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ROTARY PUMP

Filed Feb. 11, 1928

Fig. 1.

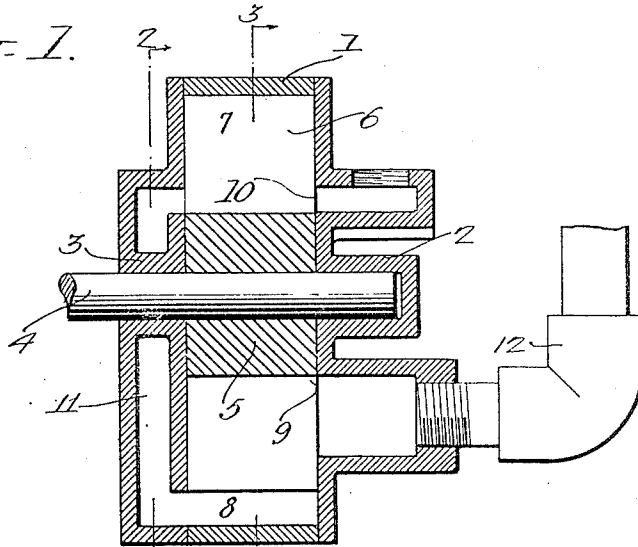


Fig. 2.

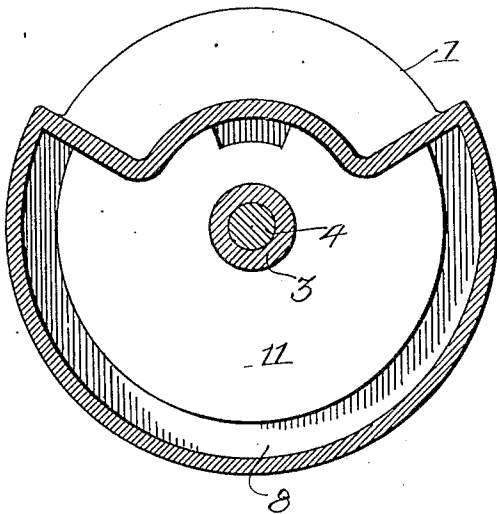
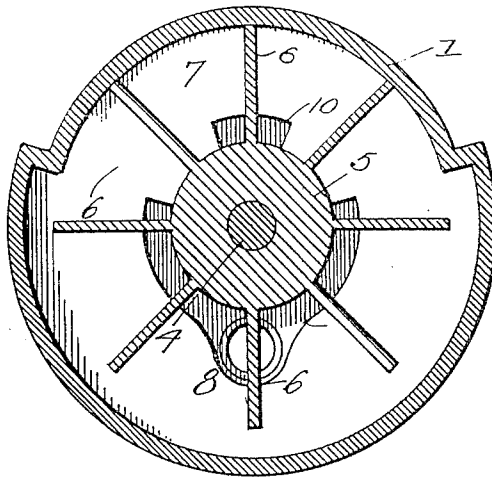


Fig. 3.



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ROTARY PUMP.

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This invention relates to improvements in pumps, and the primary object of the invention is to provide a pump of the centrifugal type of good efficiency and which by reason of its relative simplicity and cheapness of manufacture and the fact that it is self-priming is particularly well adapted for certain classes of work to which pumps of this type as made in accordance with prior practices have been generally unadaptable.

In the attached drawings:

Figure 1 is a transverse section through a pump made in accordance with my invention;

Fig. 2 is a section on the line 2—2, Fig. 1, and

Fig. 3 is a section on the line 3—3, Fig. 1.

With reference to the drawings, my pump in a preferred embodiment comprises a casing 1 having therein bearings 2 and 3 for a shaft 4 which projects through the casing at one side and is adapted for connection with a suitable source of power. Attached to the shaft in the interior of the casing 1 is a rotor 5 including a plurality of vanes 6 which in width correspond closely to the width of the chamber which the rotor occupies. This chamber has sectors, indicated in Figs. 2 and 3 by the reference numerals 7 and 8, respectively, of different radius, the sector 7 being of shorter radius than the sector 8. Preferably the vanes 6 are of such length as to closely fit at their outer edges the wall of the sector 7, while a space is afforded between the ends of the vanes and the inner wall of the sector 8. This is clearly shown in Figs. 2 and 3.

