W. H. EIZERMAN.

PUMP.

APPLICATION FILED AUG. 5, 1918.

1,333,656. Patented Mar. 16, 1920.

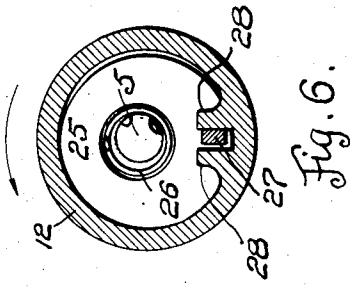

Fig. 6.

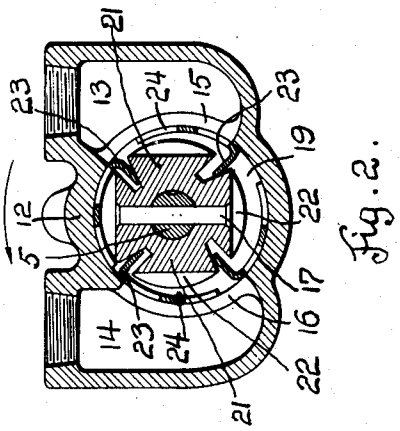

Fig. 2.

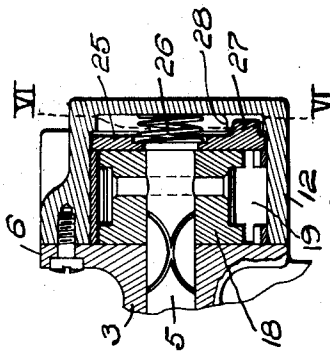

Fig. 5.

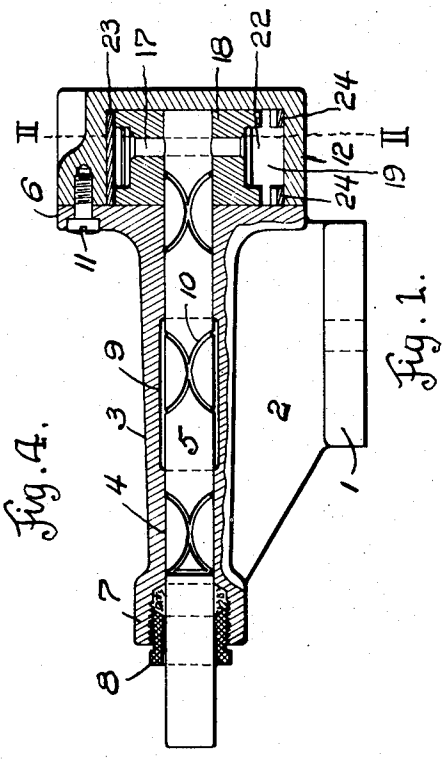

Fig. 1.

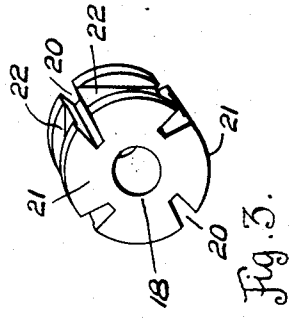

Fig. 3.

Fig. 4.

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PUMP.

1,333,656. Specification of Letters Patent. Patented Mar. 16, 1920.

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To all whom it may concern:

Be it known that I, WILLIAM H. EIZERMAN, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had therein to the accompanying drawings.

In my pending application filed Jan. 28, 1918. Serial No. 214,206, there is disclosed a rotary pump that may be used for various purposes and from a structural standpoint, the pump is characterized by a rotary abutment member in a cylinder with shiftable blade members in the cylinder about the abutment member and adapted to be shifted thereby, to successively communicate with chambers or ports of the cylinder so that a liquid or fluid may be forced through the pump. Associated with the abutment member is a novel packing and while this particular pump has been proven efficient, yet the present invention, has proven far more efficient and in simplifying the construction has materially reduced the cost of production.

Besides having some of the features of my prior invention and some of the same objects in view, there are two distinct features in the present invention, namely, a long bearing and blade members to which I attach considerable importance. By providing a long bearing for the pump shaft or arbor of the pump, all stresses and strains on the shaft that may be incurred by a driven pulley and belt at one end thereof, are eliminated, thus permitting of ordinary packing being used in connection with the pump shaft. By having the pump shaft properly balanced in its bearings, the abutment member on the end of the shaft, within the cylinder, is properly positioned and in the majority of instances it is unnecessary to use an end thrust bearing or packing for the abutment member.

The blade members are materially simplified, from a manufacturing standpoint, by making the blade members from sheet metal cut and stamped to impart a proper shape to the blade member the shape of said members preventing crowding of the same within the pump cylinder and at the same time coöperating with the abutment member in providing movable partitions between said member and the walls of the pump cylinder.

Referring to the drawings,

Figure 1 is a longitudinal sectional view of the greater part of the pump;

Fig. 2 is a cross sectional view taken on the line II—II of Fig. 1;

Fig. 3 is a perspective view of the abutment member of the pump;

Fig. 4 is a similar view of a blade member of the pump;

Fig. 5 is a longitudinal sectional view of a portion of the pump provided with an end bearing, and

Fig. 6 is a cross sectional view taken on the line VI—VI of Fig. 5.

