W. H. EIZERMAN.

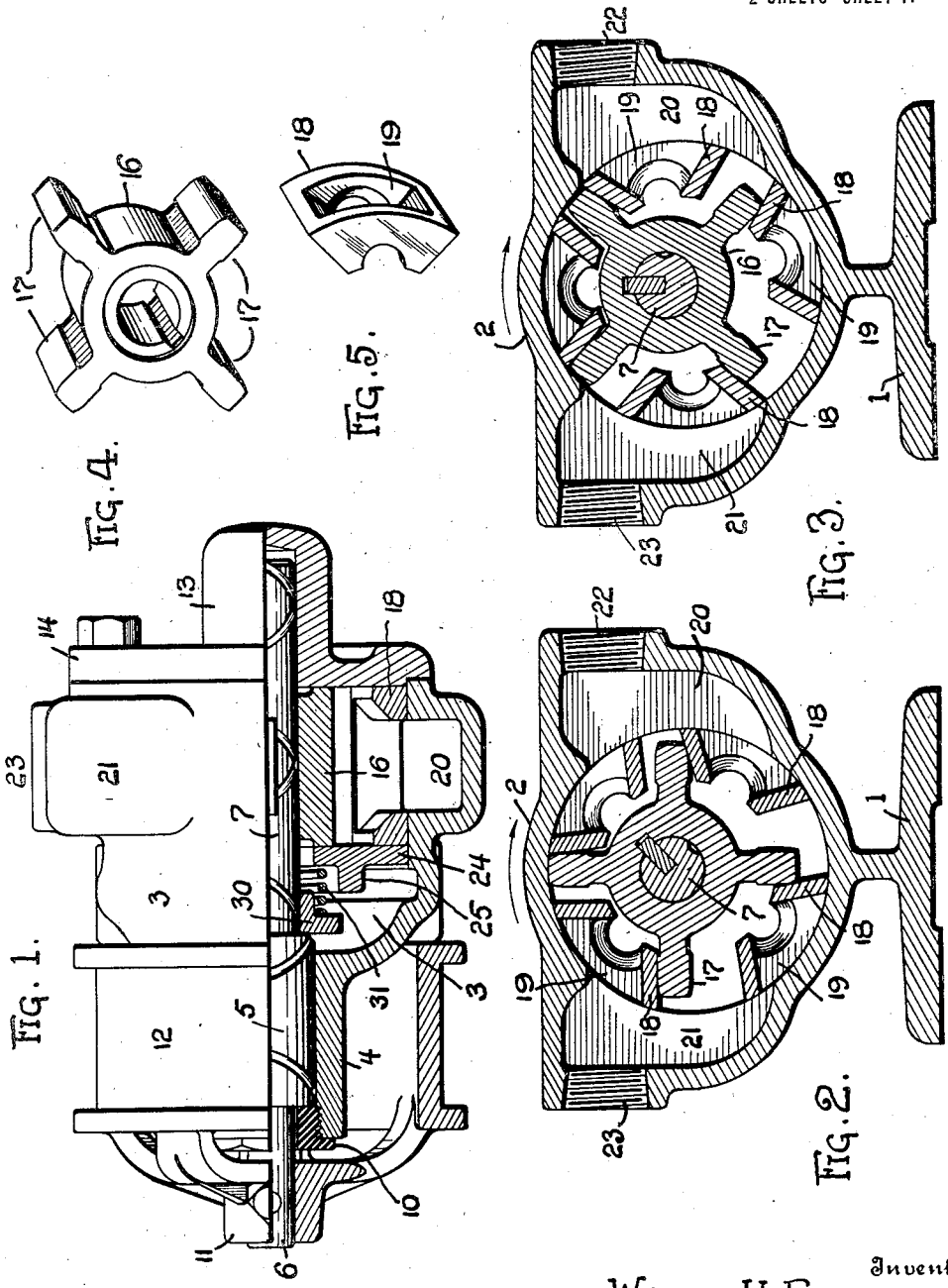
PUMP.

APPLICATION FILED JAN. 28, 1918.

1,332,547.

Patented Mar. 2, 1920.

