June 11, 1929. T. P. ROCHFORD 1,716,901

ROTARY PUMP

Filed Aug. 2, 1927

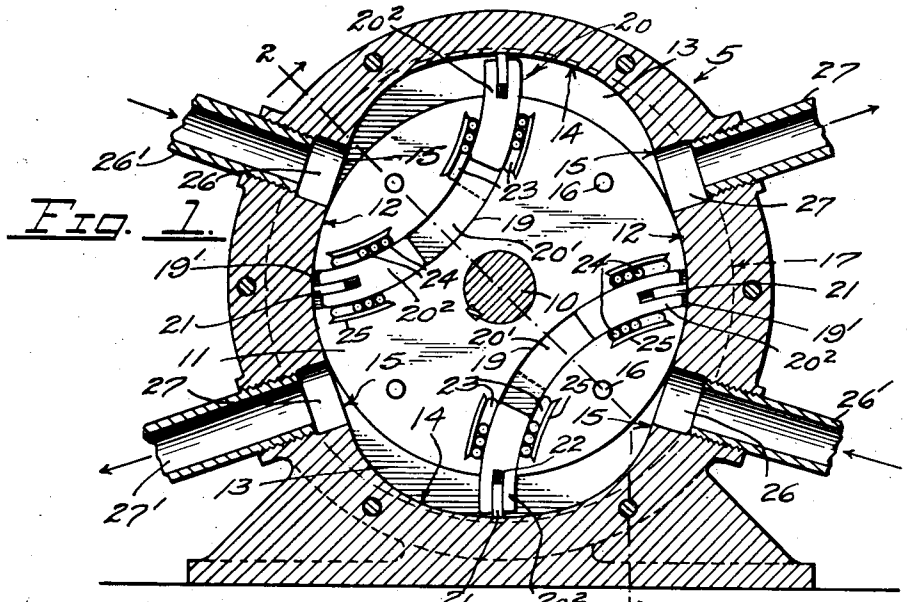


Fig. 1.

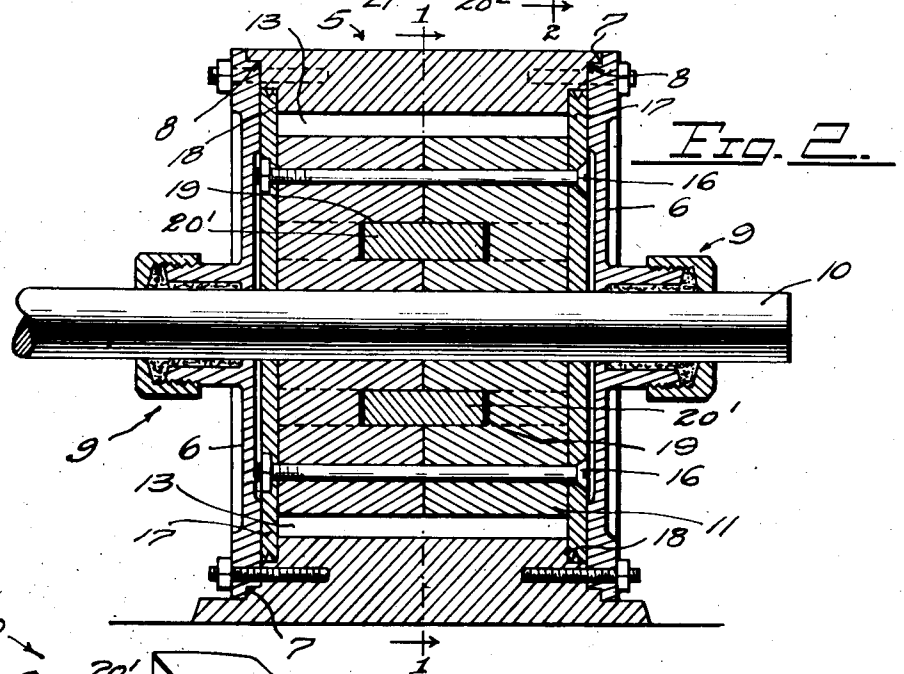


Fig. 2.

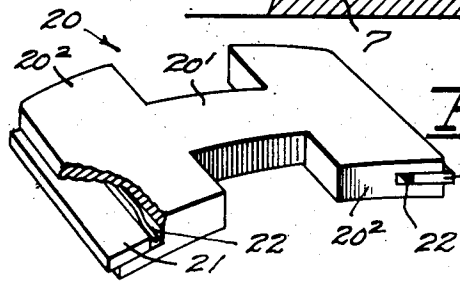


Fig. 3.

Inventor
Thomas P Rockford

By Pierce James
Attorney

Patented June 11, 1929. 1,716,901

UNITED STATES PATENT OFFICE.

THOMAS P. ROCHFORD, OF SEATTLE, WASHINGTON, ASSIGNOR TO J. P. BRICKER AND W. A. BRICKER, BOTH OF SEATTLE, WASHINGTON.

ROTARY PUMP.

Application filed August 2, 1927. Serial No. 210,029.

This invention relates to rotary pumps and its object is the perfecting of pumps of this character to provide a durable and strong construction which will be peculiarly efficient and one which will operate with a minimum consumption of power.

The invention consists in the novel construction and adaptation of the pump casing, the pistons, the mounting thereof, and other details hereinafter described and claimed.

In the accompanying drawing,—

Figure 1 is a view partly in side elevation and partly in section of a pump embodying the present invention, said section being taken substantially on line 1—1 of Fig. 2; Fig. 2 is a longitudinal section taken substantially in line 2—2 of Fig. 1; and Fig. 3 is a perspective view of one of the duplex pistons, shown detached, and partly broken away to illustrate the piston packing ring.

