Nov. 29, 1927. 1,651,336

R. WISSLER

ROTARY PUMP

Filed March 29, 1927

FIG. 1.

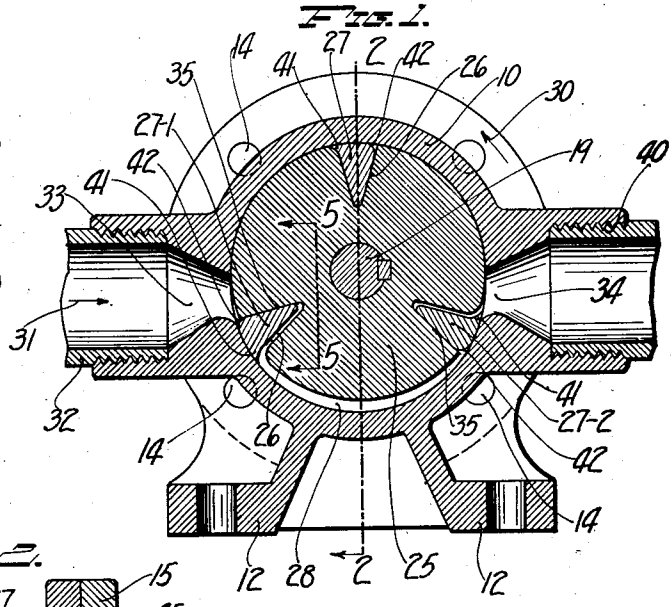


FIG. 5.

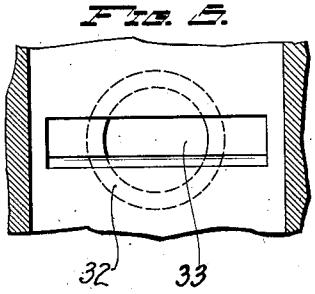


FIG. 2.

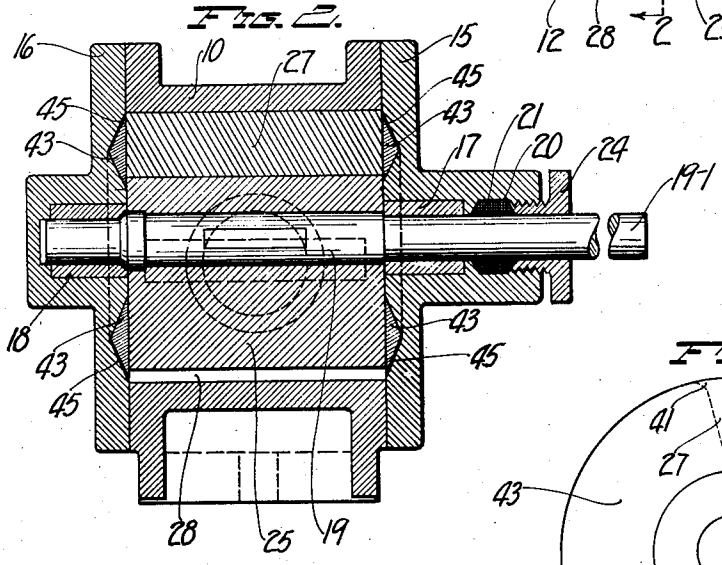


FIG. 3.

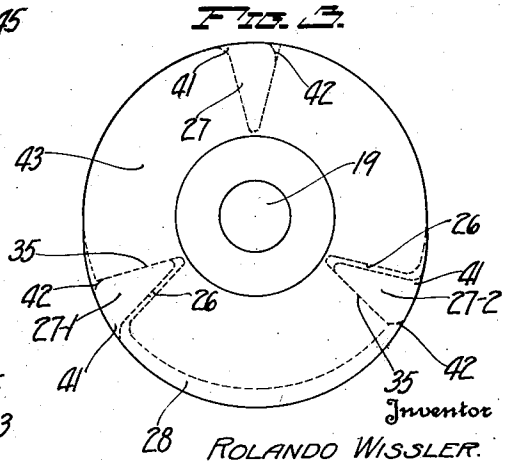
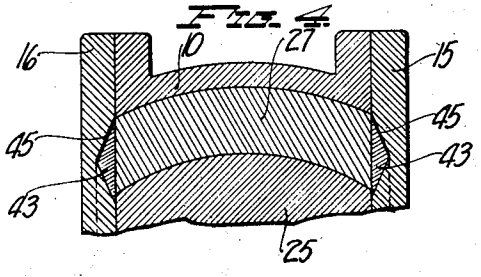


FIG. 4.



