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(54) OILROOM

(71) We, ITT INDUSTRIES INC., a Corporation organised and existing under the Laws of the State of Delaware, United States of America, of 320 Park Avenue, New York 22, State of New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to submersible pumps and in particular to an oil housing arranged between a drive unit and a pump unit of a submersible pump.

In a submersible pump, in order to prevent the medium being pumped from going into the drive unit, for instance an electric motor, the drive shaft is provided with some sort of seal. Two mechanical plane seals are often used which are separated by an oil chamber. The oil has the purpose of cooling and lubricating the seals. By inspecting the oil at intervals, it is possible to determine the condition of the seals.

The bearing of the drive shaft has up to now normally been carried out by grease lubricated ball bearings or roller bearings which are separated from the oil chamber. With the current trend towards bigger pumps, it has been shown out that lubrication with grease must be replaced by oil lubrication, which better withstands the heavy loads involved and allows longer intervals between services. The oil for this lubrication thus requires another oil chamber in addition to the oil chamber previously mentioned.

According to the present invention there is provided an oil housing for use between a drive unit and a pump unit of a submersible pump, which housing has an axial bore for accommodating a drive shaft, and wherein the housing is provided with a number of radially directed partitions which divide it circumferentially into a number of chambers for containing different media for lubrication and coolant purposes for respectively a bearing associated with the drive shaft and a seal associated

with the drive shaft.

An embodiment of the invention will now be described with reference to the accompanying drawings, in which:

Fig. 1 shows, somewhat schematically, a section through a submersible pump, and

Fig. 2 shows a radial section through the oil housing of Fig. 1.

In the Figs., reference numeral 1 stands for a submersible pump having a drive unit 2 and a pump unit 3 connected by a drive shaft 4 with bearing 5 and a seal 6. Reference numeral 7 stands for an oil housing, 8 and 9 for oil chambers, 10 for air shafts and 11 for partitions.

The oil housing 7, has the form of a cylinder having a central axial bore for the drive shaft 4 and the bearing 5. In the housing 7 there are arranged radial partitions 11, which divide the housing circumferentially into a number of chambers. One or more of these chambers, such as 8, are connected to the bearing 5 and provide the latter with lubricating and cooling oil.

The chamber or chambers 9 in the housing 7 are connected to the seal or seals 6 and contain oil for lubricating and cooling of seal or seals 6.

The air shafts 10, which are equivalent to the chambers 8 or 9 but do not have an end wall adjacent the drive unit 2, make it possible for air to circulate between the lower part of the drive unit and the upper outer part of the housing of the pump unit which in its turn is cooled by the medium to be pumped.

There is thus obtained a compact oil housing, including chambers and shafts for different lubricating and cooling media and air respectively. By the special form given to the housing the space it occupies has been minimized, which means that the drive shaft can be made short which is advantageous with regard to its strength.

Big pumps require high powers, which requires good cooling of the electric motor windings. It is therefore preferable to make air circulate through the windings and in the lower part of the motor chamber, which air is cooled by cooling ribs on the part

of the pump housing adjacent the drive unit. The embodiment described provides cooling shaft for this air in the oil housing such as to provide effective cooling of the drive unit.

WHAT WE CLAIM IS:—

1. An oil housing for use between a drive unit and a pump unit of a submersible pump, which housing has an axial bore for accommodating a drive shaft, and wherein the housing is provided with a number of radially directed partitions which divide it circumferentially into a number of chambers for containing different media for lubrication and coolant purposes for respectively a bearing associated with the drive shaft and a seal associated with one drive shaft.

2. An oil housing as claimed in claim 1 wherein a further one or more of the

chambers are open in the direction towards the drive unit and are adapted to serve as air cooling shafts for the drive unit in use thereof.

3. An oil housing for use between a drive unit and a pump unit of a submersible pump substantially as herein described with reference to the accompanying drawings.

4. A submersible pump including a drive unit and a pump unit with an oil housing arranged therebetween, wherein the oil housing is as claimed in any preceding claim.

5. A submersible pump substantially as herein described with reference to the accompanying drawings.

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For the Applicants

A technical cross-sectional drawing of a mechanical assembly. The assembly is mounted on a base (3) and consists of several components: a central shaft (4) with a top flange (2) and a bottom flange (6); two side supports (5) with internal components (7); and a central component (1) at the top. The drawing uses hatching to indicate different materials or sections.

Fig. 2.