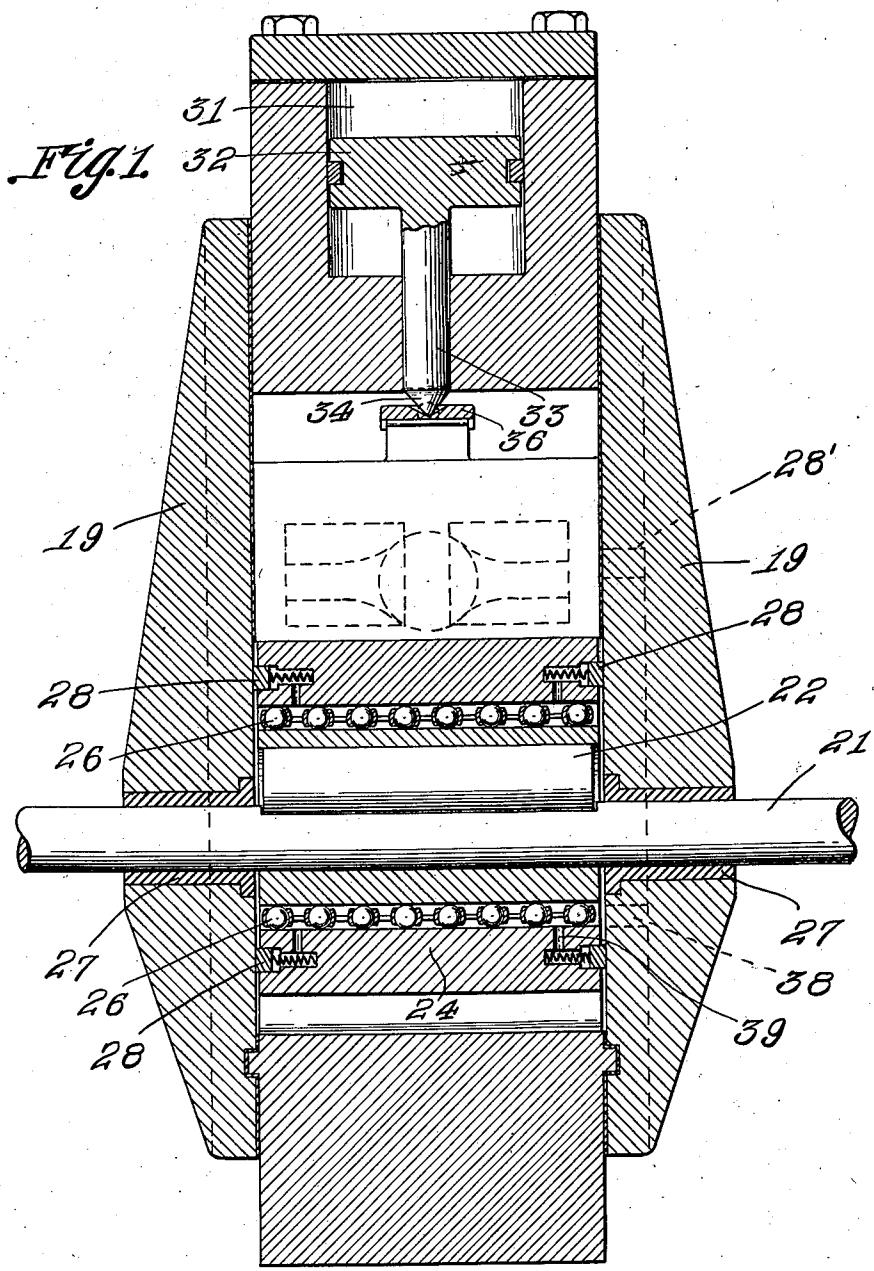
April 5, 1927. 1,623,378

W. W. BAVINGTON

COMPRESSOR

Filed Jan. 2, 1926 3 Sheets-Sheet 1

Fig. 1.



