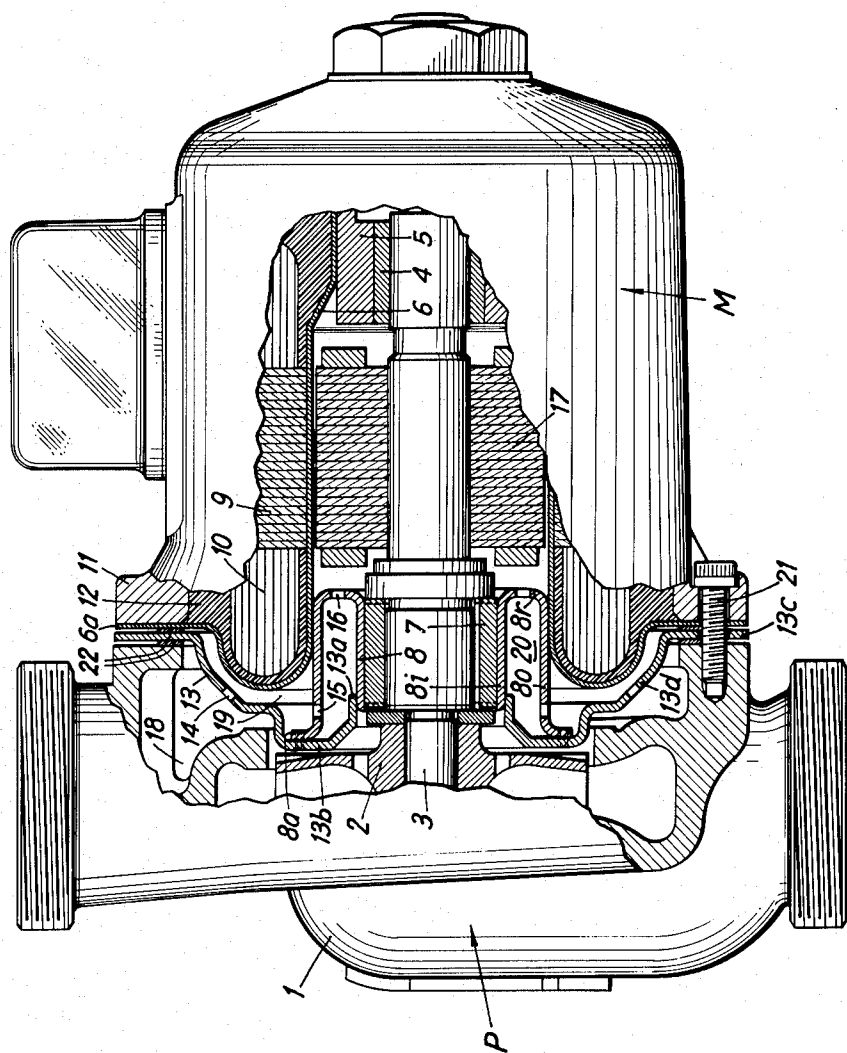


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PUMP AND MOTOR ASSEMBLY
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PUMP AND MOTOR ASSEMBLY

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This invention relates to an improved pump and motor assembly, the motor being of the type with a "canned rotor/stator unit."

An object of the present invention is to provide an improved combination pump and motor assembly wherein the rotor of the motor is surrounded by gap fluid supplied by the pump.

Another object of the present invention is to provide a combination pump and motor assembly characterized by novel features of construction and arrangement whereby the fluid supplied by the pump is relatively free from impurities thereby increasing the life of the assembly considerably.

A further object of the present invention is to provide a combination pump and motor assembly characterized by preferably a series of tranquillizing or settling chambers through which the fluid passes from the pump to the rotor cavity of the motor whereby any solid particles in the fluid settles out in the tranquillizing chambers thereby preventing contamination of the rotor cavity by said solid particles.

A still further object of the present invention is to provide an improved pump-motor combination of the above type which is a unitary sealed structure.

Still another object of the present invention is to provide an improved motor-pump combination which is extremely economical to manufacture and fully effective in operation and use.

These and other objects of the present invention and the various features and details thereof are hereinafter more fully set forth with reference to the accompanying drawing showing a motor-pump combination in accordance with the present invention in side elevation with portions broken away and partly in section.

Referring now to the drawing, there is shown a motor-pump assembly constructed in accordance with the present invention. The assembly comprises a pump P including a housing 1 within which is mounted an impeller 2, and a motor M including a housing 11 within which are mounted the armature stampings 9, the winding 10 and a rotor 17. The rotor shaft 3, which as illustrated, is supported at one end in a rear bearing 4 and at its opposite end in a front bearing 7, mounts at one end the impeller whereby upon rotation of the rotor, the impeller is driven.

The cavity in the motor within which the rotor 17 is mounted is lined in the present instance with a one-piece, deep drawn sheet metal tube 6 which at one end terminates in a radially outwardly directed flange 6a. The tube 6 extends along the "air gap" of the motor and as illustrated the body 5 of the rear bearing is press fitted in one end of the tube 6. The space between the motor housing 11 and the tube 6 that is not occupied by the armature stack 9 and the winding 10 is filled with a casting resin 12.