2 SHEETS—SHEET 1.



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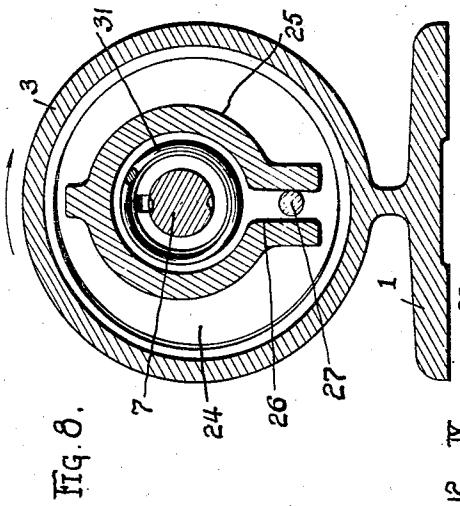


FIG. 8.

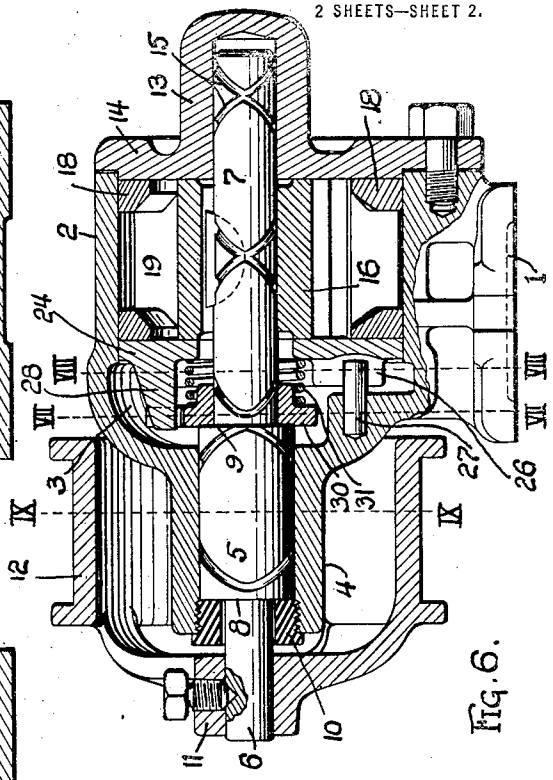


FIG. 6.

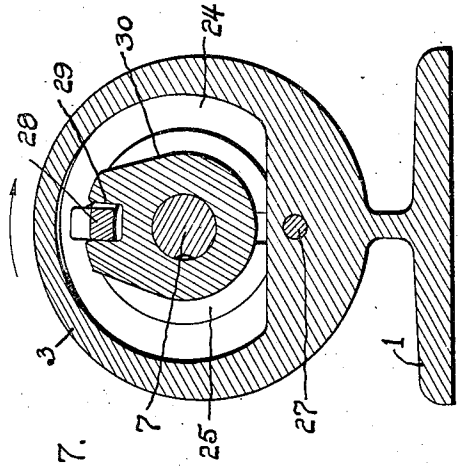


FIG. 7.

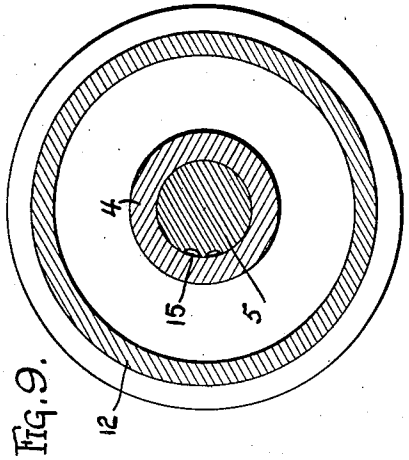


FIG. 9.

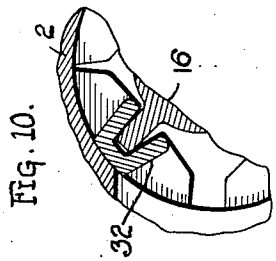


FIG. 10.

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PUMP.

1,332,547. Specification of Letters Patent. Patented Mar. 2, 1920.

Application filed January 28, 1918. Serial No. 214,206.

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.

This invention relates to rotary pumps and has special reference to pumps that may be advantageously used in connection with a forced feed lubricating system where a lubricant is pumped from a well or source of supply and distributed to bearings and other parts of motors or machinery, for instance, in and about the power plant of a motor driven vehicle. The pump may be used for pumping water or other liquid, and with slight alteration may be readily converted into an air or fluid compressor.