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COMPRESSOR

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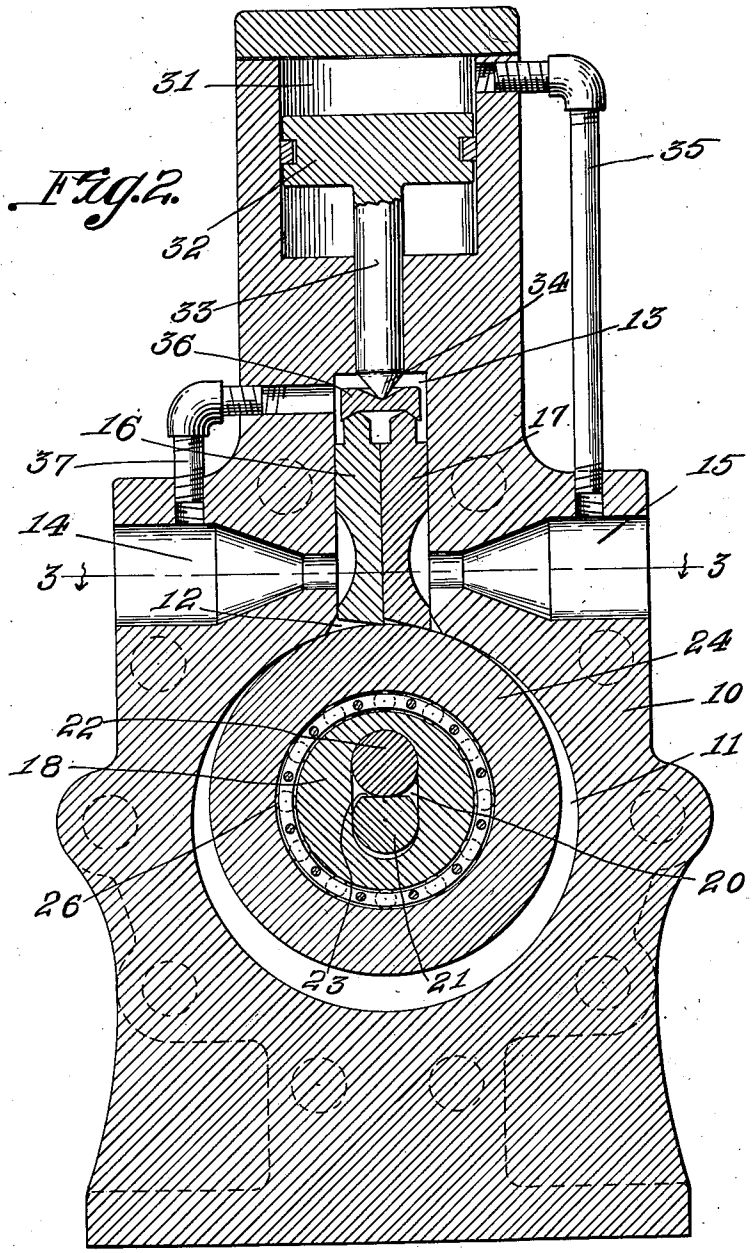
Fig. 2.



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COMPRESSOR

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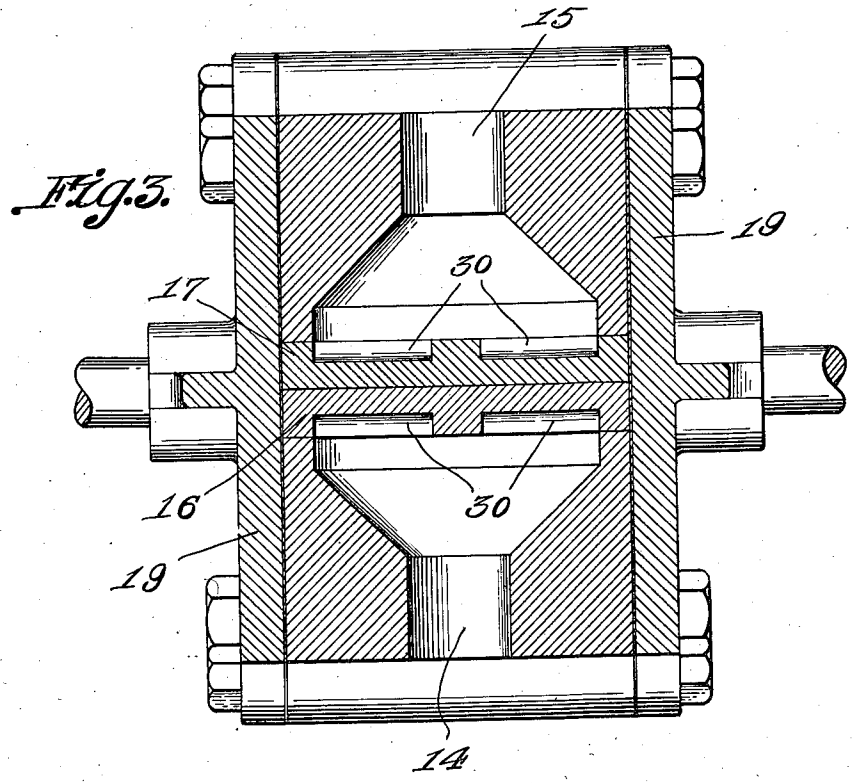

Fig. 3.