In accordance with the present invention there is provided at the forward end of the rotor cavity open to the pump in the present instance a series of tranquillizing or settling chambers which are in fluid communication with the pump and the rotor cavity, so that upon operation of the pump, fluid is supplied through the tranquillizing chambers into the rotor cavity. To this end, there is provided an annular disc member 13 having a radially extending outer edge portion 13c which is clamped be-

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tween the pump housing and the flange 6a of the tube 6 by means of a series of screws 21, a frusto-conical section 13d, an intermediate radial wall 13b and a terminal axial wall 13a. A second annular member 8 of U-shaped cross section is positioned at the open end of the tube 6 adjacent the pump having an outer axial wall portion 8o press fitted in the open end of the tube 6 and an inner axial wall portion 8i press fitted on and lending support to the bearing 7 for centering the same.

The outer axial wall 8o terminates in a radially outwardly extending turned out portion. As illustrated, the radial wall 13b of the disc member 13 abuts the turned out portion 8a of the member 8 and the short axial inner wall portion 13a engages the inner axial wall of the member 8. By this arrangement, there is formed three tranquillizing chambers, one tranquillizing chamber designated by the numeral 18 formed by the space intermediate the pump casing 1 and the disc member 13, a second tranquillizing chamber 19 formed by the space intermediate the toroidal end portion of the tube 6, a portion of the disc 13 and a portion of the member 8, and the third tranquillizing chamber 20 formed by the space between the inner and outer axial walls of the member 8 and a portion of the disc 13. The chambers are in communication with one another by means of circumferentially arranged openings in the disc 13 and member 8. More specifically, the disc 13 has openings 14 in a frusto-conical wall portion thereof and the member 8 has openings 15 in the outer axial wall and openings 16 in the radial wall 8r as illustrated. By this arrangement, when fluid from the pump enters the rotor cavity through the tranquillizing chambers 18, 19 and 20, it passes through the small openings connecting the chambers whereby any solid particles settle out and deposit at the bottom of the chambers.

Accordingly, in operation when the pump is started, fluid supplied by the pump enters the interior of the tube 6 that mounts the rotor through the chambers 18, 19 and 20. The path of the fluid through the chambers is such that any foreign matter such as solid particles present in the fluid settles out in the tranquillizing chambers 18, 19 and 20 and does not enter the rotor cavity. The agitation of the fluid by the pump therefore is dampened by the tranquillizing chambers. By this arrangement, contamination of the rotor which may result from foreign matter entering the rotor cavity is obviated. If desired, a water-softening agent may be provided in the tranquillizing chamber 20 so that if, for example, water is being used in the pump, any water passing through the tranquillizing chamber 20 is subjected to the action of the water-softening agent prior to entering the rotor cavity. Commercially available compositions such as polyphosphates prepared in suitable form, e.g., tablets, so that they will dissolve slowly, may be used as softening agents.

In lieu thereof, ion exchange resins may be used as a softening agent. By this arrangement, undesirable elements in the water may be kept out of the rotor cavity.

Thus the present invention provides a pump and motor assembly having a canned rotor/stator unit, characterized by an improved structural arrangement including means intermediate the rotor and the pump defining at least one, and preferably three, tranquillizing or settling chambers to isolate the rotor from the pump housing. One of the chambers, in the present instance the chamber 20, is formed by the hollow interior of the annular U-shaped member 8 which provides a support which centers a bearing for the rotor intermediate the pump and the motor.

While a particular embodiment of the present invention has been illustrated and described herein, it is not intended to limit the invention to such disclosure and

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changes and modifications may be made therein within the scope of the following claims.

I claim:

1. In combination, a pump having a housing and an impeller mounted in said housing, a motor including a rotor cavity for a rotor rotatably mounted therein which is operatively connected to said impeller to drive the same, said rotor cavity being lined with a deep drawn sheet metal member generally U-shaped in a section taken along a radial plane that is open at one end confronting the impeller, a pair of annular members at the open end of said U-shaped member defining a series of annular tranquillizing chambers, means defining a plurality of openings in said annular members whereby the tranquillizing chambers and the interior of said U-shaped member are in fluid communication whereby upon actuation of said impeller fluid pumped by said impeller enters said rotor cavity through said annular tranquillizing chambers.

2. The combination of a pump and motor assembly, wherein the motor comprises a rotor assembly including a shaft rotatably mounted in a rotor cavity and wherein said pump impeller is mounted on one end of said rotor shaft to be driven thereby, said rotor cavity being lined with a tubular member, one end of said rotor shaft

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journalled in a bearing press fitted in one end of said tubular member, the opposite end of said shaft being journalled in an annular member of U-shaped cross section engaging in the other end of said tube and defining a first tranquillizing chamber, said tubular member having a radially extending portion, a second annular member spaced from said radial portion defining a second annular tranquillizing chamber, said first and second tranquillizing chambers and said rotor cavity being in fluid communication whereby upon actuation of said impeller fluid enters said rotor cavity through said tranquillizing chambers.

3. The combination as claimed in claim 2 including a fluid softening agent in one of said chambers.

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