W. L. DEYSHER.

ROTARY PUMP.

APPLICATION FILED MAR. 6, 1917.

1,245,691.

Patented Nov. 6, 1917.

3 SHEETS—SHEET 1.

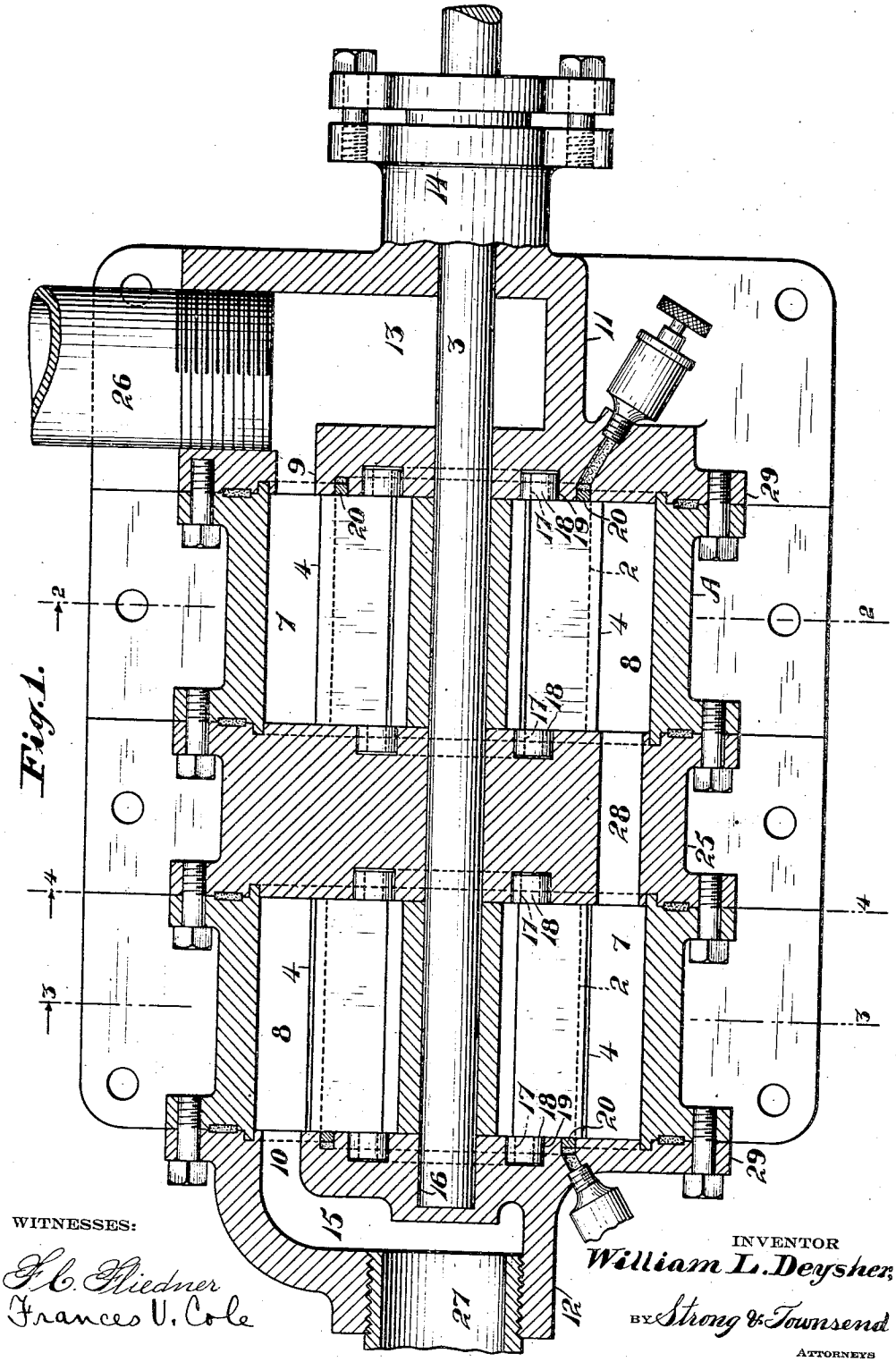


Fig. 1.

WITNESSES:

F. C. Fliedner

Frances V. Cole

INVENTOR

William L. Deysher,

BY Strong & Townsend

ATTORNEYS

W. L. DEYSHER.

ROTARY PUMP.

