Sept. 1, 1953 J. B. PARSONS 2,650,544

ROTARY PUMP ASSEMBLY

Filed May 17, 1949

FIG. 1.

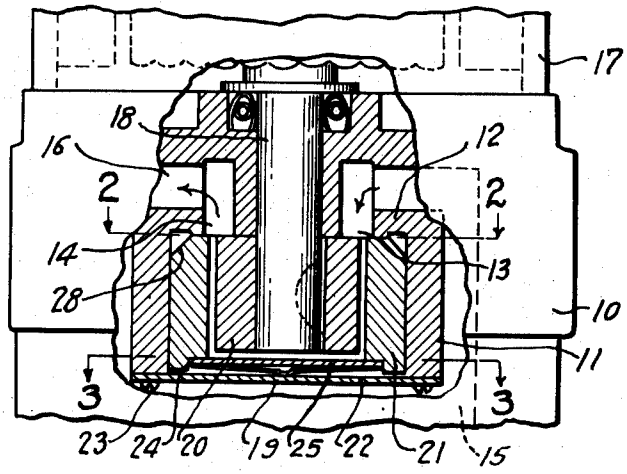


FIG. 2.

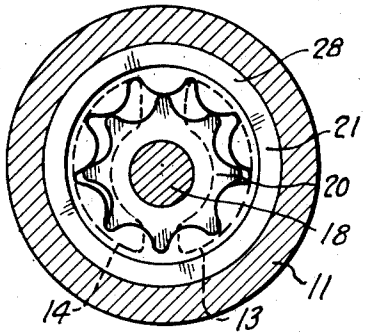
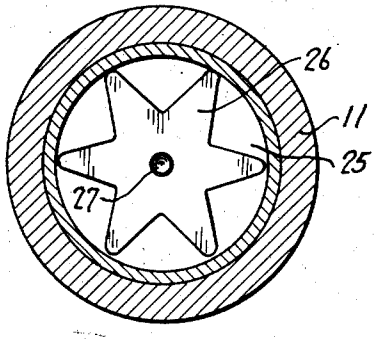


FIG. 3.



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ROTARY PUMP ASSEMBLY

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1 Claim. (Cl. 103—126)

1

This invention relates to pumps of the type having two rotor members, one disposed within and eccentric to the other, the outer rotor having internal teeth and the inner rotor having external teeth, the contours on each outlined by the tooth form of the other at regular angular motion, and an object is to improve the construction of pumps of this character so that the power necessary to drive the rotors is substantially reduced.

Another object is to produce a pump of the above character in which the outer rotor is sealed by a plate which when in operation, is held in sealing contact by fluid pressure, the inner rotor being out of engagement with the plate, a reduced bearing surface being provided between the opposite face of the outer rotor and the adjacent housing end wall, thereby to reduce the frictional contact area as much as possible.

Other objects and advantages of the invention will hereinafter appear, and for purposes of illustration but not of limitation, an embodiment of the invention is shown on the accompanying drawings, in which

Figure 1 is a fragmentary elevation of a pump assembly, portions being broken away to show the pump structure in section;

Figure 2 is a transverse sectional view substantially on the line 2—2 of Figure 1; and

Figure 3 is a sectional view substantially on the line 3—3 of Figure 1.

The illustrated embodiment of the invention comprises a casing 10 in which is disposed a pump housing 11, the outer end of which is open and the inner end of which is formed with a wall 12 which has laterally spaced inlet port 13 and outlet port 14, the inlet port 13 communicating through a passage 15 to a suitable liquid reservoir (not shown) and the outlet port 14 communicating with a passage 16 leading to the work. Superposed on the casing 10 is an electric motor 17 which has an armature shaft 18 depending therefrom with the lower end portion extending into the interior of the pump housing 13.

Secured to the lower end portion of the armature shaft 18 by a key 19 is an inner rotor member 20 which has external teeth adapted progressively to mesh with internal teeth on an outer rotor member 21. The outer rotor member 21 has a running fit within the pump housing 12 and has one more tooth than the number of complementary shaped teeth on the male or inner rotor member 20. The inner rotor member 20 is mounted eccentrically with respect to the outer rotor member 21 and moves the same ahead of it

2

progressively and continuously forming suction and compression phases which are timed with respect to the inlet and outlet ports 13 and 14 respectively, thus to provide a substantially continuous flow of fluid under pressure from the pump. The rotors are provided with contours, such that the teeth, in theory, wipe or make continuous travelling contact over those of the other during rotation. The above described pump is old in the art and it is believed that this brief description is deemed adequate for a full understanding of the invention.

The outer end of the pump housing 11 is closed by a rigid plate or disc 22 secured in place by a plurality of screws 23. Formed on the outer face of the outer rotor member 21 is an annular recess or socket 24 into which snugly fits a metallic disc 25 which is relatively rigid and which is normally held seated within the socket by a spider-like spring 26 which has a plurality of arms bearing against the under side of the plate 25 and has an outwardly projecting nubbin-like portion 27 which bears against the inner face of the closure plate 22.

It will be noted that the inner rotor member 20 is of less depth than the depth of the outer rotor member 21 so that the outer face of the inner rotor member 20 is spaced from the inner face of the disc 25.

In order to reduce the bearing contact between the inner face of the outer rotor member 21 and the end wall 12 of the housing 11, the adjacent edge portion of the outer rotor member is chamfered, as indicated at 28. By providing the chamfered area 28, only a relatively small surface of the outer rotor member 21 is in bearing contact with the end wall 12 of the housing.

In operation, it will be understood that the fluid, such as liquid under pressure, finds its way to the outer face of the disc 25, inasmuch as the running fit between the outer rotor 21 and the housing 12 is not liquid-tight, and exerts inward pressure on the outer rotor member 21, urging it against the end wall 12, but since the bearing contact between these members is reduced to a minimum, the frictional loss is reduced substantially. Inasmuch as the inner rotor member 20 is spaced from the disc 25, the friction which would otherwise be imposed upon the inner rotor member is eliminated and although the pumping efficiency is slightly reduced, this is more than compensated for by the reduction in power necessary to drive the pump. Empirically it is found that as much as thirty percent reduction in power necessary to drive the pump is thereby achieved.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claim.

What I claim is:

A pump comprising a housing having a cylindrical cavity open at the outer end, a pair of mating toothed pump rotor members arranged one within the other and disposed within said cavity, a drive for the inner rotor member, said housing having spaced inlet and outlet ports at the inner side of said rotor members, a closure for the outer end of said cavity, the inner rotor member being of appreciably less depth than the outer rotor member so that the outer end of the inner rotor member is spaced from the adjacent end of the outer rotor member, a rigid imperforate disc spaced from the adjacent face of the inner rotor member and bearing against the outer face of the outer rotor member, a centrally disposed annular recess in the outer face of the outer rotor member to receive said disc, and a spider-like spring having a plurality of arms bearing against the outer face of said disc and having a central nubbin-like portion bearing against the inner face of said closure, whereby pressure against the outer surface of the plate forces the same against the outer rotor only so as to enable rotation of the inner rotor without frictional contact with such plate.

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