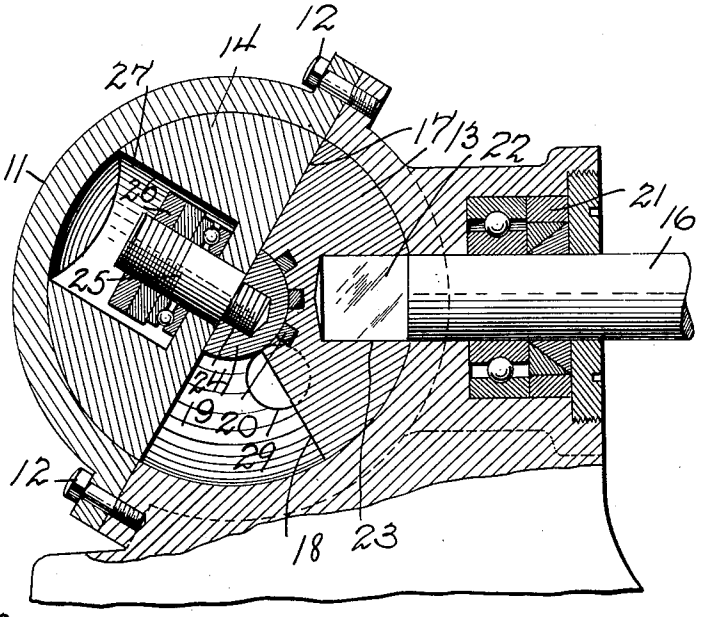
Oct. 17, 1933. J. L. KEMPTHORNE 1,930,480

PUMP AND COMPRESSOR

Filed April 9, 1932

Fig. 1



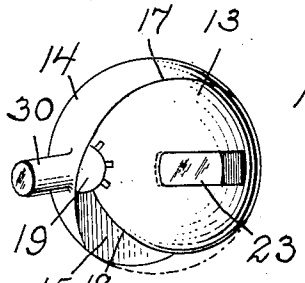
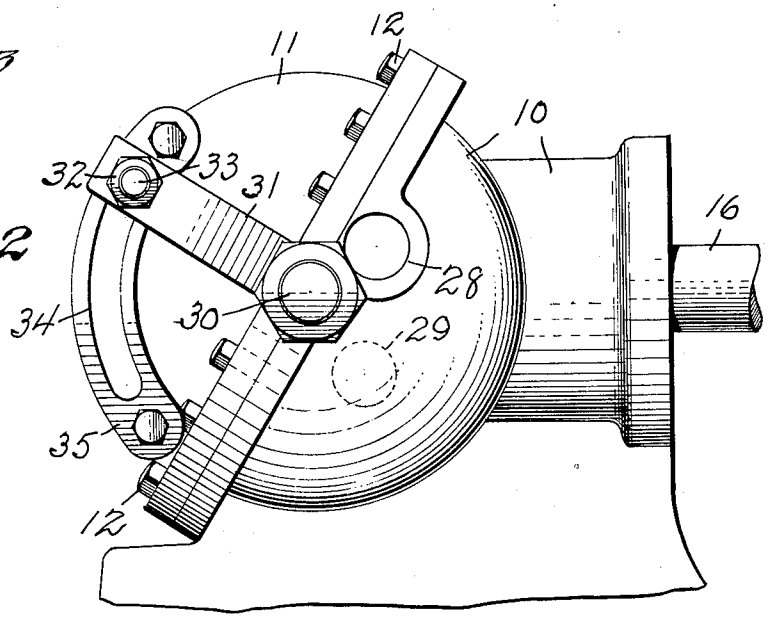


Fig. 3

Fig. 2



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PUMP AND COMPRESSOR

James L. Kempthorne, Montclair, N. J.

Application April 9, 1932. Serial No. 604,179

3 Claims. (Cl. 103—142)

This invention relates to an improved pump, compressor or similar mechanism which operates with great efficiency requiring a relatively small driving power and consisting of a small number of parts.

This machine is of the type illustrated and described in my application for Letters-Patent filed February 24, 1932, Serial Number 594,789, and embodies certain modifications that enable the machine to produce a steady flow to and from the machine. The machine also includes, if desired, an adjustable feature for which it is well adapted. The adjustable feature enables a ready and quick adjustment of the capacity of the device without changing its speed and also makes possible a reversal of flow which also can be adjusted, all this by the same means.

The invention is illustrated in the accompanying drawing in which Figure 1 is a vertical longitudinal section of the device as embodied in a pump but showing the shaft in elevation. Figure 2 is a side view showing the adjusting means. Figure 3 is a perspective view on a reduced scale, this view illustrating the rotor and the abutment that comprise the moving parts of the mechanism.

I show the machine constructed to function as a pump and comprising a casing 10 including a cap piece 11, these parts secured together by means such as the bolts 12.

