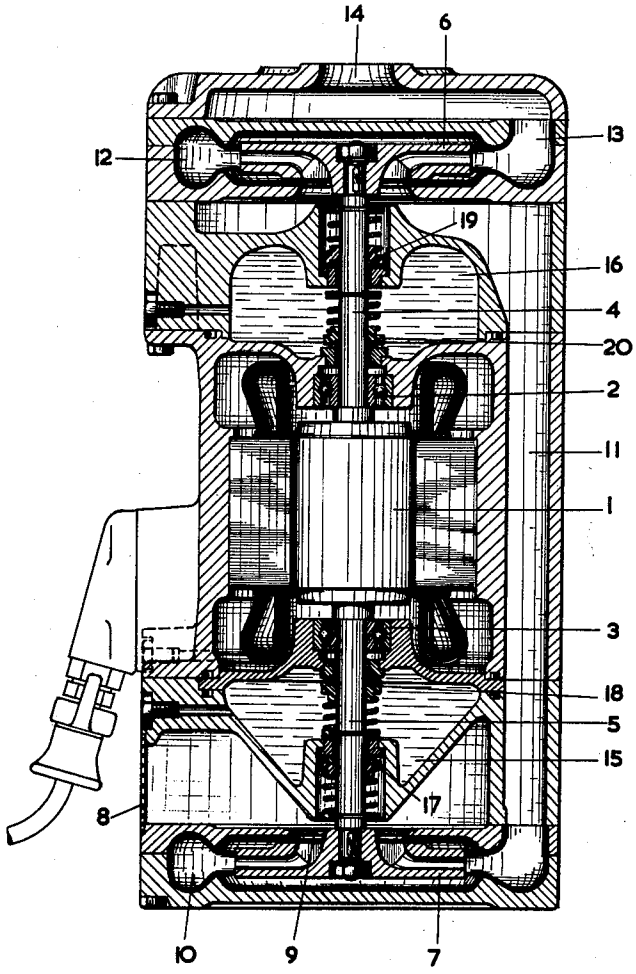
July 20, 1965 L. BOOD 3,195,468

SUBMERSIBLE PUMP

Filed May 10, 1963



INVENTOR

LOURIS BOOD

BY Irwin S. Thompson

ATTORNEY

United States Patent Office

3,195,468
Patented July 20, 1965

3,195,468

SUBMERSIBLE PUMP

Louris Bood, Voorburg, Netherlands, assignor to Mowid Anstalt, Vaduz, Liechtenstein, a corporation of Liechtenstein

Filed May 10, 1963, Ser. No. 279,661
Claims priority, application Belgium, May 18, 1962, 617,810
2 Claims. (Cl. 103—87)

The invention relates to a submersible pump such as a waste pump, and more particularly a centrifugal pump driven by the shaft of an electric motor.

Pumps of this type are commonly known. If such a pump has to operate with a somewhat higher pressure, several impellers mounted one behind the other on a shaft will have to be used. It is a disadvantage of this set-up that it is practically out of the queston to fit a satisfactory oil-bath liquid seal and at the same time to keep a small distance between the impellers, while water-lubricated shaft seals are highly susceptible to wear. The maintenance of a larger distance between the pump chambers involves the drawback that the non-supported end of the shaft becomes too long, which entails vibration and oscillation of the end of the shaft; supporting the end of the shaft on the other hand necessitates the use of watertight self-adjusting bearings.

The invention offers a method for realizing a pump with two impellers while eliminating the above-mentioned drawbacks. To achieve this, according to the invention the motor shaft simultaneously drives a pump impeller located on opposite sides of the motor, the liquid to be pumped being sucked through the one pump chamber and being conducted via one or more pipes to the other pump chamber, which is connected direct with the outlet.

The liquid is preferably sucked around the lower part of the pump housing and conducted around the impeller shaft into the first pump chamber, from which the liquid is conducted to the second pump chamber via two longitudinal channels displaced over 180° relative to each other.

In this connection it presents advantages when the two pump chambers and the corresponding liquid inlets of the motor chamber are separated by oil-filled chambers through which extend the ends of the pump shaft.

The dimensions of the two chambers of the pump are preferably almost equal and the supply of liquid to the respective pump chambers takes place in opposite directions, in consequence of which the axial load on the motor bearings is almost nil.

The invention is explained by reference to the annexed figure, which shows a vertical cross-section through a pump according to the invention along two planes at right angles to each other.

As appears from this figure, the centrally located motor **1** drives, via two ends of a shaft **4** and **5** supported in the bearings **2** and **3**, the pump impellers **6** and **7** located above and beneath the motor respectively. The water flows into the pump through the strainer **8** present round

the lower half of the pump housing, and enters the lower pump chamber **10** via the annular opening **9**. From this chamber it flows through the longitudinal channels **11** towards the upper pump chamber **12**. It leaves this chamber via the channels **13** leading to the outlet **14**.

The two pump chambers are separated from the motor chamber by the oil-filled chambers **15** and **16**. Further the conventional shaft seals **17**, **18**, **19**, and **20** are present. As these shaft seals are connected with and lubricated by the oil chambers **15** and **16** respectively, the wear will be considerably lower than is the case with water-lubricated shaft seals; this is a great advantage in particular for a pump which must be able to operate as long as possible without attendance in places difficult of access, and also entirely without water.

The two impellers **6** and **7** operate in opposite axial directions, while their dimensions are equal, so that the shaft bearings **2** and **3** are hardly subject to any axial load. Not only does this make it possible to use less expensive bearings, but the wear of the bearings also will be lower.

The pump according to the invention therefore presents all the advantages of a multi-stage pump, but without having the disadvantages of such a pump.

What I claim is:

1. A submersible pump comprising a pump casing defining a watertight electric motor chamber and first and second pump chambers disposed on opposite sides of said motor chamber, each said pump chamber having an inlet and outlet, an electric motor within said motor chamber and having a drive shaft, one end portion of said drive shaft extending into said first pump chamber and the other end portion of said drive shaft extending into said second pump chamber, said casing defining oil-filled chambers disposed one on either side of said motor chamber between said motor chamber and said pump chambers, seals for the oil-filled chambers about the shaft at both ends of each oil-filled chamber, said pump casing defining a passageway between the outlet of said first pump chamber and the inlet of said second pump chamber for conducting liquid from said first pump chamber to said second pump chamber, and impellers mounted on said end portions of said shaft within said first and second pump chambers.

2. A pump as claimed in claim **1**, in which said inlets of said pump chambers are axially disposed and open into their respective pump chambers in opposite directions thereby to reduce the axial load on the shaft.

References Cited by the Examiner

UNITED STATES PATENTS

2,603,157	7/52	Conery	103—109 X
2,682,229	6/54	Luenberger	103—87
3,022,739	2/62	Herrick et al.	103—87

FOREIGN PATENTS

299,103	10/28	Great Britain.

LAURENCE V. EFNER, *Primary Examiner.*

ROBERT M. WALKER, *Examiner.*