In the drawing, the reference numeral 1 denotes a small base having an upstanding web 2 that overhangs one end of the base 1 and the upper edge of said web is provided with a longitudinal bearing 3 having a bore 4 for a pump shaft 5. At one end of the bearing 3 is a large vertically disposed head 6 and at the opposite end of said bearing is a stuffing box 7 for a gland 8 and suitable packing. Intermediate the ends of the bearing 3 the bore 4 thereof has an annular groove or chamber 9 for the accumulation of a suitable lubricant, which through the medium of intersecting grooves 10 in the pump shaft 5 may thoroughly lubricate the entire bearing.

Connected to the head 6 by a plurality of screw bolts 11 or other fastening means is a cylinder 12 having the outer end thereof closed and the sides thereof provided with opposed inlet and outlet chambers 14 and 13, respectively.

The inlet chamber has its bottom below the plane of the bottom of the outlet chamber so that a quantity of liquid will be left in the pump to facilitate starting or priming of the pump.

The inlet and outlet chambers are adapted to be connected to suitable supply and ex-

haust pipes and said chambers communicate with the cylinder 12 through ports 15 and 16, the latter having its upper and lower edges in planes below the upper and lower edges of the port 15, for a purpose that will hereinafter appear.

In the cylinder 12 and fixed on the end of the shaft 5 by a rivet 17 or other fastening means is an abutment member 18 best shown in Figs. 2 and 3. With the shaft 5 disposed eccentrically of the cylinder 12, said abutment member is concentric on the shaft and consequently provides a chamber 19 in the lower part of the cylinder 12. The abutment member 18 may be considered as being cylindrical with its periphery provided with a plurality of radially disposed blade-ways or kerfs 20 thereby providing segmental blade supports 21. The blade supports are longitudinally grooved or recessed, as at 22, thus forming opposed walls on the sides of each blade support and it is these walls, representing portions of the periphery of the abutment member, that extend in proximity to the upper wall of the cylinder 12.

The blade ways or kerfs 20 of the abutment member 18 accommodate the blades 23, and these blades have shoes 24 adapted to bear against the walls of the cylinder 12 and rest on the side walls of the supports 21. The blades 23 are cut or stamped from sheet metal and pressed to desired form, said blades corresponding in width to the abutment member 18 and the shoes 24 thereof curved to correspond to the arcs of the blade supports 21.

The cylinder 12 is bored out or the shoes of the blades shaped so that there will be positive contact between the walls of the cylinder 12 and the shoes of the blades, and the abutment member is positioned so that there will be just sufficient clearance for the blade shoes 24 between the upper wall of the cylinder, and the abutment member, as clearly brought out in Fig. 2. The blade members are loose in the blade ways 20 and may shift therein, which is necessary, during the operation of the pump, but during such operation, the blades are prevented from crowding each other about the periphery of the abutment member and also from tilting to any degree that would cause portions of the blades to gouge or unnecessarily wear walls of the cylinder or the abutment member. For instance, the blade shoes 24 bearing against the walls of the cylinder 12 are of a sufficient length to maintain the blades 23 in a defined radial position relative to the walls of the cylinder, yet it is possible for said blades to radially shift in the blade ways, during the rotation of the abutment member, and remain in a defined relation to the cylinder walls.

Considering the operation of this form of pump, and assuming that the inlet and outlet chambers 14 and 13 of said pump contain a lubricant or other liquid, the pump is necessarily primed or in condition to be immediately placed in operation. As shown in Fig. 2, the chamber 19 may be considered as full of oil, with the blades 23 closing the end of the chamber, and it is important to have this chamber closed at its receiving end before its discharge end is opened, thus properly balancing the load in the chamber to avoid air spaces.

It is apparent that by having the shoes 24 in the form of curved arms or apertured that the chamber 19 can readily receive oil and discharge the same, and while a small quantity of oil may be carried over the abutment member, and such oil is simply a dead mass.

Reference will now be had to Figs. 5 and 6, showing a packing member 25 in the cylinder 12 and against the end of the abutment member 18, said cylinder being made of a sufficient length to accommodate the packing member and also a coiled compression spring 26 which maintains said packing member against the end of the abutment member. The packing member has a central opening providing clearance for the end of the pump shaft and said member is slightly smaller than the bore of the cylinder 12, as shown in Fig. 6, so that said packing member may be crowded against that wall of the pump cylinder 12 adjacent the inlet chamber 14. The outer face of the packing member 25 has a seat for the spring 26 and also a lug or pin 27 that extends into a slot or between lugs 28 of the end wall of the cylinder 12. The pin or lug 27 of the packing member prevents rotation of said member and to a certain extent serves as a fulcrum for said packing member, so that the upper portion of said member may have a lateral movement and may be firmly maintained against the cylinder wall adjacent the intake chamber 14. The packing member 25 compensates for any end thrust on the pump shaft 5 but in some instances, said packing member may be eliminated.

What I claim is:—

1. A pump comprising a long bearing, a stuffing box at one end thereof, a head at the opposite end of said bearing, a shaft journaled in said bearing and protruding from said head, a cylinder connected to said head in eccentric relation to said shaft, an abutment member mounted on said shaft within said cylinder, and loose blade members carried by said abutment member and extending over the periphery thereof.

2. In a pump, a cylinder, a rotary abutment member therein, and blades loose in said cylinder, each blade having a portion thereof constantly against the walls of said

cylinder and once during each rotation of said abutment member bear on the periphery of said abutment member.

3. In a pump, a cylinder having inlet and outlet ports a rotary abutment member in said cylinder and provided with blade supports, and blades extending into said abutment member and having shoes adapted to bear on said supports and prevent said blades for gouging said abutment member.

In testimony whereof I affix my signature in the presence of two witnessses.

WILLIAM H. EIZERMAN.

Witnesses:

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