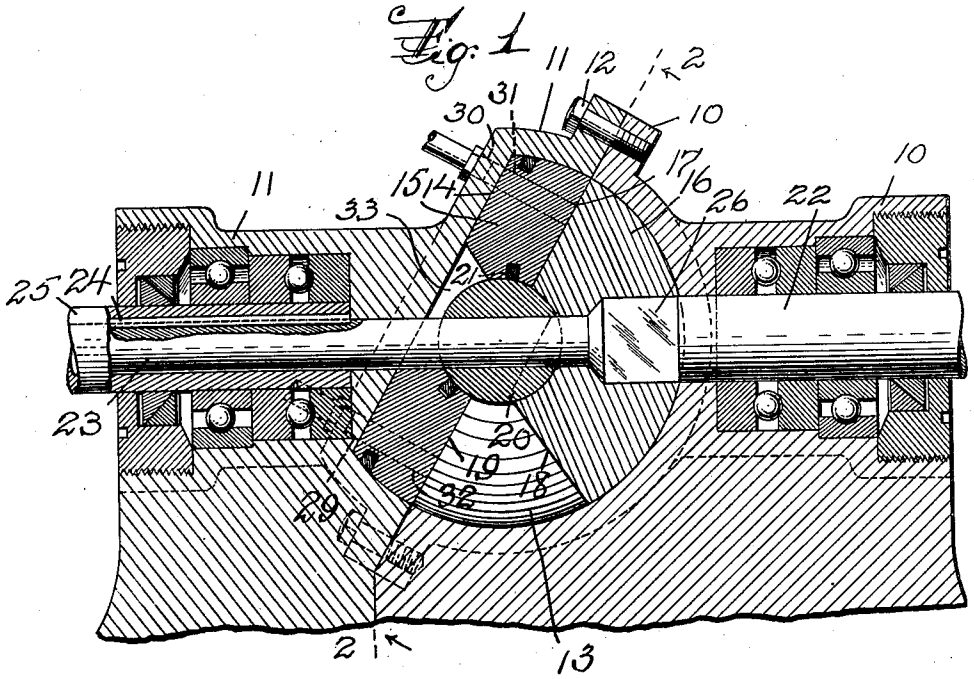
July 10, 1934. J. L. KEMPTHORNE 1,965,976

MECHANISM FOR PUMPS, COMPRESSORS, AND THE LIKE

Filed April 16, 1932

Fig. 1



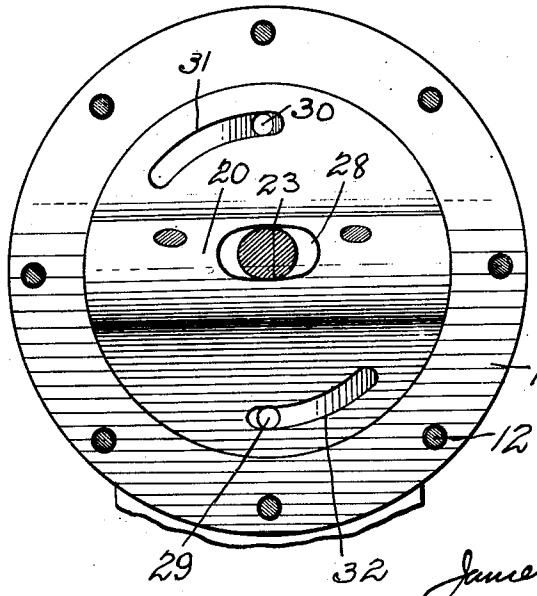


Fig. 2

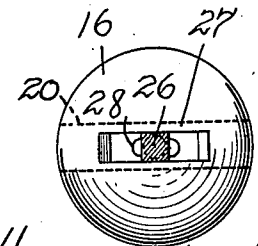


Fig. 3

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MECHANISM FOR PUMPS, COMPRESSORS, AND THE LIKE

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Application April 16, 1932, Serial No. 605,662

4 Claims. (Cl. 103—142)

This invention relates to an improved pump, compressor, engine or similar mechanism which is of the type illustrated and described in my application for Letters-Patent, filed February 24, 1932, Serial Number 594,789.

The object of the invention is to provide a mechanism construction to utilize one of two rotatable members as a means for controlling the entrance and expulsion of fluid to and from the machine. A further object of the invention is to provide a mechanism readily connected to a similar mechanism whereby they can be operated in tandem position.

The invention also resides in various details of construction to be hereinafter more fully described and finally embodied in the claims.

The invention is illustrated in the accompanying drawing in which Figure 1 is a vertical longitudinal central section of one form of device embodying my invention. Figure 2 is a section on line 2—2 in Figure 1 but showing one of the members completely in elevation. Figure 3 is a rear view of the rotor of the device but on a reduced scale.