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UNITED STATES PATENT OFFICE.

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ROTARY PUMP.

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This invention relates to a rotary pump, and its principal objects are to provide a mechanism which shall:

First, be simple, efficient and durable in construction.

Second, have few operating parts.

Third, be economical in cost.

In attaining these objects, I provide a cylindrical casing with a rotor operably mounted therein, the axis of rotation of the rotor being eccentric with respect to the axis of the casing. Across the face of the rotor, and substantially parallel with the axis thereof, I provide a plurality of pistons or impellers, these being spaced apart from each other along the circumference of the rotor.

The salient features of my invention lie in the peculiar V-shape which I give the impellers, as well as to the manner of actuating and packing the same. The impellers are mounted in grooves or recesses formed in the rotor. These grooves or recesses correspond in shape substantially with the shape of the impellers. The vertices of the grooves point towards the axis so that in rotating, the centrifugal force manifested, acts on the impellers to urge them radially outward. The wedge shape of the impellers causes them to have a clearing action without any sticking or binding in the grooves, thus giving the effect of the centrifugal force, full sway. At the same time, the resistance encountered by the impellers in performing work, acts to press one face of each impeller against the corresponding face of the V-shaped groove, in opposition to the rotative force. The clearance which naturally exists between the opposite face of an impeller and its corresponding face of the V-shaped groove, as that impeller moves outwardly with respect to the grooves, allows the fluid being pumped, to enter the space thus formed, and to exert a force acting to further press the impeller against the sealing surface, thereby tending to make a fluid-tight contact.

The sides of the rotor and the ends of the impellers are sealed or packed by means of concentric circular rings, which are also V-shaped in cross-section, and upon which the pressure of the fluid being pumped, is exerted to press them into close contact with the rotor.

The features of this invention for which the protection of Letters Patent is desired, are collectively grouped in the claims concluding this specification.

In the drawing, which illustrates one embodiment of this invention,

Fig. 1 represents a vertical center section perpendicular to the axis of rotation;

Fig. 2, a section on line 2—2, Fig. 1;

Fig. 3, a diagram indicating the positions of the principal operating parts, relative to one another;

Fig. 4, a fragmentary section showing a modification; and

Fig. 5, a fragmentary section on line 5—5, Fig. 1, parts in the foreground being omitted to show an inner portion of the cylinder in elevation.

Referring to the drawing, 10 indicates the body or cylinder which constitutes a part of the housing. The cylinder may be provided with the integral feet 12. Fastened to the sides of the cylinder, by means of studs 14, are the heads 15 and 16. For convenience, the head 16 may be blind and be bored to receive the bushing 18 while the other head 15 is bored through to receive the bushing 17. The shaft 19 is turned down on both sides of the rotor to fit these bushings. Head 15 carries a hub forming the stuffing box 20, which contains the packing 21 and the gland 24, serving to make a tight joint around the shaft 19.

Keyed on the shaft 19 is the rotor 25, and spaced around the rotor, preferably equidistant from one another, are a plurality of V-shaped grooves or recesses 26, in this instance three. In the recesses are loosely placed the impellers 27, 27^1 and 27^2, which are of a corresponding V-shape.

It will be noticed in Fig. 1 that the axis of the shaft 19 is eccentric with respect to the axis of the bore of the body 10, thus leaving a space 28, having the shape of a crescent, between the rotor and the inner surface of the cylinder. It is in the space 28 that the work of pumping is accomplished.

Power is applied to the shaft 19 by any

well known means, such as a pulley (not shown) mounted on the extended portion 19^1 of the shaft.

When shaft 19 is rapidly rotated in the direction of the arrow 30, Fig. 1, the centrifugal force manifested, urges the impellers outwardly and forces them against the inner circumferential surface of the cylinder.

