April 24, 1928. 1,667,183

F. ARNOLD ET AL

ROTARY PUMP

Filed June 1, 1925

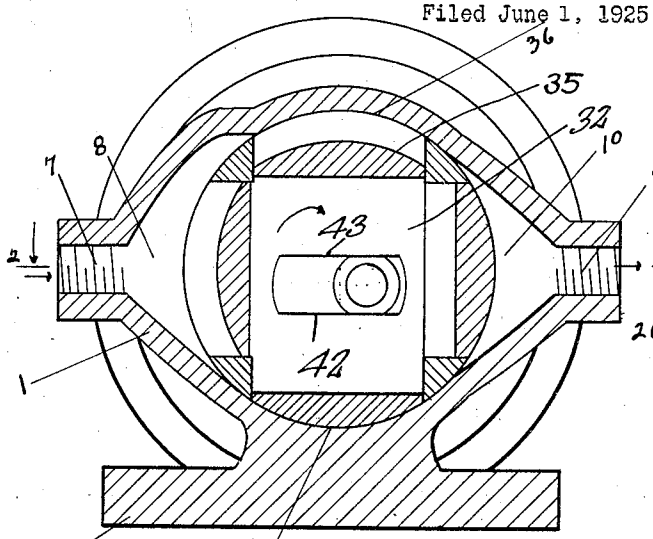

FIG. 1

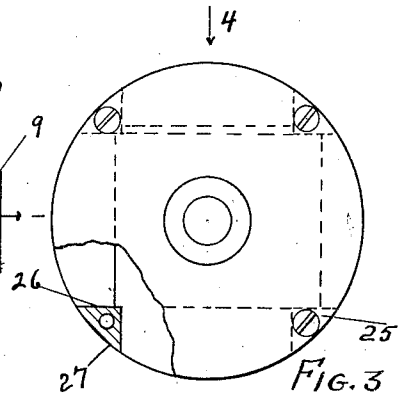

FIG. 3

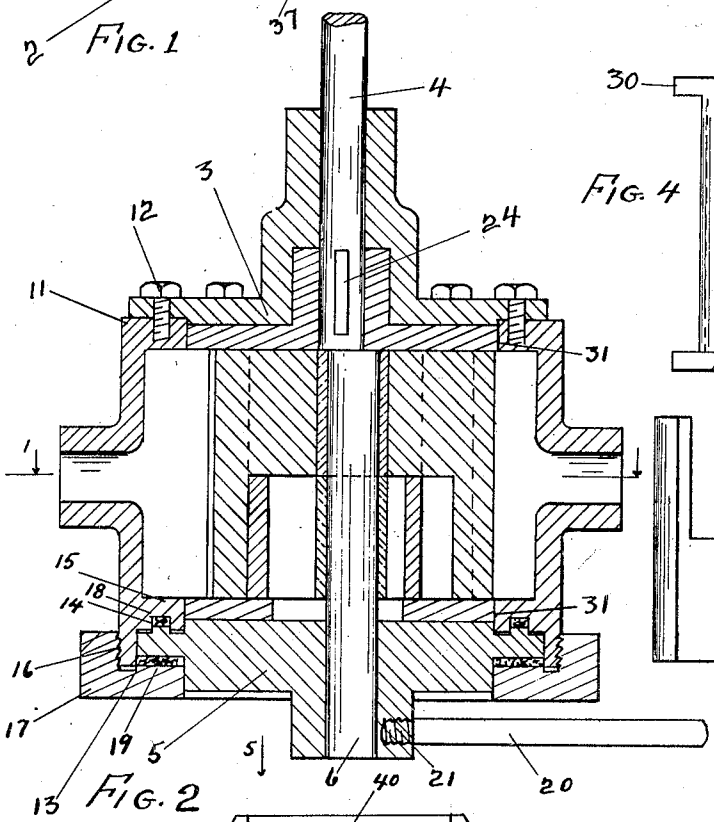

FIG. 2

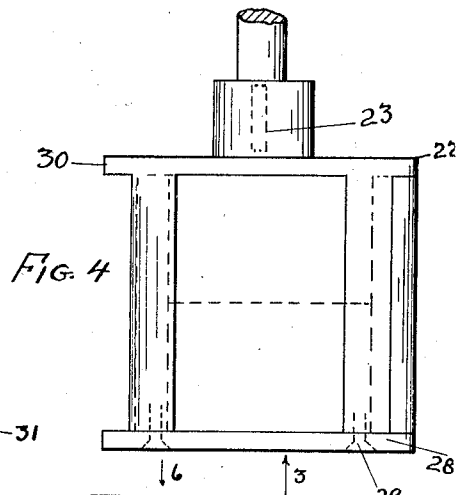

FIG. 4

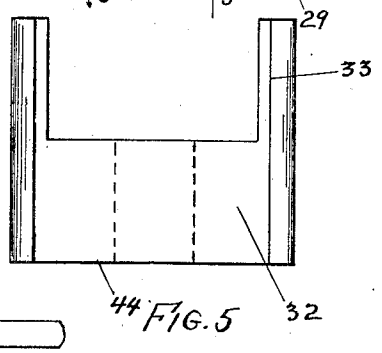

FIG. 5

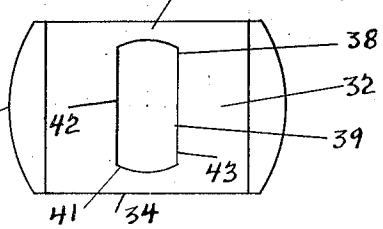

FIG. 6

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UNITED STATES PATENT OFFICE.

