

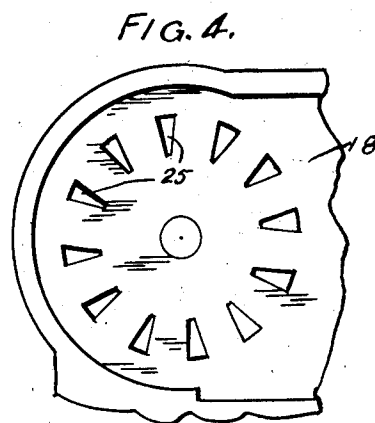
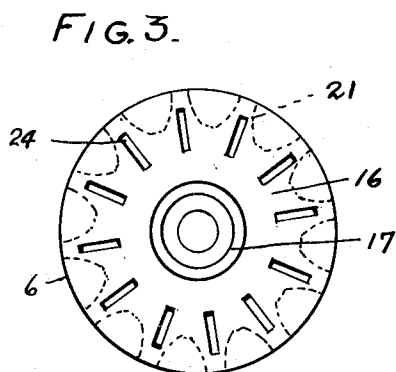
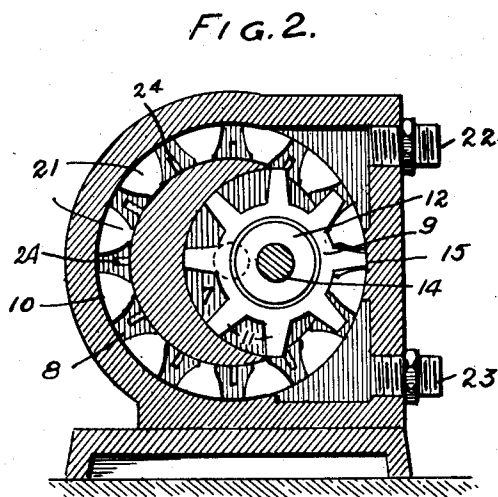
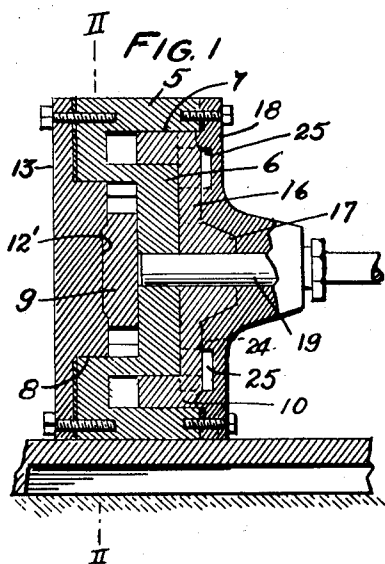
July 19, 1927.

1,636,259

A. J. SWEENEY

ROTARY PUMP

Filed Aug. 24, 1926



INVENTOR
ANDREW J. SWEENEY
BY *Greenbow & Reges*
ATTORNEYS

UNITED STATES PATENT OFFICE.

ANDREW J. SWEENEY, OF BAYONNE, NEW JERSEY.

ROTARY PUMP.

Application filed August 24, 1926. Serial No. 131,174.

The present invention relates to improvements in pumps or motors of the rotary type.

An object of the invention is to provide a pump wherein the fluid pressure upon opposite sides of a rotary or movable element is equalized or balanced so as to reduce the degree of friction and attain a more efficient operation of the pump.

As an example of one embodiment of my invention I have shown the same applied to a well known type of pump in which a toothed rotor is disposed in mesh with a toothed idler, the rotor being driven from an external source. In this type of pump the plain face of the rotor revolves adjacent to a wall of the pump casing, the pressure being effective on the opposite side gives the rotor a lateral thrust causing a relatively great amount of friction, often resulting in a retardation in the rate of speed of the rotor with a consequent loss in efficiency.

It has been proposed to equalize the pressure upon both sides of a rotor of the above-mentioned type by admitting the pressure fluid to the entire rear surface of the rotor, but owing to the necessary clearance between the wall of the casing and the periphery of the rotor communication was afforded between the high and low pressure sides of the pump, thus defeating the effectiveness of the admittance of pressure to the opposite area of the rotor.

In the present invention I provide the rotor with a series of apertures in the form of radially disposed slots and the opposed side of the casing with pockets or cells to receive fluid under pressure. As the rotor revolves the fluid enters the cells and is entrapped, thus serving to balance the rotor and also acting as a cushion to the end that friction is reduced to a minimum.

The invention will be more fully understood by reference to the accompanying drawings in which

Fig. 1 is a sectional view in elevation of a rotary pump of a well known type modified in accordance with the present invention.

