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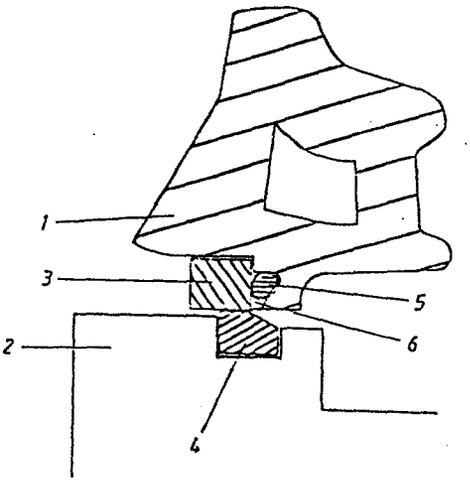
(54) A seal device.

(57) The invention concerns a seal device for preventing leakage between an impeller and its surrounding housing.

According to the invention the impeller (1) and the housing (2) are provided with one seal ring each (3) and (4) resp, which together form a mechanical seal device. At least one of the rings (3) is attached by help of an O-ring (5) in a slot (6).



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A SEAL DEVICE

This invention concerns a seal device to prevent leakage between an impeller and a non-rotating part.

Pumps having a rotating impeller such as centrifugal pumps, take in the pumped medium at the center of the impeller and leave it by the periphery. It is then important that the inlet of the impeller fits closely with the inlet of the housing and that pumped medium is prevented from flowing back to the inlet. Such a backflow creates efficiency losses and turbulence at the inlet.

In order to obtain the requested sealing between impeller and non-rotating parts, it is common to arrange a wear part, for instance made of rubber, on the non-rotating part and let the impeller contact that part during rotation. In this way an effective sealing is obtained as long as the wear part is intact. When pumping liquids containing heavily wearing objects, such as sand and sludge cuttings in mines, the lifetime of the wear parts become very short which means short service intervals.

The purpose of the invention is thus to replace the wear parts made of rubber by a more resistant matrial which extends the service intervals.

This is obtained by providing the impeller as well as the non-rotating part with seal rings made of hard metal or ceramics, which together form a mechanical seal which in an effective way prevents the pumped medium from flowing back to the inlet and which has a very good wear resistance.

According to a preferred embodiment of the invention, at least on of the seal rings is attached by help of an O-ring. This means that the seal ring may be easily replaced and also eliminates problems due to the seal ring not being sufficiently plain. The latter may easily be the

case if the ring is mounted in another way, for instance as a shrinkage fit; as the diameters in question are big.

The invention is described more closely below with reference to the enclosed drawing.

In the drawing 1 stands for an impeller, 2 a part of a pump housing, 3 and 4 mechanical seal rings, 5 an O-ring and 6 a slot for the latter.

According to the invention a mechanical seal is thus arranged between the impeller 1 and the housing 2 preventing medium that has passed through the impeller to flow back to the inlet.

The mechanical seal, which has an axial sealing surface, consists of a seal ring 3 attached to the impeller and another ring 4 attached to the housing. In order to make replacement possible, at least one of the rings 3 is attached by an O-ring. For that purpose a slot 6 is made in the impeller, extending axially along a part of a mantle surface of the impeller. The slot has then such a configuration that it is deeper in the radial direction at some distance from the opening.

When mounting a seal ring on the impeller, an O-ring is first placed in the slot and then the seal ring is pressed downwards outside the O-ring. This means that the O-ring becomes deformed and thus locks the seal ring. Thanks to the fact that the slot is more shallow at the opening, the locking becomes very effective as the O-ring must be deformed even more to be able to slip out of the slot. This means that the locking becomes stronger the higher pressure the seal is exposed to. Even the other seal ring 4 may be mounted in the same way.

The advantages in the invention are several. A sealing is obtained which is very resistant to wear and in addition the O-ring attachment means that the rings are easy to

replace and problems due to the seal rings not being sufficiently plain are eliminated.