FRANK ARNOLD AND WALTER RANDOLPH, OF OAKLAND, CALIFORNIA.

ROTARY PUMP.

Application filed June 1, 1925. Serial No. 33,972.

Our invention is a rotary pump of the type having a rotor cage operating on a true center and having slidably mounted thereon a pair of impeller pistons mounted at right angles to each other. These impeller pistons are reciprocated by an eccentric stud, and means are provided for adjusting the position of the stud relative to the axis of rotation of the rotor cage.

It is an object of the invention to provide means for changing the rate of the flow of water or other fluid without changing the speed of the driving shaft.

Our invention will be more readily understood from the following description and drawings in which:—

Figure 1 is a vertical section of our pump on the line 1—1 of Figure 2 in the direction of the arrows, showing the means for adjusting the stud.

Figure 2 is a horizontal section of Figure 1 in the direction of the arrow on the line 2—2.

Figure 3 is an end view of the rotor cage in the direction of the arrow 3 of Figure 4, partly in section.

Figure 4 is a plan of Figure 3 in the direction of the arrow 4.

Figure 5 is a plan of one of the impeller pistons as if taken in the direction of the arrow 5 of Figure 6.

Figure 6 is an elevation of Figure 5 in the direction of the arrow 6.

Referring particularly to Figures 1 and 2 the pump casing 1 is mounted on a suitable base 2 and has a fixed head 3 at one end, having a bearing for the drive shaft 4, and at the other end has a disc 5 forming a mounting for the eccentric stub shaft 6. The inlet 7 leads into an inlet chamber 8 and the outlet 9 is fed from an outlet chamber 10. The head 3 is secured to the flanges 11 by the bolts 12, and the disc 5 is formed with an annular projection 13 extending into an annular groove 14 in the flange 15. A rim 16 extends beyond the flange and has a screw-threaded collar 17 threaded thereon. There is a packing 18 in the groove of the flange and an annular packing ring 19 between the collar and the disc 5. The disc is turned by the handle 20, removably secured in a socket 21.

The rotor cage is constructed as follows, having reference particularly to Figures 3 and 4. A disc 22 has an annular boss 23 to which the shaft 4 is secured by a key 24. Four somewhat triangular shaped arms 25 extend from the disc horizontally and have bearing faces 26 and 27 forming guideways for the pistons. A second disc 28 is secured to the ends of the arms 25 by screws 29 or any suitable fastening. The discs have peripheral bearing surfaces 30 which rotate on the bearing surfaces 31 of the casing.

The impeller pistons of which there are two are of substantially the same shape and each has a body portion 32 and legs 33. The pistons have opposite flat sides 34 to slide between the faces 26 and 27 of the cage arms 25, and have cylindrical surfaces 35 to bear against the cylindrical surfaces 36 and 37 of the casing. The pistons have transverse slots 38 to receive bushings 39, mounted on the eccentric stud 6. Each slot is preferably rounded at each end as shown at 41. The bushings have flattened faces 42 to bear against the sides 43 of the slot.

The impeller pistons are assembled in the rotor cage with their bases 44 bearing against the discs 22 and 28, and with the legs 33 extending past the surfaces 43 and spaced therefrom so that each impeller may slide at right angles to the other.

The pump is assembled so that the shaft 4 rotates the rotor cage which carries the impeller pistons with it. The eccentric stub shaft forces the pistons to reciprocate, thus acting to draw in the liquid through inlet 7 and discharge it through outlet 9 in the known manner. For maximum output the eccentric stud is positioned so that the pistons are forced inward from the inlet chamber 8 and outward at the outlet port 10, thereby drawing water into the pump and forcing it out of the outlet 9. By changing the position of the eccentric stud by loosening the collar 17 and turning the disc 5 by the handle the output may be decreased without alteration of speed of the main shaft, and by shifting the stud into the position opposite of that shown, the pump will operate to force the liquid in the opposite direction.

It is to be noted that the impeller pistons operate independently of each other, although they are both controlled by the same eccentric stud. Each piston has full pumping capacity, as the leg portion 33 and the body portion 32 being connected, extend between the discs 22 and 28 of the rotor cage and extend across the full distance of the

inlet chamber 8 and outlet port 10: thus for each rotation of the shaft there are four impulses pumping the fluid.

Our invention may be materially changed and altered to suit special circumstances such as in size, the fluid to be pumped and in other details without departing from the spirit thereof.

Having described our invention what we claim is:—

A rotary pump comprising a casing having an inlet and an outlet, a rotary cage in said casing comprising four frame members arranged so that the outer faces of the same form parts of a cylinder while their inner faces form two diametrical passages arranged transversely to one another, two U shaped elements reciprocable in the passages and arranged so that the legs of either straddle the base of the other and having outer faces complementary to those of the frame members and eccentric means engaging both elements so as to cause the same to reciprocate when the cage is revolved, the latter means comprising a concentric disc mounted with freedom of rotary adjustment and a shaft extending eccentrically therefrom into slots provided in the bases of the U shaped members.

In testimony whereof we affix our signatures.

FRANK ARNOLD.
WALTER RANDOLPH.