Fig. 2 is a transverse sectional view of the pump taken on line II—II in Fig. 1.

Fig. 3 is a view of the rear side of the rotor showing the radially disposed apertures in the disk thereof, and

Fig. 4 is a view of the interior of the casing showing cells to receive pressure fluid.

The pump selected to illustrate an embodi-

ment of my invention comprises a casing or cylinder 5 having a dividing wall 6 separating the casing into two chambers 7 and 8 in which are disposed an idler or follower wheel 9 and a rotor 10, respectively.

The follower wheel is provided with teeth 11 extending radially from the periphery of the wheel. The teeth may be slightly tapered so that the root of each tooth is of greater width than the summit. The idler 9 has a running fit with the chamber and is provided with a centering boss 12 to fit a recess 12' which may be provided in the cover 13 of the casing, suitable packing being provided to prevent leakage. A mounting for the wheel 9 is provided in the form of a stub shaft 14 mounted in the dividing wall 6 and in the cover.

At the side of the casing opposite to that having the chamber 7 is the chamber 8 and a portion of the wall dividing the chambers is removed so that the chambers intersect tangentially as shown in Fig. 2. At the point of intersection of the chambers is a contact face or abutment 15 which in conjunction with the rotary elements separates the two chambers.

The rotor or driving element 10 is in the form of a disk 16 provided with a hub 17, fitting a recess in a head or wall 18 of the casing, suitable packing being provided to prevent leakage. The rotor is keyed to a shaft 19 mounted in a bearing in the wall 6.

The disk 16 of the rotor 10 is provided with a plurality of teeth 21 disposed adjacent to the perimeter of the disk and these teeth are arranged to mesh with teeth 11 on the idler 9. It will be evident that the teeth when in intermeshing contact operate in conjunction with the abutment 15 to prevent the passage of fluid from one side of the chamber to the other.

In the upper and lower portions of the casing are ports 22 and 23, respectively, extending on tangential lines from the annular chamber 8 and either port may serve as an inlet or an outlet.

For the purpose of attaining a proper balance of the rotor when the device is used to take in fluid at atmospheric pressure and discharge at about 150 to 200 pounds, I provide the disk 16 of the rotor with a plurality of radially disposed slots 24 and the wall or head 18 with pockets or cells 25.

When the present device is in use the fluid entering the lower port 23 at low pressure

is discharged from port 22 at high pressure but the openings 24 prevent the pressure fluid to pass into the cells and balance the rotor, the fluid entrapped in the cells serving as a cushion and eliminating friction.

It will be understood that the cells may be of different capacities or their effective areas may be varied in accordance with the area of the disk. The apertures 25 or slots in the disk may, if desired, have a combined area greater than the area of the disk at the side opposite to the cells 25.

By reason of the present improvement a pump employing a rotor as above described may be operated with an equal distribution of pressure thus relieving friction and promoting the efficiency of the device.

The cells 25 may be of graduated capacity from the high to the low pressure side of the pump, or an opposite arrangement may be provided. The degree in variation between the cells may be calculated or determined by experiment to obtain a smooth gradient of pressure to balance the rotary element and compensate for a difference in pressure over the surface thereof opposed by the pressure in the cells.

Although a preferred embodiment of the invention is shown and described herein it will be understood that modifications may be made therein without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. In a pump or motor mechanism, a casing having an intermediate dividing wall separating the interior of the casing into

intersecting chambers, a rotatable member adjacent to an interior wall of the casing, said member having an aperture for the passage of pressure fluid therethrough, and a pocket in the wall of the casing to receive and entrap said fluid to equalize the lateral thrust upon said member resulting from the pressure fluid.

2. In a pump or motor mechanism, a casing having an intermediate dividing wall separating the interior of the casing into intersecting chambers, a rotatable member operable under pressure and rotatable adjacent to an interior wall of the casing, said member having a plurality of apertures for the passage of pressure fluid therethrough, and a plurality of pockets in the wall of the casing to receive and entrap said fluid to equalize the lateral thrust upon said member resulting from the pressure fluid.

3. In a pump or motor mechanism, a casing having an intermediate dividing wall separating the interior of the casing into intersecting chambers, a rotatable member operable under pressure and rotatable adjacent to an interior wall of the casing, said member having a plurality of radially disposed apertures for the passage of fluid under pressure therethrough, a plurality of radially disposed pockets in the wall of said casing disposed to register with said apertures to receive and entrap fluid under pressure which serves during a rotation of said rotatable member to balance the same against pressure built up in said device.

In testimony whereof I affix my signature.
ANDREW J. SWEENEY.