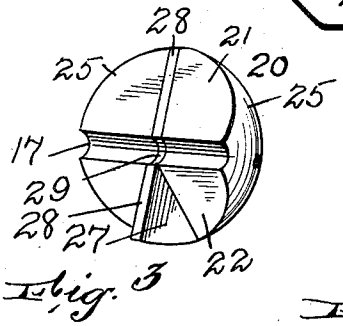


Fig. 3

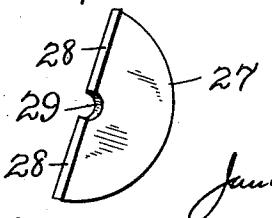


Fig. 4

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Patented Dec. 13, 1932 1,890,612

UNITED STATES PATENT OFFICE

JAMES L. KEMPTHORNE, OF MONTCLAIR, NEW JERSEY

ENGINE

Application filed April 1, 1931. Serial No. 526,814.

This invention relates to an improved engine either as a prime mover or as a pump or compressor. For clear description and understanding I have illustrated and described the engine in this specification as a pump or compressor.

The engine is of the type that employs a rotating member shaped like a segment of a ball and with a flat face inclined to the axis of rotation. This member rotates opposite an abutment which contacts with it across the centre of the spherical opening in which they operate. The abutment in turn is provided with a plate or plates to divide the opening, in conjunction with the abutment of the two main members, into four chambers. These chambers have suitably disposed inlet and outlet ports. This engine is an improvement of my engine illustrated and described in my application on November 25, 1930, Serial Number 497,980.

The objects of this invention are to provide an engine of this type which provides a steady flow of fluid therefrom; one in which a relatively great degree of compression can be provided and one that can be readily adapted for so connecting the chambers as to provide easy compounding or multiplying of pressure.

The invention is illustrated in the accompanying drawing in which Figure 1 is a vertical longitudinal section of an engine embodying my invention and showing the abutment and part of the rotary member in elevation. Figure 2 is a section on line 2—2 in Figure 1. Figure 3 is a reduced perspective view of the abutment and the dividing plate. Figure 4 is a similar view of the dividing plate.

The engine comprises a casing 10 which is conveniently made of two members fastened together by bolts 11. This is for convenience in making and assembling and the division is in line with the axis of rotation of the shaft 12. The members that make up the casing are recessed and when the parts are assembled these recesses form the spherical opening 13.

In this opening and filling a part thereof is a rotary member 14 secured to the shaft 12 by means of which it can be driven. The rotary member has its face arranged at an angle to the axis of rotation. The rotary-member is provided with a face plate 15 which fits the walls of the opening 13 and does not rotate but rocks and gyrates as the rotary member revolves behind it. The plate 15 rocks at its centre on a rib 16 and a pair of end studs 17. These studs are located in the opposite sides of a ring 18 which is arranged in recess 19 in the casing. The ring is free to oscillate. Carried by the ring 18 is an abutment 20 which occupies part of the spherical opening 13 opposite the rotary member and it has two inclined faces 21 and 22 which converge toward the center of the opening and where they join there is a recess to form a seat 23 for the rib 16.

The abutment is made up of two members or pieces shown at 24 and 25 secured as by screws 26 to the ring 18 and therefore oscillatory along with the ring. The abutment can oscillate with the ring but is held against rotation relative to the axis of shaft 12.

Between the two members 24 and 25 is a plate 27 that is free to rock. It abuts on its flat edge 28 on the face of the face plate 15 and is moved by and adjusts itself to the motion of the face plate 15. The plate 27 is recessed at 29 to receive the rib 16.

Suitable sealing devices can be used where necessary. I show a piston ring 30 on the outer face of the face plate 15 as a sealing member at this place.

The casing is provided with inlet ports 31 and outlet ports 32 which are located in each of the four chambers into which the spherical opening is divided by the rib 16 and at right angles thereto by the dividing plate 27. The shaft is driven by a suitable element such as the pulley 33.

When the engine is operated the shaft rotates the member 14 which causes the face plate 15 to gyrate or wobble. The wobbling of the face plate causes the abutment 20 to oscillate in conformity to its movement and it also causes the dividing plate 27 to rock freely in the oscillating abutment.

Suitable anti-friction devices can be incorporated where desired and I show the balls

34 situated between the main part of the member 14 and the face plate 15.

Various changes can be made in the proportions and angles of the parts without departing from the scope of the invention.

I claim:—

1. An engine comprising a casing having a spherical opening therein, a rotatable member partly filling said opening and having a face inclined to its axis of rotation, an abutment opposite the member and also partly filling said opening and spaced from said member except at the central portion thereof where the member and abutment contact, means for supporting the abutment to give it an oscillation to conform to the movement of the rotary member and to hold it against rotation with the rotary member, and a plate mounted so as to rock in said abutment and in contact with the face of the rotary member, and a shaft secured to the rotary member.

2. An engine comprising a casing having a spherical opening, a rotary member filling half the opening and including a face plate at an angle to the axis of rotation, an abutment against which the centre of the face plate abuts, the abutment having inclined faces converging to the centre thereof to contact with the face plate, a ring surrounding the opening and to which the abutment is secured, the ring being free to oscillate whereby the abutment oscillates under the influence of the rotating member but is held against rotation parallel to the plane of rotation of the rotary member, and a plate arranged to rock in the abutment and in contact with the face of the rotary member on both sides of the centre thereof whereby the spherical opening is subdivided into four chambers, and a shaft secured to the rotary member.

3. An engine comprising a casing having a spherical opening therein, a rotary member having an inclined face at an angle to the axis of rotation and bisecting the centre of the opening, an abutment opposed to the rotary member and with faces converging to the centre where they contact with the member and a plate projecting from the abutment and in contact with the inclined face of the rotary member, and free to advance and retreat in contact with said inclined face in its gyration, said abutment and its plate having a limited oscillation in the casing and held by the casing against rotation parallel to the plane of rotation of the rotary member.

In testimony whereof he affixes his signature.

JAMES L. KEMPTHORNE.