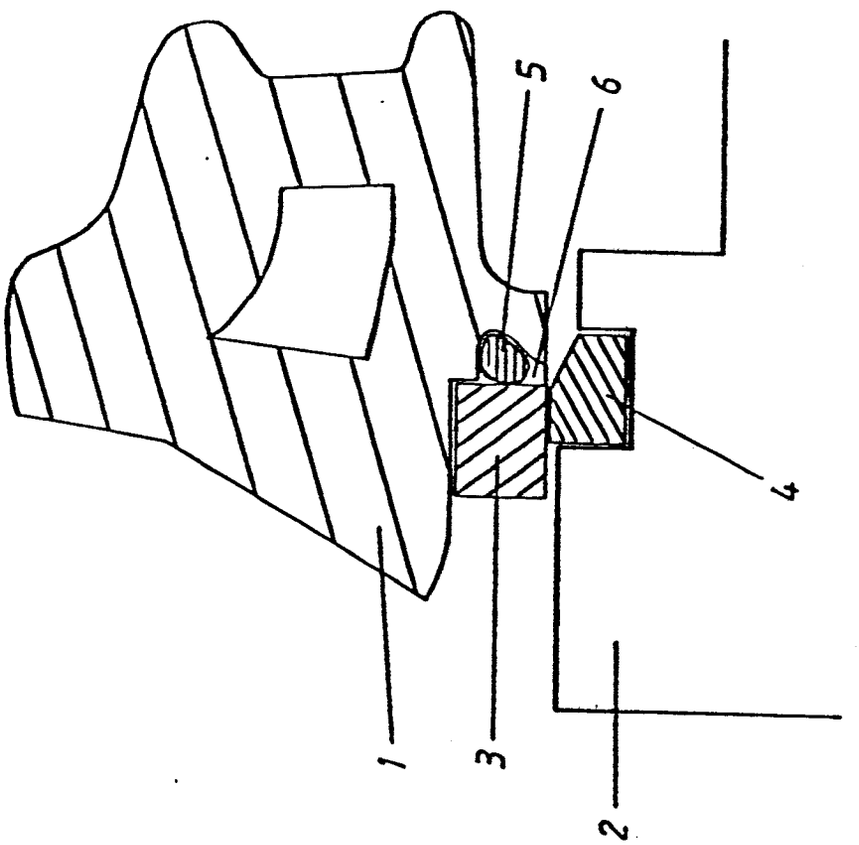
A specific advantage occurs if the sealing surface has a radial direction. This means that the demands for tolerances decrease as a sufficient sealing is obtained, even if the rings are somewhat displaced relative each other. This quality is especially important if the pump contains several steps, that is to say several continous impellers on the same shaft.

CLAIMS

1. A device for obtaining a sealing between a rotating impeller and a surrounding housing, c h a r a c t e r i z e d in that it comprises two seal rings (3) and (4) resp, one of them attached to the impeller (1), the other to tha housing (2), at least one of rings being attached by help of an O-ring.

2. A device according to claim 1, c h a r a c t e r i z e d in that the O-ring (5) is arranged in a slot (6) the opening of which is somewhat shallower than its inner part.

3. A device according to claim 1, c h a r a c t e r i z e d inn that the sealing surface between the two rings has a radial direction.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EP 86 85 0033

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	FR-A-2 296 124 (WARMAN INTERNATIONAL) * Page 5, line 9 - page 6, line 2; figure 1; page 6, line 26 - page 7, line 29; figures 3,4 *	1	F 04 D 29/16
X	US-A-1 521 226 (BOGDANOFF) * Page 1, lines 60-89; figures II, VII *	1,3	
X	DE-C- 142 214 (SEITZ) * Page 1, lines 26-49; figures *	1,3	
A	DE-C- 422 681 (OLIVER) * Page 2, lines 10-17; figures 1,2 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			F 04 D 29/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26-05-1986	KAPOULAS T.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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