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MECHANISM FOR USE IN PUMPS, COMPRESSORS, AND ENGINES

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This invention relates to an improved mechanism for use in pumps, compressors and engines and is of the type that utilizes a segmental rotor in a semi-spherical chamber of a casing, the rotor having connection with a shaft.

One object of the invention is to provide a mechanism which allows compression in the chamber of the machine to reach a proper degree before opening the exhaust port, thus preventing the head pressure from rushing in. In this way the efficiency of a compressor made according to my invention is increased.

Another object of the invention is to provide a larger outlet port and thus increase the efficiency of the mechanism as a pump.

A still further object of the invention is to provide a construction that enables better timing when the mechanism is installed as an engine.

Another object of the invention is to furnish a mechanism of few parts, that can be economically manufactured and can be easily and quickly assembled or repaired.

The invention is illustrated in the accompanying drawings in which Figure 1 is a vertical central section of a device embodying my invention and in which the rotor and the shaft are shown in elevation. Figure 2 is a section on line 3—2 in Figure 1. Figure 3 is a rear view of the rotor detached and showing the end of the shaft in section.

The casing is provided with a central semi-spherical chamber. The form of casing shown comprises a member 10, having a curved inner face 11 and a flat member 13 secured by bolts 12 to the member 10. The flat member 13 acts to hold a plate 14 which is freely rotatable in the machine. It is shown supported on its inner face at the edges by the shoulder 15 of the member 10. Secured to the inner face of the plate 14 is a sealing strip 16. The sealing strip is preferably half-round in cross-section with its flat face against the plate 14. The strip is placed across the diameter of the plate 14 and the screws 17 represent a means for fastening the strip 16 to the plate 14.

The rotor 18 is segmental, being of less mass than a hemisphere, having a rounded face 19 to bear against the rounded inner face 11 of the chamber in the casing. The rotor has a diametrically arranged recess 20 which bears against the sealing strip 16. The rotor also has convergent faces 21 and 22 which co-operate with the plate 14 to form compression chambers in succession as the rotor rotates. The shaft 23 rotates in the casing and engages the rotor 18.

The shaft rotates on an axis which is inclined relative to the plane of the plate 14. The connection between the rotor and the shaft is such as to cause the rotor and shaft to rotate together while it also allows the rotor lateral movement relative to the shaft as the rotor conforms to the angle of the plate 14. A simple form is shown which comprises a slot 24 in the rotor which slot is parallel with the sealing strip 16 and a square end 25 on the shaft which end fits the slot to insure their rotation together.

The casing is provided with a suitable inlet port 26 and a suitable outlet port 27. The rotatable plate 14 has suitable openings 28 and 29 which serve to alternately register with the ports 26 and 27 of the casing. The shape and dimensions of the ports will vary with requirements of the particular installation but the usual procedure is to elongate the ports 26 and 27 to give adequate and proper timing of the duration of opening. The ports 28 and 29 can be made round or given any other suitable shape.

In operation the shaft and rotor rotate together and the rotor by its engagement with the sealing strip 16 of the plate 14 causes the rotation of the plate. The plate by its openings 28 and 29 controls the inlet and exhaust of fluid. The rotor as it revolves moves first one and then the other of the faces 21 and 22 toward the plate 14 and thus expels the contents of the space between the faces and the plate successively through the outlet 27. The faces after leaving the outlet position move away from the plate 14 while rotating and successively draw in fluid through the port 26 when it is uncovered by the opening in the plate 14.

The rotation of the plate 14 by the rotor with the ports and outlet properly disposed enables the opening of the outlet 27 to be delayed until the compression in the compressor is higher than the head pressure against which the compressor is operating. This prevents any passage of fluid back into the compressor when the port opens. The location of these ports and openings can also be determined to produce proper timing when the device is used as an engine operated by steam or air or as an internal combustion engine and also to provide larger ports when the device is used as a pump.

It will be evident from this description that the plate 14 and the rotor are moved together by the co-operation resident in such connection as is supplied by the sealing strip 16 and the operation of these parts are not affected no matter which one of these elements is the driving member.
instance, plate 14 can be positively rotated and thus cause the rotation of the rotor in this way.

Various changes may be made in the size and shape of the parts without departing from the scope of this invention.

I claim:

1. A mechanism comprising a casing having a semi-spherical chamber therein, a rotatable plate forming the flat wall of said chamber, a semi-cylindrical sealing strip secured on the inner face of the plate, and diametrically disposed thereon, a rotor of segmental shape having converging flat faces and recessed across its diameter to fit the sealing strip, a shaft rotatable on an axis inclined to the plane of the plate, and co-operative means connecting the rotor and the shaft to allow lateral movement of the rotor in the casing while rotating with the shaft, the casing having ports to control the inlet and outlet of fluid from the chamber.

2. A mechanism comprising a casing having a semi-spherical chamber therein, a rotatable plate forming the flat wall of said chamber, a semi-cylindrical sealing strip secured on the inner face of the plate, and diametrically disposed thereon, a rotor of segmental shape having converging flat faces and recessed across its diameter to fit the sealing strip, a shaft rotatable on an axis inclined to the plane of the plate, the rotor having a slot on its rounded face and parallel with the recess, the shaft having a square end to fit said slot, the casing having ports to control the inlet and outlet of fluid from the chamber.

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