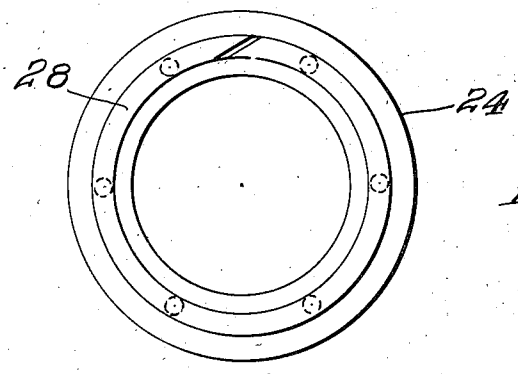

Fig. 4.

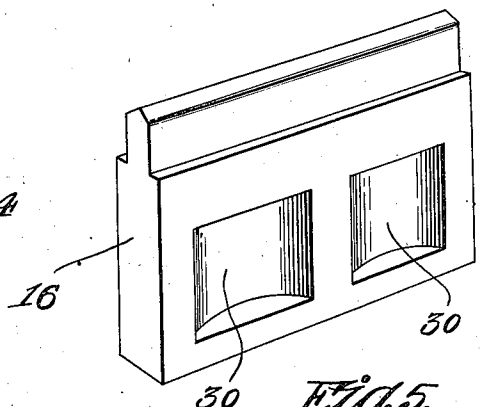

Fig. 5.

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Patented Apr. 5, 1927.

1,623,378

UNITED STATES PATENT OFFICE.

WALTER W. BAVINGTON, OF OKMULGEE, OKLAHOMA.

COMPRESSOR.

Application filed January 2, 1926. Serial No. 78,953.

This invention relates to rotary pumps, compressors or the like, and wherein rotary motion is utilized for pumping or handling the fluid in the desired manner.

The chief characteristic of the present invention resides in the fact that the efficiency of the pump does not depend upon its speed or centrifugal force, being capable of discharging its full capacity regardless of its speed, as well as automatically compensating for wear which might occur on the working parts.

Another important object resides in the use of valves for controlling the inlet and outlet ports of the pump, the valves being actuated by a rotor operated within the cylinder, and which valves are constantly maintained in contacting engagement with the periphery of the rotor by the fluid handled by the pump.

Figure 1 is a vertical longitudinal sectional view.

Figure 2 is a vertical transverse sectional view.

Figure 3 is a sectional view on line 3—3 of Figure 2.

Figure 4 is an end view of the rotor showing the arrangement of the packing rings.

Figure 5 is a perspective view of one of the valves.

Referring to the drawings in detail, 10 indicates a casting which is bored to provide a cylinder 11 which communicates through an opening 12 with a valve chamber 13. The inlet port is indicated at 14 and communicates with one side of the chamber 13, while the outlet port is indicated at 15 and leads from the other side of the chamber as clearly shown in Figure 2. Valves of any suitable construction are employed for controlling communication between the respective inlet and outlet ports through the cylinder 11, these valves preferably being in the nature of slide valves indicated at 16 and 17 respectively and arranged to operate in the chamber 13. These valves are actuated or controlled in a manner to be hereinafter described.

Arranged within the cylinder 11 is an eccentric 18 which is longitudinally slotted throughout its entire length, the eccentric also being coextensive in length with the cylinder, the ends of the latter being closed by the heads 19 of the structure clearly shown in Figure 1. The slot in the eccentric is indicated at 20 and this slot is provided to receive the power shaft 21 and a comparatively short shaft 22. The latter extends throughout the entire length of the cam as shown in Figure 1. The power shaft 21 is preferably provided with a flat side or portion 23, thus defining a recess to receive the shaft 22, the latter reposing upon the flat side 23 as clearly illustrated in Figures 1 and 2. This construction and arrangement of parts is employed to rotate the eccentric 18, motion being transmitted from the latter to the rotor 24. The rotor 24 is arranged in spaced concentric relation about the eccentric 18, and interposed between these parts is an annular series of anti-frictional rollers 26 by means of which motion is transmitted from the eccentric to the rotor, causing the latter to roll about the cylinder 11. In other words when power is applied to the shaft 21, the latter will have a tendency to revolve in its bearings 27, but inasmuch as the shaft 22 reposes upon the flat side 23 of the power shaft, the said shaft 22 will be moved with the shaft 21 causing the eccentric 18 to rotate, this motion being transmitted through the roller bearings 26 to the rotor as above stated. The flat side or portion 23 of the shaft 21 acts as a wedge trying to pass the shaft 22, thus causing the rotor to be constantly moved outwardly against the wall of the cylinder. This movement of the rotor also automatically compensates for any wear which might occur in any of the working parts. This fact coupled with the fact that the opposite ends of the rotor are equipped with spring pressed packing rings 28 effectively held in contacting engagement with the adjacent heads 19, provide for a leak proof structure. By the use of anti-frictional bearings 26, it will be noted that the rotor does not revolve within the cylinder which would cause unnecessary sliding friction, but on the contrary rolls around the cylinder, thus only having rolling friction to contend with. The pump can be rotated in either direction, and the valves arranged to permit of this reverse movement of the rotor.

