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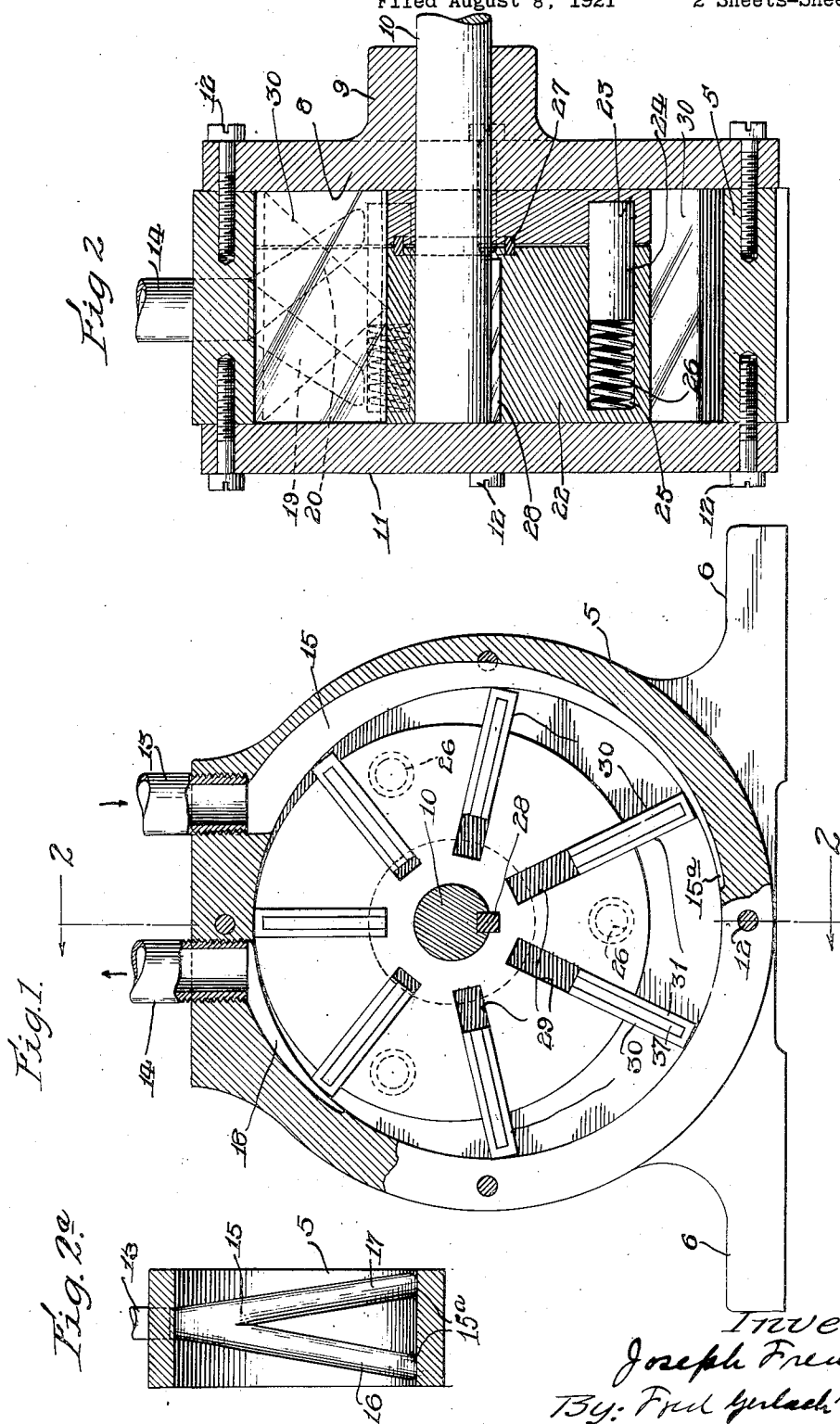
1,582,922

J. FREUD

ROTARY PUMP

Filed August 8, 1921

2 Sheets-Sheet 1



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Fig. 4.

