

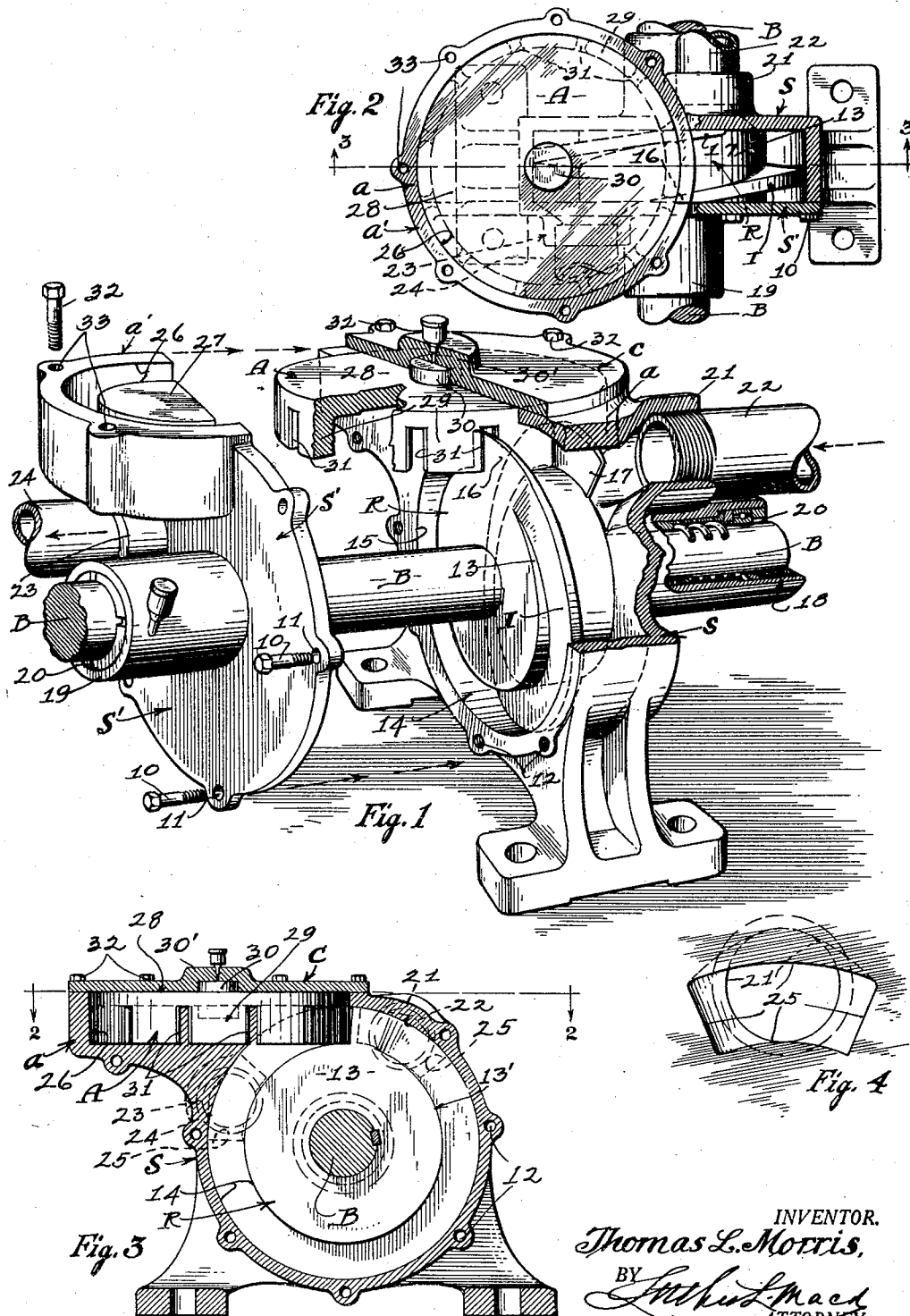
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ROTARY FLUID PUMP

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ROTARY FLUID PUMP

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This invention relates to rotary fluid pumps, and the main object is to provide an improved type of pump, free from unnecessary parts and arranged to produce a continuous flow of liquid.

Another object is to provide a rotary fluid pump embodying a rotor having a helical impeller vane on the periphery thereof, the opposite ends of which overlap at a given point on the periphery of the rotor, and a continuously rotatable abutment meshing with and adapted to be rotated by the rotor for diverting the fluid through a discharge outlet during the operation of the pump.

More detailed objects of invention will appear as the description progresses.

In the accompanying drawings I have shown a preferred embodiment of my invention, subject to modification within the scope of the appended claims without departing from the spirit thereof.

In said drawings:

Fig. 1 is a perspective view of a pump constructed in accordance with my invention, in which a portion of the stator is broken away and a separable portion of the same is shown removed from operative position for illustrating the interior of the pump.

Fig. 2 is a sectional plan of the same on line 2—2 of Fig. 3.

Fig. 3 is a sectional elevation of the pump on line 3—3 of Fig. 2.

Fig. 4 is a diagram typical of the inlet and outlet to the pump, showing the form and area thereof.

As shown in the drawings in a preferred form, my improvements consist in the provision of a stator S having a separable side member S', in which is rotatably mounted a rotor R which meshes with and is adapted to operatively engage a rotatable abutment A. Member A is housed in extensions α and α' formed, respectively, on the stator members S and S' and adapted to be covered by a cover plate C. Member S' is removably attached to one side of the stator S by means of bolts 10, 10, etc., which are inserted through openings 11, 11, etc., in the member S' and are adapted to be threaded into openings 12, 12, etc., in the member S.

The rotor R is circular in form and includes a circular body portion 13 having an impeller vane I helically formed therearound and operable within the annular fluid chamber 14 formed between the body 13 of the rotor and the bore 15 of the stator S.

