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[54] **PUMP ASSEMBLY**
5 Claims, 1 Drawing Fig.

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[50] **Field of Search** 417/410, 423, 424; 415/173; 310/87, 88, 90

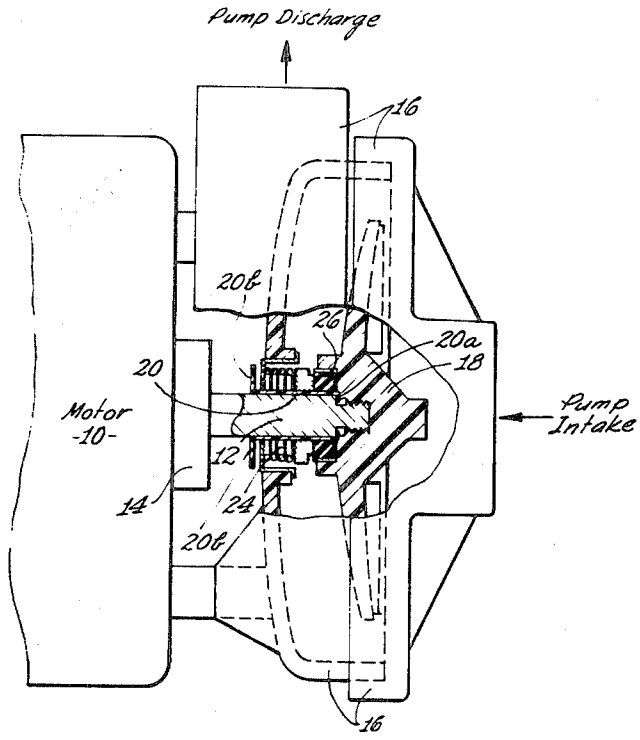
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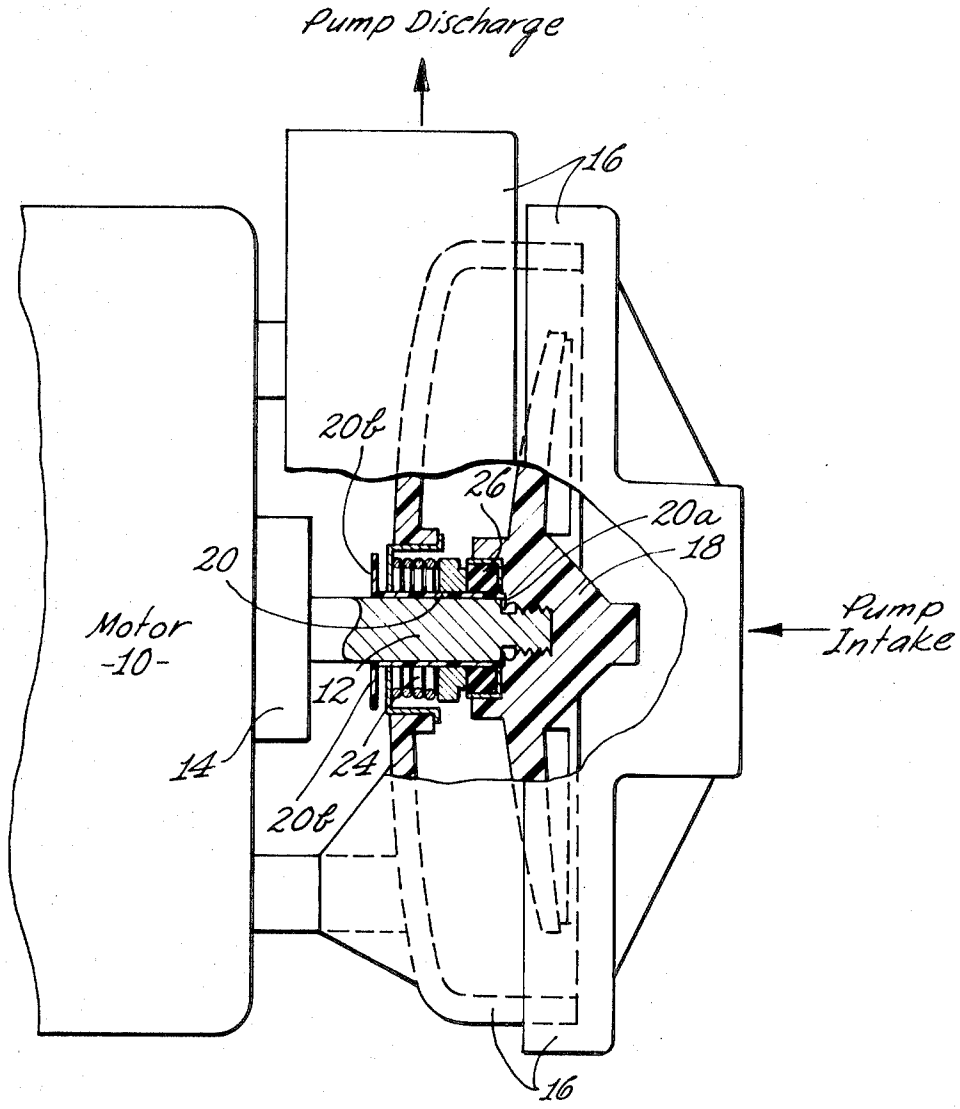
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ABSTRACT: A pump assembly is provided which is constructed to prevent any possibility for the liquid passing through the pump to receive an electric charge due to defects in the insulation of the pump motor. The housing and impeller of the pump may be constructed, for example, of an insulating plastic material, and a sleeve of an insulating plastic material is mounted on the portion of the aforesaid shaft extending into said pump housing so as to insulate the shaft from the liquid within the pump housing. The sleeve also has an integral shoulder outside of the pump housing which extends radially outwardly and the shoulder exerts a centrifugal force on any liquid which may leak from the pump housing so as to prevent such liquid from entering the motor bearings.