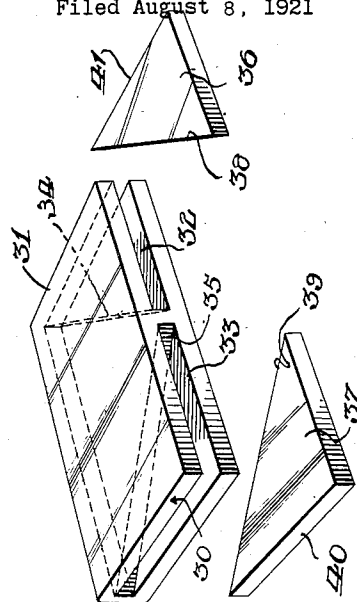
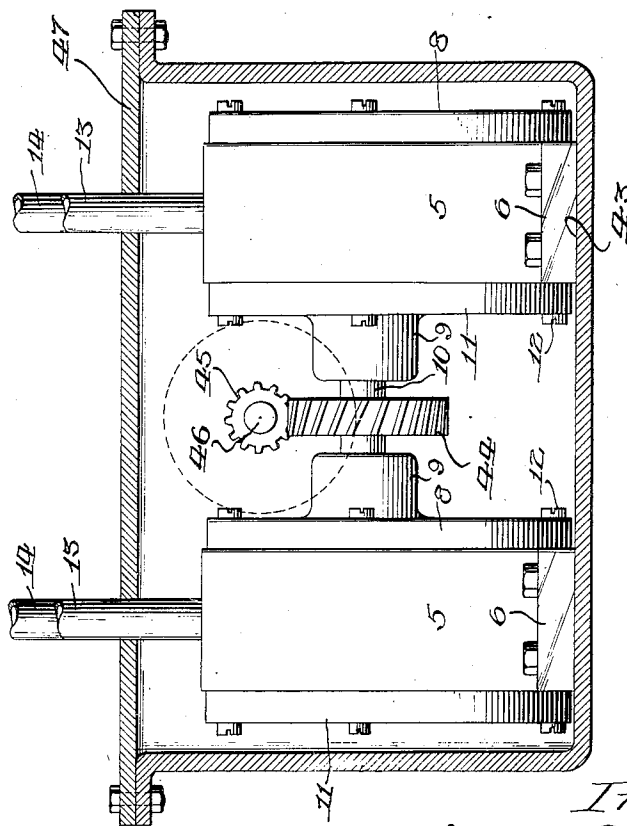


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH FREUD, OF CHICAGO, ILLINOIS.

ROTARY PUMP.

Application filed August 8, 1921. Serial No. 490,550.

To all whom it may concern:

Be it known that I, JOSEPH FREUD, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a full, clear, and exact description.

The invention relates to rotary pumps.

One object of the invention is to provide an improved rotary pump in which the vanes are composed of relatively movable sections with provision for lateral deflection to cause the sides of the vane to frictionally engage the sides of the cylinder and prevent leakage of the fluid between the rotor and the ends of the cylinder. Another object of the invention is to provide a structure in which a plurality of pumps are driven in a case containing lubricant. Other objects of the invention will appear from the description.

The invention consists in the several novel features hereinafter set forth and more particularly described in claims at the conclusion hereof.

In the drawings: Fig. 1 is a transverse section of a rotary pump embodying the invention. Fig. 2 is a longitudinal section. Fig. 2^a is a longitudinal section, slightly reduced, showing the portion on the inlet which communicates with the cylinder, the rotor and vanes being omitted. Fig. 3 is a section showing a plurality of pumps mounted in a case adapted to contain lubricant. Fig. 4 is a detail perspective of one of the vanes, the sections being separated for illustrative purposes.

The pump casing comprises a cylinder 5 provided with lugs 6 whereby it may be secured in a case 43, a head 8 which is provided with a bearing 9 for a drive shaft 10 and a head 11, said heads being secured to the cylinder by screws 12. An inlet pipe 13 for admitting fluid is connected to the top of the cylinder and an exhaust pipe 14 for the escape of fluid under pressure from the cylinder is also connected to the top of the cylinder. The lower end of the inlet pipe 13 is in communication with a groove 15 which extends from the pipe circumferentially around the cylinder in gradually de-

creasing depth and which is provided with oblique branches 16 and 17, the branches terminating at 15^a in the cylinder where the admission of fluid under pressure is to be cut off from the spaces between the vanes. An outlet groove 18 extends circumferentially around the cylinder and comprises oblique branches 19 and 20 which commence at that point in the cylinder at which the exhaust of fluid under pressure is to begin and is of gradually increasing depth from that point to the exhaust pipe 14. A characteristic of these ports is that they extend substantially from end to end of the cylinder so that the wear on the outer ends of the vanes which rotate in the cylinder is equalized rather than localized.

A shaft 10 is eccentrically mounted in the cylinder and a rotor driven thereby comprises a body formed of sections 22 and 23 which are secured to rotate together by pins 24 which are secured in the sections 23 and are fitted into sockets 25 in the section 22. Springs 26 act on the pins 24 to press the sections apart to cause the sides of the rotor to fit against the inner faces of the heads 11 and 8 respectively. A ring 27 is held in annular grooves in sections 22 and 23 to prevent fluid from passing from one side of the rotor to the other through the space between the sections. Section 22 is secured to shaft 10 by a key 28.