In said drawing, the reference numeral 5 represents the pump casing body having a chamber of a general elliptic form and is provided with removable heads 6 having in their peripheries rabbets 7 to afford central protruding portions which fit into recesses 8 provided in the respective ends of the body. 9 represents packing boxes provided upon the casing heads for a shaft 10 which extends centrally through the casing chamber.

Keyed or otherwise secured to the shaft 10 is a rotor having a central cylindrical drum portion 11 of a diameter to fit within a bored portion centrally of the major axis of the said chamber and contacting with the peripheral surfaces 12 of said bored portion at diametrically opposite sides of the drum. Said drum occupying the bored central portion of the casing chamber provides cavities or pumping chambers 13 at diametrically opposite sides of the drum.

Each of the pumping chambers is provided with an arcuate outer surface 14 concentric to the shaft axis, the ends of said arcuate surfaces being connected by surfaces 15 which are tangential with the respective bore surfaces 12.

Rigidly secured as by means of bolts 16 to the ends of the drum 11 the rotor is provided with circular disks 17 of a diameter somewhat greater than the major diameter of the casing chamber to provide circumferential flanges to extend into circular recesses 18 provided in the casing as shown in Fig. 2.

The drum part 11 is provided with slots 19 formed to arcs of circles and arranged to extend laterally through such drum part with their convex sides innermost, as shown in Fig. 1. The widths of the said slots 19, see Fig. 2, at their midlengths is less than the distance between the rotor disk elements 17, but near their ends, said slots, as at 19^1, are of widths equal to the spacing of the disks.

Fitted to reciprocate laterally within the respective slots are blocks 20 of substantially the shape of a capital letter H in horizontal section (Fig. 3) and in end elevation of a circular arc corresponding to the arc of the respective drum slot. More particularly, the H-shape of a block provides a transverse central stem, indicated by 20^1, connecting transverse bar sections 20^2, one at each end of a block, constituting pistons and an entire block, including the stem and coupled pistons will be hereinafter termed a duplex piston. The width of the pistons 20^2 is such as will make sliding fits with the respective disks. The width of a stem is less than the width of a slot at its midlength. In the extremities of a duplex piston the same are provided with grooves to accommodate, in each groove, a metal packing strip 21 and a spring 22 which functions to maintain the respective strips in continuous contact with the peripheral wall of the casing chamber.

Provided at opposite sides of each groove and adjacent to the circumference of the drum part 11 are recesses 23 for rollers 24 which are adapted to bear against the duplex pistons. Backing plates 25 of hard metal are desirably provided to take the wear of the rollers.

The respective pumping chambers 13 are provided at their opposite sides with inlet and outlet ports 26 and 27 which communicate with liquid supply and discharge pipes 26^1 and 27^1 respectively.

In the construction of my improved pump the transverse formation of the casing chamber is such that the distances between portions of the peripheral surfaces thereof measured on the arc of the respective drum slots 19 will be substantially equal for every rotary position of the rotor.

Each of the duplex pistons 20 (Fig. 3) is,

moreover, of a single piece—that is, the pistons 20^2 proper are integral with the respective stem 20^1—and its length is slightly less than the distance between portions of the above referred to peripheral surfaces of the casing chamber with respect to the drum slots.

The spring pressed packing strips 21 compensate for irregularities in the formation of the inner peripheral surfaces of the casing and also serves to afford a practically non-leakable contact between the pistons and the casing.

In operation, the rotor is driven by power applied through the shaft 10 causing the pistons to be revolubly carried about the shaft axis and to traverse the pumping chambers 13 between the respective liquid inlets 26 and outlets 27 thereby inducing the flow of the liquid into the pumping chambers and expelling it from the latter through the associated outlets.

The operation of the invention is simple and most effective, the pistons being protruded and retracted in passing into and from the respective pumping chambers by the cam action of the casing itself.

What I claim is—

1. In a rotary pump, the combination with a casing having a body portion provided in each of its ends with a circular recess and an elliptical chamber between the recesses, a removable cover for each end of the casing body, and a shaft extending centrally through said chamber and said circular recesses, of a rotor mounted upon said shaft within the casing, said rotor comprising a cylindrical drum operating within said chamber and disk elements rotatable in the respective recesses, said drum being located to divide said chamber into two pump compartments one at each end of the chamber at diametrically opposite sides of the drum, said drum having therein transversely arranged slots of a circular-arc form, a curved member provided in each of said slots and formed to provide piston elements at the opposite ends thereof, each of said piston elements having a groove, and spring-pressed packing strips in said grooves.

2. In a rotary pump, the combination with a casing having a body portion provided in each of its ends with a circular recess and an elliptical chamber between said recesses, a removable cover for each end of the casing body, and a shaft extending centrally through said chamber and both of said recesses, of a rotor mounted upon said shaft within the casing, said rotor comprising a cylindrical drum operating within said chamber and disk elements rotatable in the respective recesses, said drum being located to provide a pump compartment at each end of the chamber at diametrically opposite sides of the drum, said drum having therein transversely arranged slots of a circular-arc form, a curved member provided in each of said slots and formed to provide piston elements at the opposite ends thereof, each of said piston elements having a groove, spring-pressed packing strips in said grooves, and anti-friction rollers for the respective piston elements provided at the convex and concave sides thereof in the drum portion of the rotor and in proximity to both ends of the respective slots.

Signed at Seattle, Washington, this 8th day of July, 1927.

THOMAS P. ROCHFORD.