The casing 1 comprises a suction port 9 and a discharging port 10, these ports entering the side of the casing and communicating respectively with the sector 8 and the sector 7. The casing also comprises a bypass between the two sectors 7 and 8 which is designated in Fig. 1 by the reference numeral 11 and which extends from the outer part of the sector 8 to the inner part of the sector 7, and it will be noted that in a preferred embodiment and as illustrated, this bypass 11 enters the sector 7 at a point directly opposite the port 10. The sizes of the various ports may be substantially as illustrated or may be varied in accordance with the character of the work for which the pump is to be employed. Upon the relative areas of the ports will obviously depend to some extent

the capacity of the pump and the velocity of discharge.

The operation of the pump is as follows: The casing is initially primed by introduction of sufficient liquid to insure immersion of the outer ends of the vanes 6 in the sector 8 which preferably constitutes the bottom of the pump, this sector thereby also constituting during the periods of inoperation a reservoir in which sufficient water is trapped to insure the further operation of the pump without priming. To this end, the intake duct 12 may be arranged as illustrated. The rotor operating at a high rate of speed impels the water outwardly by centrifugal action in the sector 8 and drives the water through the bypass 11 and into the lower portion of the sector 7. The outward movement of the liquid in the sector 8 and through the bypass 11 creates in this segment a partial vacuum which causes a suction at the port 9 which is connected, as by the duct 12, with the fluid which it may be desired to pump, this fluid thus being drawn from the source through the port 9 into the sector 8 as indicated. This fluid, as the vanes come into the sector 7, is trapped between the vanes, and the liquid entering this space through the bypass 11 forces the trapped fluid through the port 10 to the discharge. By reason of the relative location of the ports in the sector 7, the liquid discharged from the bypass is projected directly towards the port 10 and functions as a piston in displacing the trapped fluid. It will be noted that the vanes of the rotor function as impellers in the sector 8 and, in the sector 7, as valves to separate the suction and pressure sides of the pump chamber.

The pump is capable of efficient operation in moving both gases and liquids, and is valuable as a vacuum pump. Primarily, however, the invention provides a pump of this class of extremely simple construction which, after the initial introduction of liquid, as set forth, is completely self-priming. Obviously, the pump is subject to considerable variation in detail without departure from the essential features of the invention.

I claim:

1. A pump comprising a casing having a rotor chamber including sectors of different radius, a rotor mounted in the chamber and having vanes which correspond in length substantially to the radius of the shorter sec-

tor, intake and discharge ports in the side of said casing adjacent the axis of the rotor and communicating respectively with sectors of larger and smaller radius, and a bypass
5 extending from the outer or peripheral portion of the sector of greater radius to the inner portion of the other sector and entering the side of the latter at a point opposite the discharge port.

10 2. A pump comprising a casing having a main chamber including sectors of different radius defining respectively intake and pressure areas, a rotor in the chamber having vanes fitting the sector of smaller radius
15 and functioning to segregate said areas, ports at opposite sides of the sector of smaller radius and in the inner portion thereof, a port in the side of the sector of larger radius and in the inner portion thereof, and a
20 second port in the last-named sector in the outer or peripheral portion thereof and connected with one of the ports of the sector of smaller radius.

3. A pump comprising a casing having a
25 main chamber including sectors of different

radius, the sector of greater radius having an intake port adjacent the inner portion and a discharge port in the outer or peripheral portion, and the sector of smaller radius having intake and discharge ports both located
30 in the inner portion, a bypass channel connecting the discharge port of one sector with the intake port of the other, and a rotor mounted in the chamber having parts adapted to separate the other ports of the two sec- 35
tors.

4. A centrifugal pump comprising an impeller, an impeller chamber having intake and discharge ports, and means for directing pump fluid transversely through the impeller
40 at a point adjacent the axis of the latter.

5. A centrifugal pump comprising an impeller; an impeller chamber shaped with the impeller to provide within the chamber segregated suction and pressure areas, and
45 means for directing the discharge from the suction area transversely through the pressure area at a point adjacent the axis of the impeller.

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