The casing of the machine is shown as formed of two complementary members 10 and 11 secured together by bolts 12 and recessed to form a semi-spherical opening 13 in the member 10 and a circular flat opening 14 in the member 11. In the latter is a rotatable disc or abutment 15. In the semi-spherical recess is the rotor 16 which has converging faces 17 and 18. These faces converge toward the centre of the face 19 of the abutment. The central juncture between the rotary abutment and the rotor is sealed by a cylindrical sealing rod or strip 20 both members being recessed ot receive the strip 20. Sealing rings 21 may be employed to insure a tight joint. The rotor is secured to rotate with a shaft 22 which extends from one end of the casing or at one end it can be reduced in diameter as at 23 and secured by a feather or key 24 to a shaft 25 of an adjacent unit when two machines are to be directly connected. The shaft 22 is provided with a square or polygonal part 26 where it engages the rotor to turn the latter. The rotor has a slot 27 to receive the square part of the shaft 22. The slot 27 is parallel to the sealing rod or strip 20. The part of the rotor adjacent the square portion 26 is also slotted as at 28 for allowing movement of the rotor which movement is lateral relative to the axis of the shaft and for the purpose which will be described hereinafter.

The casing member 11 is provided with an inlet port 29 and an outlet port 30. The rotary abutment has ports, 31 and 32 which are of a pre-determined length to control the duration of opening and closing of the ports 29 and 30.

The abutment 15 is provided with a tapered opening 33 at the centre where the shaft passes through. This allows for the rotation of the abutment which rotates at an angle inclined relative to the axis of the shaft.

In the operation of the machine the rotation of the shaft 22 causes the rotor to turn. The rotor 16 rotates the sealing strip 20 and the abutment 15 with it. As the rotation begins from an assumed position shown in Figure 1 the rotor moves laterally while rotating which lateral movement is possible by reason of the slot 27. This movement, lateral relative to the axis of the shaft, causes the rotation of the rotor to force the face 18 toward the abutment 19 to force fluid out through the port 32 in the abutment 15 and through the port 29 and thus from the machine. At the same time the surface or face 17 moves from the abutment face 19 and thus opens the space to draw liquid into the machine through ports 30 and 31. As the rotor proceeds in its turning movement past a half-rotation the same thing occurs and there is an expulsion by the face 17, now at the bottom part of the machine and a suction by the face 18 now at the top part of the machine. These terms top and bottom are employed for clear description, assuming the machine to be placed as in the drawing.

While I have described the device as a pump or compressor it will be evident that the mechanism can be adapted for use in a prime mover. It can be used as an air, steam or internal combustion engine. The ports 31 in the abutment can be utilized as cut-offs especially in the use of steam, thus utilizing the expansion thereof in operating the device as an engine. With several units in line, with different starting angles in each, a smooth running set of engines practically without vibration can be set up. In practice I find that a single unit operates without appreciable vibration and is powerful.

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

I claim:—

1. A mechanism of the kind described, comprising a casing having a chamber therein with a wall semi-spherical at one side and shaped to rotatably receive a disc-like abutment on the other side, a disc-like abutment in the latter side with one face inclined and in a plane passing

through the centre of the semi-spherical wall, a rotor in the semi-spherical part of the chamber, the rotor having faces converging toward the center of the abutment thereby providing a fluid working space in said chamber, a diametrically disposed rib between the rotor and the abutment, a shaft connected to said rotor to rotate the rotor and having co-operating means to allow movement of the rotating rotor in a transverse direction relative to the axis of the shaft, and inlet and outlet passages leading to said working space and alternately opened and closed by said rotating abutment.

2. A mechanism of the kind described, comprising a casing having a chamber therein with a wall semi-spherical at one side and shaped to rotatably receive a disc-like abutment on the other side, a disc-like abutment in the latter side with one face inclined and in a plane passing through the centre of the semi-spherical wall, a rotor in the semi-spherical part of the chamber, the rotor having faces converging toward the center of the abutment thereby providing a fluid working space in said chamber, a sealing rod interposed between the rotor and the abutment to form a closure between them diametrically across the centre, a shaft connected to the rotor for operating the rotor, the rotor being slotted to allow lateral movement of the shaft, and inlet and outlet passages leading to said working space and alternately opened and closed by said rotating abutment.

3. A mechanism as set forth in claim 1 and having the casing and the abutment equipped with ports for controlling the inward and outward flow of fluid, and means for rotatably connecting the abutment and the shaft.

4. A mechanism of the kind described comprising a casing having a chamber with a semi-spherical wall, a rotor arranged against the wall and having converging flat faces, an abutment with a flat face rotatably positioned in said chamber and providing with said rotor faces a fluid working space, the locality of the convergence of the walls of the rotor and the opposed face of the abutment having diametrically arranged recesses, a cylindrical sealing strip in said recesses whereby the abutment is rotated with the rotor, and a shaft for rotating the rotor, the rotor having a slot for the shaft to allow the rotor to rock on the shaft when the rotor rotates, said casing and abutment being provided with inlet and outlet passages leading to said fluid working space.

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