APPLICATION FILED MAR. 6, 1917.

1,245,691.

Patented Nov. 6, 1917.

3 SHEETS—SHEET 2.

Fig. 2.

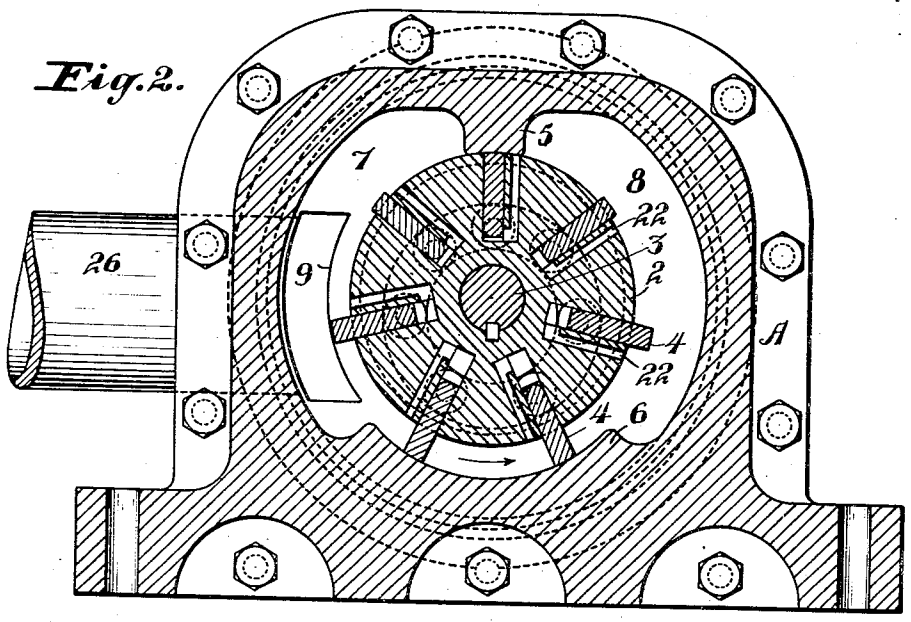
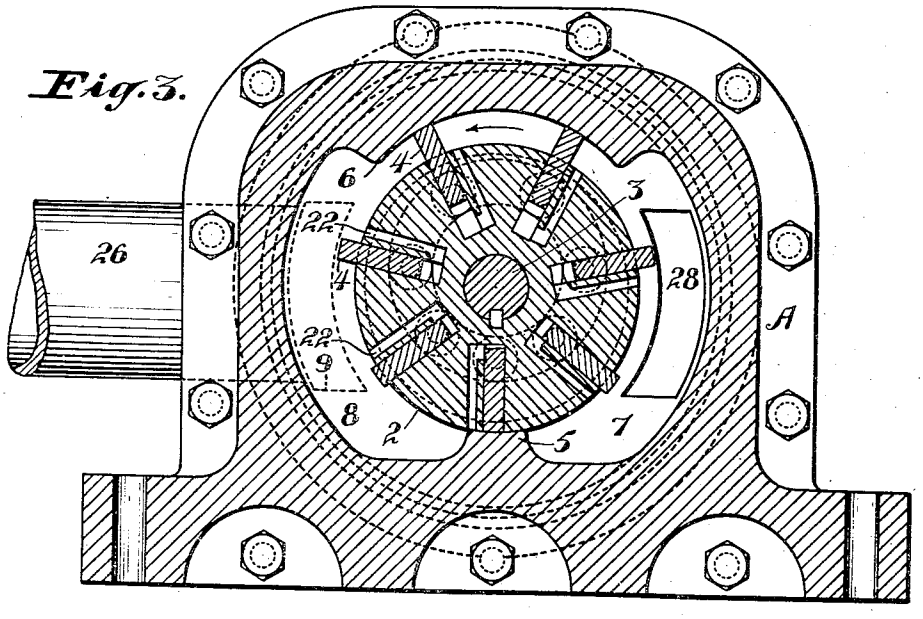


Fig. 3.



WITNESSES:

F. C. Fliedner

Frances V. Cole

INVENTOR

William L. Deysher,

BY *Strong & Townsend*

ATTORNEYS

W. L. DEYSHER.

ROTARY PUMP.

