

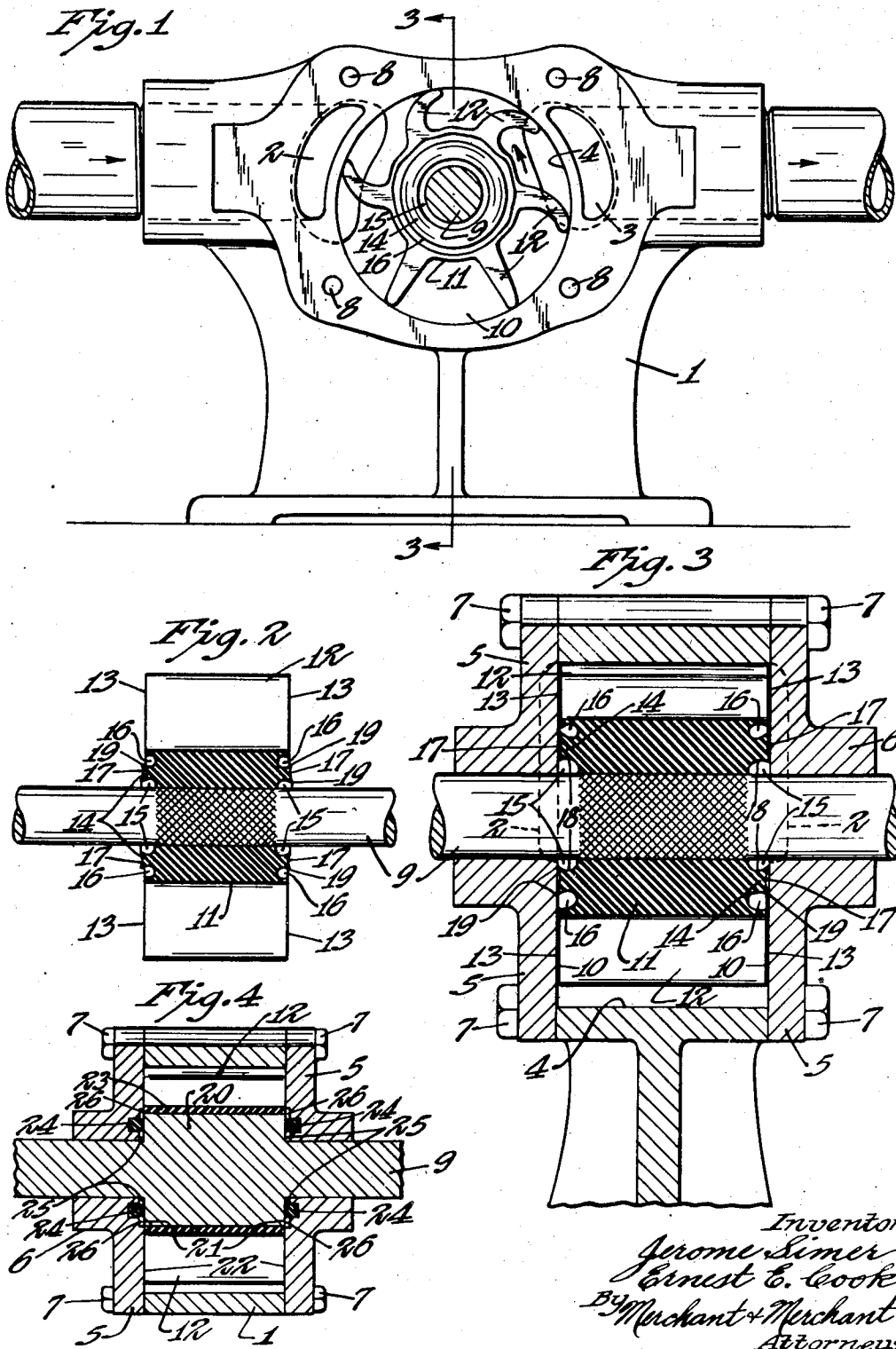
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ROTARY PUMP WITH ELASTIC ROTOR SEALING RIB

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ROTARY PUMP WITH ELASTIC ROTOR
SEALING RIBJerome Simer and Ernest E. Cook, Minneapolis,
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2 Claims. (Cl. 103—117)

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Our invention relates to fluid pumps and more particularly to the provision of adequate pressure seals therefor.

A primary object of our invention is to provide a quick-acting and positive seal for the above purpose.

Another object of our invention is to provide a seal which is inexpensive to manufacture, easy to install, and has long life.

Another object of our invention is the provision of a novel self-sealing rotor for fluid pumps.

The above and other objects of our invention will become apparent from the following specification and the attached drawings.

Referring to the drawings wherein like characters indicate like parts throughout the several views:

Fig. 1 is a side elevation of our novel pump, some parts being removed to show the interior thereof;

Fig. 2 is a vertical axial section of the rotor shown in Fig. 1;

Fig. 3 is an enlarged vertical section taken on the line 3—3 of Fig. 1; and

Fig. 4 is a vertical axial section of a modified form of our invention.

Referring more particularly to the drawings, the numeral 1 indicates a pump casing or housing which is provided with an intake port 2 and an outlet port 3.