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PUMP ASSEMBLY

BACKGROUND OF THE INVENTION

Electrically driven water pumps often create a hazard in that should the shaft of the electric drive motor receive an electric voltage due to a breakdown in the internal insulation of the motor, there is always a danger that the liquid in the pump will become charged electrically, and will conduct the electric energy to exposed metal surfaces with resulting hazards to users of the equipment.

The pump assembly of the present invention is constructed to include an insulating sleeve on the portion of the motor shaft which extends into the pump housing so as to insulate the shaft from the liquid in the pump. As mentioned above, the insulating sleeve is provided with a radially outwardly extending flange externally of the pump housing, the flange being located between the pump housing and the drive motor. The flange exerts a centrifugal force on any liquid which may leak out of the pump, and it prevents such liquid from entering the motor bearing.

It is, accordingly, an objective of the present invention to provide an improved electric drive motor and pump assembly which is constructed so that exposed metal surfaces cannot become hazardously charged with electricity, even in the presence of insulation breakdowns within the electric drive motor.

BRIEF DESCRIPTION OF THE DRAWING

The single FIGURE is a side view, partly in section, of a combined electric motor and pump assembly, and which is constructed to incorporate the teachings of the present invention.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

The assembly shown in the accompanying drawing includes a motor **10**. The motor **10** has a drive shaft **12** which is rotatably supported in appropriate motor bearings, such as the bearing **14**. The drive shaft **12** is composed usually of electrically conductive material, such as steel. The drive shaft extends into the housing **16** of an associated pump. The pump includes an impeller **18** which is mounted on the shaft **12**. The shaft **12** causes the impeller to rotate within the housing **16**, causing liquid to be drawn into the pump intake at the right-hand side of the housing, and to be discharged through a pump discharge in the left- or right-hand portion of the housing, depending upon the direction of rotation.

In the practice of the present invention, a sleeve **20** formed of an appropriate insulating material, such as molded nylon, is mounted on the portion of the shaft **12** which extends into the pump housing **16**.

The forward end of the sleeve **20** has an inwardly extending radial flange **20*a*** which extends over the edge of a shoulder formed adjacent the threaded end of the shaft **12**, the flange **20*a*** being clamped between the impeller **18** and the shoulder. The shaft **12** is rotatably mounted in the pump housing **16**, and usual types of shaft seals **24** and **26** are provided to prevent water in the housing from passing around the drive shaft **12** and out of the housing **16**.

However, despite the presence of the seal **26**, it is usual for some liquid to escape from the housing. To prevent this latter liquid from entering into the motor bearing **14**, the sleeve **20** is provided with a peripheral flange **20*b*** outside of the housing **16**, the flange **20*b*** extending radially outwardly. Then, as the shaft **12** and sleeve **20** rotate, the flange **20*b*** sets up a centrifugal force on any liquid escaping from the housing around the shaft **12** and thereby prevents such liquid from entering the motor bearing **14**.

The pump housing **16** may, for example, be constructed of a suitable plastic material such as polyvinyl chloride. The impeller **18** may also be constructed of plastic, such as polycarbonate.

The invention provides, therefore, an improved pump assembly which serves to prevent electric current from entering the liquid in the pump in the event of an insulation failure within the electric drive motor, and thereby prevent any exposed metal parts which would normally be contacted by the water from becoming hazardously charged with electricity.

What is claimed is:

1. In combination:

a pump housing;

an electric motor having a metallic electrically conductive drive shaft rotatably supported in a motor bearing and having a portion extending beyond said bearing and into said pump housing;

an impeller mounted within said pump housing on the end of said drive shaft remote from said motor and rotatable with said drive shaft to cause liquid to be drawn into said pump housing and subsequently discharged therefrom;

shaft-sealing means supported on said pump housing and surrounding said drive shaft to prevent liquid in said pump housing from passing around said drive shaft and out of said housing; and

a sleeve of electrically insulating material surrounding the aforesaid portion of said shaft extending through said sealing means and into said housing for electrically insulating said shaft from the liquid in said housing and for protecting the shaft from corrosive attack by the aforesaid liquid.

2. The combination defined in claim 1, in which said sleeve includes an end extending externally of said pump housing through said sealing means and toward said motor bearing and an integral flange extending radially outwardly therefrom and positioned on said end of said sleeve externally of said pump housing in spaced relationship with said motor bearing and rotatable with said shaft to exert a centrifugal force on liquid escaping through said sealing means from said pump to prevent such liquid from entering the aforesaid motor bearing.

3. The combination defined in claim 1, in which said sleeve is formed of molded nylon.

4. The combination defined in claim 1, in which said pump housing and said impeller are formed of a plastic material.

5. The combination defined in claim 1, in which said shaft has a threaded end and a shoulder adjacent said threaded end, and in which said impeller is threaded onto said shaft to engage the shoulder, and further in which said sleeve has an inwardly extending integral flange clamped between said impeller and said shoulder.