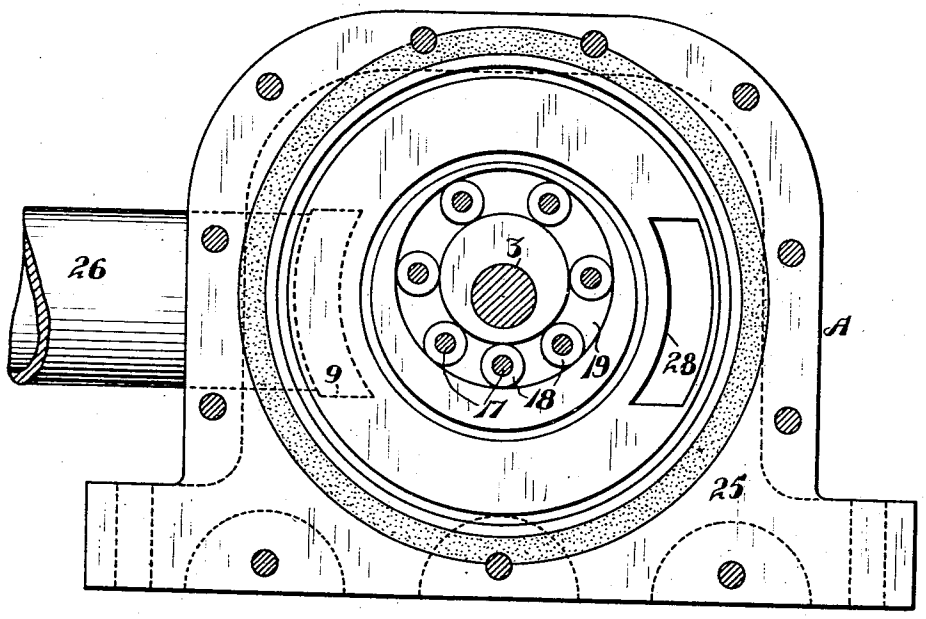
APPLICATION FILED MAR. 6, 1917.

1,245,691.

Patented Nov. 6, 1917.

3 SHEETS—SHEET 3.

Fig. 4.



WITNESSES:

F. C. Fliedner

Frances V. Cole

INVENTOR

William L. Deysher,

BY Strong & Townsend

ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM L. DEYSHER, OF SAN ANSELMO, CALIFORNIA.

ROTARY PUMP.

1,245,691. Specification of Letters Patent. Patented Nov. 6, 1917.

Application filed March 6, 1917. Serial No. 152,549.

To all whom it may concern:

Be it known that WILLIAM L. DEYSHER, a citizen of the United States, residing at San Anselmo, in the county of Marin and State of California, have invented new and useful Improvements in Rotary Pumps, of which the following is a specification.

This invention relates to a rotary pump.

One of the objects of the present invention is to provide a simple, substantial and cheaply manufactured pump of the rotary type consisting of a cylinder, a power-driven rotating piston, a plurality of vanes carried by and slidably mounted in the piston and a pair of abutments to divide the cylinder into an intake and discharge chamber of large capacity, said chambers being particularly provided for the purpose of permitting the formation of large intake and discharge ports and also to permit the fluid velocity through the cylinder proper and eddy currents to be reduced to a minimum. Another object of the invention is to provide a construction which will permit any number of cylinders to be connected as an alined series-connected multi-stage unit, particularly adapted for use where a high pressure and constant flow is required. Another object of the invention is to provide a novel form of packing ring to prevent leakage between the pump chambers around the ends of the piston. Another object of the invention is to form a port connection between the bottom of each vane pocket and the surface of the piston to relieve both vacuum and back pressure behind the vanes when they are projected and retracted, and also to permit each vane to serve the function of a piston to assist the pumping action, particularly when water is being handled. Further objects will hereinafter appear.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a central longitudinal plan section through a two-stage pump;

Fig. 2 is a cross section on the line 2—2 of Fig. 1;

Fig. 3 is a cross section on the line 3—3 of Fig. 1;

Fig. 4 is a cross section on the line 4—4 of Fig. 1.

Referring to the drawings in detail, A indicates the cylinder of the pump, 2 a rotating piston, 3 the shaft upon which the piston is secured and 4 a plurality of vanes slidably mounted in the piston. The cylinder proper is divided into two chambers by means of a pair of abutments 5 and 6 to permit the formation of an intake chamber 7 and a discharging chamber 8, said chambers being of large capacity to permit the formation of large intake and discharge ports, such as shown at 9 and 10, and also to permit a reduction of the fluid velocity through the cylinder proper and prevent formation of eddy currents.