My invention aims to provide a rotary pump wherein rotary abutments and shiftable blade members are disposed in a cylinder to force or conduct a lubricant or other liquid therethrough, the relative location of the inlet and outlet openings of the cylinder to the abutments and blade members thereof being such as to constantly maintain a body of lubricant or liquid within the pump for the following purposes.

First, the body of lubricant seals certain parts of the pump rendering the same operative and efficient, particularly when priming or starting the pump.

Second, the body of lubricant within the pump secures constant lubrication of all movable or wearing parts thereof, consequently the pump requires no attention whatsoever during its operation.

My invention further aims to provide a pump of the above type wherein packing members are disposed to prevent leakage one of said members having an end thrust movement in connection with the drive shaft of the pump to prevent leakage thereabout, and the other packing member, during the operation of the pump constantly exerts an end thrust and sidewise action which positively seals the essential portions of the pump cylinder and secures an efficient action of the shiftable blade members, at the intake opening of the pump.

My invention still further aims to provide a small and compact pump of the above type, wherein the parts are constructed with a view to reducing the cost of manufacture and at the same time retain those features by which durability and ease of assembling are secured. With these ends in view, my invention resides in the novel construction to be hereinafter specifically described and then claimed.

Reference will now be had to the drawings wherein—

Figure 1 is a plan of the pump partly in horizontal section;

Fig. 2 is a cross sectional view of the pump showing how the shiftable blade members are moved by the rotary abutments;

Fig. 3 is a similar view showing the intake and discharge of lubricant, said view illustrating advance positions of the shiftable blade members relatively to what is shown in Fig. 2;

Fig. 4 is a perspective view of a detached abutment member;

Fig. 5 is a similar view of a detached shiftable blade member;

Fig. 6 is a vertical longitudinal sectional view of the pump;

Fig. 7 is a cross sectional view taken on the line VII—VII of Fig. 6;

Fig. 8 is a cross sectional view taken on the line VIII—VIII of Fig. 6,

Fig. 9 is a similar view taken on the line IX—IX of Fig. 6, and

Fig. 10 is a detail, sectional view of a modified form of blade member.

In the drawings, the reference numeral 1 denotes a base, and integral therewith is a cylinder 2 having one end thereof open and the opposite end closed by a chamber 3 terminating in a bearing 4.

Journaled in the bearing 4 is a drive shaft 5 having reduced ends 6 and 7 providing annular shoulders 8 and 9. The shoulder 8 abuts a packing nut 10 screwed or otherwise mounted in the outer end bearing 4 and this nut is preferably made of Babbitt metal and loosely surrounds the reduced end 6 of the drive shaft. On the reduced end 6 of the drive shaft is mounted the spider 11 of a pulley or belt wheel 12, said pulley or belt wheel surrounding the bearing 4 and having peripheral flanges to prevent a belt or flexible power transmission member from becoming accidentally displaced.

The reduced end 7 of the drive shaft 5 extends through the pump cylinder 2 into a bearing 13 carried by a detachable end plate 14 connected to the cylinder 2.

The bearings 13 and 4 are disposed in longitudinal alinement and eccentric relative to the axis of the pump cylinder 2 and the shaft journaled in these bearings has spiral intersecting lubricating grooves 15 adapted to conduct lubricant from the pump cylinder 2 or the chamber 3 to bearings 4 and 13.

Keyed or otherwise mounted on the reduced end 7 of the shaft 5, within the cylinder 2, is an abutment member 16 provided with equally spaced radially disposed abutments 17 having the outer ends thereof slightly enlarged and the outer edges thereof shaped to engage and wipe the upper walls of the cylinder 2, as best shown in Figs. 2 and 3.

The abutments 17 coöperate with walls of the pump cylinder 2 in providing pockets or compartments about the member 16 and in each pocket or compartment is placed a shiftable blade member 18, one of which is best shown in Fig. 5, of the drawing. Each blade member is segment shaped in elevation with parallel side walls and radially disposed end walls. Each member is hollow or has an opening 19 and the openings of said members are adapted to communicate with the pockets or compartments between the abutments 17. The openings 19 are also adapted to communicate with intake and outlet chambers 20 and 21 respectively, said chambers having openings or pipe connections 22 and 23. The chambers 20 and 21 are in enlarged portions of the pump cylinder 2 and the openings 22 and 23 communicate with the upper ends of the chambers and are above the horizontal plane of the pump shaft 5.

