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Description

This invention concerns a seal device as claimed in claim 1 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.

According to US-A-1521226 subject problem has been solved by a device where parts may be adjusted to take up for wear. The adjustment is obtained by pressing an inclined surface of its seal ring towards a gasket.

The purpose of our invention is to replace the wear parts made of rubber by a more resistant material 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 one 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 radial 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 continuous impellers on the same shaft.

Claims

1. A seal device in a rotating impeller (1) and its surrounding housing (2), comprising a seal ring (3) arranged in a slot (6) in said impeller (1) and another seal ring (4) arranged in a slot in said housing (2), said seal rings (3, 4) forming a mechanical seal device between said impeller (1) and said housing (2), characterized in that at least one of the seal rings (3) is attached by help of an 0-ring (5) located in said slot (6), said 0-ring (5) being such that when mounting the seal ring (3), the 0-ring is deformed within the circumferential axially directed slot (6) adjacent to the seal ring (3), thus locking the latter, the outer opening of said slot (6) being somewhat shallower in the radial direction than its inner part thus effectively blocking the 0-ring within the inner part of the slot.

2. A device according to claim 1, characterized in that the sealing surface between the two seal rings (3) and (4) has a radial direction with regard to the axis of rotation.

Patentansprüche

1. Dichtungsvorrichtung bei einem rotierenden Flügelrad (1) und dem dieses umgebenden Gehäuse (2), mit einem in einem Schlitz (6) in dem Flügelrad (1) angeordneten Dichtungsring (3) und mit einem in einem Schlitz in dem Gehäuse (2) angeordneten weiteren Dichtungsring (4), wobei die Dichtungsringe (3, 4) eine mechanische Dichtungsvorrichtung zwischen dem Flügelrad (1) und dem Gehäuse (2) bilden, dadurch gekennzeichnet, daß wenigstens einer der Dichtungsringe (3) mit

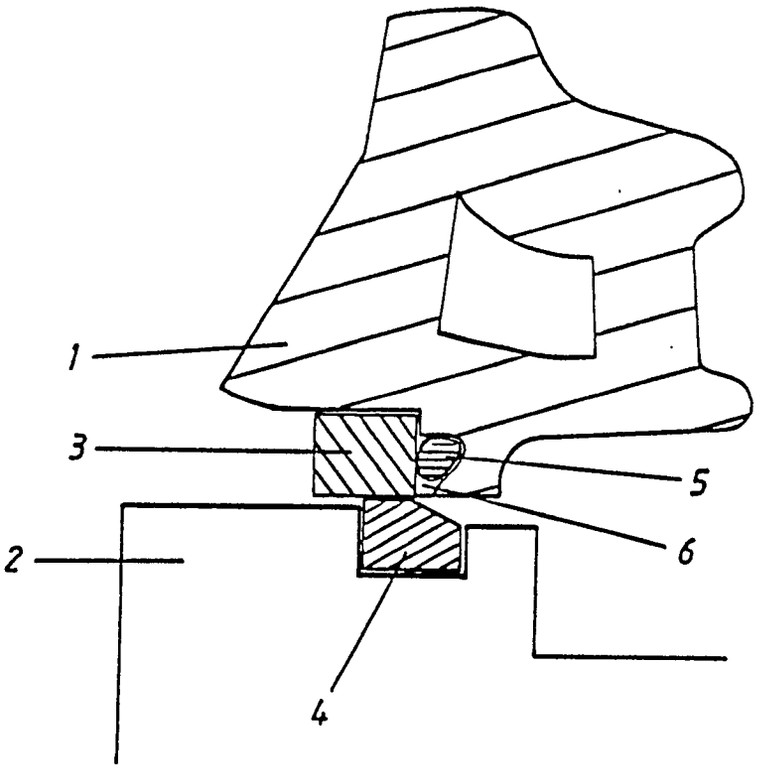
Hilfe eines in dem Schlitz (6) befindlichen O-Rings (5) angebracht ist, wobei der O-Ring (5) derart ausgebildet ist, daß bei Montage des Dichtungsrings (3) der O-Ring innerhalb des an den Dichtungsring (3) angrenzenden, in Umfangsrichtung verlaufenden und in Axialrichtung weisenden Schlitzes (6) verformt und der Dichtungsring dadurch verblockt wird, wobei die äußere Öffnung des Schlitzes (6) in Radialrichtung etwas weniger breit als ihr innerer Teil ausgebildet ist and der O-Ring dadurch innerhalb des inneren Teils des Schlitzes wirksam blockiert ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Dichtungsfläche zwischen den beiden Dichtungsringen (3) und (4) in bezug auf die Rotationsachse in Radialrichtung verläuft.

Revendications

1. Dispositif d'étanchéité placé dans une roue à aubes rotative (1) et le carter (2) qui l'entoure, comprenant une bague d'étanchéité (3) disposée dans une gorge (6) ménagée dans la roue à aubes (1) et une autre bague d'étanchéité (4) disposée dans une gorge ménagée dans le carter (2), ces bagues d'étanchéité (3, 4) formant un joint mécanique étanche entre la roue à aubes (1) et le carter (2), caractérisé en ce qu'au moins l'une des bagues d'étanchéité (3) est fixée à l'aide d'un anneau torique (5) logé dans la gorge (6), cet anneau torique (5) étant tel que, lorsqu'on monte la bague d'étanchéité (3), il se trouve déformé à l'intérieur de la gorge circonférentielle (6) orientée axialement, en une position adjacente à la bague d'étanchéité (3), ce qui verrouille ainsi cette dernière, le débouché extérieur de cette gorge (6) étant dans une certaine mesure plus étroit, suivant la direction radiale, que sa partie intérieure, ce qui bloque ainsi efficacement l'anneau torique à l'intérieur de cette partie intérieure de la gorge.

2. Dispositif suivant la revendication 1, caractérisé en ce que la surface d'étanchéité entre les deux bagues d'étanchéité (3) et (4) a une direction radiale par rapport à l'axe de rotation.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