Longitudinal guide-grooves 29 are formed in the rotor and extend from end to end thereof and a vane 30 is slidably held in each groove, so that it will, in its rotation, retain contact between its periphery or outer end and the wall of the cylinder in which the rotor is eccentrically mounted. Each vane 30 comprises a member 31 which is provided with channels 32 and 33 having oppositely inclined inner surfaces 34 and 35 and sections 36 and 37 fitting in the channels respectively and having correspondingly inclined inner surfaces 38 and 39. The coacting inclined surfaces between the sections of the vanes are formed so that centrifugal force will deflect the sections 36 and 37 outwardly so that their outer edges 40 and 41 will contact with the cylinder heads 11 and 8 respectively to close the space

between the ends of the vane-section 31 and the cylinder-heads.

A plurality of these pumps is mounted in a case 43 which is adapted to contain lubricant and the shaft 10 is extended into and secured to the rotors of both pumps. A gear 44 is secured to the shaft between the pumps and is driven by a suitable gear 45 on a shaft 46 which extends through one side of the case 43 and may be driven by an electric motor outside of the case. The inlet and exhaust pipes 13 and 14 extend through the top 47 of the casing 43. By mounting the pumps in this manner, the lubricant will seal all openings in the pumps, and the gearing for driving the shaft will run in lubricant and sufficient oil will work into the pumps to lubricate the parts without special lubricating means.

The end of the outlet 18 is disposed substantially at the rear edge of the vanes when the centers of the vanes are coincident with the line of contact between the rotor body and the cylinder and the inlet 15 is spaced from the end of the outlet a sufficient distance to avoid escape of air under pressure between the rotor and the cylinder from the outlet to the inlet and, by this construction, back pressure in the inlet is avoided.

In operation, the shaft 10 will be driven to continuously operate the rotors of both pumps. As the vanes in successive rotation reach the intake port 13, air will pass into the space in front of the vanes and as they pass the inner end 15^a of the intake-grooves 15, the air in front of the vanes will be forced through the exhaust groove 19 and pipe 14 for work wherever desired. A series of seven vanes is illustrated and the ends of the intake and exhaust ports are correlated so that the spaces in front of the vanes will be successively cut off from the intake before the vane ahead of it clears the commencement of the exhaust port. During this operation, centrifugal force will cause the vane-sections 36 and 37 to be directed outwardly and the coacting inclined surfaces between the vane-sections will deflect the sections 36 and 37 endwise of the cylinder and prevent leakage of the fluid between the vanes and the cylinder ends. When the construction shown in Fig. 3 is used, the pumps will be submerged in oil and be self-lubricating.

The invention exemplifies a rotary pump in which the vanes are formed of sections to prevent leakage between their ends and the cylinder-heads and a characteristic of this construction is that the pressure of the end-sections varies according to the centrifugal force which is dependent upon the speed of the motor. Another characteristic of the invention is that a plurality of pumps are mounted so that no special lubricators are necessary to lubricate the parts inside of the pump casing.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a rotary pump, the combination of a casing having a cylinder therein, a shaft, and a rotor provided with a radially slidable vane comprising a member which has its outer edge engaging and controlled by the cylinder, and an end member movable to engage a cylinder end, said members being provided with coacting surfaces between them by which centrifugal force will shift the end member longitudinally against the cylinder end.

2. In a rotary pump, the combination of a casing having a cylinder therein, a shaft, and a rotor provided with a radially slidable vane comprising a member which has its outer edge engaging and controlled by the cylinder and longitudinally movable end members, said members having coacting inclined surfaces between them by which centrifugal force will cause the end members to be shifted longitudinally against the cylinder ends.

3. In a rotary pump, the combination of a casing having a cylinder therein, a shaft, and a rotor provided with a radially slidable vane comprising a member having its outer edge formed to engage and controlled by the cylinder and having longitudinally extending channels therein, and longitudinally movable end members slidably mounted in said channels, and coacting surfaces between the members whereby centrifugal force will shift the end members against the cylinder ends respectively.

4. In a rotary pump, the combination of a casing having a cylinder therein, a shaft, and a rotor provided with a radially slidable vane comprising a member having its outer edge formed to engage and controlled by the cylinder and having longitudinally extending channels therein, longitudinally movable end members slidably mounted in said channels, and coacting surfaces between the members whereby centrifugal force will shift the end members against the cylinder ends respectively, the channeled member having a wall adjacent either face of the end members.

5. In a rotary pump, the combination of a casing having a cylinder therein, a rotor formed of sections and provided with grooves, vanes slidably mounted in the grooves, means to spread the sections, and a ring interfitting with and between the sections.

6. In a rotary pump, the combination of a casing having a cylinder therein, a rotor

formed of a pair of axially disposed sections and provided with grooves, vanes slidably mounted in the grooves, means to spread the sections, and means for securing the sections against relative rotation. 10

7. In a rotary pump, the combination of a casing having a cylinder therein, a rotor formed of axially disposed sections and provided with grooves, vanes slidably mounted in the grooves, pins disposed between the sections for securing the sections against relative rotation, and springs abutting against the pins to spread the sections.

JOSEPH FREUD.