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ROTARY ROLLER PUMP

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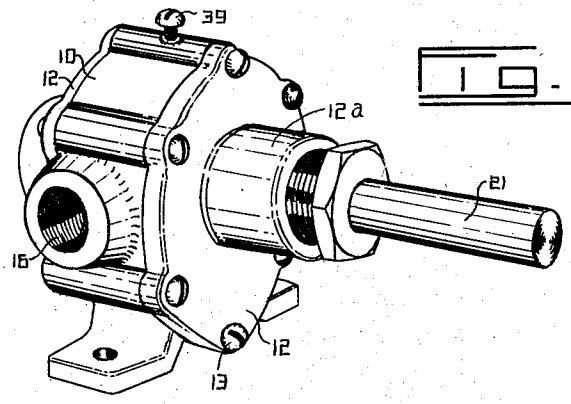



Fig. 1.

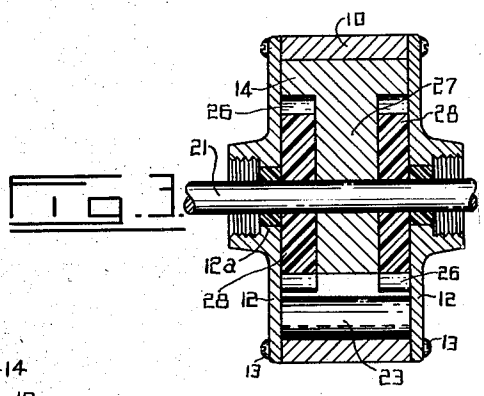



Fig. 3.

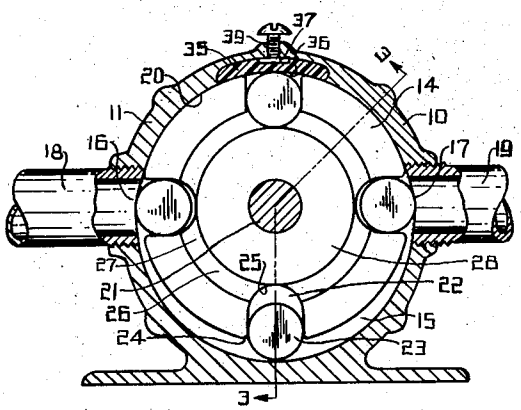



Fig. 2.

INVENTOR

ROBERT EDISON EDOUARD JESSOP

BY

Fetherstonhaugh & Co.

ATTORNEYS

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## ROTARY ROLLER PUMP

Robert Edison Edouard Jessop, West Vancouver, British Columbia, Canada

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1 Claim. (Cl. 103—136)

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This invention relates to improvements in rotary roller pumps.

The rotary roller pump, according to the present invention, is the type having a rotor eccentrically mounted in a casing with a plurality of recesses in its periphery, each having a roller mounted therein adapted to engage the inner peripheral wall of the casing. In most known pumps of this type, the rollers have been kept in contact with the peripheral wall by centrifugal force only with the result that they are not as efficient as they should be.

The main object of this invention is to provide means for keeping the rollers in positive engagement with the peripheral wall of the pumping chamber without creating additional wear in the unit.

A further object is the provision of a rotary roller pump in which there is less wear than there is in ordinary pumps of this type.

A still further object is the provision of a rotary roller pump which automatically adjusts itself to compensate for any wear or deformation of parts.

With these and other objects in view, the present invention consists essentially of a rotary roller pump comprising a casing, a circular pumping chamber formed in the casing, a rotor rotatably and eccentrically mounted in the chamber, said rotor engaging the peripheral wall of the chamber in one area thereof, spaced inlet and outlet ports in the peripheral wall of the chamber, one on each side of said contact area, a shaft connected to the rotor and extending through the side walls of the chamber, a plurality of recesses formed in the periphery of the rotor, a roller in each recess extending from face to face of the rotor, and fluid means for urging the rollers against the peripheral wall of the pumping chamber, as more fully described in the following specification and illustrated in the accompanying drawings, in which

Figure 1 is a perspective view of the pump,

Figure 2 is a side elevation with the near side removed, and

Figure 3 is a cross section taken on the line 3—3 of Figure 2.

Referring more particularly to the drawings, 10 is a casing formed of a circular wall 11 and side walls 12 removably secured thereto by studs 13. A rotor 14 is rotatably and eccentrically mounted in a pumping chamber 15 formed in the casing. Ports 16 and 17 are formed in the wall of the chamber on opposite sides thereof, preferably in the horizontal axial plane of the pump.