The shaft is journaled in a pair of head members 11 and 12 secured one at each end of the cylinder, the head member 11 being provided with an intake chamber 13 which communicates with the port 9 and a stuffing box 14 through which the shaft extends. The opposite head is provided with a discharging chamber 15 which communicates with the port 10 and it also serves as an end bearing for the driving shaft 3 as indicated at 16.

Formed on each end of each vane 4 is a projecting pin 17 and carried by each pin is a roller 18 which extends into an annular groove 19 formed one in each head member 11 and 12. Said annular grooves are eccentrically positioned with relation to the shaft 3 and as the rollers run in and are guided by the same, it can readily be seen that each vane is projected and retracted with relation to the abutments 5 and 6 once during each revolution of the piston, the vanes being retracted while passing the abutment 5 and projected when in alinement with the abutment 6, said abutment being spaced with relation to the piston to permit a pocket formation between each set of vanes as they pass by to carry water from the intake chamber 7 to the discharging chamber 8.

Comparatively little wear, if any, takes place between the outer faces of the vanes and the abutments 5 and 6 as a suitable clearance, for instance, a thousandth of an inch, is provided. Also comparatively little leakage takes place between the chambers 7 and 8 as the high speed and velocity produced when the piston is running reduces the time element involved or contact period between a vane and the abutments to such a minimum amount that leakage can hardly take place, even though a considerable space is formed between the faces of the vanes and the abutments.

For the purpose of preventing leakage between the chambers 7 and 8 around the ends of the piston, a pair of rings, such as indicated at 20, have been provided, there being one ring on each end of the piston. These rings extend into annular grooves formed on the inner faces of the head members 11 and 12, and as these annular grooves are comparatively deep, an annular packing chamber is formed between the inner face of the rings and the bottoms of the grooves, which spaces may be filled with a hard packing grease by means of compression cups or the like.

The packing rings will in this manner run against the face of hard packed grease, which not only serves as a lubricant, but also as an anti-friction packing surface which positively prevents leakage around the ends of the piston.

Connecting the lower end of each vane pocket with the surface of the piston is a port 22. These ports permit the vanes to be projected and retracted without exerting any resistance and also permit each vane to serve the function of a piston. That is, the vane in its travel from the abutment 5 to the abutment 6 is gradually projected, thereby causing a sufficient vacuum in the lower end of the vane pocket to permit water or air to be drawn through the port 22 into the pocket. This takes place while the port is in communication with the chamber 7. The reverse movement or retraction of the vane during its passage through the chamber 8 causes the volume of air or water drawn into the vane pocket to be expelled into the chamber 8, thereby materially assisting the pumping action of the rotor as each vane is projected and retracted once during each revolution. It can readily be seen that a comparatively great volume of water is handled merely by the reciprocating pumping action produced, this being particularly true where the pump is used for handling water.

A pump constructed as here shown may employ several cylinders and rotors if desired, the construction being ideal for an alined series-connected multi-stage unit. Where two cylinders are employed, as shown in Fig. 1, it is only necessary to place an intermediate head 25 between the cylinders, said head serving as a central bearing for the shaft 3 and also as a dividing plate between the pistons.

The flow of water through a double-stage unit, such as shown, will be as follows:

Water entering the intake pipe 26 and chamber 13 passes through the port 9 into the suction or intake chamber 7 of the first cylinder. It is here trapped between the abutment 6 and the vanes and carried over into a discharging chamber 8. It then passes through a port 28 formed in the intermediate head 25 and is thus permitted to enter the intake chamber 7 of the second cylinder where it is again trapped between the abutment 6 and the vanes and carried over into the discharging chamber 8 where it finally discharges through the port 10, chamber 15 and discharge pipe 27. The position of the abutments 5 and 6 is reversed in the second cylinder, as shown in Fig. 3, to permit the water to travel in a spiral path while passing through the cylinders. The spiral passage of the water can readily be seen from Figs. 2 and 3, as the water entering through the first port 9 is carried under the first piston into the first dicharging chamber, then through the port 28 into the second intake chamber from which it is carried over the second piston into the second discharging chamber 8 from where it is finally permitted to escape through the port 10 and discharge pipe 27. The spiral passage of the water is of considerable importance, as it materially reduces any tendency to set up eddy currents.