The valves 16 and 17 respectively are of the sliding type, operating within the chamber 13 and having their adjacent sides or faces in contacting engagement. The outer side of each valve is formed with spaced recesses 30, so that when either valve is lowered or moved within the cylinder, communication is established between the adjacent

port and said cylinder through the particular recess. These valves are actuated or controlled by the rotor 24, having their lower ends constantly contacting the periphery of the rotor, so that as the latter moves away from the top portion of the cylinder wall, or in other words from the position which it occupies in Figure 2, the valves are allowed to enter the cylinder to establish communication between the respective port and the cylinder in the manner above stated.

In practice, the fluid to be handled by the pump or compressor is admitted through the inlet port 14, and when the high point of the rotor passes the valves, both of the latter will slide partly within the cylinder, thereby allowing the fluid to enter the cylinder behind the rotor. At the same time whatever fluid is being driven ahead of the rotor will escape or pass out through the port 15, the valve always being in contact with the periphery of the rotor. For this purpose, I provide a structure with a small cylinder 31 in which operates a sliding piston 32, the latter including a stem 33 which enters the chamber 13 and terminating to provide a pointed extremity 34. A certain amount of fluid handled by the pump is conveyed to the cylinder 31 through a pipe 35 which establishes communication between the outlet port 15 as clearly illustrated in Figure 2, thus we have the same pressure on the piston 32 as the discharge pressure at one side of the pump. The pressure in the cylinder 31 operating upon the piston 32 holds the latter downwardly so that the valves 16 and 17 are maintained in constant engagement with the periphery of the rotor 24. The action of the valves is such that they are not always even, that is to say that one or the other will be slightly higher or lower than the other, but in order to provide an equal pressure from the piston on both of these valves, I employ a link 36 designed to straddle the upper ends of the valves, and formed with a central depression to receive the pointed extremity 34 of the piston rod 33, the link 36 is flexible for the purpose just stated.

When pumping air or any gas, oil will also be forced through the opening 28' against the ends of the valve, thus making a perfect oil seal against leakage. As any of this oil finds its way into the chamber 13, it will be drained therefrom through a pipe 37 and returned to the suction. Oil being fed into the cylinder through the suction will also form a seal at the line of exit, between the cylinder and discharge valve, and this oil forces out all of the gas to prevent any expansion. Oil will also pass through the small ports 38 and 39 to maintain the adjacent working parts properly lubricated. Should any pressure within the cylinder 31 find its way down into the chamber 13, it will pass therefrom through the pipe 37 into the port 14.

While it is believed that from the foregoing description, the nature and advantages of the invention will be readily apparent, I desire to have it understood that I do not limit myself to what is herein shown and described, and that such changes may be resorted to when desired as fall within the scope of what is claimed.

Having thus described the invention, I claim:

1. In a pump, a cylinder having inlet and outlet ports at the opposite sides thereof, an eccentric arranged to rotate within the cylinder, a rotor disposed in spaced concentric relation to said eccentric, anti-frictional bearings positioned between the eccentric and said rotor, means including said bearings for transmitting motion from the eccentric through the rotor, causing the latter to roll about the cylinder, a valve chamber arranged above the cylinder and communicating therewith, slide valves operating in said chamber and controlling communication between said ports and said cylinder, a drain pipe establishing communication between the valve chamber and the inlet port of the cylinder, a second cylinder disposed above said chamber, a piston arranged to operate in the last mentioned cylinder, means for conveying a pressure from the outlet side of the pump to the second mentioned cylinder to hold the piston depressed, and a connection between the piston and said valves whereby the latter are constantly maintained in contacting engagement with the periphery of the rotor as and for the purpose specified.

2. In a pump, a cylinder having an inlet and outlet port at the opposite sides thereof, an eccentric arranged to rotate within the cylinder and longitudinally slotted, a rotor disposed in spaced concentric relation with said eccentric, anti-frictional bearings positioned between the eccentric and said rotor, a power shaft passed through said eccentric and having a flat side, a second shaft arranged within the slot of said eccentric and reposing upon the flat side of said power shaft, whereby said rotor through the instrumentality of said bearing is caused to roll about the cylinder, a valve chamber communicating with said cylinder, slide valves operating in said chamber to control communication between the ports and said cylinder, said valves being actuated by said rotor, a drain pipe establishing communication between the valve chamber and the suction side of the pump cylinder, and pressure actuated means for holding said valves in constant engagement with the periphery of said rotor as and for the purpose specified.

In testimony whereof I affix my signature.

WALTER W. BAVINGTON.