On the inside, the housing is provided with a smooth cylindrical wall 4 at its periphery. A pair of axially spaced side plates 5 are provided with axially projecting bearing bosses 6. Studs 7, which fit into threaded holes 8 in the housing 1, make it possible to remove the side plates 5 at will. A shaft 9 is journaled for rotation in the bearing bosses 6 of side plates 5, eccentric with respect to the axis of cylindrical wall 4, and is shown as having its ends projecting outwardly therefrom. Side plates 5 are shown as being provided with opposed parallel smooth walls 10.

Mounted fast on shaft 9 for rotation within the housing, is a rotor 11, made preferably of rubber or other flexible resilient material and having a plurality of integrally formed, resilient, radial vanes 12.

The straight side edges 13 of rotor 11 are flush with the smooth walls 10 of the side plates 5, that is, snug enough to prevent excess leakage of the fluid being propelled by the radial vanes 12, but not tight enough to cause excess friction. In the structure shown in Figs. 1, 2 and 3, the rotor 11 is provided with axially projecting endless, resilient ribs 14 which surround shaft 9 and

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preferably, and as shown, are concentric therewith. An endless concentric channel 15 separates ribs 14 from shaft 9 whereas a likewise endless concentric channel 16 defines the radially outer limits of said ribs. As shown, particularly in Figs. 2 and 3, ribs 14 project axially outwardly slightly beyond the straight side edges 13 of the rotor 11 so as to press or rub with greater force against the smooth inside walls or surfaces 10, than does the edge 13 of the rotor 11.

As shown, ribs 14 are provided with cross-sectionally concave faces 17 throughout their circumference. Also, the sides of the ribs 14 taper inwardly from their faces 17 toward their medial portions as indicated by the numeral 18, whereby to create feathered outer edges 19.

In the modified construction, shown in Fig. 4, the shaft 9 is provided with a rotor 20 which, while shown as being formed integrally with the shaft 9, can be made separately from any suitable hard material and made fast thereto. In any event, rotor 20 has straight side edges 21 which are in substantial alignment with straight side edges 22 of casing 1. The peripheral outside surface of rotor 20 is provided with an overlying layer of rubber or other suitable material 23 to which are integrally formed the resilient radially extending vanes 12.

Inset in straight walls 22 of side plates 5 are resilient endless ribs 24 of the same general construction as the ribs 14 of Figs. 1, 2 and 3. An endless channel 25 separates rib 24 from shaft 9, and endless channel 26 defines the outer radial limits of rib 24.

Operation

Inasmuch as the operation of the structure shown in Figs. 1, 2 and 3 and that shown in Fig. 4 are identical, we will describe only the operation of the preferred structure shown in Figs. 1, 2 and 3.

Referring then to Figs. 1 and 3, wherein the pressure side is toward the top of the rotor and the partial vacuum is at the bottom thereof, it will be observed that the concave faces 17 have become somewhat flattened as they are firmly compressed against the smooth walls 10 of the housing, thereby creating a suction-cup effect.

As the ribs 14 rotate within the housing they are constantly subjected to a torque or twisting action as any given position thereon passes from the lower vacuum side of the housing 1 to the upper pressure side thereof. This torque or lateral flexing is, of course, greatly facilitated by the fact that the ribs 14 are narrower at their

centers as indicated at 18. Furthermore, the feathered edges 19, because of their extreme flexibility, make possible a considerable lateral twisting of the ribs 14, by virtue of the reversal in pressures, without breaking of the seal.

We find this seal highly satisfactory in that it has an extremely high degree of efficiency with but negligible friction.

The simplicity and utility of our invention is thought to be made obvious from the foregoing description and it will, of course, be understood that various alterations and changes in the details of construction and arrangement of parts may be made within the scope of the invention herein disclosed and claimed.

What we claim is:

1. In a fluid pump including a housing member having a cylindrical wall, spaced parallel side walls having smooth inner surfaces, spaced inlet and outlet ports, a shaft extending through at least one of said side walls and journaled for rotation therein, a rotor member mounted on said shaft for rotation within said housing member, said rotor member having side surfaces adjacent said surfaces of the side walls; the improvement which comprises pressure sealing means between the housing member and rotor member and which includes a resilient endless rib projecting laterally from one of said members in surrounding relation to said shaft, said rib having a concave face in yieldable bearing engagement with an adjacent surface of the other of said members with the rib under compression, and said rib having an undercut side wall defining between same and said concave face a feathered edge in sealing engagement with said surface of the other of said members.

2. In a fluid pump including a housing having a cylindrical wall, spaced parallel side walls having smooth inner surfaces, spaced inlet and outlet ports, a shaft extending through at least one

of said side walls and journaled for rotation therein, a rotor mounted on said shaft for rotation within said housing, said rotor having side surfaces adjacent said surfaces of the side walls; the improvement which comprises pressure sealing means between the housing and rotor and which includes a resilient endless rib projecting laterally from said rotor at each side thereof and in surrounding relation to said shaft, each of said ribs having a concave face in yieldable bearing engagement with a side wall surface and said ribs further having feathered edges at opposite sides of the concave face in tight sealing engagement with said side wall surfaces, and restricted body portions to provide for ready flexing of the ribs, said ribs having concave side walls which with said concave face provide said feathered edges and said concave side walls providing said restricted portions in the ribs for ready flexing thereof for operative movement of the rotor.

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