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A. J. NORTHEY

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ROTARY PUMP

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Fig. 2.

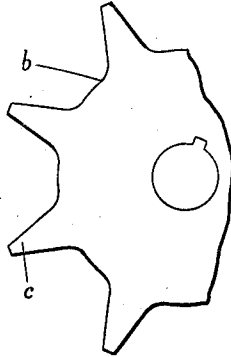
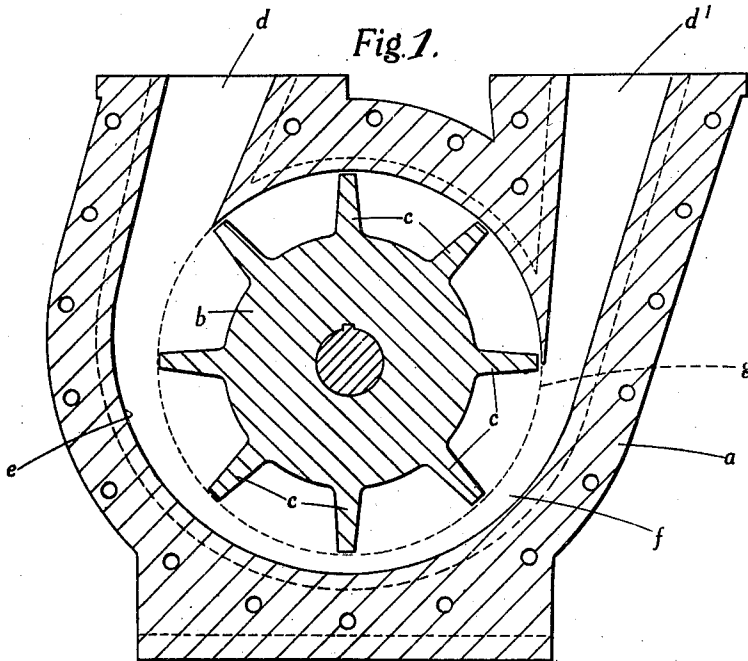


Fig. 1.



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ROTARY PUMP

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1 Claim. (Cl. 103—96)

This invention relates to rotary pumps and has for its chief object the provision of an improved and simplified form of rotary pump which comprises a relatively small number of parts thereby enabling the same to be produced at a relatively low cost.

According to the invention the improved form of pump comprises a rotor provided with vanes and arranged in a casing formed with inlet and outlet ports interconnected with one another by a passage of convergent-divergent or Venturi-like formation, the convergent portion of the passage being of greater length than the divergent portion thereof.

In carrying the invention into effect according to one convenient mode, the pump comprises a casing accommodating a cylindrical rotor having a series of vanes extending outwardly from its periphery, the rotor being arranged concentrically in its casing with but a small clearance between the tips of the vanes and a part of the inner wall of its casing, which part is of cylindrical or other formation affording a substantially constant clearance between the same and the tips of the vanes. Between the inlet and outlet ports, however, the inner wall of the casing is preferably shaped so that a convergent-divergent or Venturi-like passage is provided between the said inner wall and the adjacent arcuate path traversed by the tips of the vanes. The inlet and outlet ports may be spaced so that the passage formed therebetween subtends an angle more than 180° at the centre of the rotor or they may be spaced further apart according to the conditions to be complied with and the nature of the fluid to be pumped.

By this arrangement, kinetic energy is imparted to the fluid drawn into the casing by the rotating vanes and, as the fluid passes out through the divergent portion of the aforesaid passage, the kinetic energy is converted into pressure energy, the pressure developed being dependent upon the speed of rotation of the vanes, their number and/or configuration and the configuration and dimensions of the aforesaid passage.

In order that the said invention may be clearly understood and readily carried into effect, the same will now be more fully described with reference to the accompanying drawing in which—

Fig. 1 is a vertical sectional view through one form of rotary pump produced in accordance with the invention; and

Fig. 2 is a fragmentary view of a modified form

of rotor that may be employed in carrying out the invention.

In Fig. 1 of the accompanying drawing, there is illustrated diagrammatically one form of the invention in which the inlet and outlet ports are indicated at d and d' respectively and in which a indicates the pump casing and b indicates the rotor. As will be seen, the rotor is provided with a series of radially disposed vanes c and is arranged concentrically in the casing with but a small and substantially constant clearance between the tips of the vanes and the inner wall of the casing over a portion of the latter. Between the ports d and d' another portion of the inner wall of the casing is shaped as shown at e so that a convergent-divergent or Venturi-like passage f is provided between the said inner wall and the adjacent arcuate path g traversed by the tips of the vanes c .

In many instances, it is desirable so to form the casing and so to arrange the inlet and outlet ports that a passage f of relatively great arcuate length is provided. For example, as is shown in Fig. 1, the casing may be formed and the ports may be arranged so that the convergent-divergent passage f extends over an angle of substantially more than 180° . In the arrangement shown, the convergent portion of the passage f extending between the inner end of inlet port d and the throat of passage f , is of greater length than the divergent portion of the passage f extending between said throat and the inner end of outlet port d' , so that the throat of passage f is nearer to the outlet, than to the inlet, port.

It will be appreciated that with the rotary pumps produced in accordance with the invention, the rotor blades keep the liquid pressed against the walls of the passage and at the same time drive it forward through the converging passage at an increasing speed until it reaches a maximum at the throat of the venturi. At this point the energy imparted to the liquid is mainly kinetic. The relatively long convergent portion of the passage f tends to impart the kinetic energy to the liquid gradually, and thus reduces shock. From this point the velocity decreases and the pressure rises as the liquid passes along the divergent passage and the kinetic energy is converted into pressure energy.

In some instances the inlet and outlet passages may be formed so that their configurations or the extents of their convergence or divergence differ.

Also, the form of the blades provided on the rotor may be varied according to the conditions or requirements to be met. In the embodiment illus-

trated, the blades are shown slightly tapered but, in some instances, the amount of the taper may be increased considerably as is shown diagrammatically, for example, in Fig. 2. Moreover, if
5 desired, the radial or outwardly extending surfaces of the blades may be shaped or formed with ribs or projections to decrease the effects of their impact with the fluid or liquid being pumped.

Having thus described this invention what I
10 claim as new therein and desire to secure by Letters Patent is:

A rotary pump comprising a casing formed with inlet and outlet ports and a curved inner wall, said inner wall being made up of two complementary and unsymmetrical sectors merging
15 with the inlet and outlet ports, a cylindrical rotor positioned within said casing and rotatably mounted relative to the curved inner wall thereof, vanes merging with and extending radially
20 outwards from the surface of said rotor, the surface of said rotor being otherwise cylindrical and continuous, one sector of said inner wall being

arcuate in form and concentric with the rotor and its radially extending vanes, there being a small but substantially constant clearance between the vane tips and said concentric surface, the other
5 sector of said inner wall being eccentric with respect to the rotor to form a passage defined by the path traversed by the tips of the vanes in rotating and said eccentric inner wall, said passage being Venturi-like in form and extending from
10 the inner end of the inlet port to the inner end of the outlet port, said Venturi-like passage consisting of a throat, a portion extending from the inlet port to the throat and converging with the
15 latter, and a portion diverging from the throat and extending to the outlet port, and said convergent portion between the inlet port and the
20 throat being of greater length than the divergent portion between the throat and the outlet port, whereby the throat is disposed nearer to the outlet port than to the inlet port.

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