The ends of the shiftable members 18 and one end of the abutment member 16 engage the end plate 14 and engaging the opposite end of the members 16 and 18 is a packing member 24. This packing member has a central opening providing clearance of the pump shaft, and said member is slightly smaller than the bore of the cylinder 2, as shown in Fig. 8, so that said packing member may be crowded against that wall of the pump cylinder 2 adjacent the intake chamber 20. The outer face of the packing member 24 has an annular rib 25 and the lower portion of said rib is provided with a slot 26 to receive a pin 27 fixed in a wall of the chamber 3. The pin prevents rotation of the packing member 24 and to a certain extent serves as a fulcrum for said packing member, so that said upper portion of said member may have a lateral movement and may be firmly maintained against the cylinder wall adjacent the intake of the chamber 20.

The upper portion of the rib 25 has a lug 28 protruding into a slot 29 in the upper edge of another packing member 30 on the reduced end 7 of the pump shaft against the annular shoulder 8. The packing member 30 has a hub portion supporting a coiled compression spring 31 and the expansive force of this spring tends to separate the packing members 24 and 30, maintaining the former against the end of the abutment member 16 and the latter against the annular shoulder 9 of the pump shaft 5. It is now apparent that the pump shaft 5 will be constantly pressed against the packing nut 10 with the annular shoulder 8 wiping the inner end of the packing nut during the rotation of the pump shaft. Wear on the packing nut 10 is hardly perceptible and is uniform, so it is practically impossible for a lubricant to pass out of the outer end of the bearing 4 into which the lubricant is conducted by the grooves 15 of the pump shaft.

Since the packing member 30 is loose on the reduced end 7 of the pump shaft and is articulated with the packing member 24, there is always a tendency of the packing member 30 to rotate in the direction of a pump shaft, consequently the packing member 30 will exert a certain amount of leverage on the packing member 24 causing said member to snugly engage that wall of the pump cylinder 2 contiguous to the intake chamber 20, thus insuring proper packing at the marginal edges of the chamber, so that the contents of the intake chamber can only enter the pocket or compartment communicating therewith. It is immaterial what amount of lubricant escapes from the pump cylinder 2 into the chamber 3 at the outlet side of the pump cylinder, as the lubricant which accumulates in the chamber 3 contributes to a thorough lubrication of the pump and facilitates priming or starting of the same.

In operation, the pump may be driven clockwise or counter clockwise, but as so far described it has been considered and shown as having the pump shaft 5 driven clockwise as indicated by arrows in Figs. 2 and 3 of the drawing. As shown in Fig. 2, two of the pockets or compartments in the pump cylinder are in communication with the intake chamber 20 to receive lubricant therefrom, and the remaining two pockets or compartments are in communication with the outlet chamber 21. Those pockets communicating with the intake chamber 20 are receiving lubricant and as the abutment member is turned clockwise, the shiftable blade members are carried therewith and by centrifugal force are maintained in engagement with the walls of the pump cylinder, and propelled and pushed about said walls by the abutment member 16. By reference to Fig. 3 it will be noted that one of the blade members is coöperating with the abutment member and the walls of the pump cylinder

in providing an inclosed bottom pocket or compartment containing lubricant and that during the shifting of the pocketed lubricant that one pocket or compartment is discharging into the outlet chamber and another is receiving lubricant from the intake chamber. It is therefore evident that the loose blade member shifted by the abutment member coöperates therewith and the walls of the pump cylinder in providing an inclosure for the body of lubricant to be conveyed from the intake chamber 20 to the outlet chamber 21. The blade members are successively brought into operation for this purpose and quantities of lubricant are successively conducted or conveyed from the intake chamber to the outlet chamber, thus maintaining a constant flow from the pump without any danger of back pressure effecting the operation of the same.

Considering the shiftable blade member, which may be cast or made from sheet metal, the openings 19 of said members may be increased or decreased in area according to the liquid or fluid to be pumped.

For a heavy lubricant or slow flowing liquid the shiftable member may be hollow or provided with large openings as shown and for a light liquid or fluid the openings may be small; in one instance there may be a greater period of communication between the pockets and the chambers than in the other instance.