A comparatively low velocity of the water is maintained throughout the pump, as the intake and discharging chambers, together with the communicating ports, are of large capacity and area, the only point where high velocity exists being the passage between the pistons and the abutments 6. The velocity of the water is materially reduced at all other points, thereby reducing surface friction and eddy current formation.

The several cylinders, end heads and intermediate heads may be secured together in any suitable manner, but preferably by flanging the ends, as shown at 29. The provision of the packing rings, together with the grooves for the reception of the packing, permits considerable play between the ends of the pistons and the heads without increasing any tendency toward leakage at these points. The pistons can therefore run comparatively free at all times as end thrust is practically prevented, particularly where a horizontal unit is employed, as here shown.

While grease is employed as a packing, it is obvious that any other suitable material may be employed.

I similarly wish it understood that the materials and finish of the several parts of the pump may be such as experience and judgment in the manufacture may dictate.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A pump comprising a cylinder having heads at each end and an intermediate diaphragm forming two cylindrical chambers axially in line with inlet and discharge passages, a central shaft journaled in said heads and diaphragm, a radially slotted drum fixed to the shaft in each chamber, vanes slidable in the slots, concentric abutments formed in

the chambers having alternate wide and narrow concentric surfaces, eccentric channels formed in the cylinder heads and in the diaphragm, and rollers journaled to the ends of the vanes and traveling in the channels, so that the vanes in one chamber are extended to form a suction fit with the wide surface therein and the vanes in the succeeding chamber are extended to fit the wide surface on the opposite side of the second chamber.

2. In a pump of the character described, cylindrical chambers axially in line and an interposed diaphragm, inlet and outlet passages in the cylinder heads, a passage through the diaphragm in a line at right angles with those in the heads, abutments projecting into the chambers and forming alternate long and short segmental faces at opposite sides, drums axially turnable in each cylinder, radial slots in the drums, vanes fitting in the slots, and means by which the vanes are extended to form a suction fit with the longer abutment surfaces of the respective chambers, whereby the impelled medium moves spirally through the chambers from the inlet to the outlet.

3. In a pump, a plurality of axially disposed chambers with intermediate diaphragm, inlet and discharge passages through opposite sides of the chamber heads, a passage through the diaphragm at right angles with those in the heads, abutments at opposite sides of the chambers and at right angles with the head passages, one of said abutments forming an extended concentric segment, concentrically revoluble, radially slotted drums revoluble in each chamber, vanes fitting the slots, and means by which said vanes are extended from the periphery of each drum to alternately form a working fit with the extended abutment surfaces and retracted to pass the opposite abutment.

4. A rotary pump comprising a cylinder having an intake and discharge chamber of large capacity formed therein, a pair of abutments secured in the cylinder separating the chambers, a rotating piston member centrally positioned between the chambers and in alinement with the abutments, having a plurality of pockets formed therein, a vane mounted in each pocket, a plurality of ports formed in the piston, one adjacent each pocket, said ports extending from the face of the piston to the lower ends of the pockets, means for projecting the vanes with relation to one abutment member and retracting the same with relation to the opposite abutment member, a head member secured on each end of the cylinder forming a closure for the same, each head having an annular groove formed therein positioned concentric with relation to the piston and a ring secured on each end of the piston extending into said grooves.

5. A rotary pump comprising a pair of cylinders, an intermediate head interposed between the cylinders having a port therein forming communication between the cylinders, a head member on the opposite end of each cylinder, one of said heads having an intake port formed therein communicating with the first cylinder and the opposite head a discharge port which communicates with the second cylinder, a pair of opposed abutment members secured in each cylinder, a rotating piston in each cylinder and a plurality of vanes carried by each piston adapted to be retracted with relation to one set of abutments and projected with relation to the opposite set of abutments.

6. A series pump comprising a plurality of cylindrical chambers axially in line with inlet and discharge passages out of line through the chamber heads, segmental abutments concentric with the interior of the cylinders, alternate of said abutments having a long segmental face, radially slotted drums axially journaled within the cylinders with peripheries fitting the short abutments, vanes slidable in the slots, and means whereby the vanes are projected to form a suction fit with the longer abutment and retracted to pass the opposite shorter abutment.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM L. DEYSHER.

Witnesses:
DAVID MONSON,
FRANK E. DULEY.