Impeller vane I extends slightly more than one complete turn around the body 13 of the rotor, so that the ends 16 and 17 of said vane slightly overlap. Said end portions are flush on their outer faces with the respective sides of the rotor body 13.

Rotor R is suitably fixed to a shaft B which is journaled in bearings 18 and 19 formed on the stator members S and S', respectively. Said bearings may be provided with suitable packing glands as at 20 for preventing the leakage of the fluid around the shaft B.

Stator S has an inlet 21 internally threaded to receive an inlet pipe 22 for conducting a fluid to the chamber 14 of the pump. The stator member S' has a similarly formed outlet 23 threaded to receive a discharge pipe 24 by means of which the fluid may be conducted from the pump to points of storage or use.

The area of the inlet and outlet pipes 22 and 24 corresponds substantially to segmental ports 25 and 26 which are formed in the end walls of the stator members S and S', said ports being of a width corresponding to the width of the chamber 14. The inlet port is positioned on the forward side of the abutment A when the rotor operates in a clockwise direction, as seen from the left hand side of Fig. 1, while the outlet port is on the rear side of said abutment in such case.

The members α and α' on the members S and S', respectively, which together form a housing for the rotatable abutment A, are provided with an annular bored seat 26 formed between the circular outer wall of said extensions and mating inner portions 27. Member A has a web portion 28 which overlies the portions 27, and an annular depending rim portion 29 which operates in the annular bored recess 26.

As shown in Fig. 3, the member A may be rotatably supported in operating position on a trunnion 30 which seats in a boss 30' on the

cover C. Said member A is eccentrically disposed with respect to the axis of the rotor shaft B so that the peripheral rim 29 of the abutment member will overlie the periphery 13' of the rotor body 13, at a point on a perpendicular line cutting the axis of the shaft B. Thus the rim 29 of the abutment A serves to close the chamber 14 of the pump at such point. Said web 29, however, is provided with a plurality of uniformly spaced notches 31, 31, etc., which are adapted to engage the impeller vane I on the rotor R, so that in the operation of the pump said rotor will serve as a worm, while the abutment A will function as a worm gear adapted to be driven by the rotor.

The notches in the abutment member are closed when the same are within the chamber 14, by reason of the engagement of one or more notches with the impeller vane I at one or more points.

The abutment A is removably held in position by means of the cover C which is attached to the portions *a* and *a'* of members S and S', respectively, by means of bolts or screws 32 which are threaded into openings 33, 33 in said members *a* and *a'*.

In operation when the motor is assembled as shown in Figs. 1 and 3 and power is applied to the shaft B, the member R will rotate within the cylinder 14 and induce a flow of fluid through pipe 22 and inlet 21, into said chamber, the helical impeller vane I operating in said chamber to force the fluid therearound and outwardly through inlet 23 and discharge pipe 24. The abutment A serves to prevent the flow of fluid beyond the outlet, and to divert the same there-through continuously during the rotation of member R.

The impeller vane I is so arranged, as hereinbefore described, that the ends 16 and 17 thereof overlap sufficiently to permit the complete engagement of one of said ends with a succeeding notch 31 before the other end disengages the preceding notch. Thus the members A and R are continuously in mesh.

The operation and out-put of the pump is continuous and practically noiseless, due to the worm and gear-like characteristics of the members A and R. This construction simplifies and reduces the possibility of troubles in a rotary pump, such as are common to pumps wherein sliding abutments are employed in lieu of the rotatable abutment A of my invention.

The pump is so arranged that it may be directly or indirectly connected with a source of power, such as an electric motor, and the out-put will be proportionate to the speed.

An important feature of my pump consists in the arrangement and form of the impeller vane I on rotor R, which by reason of a substantial overlapping of the ends 16 and 17 thereof prevents at all times any com-

munication between the inlet and outlet sides of the pump. For instance, when the pump operates in a clock-wise direction, as seen in Fig. 1 from the left hand side, the end portion 16 of vane I will not emerge from the slot 31 in the member A until the inner side of said slot is flush with the outer side of the rotor R, and the succeeding slot 31 is entirely closed by the opposite end of the vane.

Furthermore, the end portions 16 and 17 of vane I overlap to such an extent that, for instance as shown in Fig. 1, as the portion 17 approaches the inlet port 25, the opposite end portion 16 will not emerge from one of the slots 31 until such portion 17 has completely covered the inlet port 25.

It will be obvious that my pump can be operated at a substantially higher speed than others wherein sliding abutments are employed, as all operating parts embodied in my pump are continuously rotatable. It will be understood further that quick access may be had to the interior of the pump for any purpose, by removing either or both of the cover members S' and C.

While I have shown a preferred embodiment of my invention, it will be apparent that I may modify or change the scope of the same within that of the appended claims without departing from the spirit thereof.

What I claim is:

1. A device of the class described comprising a casing having a chamber therein, a detachable side head for the chamber, a rotor in the chamber provided with a helical impeller vane, said casing having a top chamber above said rotor with a detachable top therefor having a seat therein, a rotatable disc having a trunnion at its central portion fitting in said seat and a downwardly projecting peripheral rim having notches therein through which the vane may pass, a base for supporting the rotor chamber, said detachable side head carrying an outer wall and a bored seat for said rim.

2. A device of the character described comprising a casing having a detachable head, a rotor in the casing having a vane thereon, said casing having a chamber above the rotor, a detachable covering for said last mentioned chamber having a seat therein near its center, a rotatable disc having a trunnion on its top side fitting in said seat, said disc having a downwardly extending rim with notches therein through which the vane passes and said detachable head having thereon a side extension with a seat and a wall to surround said web.

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