These parts are shaped on the inside to form a spherical chamber which is occupied at one end by the rotor 13 and at the other end by the abutment 14. The outer faces of these two members are rounded to fit the walls of the chamber but the abutting faces are made to form flat or at least nearly flat faces to co-operate when pressed together to expel a maximum amount of fluid from between the members. These faces for clearness will be described as flat faces.

The flat face 15 of the abutment 14 is inclined relative to the axis of a shaft 16 which rotates the rotor 13. The face 15 extends across the entire area of the abutment and its centre is at the centre of the spherical chamber. The abutment is therefore semi-spherical and occupies one-half the chamber in the casing. The flat faces of the rotor 13 are shown at 17 and 18 and converge toward the centre of the abutment. To form a broad and adequate seal between the abutment and the rotor, in lieu of a knife edge, I introduce a laterally arranged sealing strip 19 extending along the ridge formed across the centre of the rotor and consequently across the face of the abutment. The ends of sealing strip are shaped to fit the wall of the chamber in which the sealing strip rotates with the rotor. Suitable packing 20 can be used to complete the seal between the rotor 13 and the strip 19.

The rotor 13 is connected to the shaft 16 so that they rotate together. The shaft is mounted in the bearing 21 and has a non-circular end 22 which fits into a slot 23 in the rotor 13. The slot 23 extends across the rear face of the rotor and is parallel with the sealing strip 19. In the form shown I illustrate a square end on the shaft. This enables the rotor to rock when rotated by the shaft in order to enable the sealing strip to wipe across or engage the face 15 of the abutment at all points in the rotation of the rotor.

The sealing strip is secured to the abutment member. It is shown secured on the screw-threaded and reduced end 24 of a stud 25. The stud 25 fits in a central opening in the face 15 of the abutment and is secured for easy rotation as by the bearing 26. The abutment is provided with a recess 27 for the reception of the bearing.

The rotor can also be utilized as a means for controlling the admission and expulsion of fluid to and from the casing. The inlet port 28 is shown on Figure 2 and the outlet port at 29 is Figure 1. This is assuming the parts as adjusted in the drawing and the rotor rotating counter-clockwise looking from the shaft toward the rotor.

The abutment piece can be adjusted not only to vary the capacity of the pump without affecting the speed but also to reverse the pump without changing the direction of rotation of the rotor. The form shown embodies a stud 30 on the abutment 14 and projecting through the casing where it is secured to a lever 31. The lever 31 is held in adjusted position by a clamping screw or nut 32 on a bolt 33. The bolt passes through an arcuate slot 34 in a fixed plate 35.

In operating the device the shaft is rotated which rotates the rotor held against the flat face of the abutment because its rear bulged face fits the curvature of the spherical casing. As the rotor rotates from the position shown in Figure 1 it adapts itself to the inclination of the face 15 this being possible by reason of the slot 23. The slot enables the rotor to move in a plane vertical to the face 15 as the strip 19 moves to and from the vertical position it assumes in its rotation past the vertical centre of the chamber. The strip 19 when horizontal, as in Figure 1, extends from side to side. When it has moved a quarter revolution it is inclined along the face 15 and both faces 17 and 18 are spaced from the

face 15. As the rotor completes a half revolution the strip 19 is again horizontal, the previously separated faces 18 and 15 are close together, and the previously closed faces 15 and 17 are separated.

When the lever 31 or other means is moved to shift the abutment 14 as to its angle the face 15 is moved toward the vertical. This prevents close contact of the faces 17 and 18 with the face 15 and the capacity is reduced. When the abutment is moved far enough to bring the face 15 over the centre and incline it to the other side of the centre at the top and bottom from the position shown in the drawing, the pump is reversed. The port 28 is then the outlet opening and the port 29 is the inlet opening.

Various modifications in the form and proportion of the parts can be made without departing from the scope of the invention.

I claim:—

1. A pump, compressor or like mechanism comprising a casing having a spherical chamber therein, an abutment occupying one-half the chamber, a rotor occupying a portion of the other half and having faces converging toward the centre of the abutment whereby a diametrically disposed contact is established between the rotor and the abutment, and a shaft connected to the rotor for rotating it, said rotor having loosely fitting means for receiving the shaft in order that the rotor may rock and thus conform to the curved face of the chamber while rotating the casing having inlet and outlet ports.

2. A device as set forth in claim 1 in which the abutment is provided with means for pivotally securing it in the chamber, said means causing the tilting of the abutment to both sides of the centre whereby the direction and quantity of flow of fluid passing through the pump may be regulated.

3. A device as set forth in claim 1 and provided with a sealing strip extending diametrically across the face of the abutment and interposed between the abutment and the rotor, and means for rotatably securing the sealing strip to the abutment.

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