Supposing the fluid which is pumped, enters the cylinder in the direction of the arrow 31 through the pipe 32; the fluid follows the impeller 27^1 and gradually fills a space corresponding to 28 which will be formed, when the rotor has advanced sufficiently, between impellers 27 and 27^1. As soon as the impeller 27 passes the opening 33, it will push this fluid forward, and when the impeller 27^1 clears the passage 34, the said fluid will be forced into this passage against the head of fluid that may exist in pipe 40.

It will be observed that as the rotor turns, the loosely held impellers are carried outwardly by action of the centrifugal force as previously mentioned, and at the same time meeting the opposition of the fluid head, are forced against the faces 35, leaving a space or crevice on the opposite side of the impeller into which the fluid is crowded. This causes the impeller to be forced against the face 35 with a pressure equivalent to that exerted upon the impeller by the head against which the fluid is pumped.

The sharp toe portion 41, at the forward end of the base of each impeller, forms a claw-like protrusion which incisively engages the fluid ahead thereof, and the pressure of the fluid acting on the projected area of the toe portion normal to the curved surface of the cylinder, adds its quota to the force acting to push the impeller against the inner cylinder face.

The heel portion 42 of the impeller, opposite the toe portion, is preferably rounded, so as to allow a freer entrance of liquid when an impeller passes the intake, and a freer release when an impeller passes the outlet.

The ends of the impellers lie in the same planes as the sides of the rotor, and these are coincident with the planes of the packing rings 43. The packing rings are V-shaped in cross-section, and superficially may have the shape of an eccentric annulus as indicated in Fig. 3.

The heads 15 and 16 are recessed to receive the packing rings, and a slight space 45 along an inclined face, permits fluid under pressure to enter, thereby exerting a force to keep the packing rings in contact with the rotor.

This mechanism is herein described with reference to its functioning as a pump, but to a skilled person, it will be obvious that no changes in construction would be required to make it serve as a prime mover.

While a specific embodiment of my invention is herein shown and described, it is to be understood that various changes could be made therein without departing from the spirit and scope of the invention as defined in the claims.

Having fully described my invention, what I claim is:

1. In a rotary pump, a cylinder, a rotor operably mounted therein, V-shaped recesses defined transverse to the circumferential face of said rotor, impellers having a V-shaped cross-section operably disposed in said recesses, and means for imparting motion to said rotor.

2. In a rotary pump, a cylindrical casing, a rotor eccentrically mounted therein, V-shaped impellers extending transverse to the circumferential face of said rotor, said impellers having their vertices pointing in the direction of the axis of the rotor, and means for conducting fluid to and from the said casing.

3. A rotor, a plurality of substantially V-shaped impellers operably disposed in said rotor, said impellers extending transverse to the face of the rotor, a casing eccentric with respect to the axis of the rotor, said impellers being operative to move inwardly and outwardly with respect to said axis during the turning of said rotor, and means for imparting motion to said rotor.

4. A rotor having V-shaped recesses therein, said recesses extending transverse of the circumferential face of said rotor, impellers loosely mounted in said recesses, a casing limiting the movement of said impellers in said recesses, and means for imparting motion to said rotor.

5. A rotor, substantially V-shaped impellers movably mounted in recesses defined in said rotor, said recesses extending transverse of the circumferential face of said rotor, a casing eccentrically enclosing said rotor, the said impellers being arranged to contact the inner circumferential face of said casing, and means for imparting motion to said rotor.

6. A rotor, V-shaped recesses defined therein, said recesses extending transverse to the circumferential face of said rotor, the vertices of said recesses pointing towards the axis of said rotor, V-shaped impellers disposed in said recesses, said impellers having forwardly protruding toe portions at the base of the said V, rounded heel portions opposite the toe portions, a casing eccentrically enclosing said rotor, said impellers being arranged to contact the inner circumferential face of said casing, and means for imparting motion to said rotor.

7. An impeller having basically a V-shape, a protruding toe portion at one end of the base of the V, a rounded heel portion at the other end of the base, a rotor in which said impeller is operably mounted, and a casing enclosing said rotor, the said casing being so arranged that the face between the toe and heel portion of the said impeller shall contact the inner cylindrical surface of the said casing when said rotor is rotated.

In testimony whereof, I sign my name hereto.

ROLANDO WISSLER.