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However, these ports may be formed in the side walls 12 adjacent the positions shown in the drawings. These are inlet and outlet ports, the function of each depending upon the direction of rotation of the rotor. Pipes 18 and 19 connect with the ports 16 and 17, respectively, and are adapted to convey a liquid to and from the pump. The rotor 14 engages the peripheral wall of the pumping chamber in the area 20, said area preferably extending between the tops of the ports 16 and 17. The area 20 is concentric with and has the same radius as the rotor so that the latter fits snugly against this portion throughout its length, as clearly shown in Figure 2. This peripheral wall drops away from the rotor on each side of the area 20, although it is substantially circular. The rotor is mounted on a shaft 21 which extends through bearings 12a formed on the walls 12.

The rotor 14 has a plurality of recesses 22 formed in its periphery, each having a roller 23 mounted therein. These rollers are preferably formed of a rubber composition material and extend from face to face of the rotor. The depth of each recess is substantially the same as the diameter of its roller and its outer corners are preferably rounded as at 24, while the bottom 25 thereof is curved and has the same radius as the roller.

A pressure chamber 26 is formed within the rotor 14 centrally thereof. Actually, the rotor has a central web 27 by means of which it is mounted on the shaft 21 and the inner pressure chamber 26 is formed on each side thereof, the two parts of said chamber being connected by the recesses 22. The walls 12 form the outer walls of the pressure chamber. A rubber ring 28 is pressed on the shaft 21 on each side of the web 27, and the outer surfaces of these rings may protrude slightly beyond the side faces of the rotor so that when the latter is mounted in the casing 10, the rings press against the inner surfaces of the side walls 12 to form a sliding tight joint inside the bearings 12a.

A rubber insert 35 is located in the area 20 substantially mid way between the ends thereof and extends across the pump between the opposite sides of the pumping chamber 15. The inner surface 36 of this insert is concentric and in line with the surface of the area 20, and this insert may be provided with a stiffener 37 extending across the back thereof. A screw 39 is threaded through the casing 10 with its inner end bearing against the stiffener 37 adjustably to apply pressure on the insert 35.

In operation, the shaft 21 and the rotor 14 are turned by a suitable source of power, not shown. Centrifugal force tends to throw the rollers 23 against the peripheral wall of the pumping chamber 15 and they roll along said wall. The inner pressure chamber 26 fills with the liquid being pumped. This liquid forms an incompressible flexible body pressing the rollers against the peripheral wall. As the rotor turns, the rollers move towards and away from the shaft 21. The pressure chamber overlaps and communicates with the recesses in which the rollers operate, see Figure 2, so that the latter move into and out of said chamber. When a roller moves into the inner chamber, it displaces a certain amount of the liquid therein, thus urging at least one of the rollers outwardly. The upper roller in Figure 2 is as far into the inner chamber as it will go, while the lower roller is completely out of said chamber. Thus, the roller or rollers moving into the chamber meet resistance by the fluid therein and are, consequently, firmly pressed against the peripheral wall, and this inner movement causes the fluid in the chamber to press a roller or rollers outwardly against said peripheral wall. The fluid in the chamber makes a direct connection between the rollers and yet it causes no wear on them.

Assuming that the ports 16 and 17 are inlet and outlet ports respectively, the rotor would be turning in an anti-clockwise direction with reference to Figure 2. As the rollers pass the port 16, liquid is drawn in by the suction created and this liquid is moved around the chamber 15 and discharged through the port 17 under pressure. The concentric area 20 prevents liquid from moving from the outlet to the inlet port. The rubber insert 35 bears against the periphery of the rotor to make sure that no liquid moves past this point, and the pressure on the insert may be adjusted by the screw 39 to compensate for any wear in the insert. It will be noted that when a roller is touching the rubber insert, it also touches the rings 28 so that liquid cannot shift to the other side of the pressure chamber. The rings 28 also prevent any liquid from leaking out of the casing along the rotor shaft.

What I claim as my invention is:

A rotary roller pump comprising a casing, a circular pumping chamber formed in the casing, a rotor rotatably and eccentrically mounted in the chamber, said rotor engaging the peripheral wall of the chamber in one area thereof, spaced inlet and outlet ports in the peripheral wall of the chamber, one on each side of said contact area, a shaft connected to the rotor and extending through the side walls of the chamber, a plurality of recesses formed in the periphery of the rotor and extending from side to side thereof, a roller in each recess extending from face to face of the rotor, an inner pressure chamber formed in two sections within the rotor, one on each side of the rotor and opening outwardly from the side thereof, said chamber sections connecting with and being interconnected by all the recesses, and said inner chamber being filled during operation with the liquid being pumped to form an incompressible flexible body urging all the rollers against the peripheral wall of the pumping chamber, and a rubber ring pressed on the shaft within each chamber section with its outer surface protruding beyond the rotor side, said rings pressing against the sides of the casing.

ROBERT EDISON EDOUARD JESSOP.




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