Since the shiftable members are free to engage the walls of the cylinder 2, particularly at the sides of the chamber 20 and 21 there is a minimum wear on said members, and practically the same results can be obtained by providing an abutment member with rocking members or shoes 32, as shown in Fig. 10 of the drawing. The rocking members or shoes 32 are self adjusting relative to the cylinder wall and provide pockets or compartments between the abutments of the rotary member. This, as well as a preferred form of construction, is in contradistinction to blades or piston members connected to a rotary member as sometimes found in connection with rotary engines, and while in the drawings there are illustrated the preferred embodiments of my invention, it is to be understood that the structural elements are susceptible to such variations and modifications as fall within the scope of the appended claims.

What I claim is:

1. A pump comprising a cylinder having intake and outlet openings communicating therewith and disposed in a horizontal plane at the upper portion of said cylinder, a rotary abutment member eccentrically disposed in said pump cylinder with the axis thereof below the plane of the cylinder opening, and a plurality of shiftable blade members loose in said cylinder and adapted to be shifted thereabout by said rotary abutment member so that said shiftable blade members successively communicate with the openings of said pump cylinder, each blade member having converging end walls either of which may be engaged by said abutment member to permit of the operation of said pump being reversed.

2. A pump comprising a cylinder having intake and outlet chambers, a rotary abutment member eccentrically disposed in said cylinder, and segment shaped hollow blade members loose in said cylinder adapted to successively communicate with the chambers thereof and be shifted by said abutment member engaging either end of each blade member.

3. A pump comprising a cylinder provided with intake and outlet chambers, a rotary abutment member in said cylinder, shiftable blade members in said cylinder adapted to be shifted by said abutment member to successively communicate with the chambers of said cylinder, and a packing member engaging the end of said abutment member and constantly maintained against that wall of said cylinder adjacent the intake chamber thereof.

4. In a pump, a pump cylinder, a shaft extending therethrough, loose blade members in said cylinder adapted to be actuated by said shaft to conduct liquid through said pump cylinder, a packing member for said cylinder, a packing nut for said shaft, and means adjacent said packing member constantly exerting pressure on said packing member and maintaining said shaft in engagement with said packing nut.

5. In a pump, a pump cylinder, a shaft extending therein, loose blade members in said cylinder adapted to be actuated by said shaft to conduct liquid through said cylinder, a packing member for one end of said cylinder, and means actuated by said shaft maintaining said member constantly against the wall of said cylinder.

6. In a pump, a pump cylinder, a shaft extending therein, an abutment member on said shaft within said cylinder, loose blade members in said cylinder adapted to be actuated by said abutment member to conduct a liquid through said cylinder, a packing member engaging the ends of said abutment and blade members, and means under the influence of said shaft normally maintaining said packing member against the wall of said cylinder.

7. In a pump, a cylinder, provided with intake and outlet chambers, bearings supported from said cylinder, a shaft journaled in said bearings, a packing nut in one of said bearings, a pulley on said shaft surrounding the same bearings, means in said cylinder actuated by said shaft, adapted for conducting a liquid from the intake chamber

of said cylinder to the outlet chamber thereof, and means exerting a constant pressure against said shaft to maintain said shaft in engagement with said packing nut.

8. In a pump, a pump cylinder provided with intake and outlet openings communicating therewith, a rotary abutment member eccentrically disposed in said cylinder with the axis thereof below the plane of the cylinder openings, blade members loose in said cylinder adapted to be actuated by said rotary abutment member, and a packing member fitted in said cylinder against said abutment and blade members and normally maintained in engagement with the walls of said cylinder adjacent the port thereof.

9. In a pump, a pump cylinder, a shaft extending through said cylinder, pumping devices in said cylinder actuated by said shaft, articulated packing members for said shaft and said pumping devices, and means interposed between said packing members adapted to constantly exert an outward pressure on said packing members.

10. In a pump, a pump cylinder having an end chamber, a pump shaft extending through said cylinder and the chamber thereof, pumping devices in said cylinder actuated by said shaft, articulated packing members in the chamber of said cylinder with one of said packing members under the influence of said shaft to maintain the other of said packing members normally against the wall of said cylinder, and means between said packing members normally exerting an outward pressure thereagainst.

11. In a pump, a pump cylinder provided with an end chamber adapted to receive liquid therefrom, a shaft extending through said cylinder in the chamber thereof, pumping devices in said pump cylinder adapted for conducting a liquid therethrough, a spring pressed packing member in said cylinder for said pumping devices, and means under the influence of said shaft maintaining said packing member constantly in engagement with a wall of said cylinder.

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

WILLIAM H. EIZERMAN.

Witnesses:

KARL H. BUTLER,

ANNA M. DORR.