Sept. 20, 1949. K. B. GILLESPIE 2,482,414

WATER PUMP SEAL

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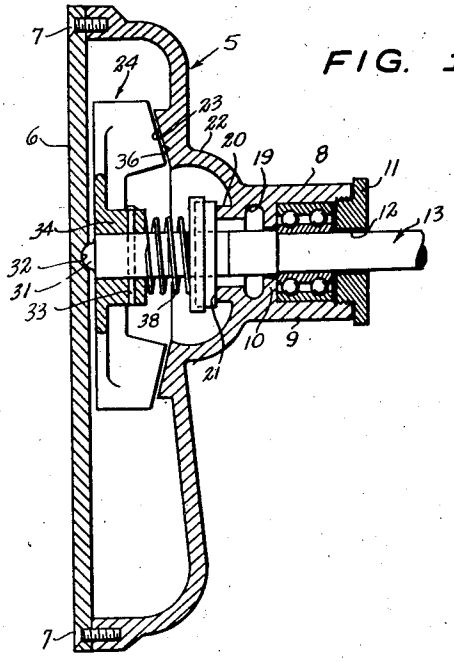
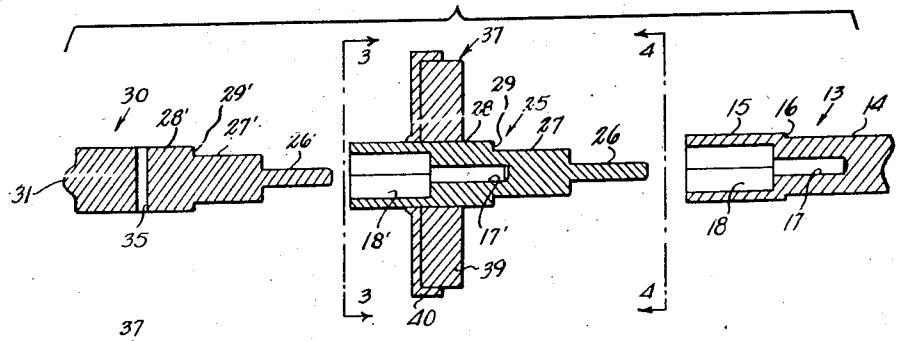


FIG. 1.

FIG. 2.



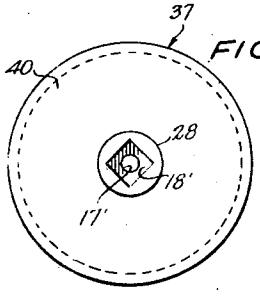


FIG. 3.

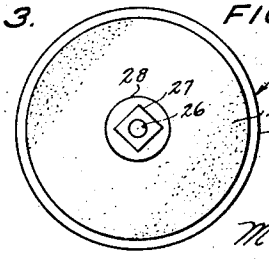


FIG. 4.

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WATER PUMP SEAL

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2 Claims. (Cl. 103—103)

1

This invention relates to improvements in rotary liquid pumps involving shaft sealing means, the primary object of the invention being to provide a novel and superior arrangement of this kind which is more efficient and longer lasting, by reason of its unusual construction, and by reason of the elimination of the relatively easily destructible and easily deteriorated rubber sealing means usually found in such pumps.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawing, wherein, merely for present purpose of illustration, a specific embodiment of the invention is set forth in detail.

In the drawings:

Figure 1 is a vertical longitudinal section taken through said embodiment.

Figure 2 is an exploded view showing in longitudinal sectional, the shaft components and the sealing disk thereon.

Figure 3 is a left-hand end elevation of the intermediate shaft component, and

Figure 4 is a right-hand end elevation of said intermediate shaft component.

Referring in detail to the drawings, the numeral 5 generally designates the preferably cast iron pump housing, whose open back is closed by a plane plate 6, secured to the rear edge of the housing 5, as by screws 7.

The housing 5 includes the forward tubular part 8 containing a double row ball or roller bearing 9 against an internal shoulder 10, and maintained in place by a threaded plug 11 having the central hole 12 through which the forward shaft section 13 projects.

The forward shaft section 13, as shown in Figure 2, comprises the forward portion 14 traversing the bearing 9, and the rearward larger diameter portion 15 defining the thrust shoulder 16 abutting the rear end of the bearing 9. The portion 15 has a round axially extending bore 17 opening at its rear end in a larger diameter axially extending squared socket 18, opening through the rear end of the portion 15. Behind the internal shoulder 10 the housing 5 has a diametrically enlarged chamber 19 in which the portion 15 of the forward shaft section 13 extends.

The chamber 10 terminates at its rear end in an annular seat 20 having a plane rearwardly directed face 21, which seat is in concentrically spaced relation to a bulbous housing portion 22, whose peripheral edges terminate in a bevelled ring portion 23 facing the forward side of the pump rotor or impeller 24.

2

The pump shaft further comprises the intermediate shaft section 25, which comprises the forward pin 26 to fit in the bore 17 of the forward shaft section 13, the larger squared portion 27 to fit in the squared bore 18, and the further enlarged portion 28 defining the shoulder 29 for abutting the rear end of the forward shaft section 13, when these sections are assembled as shown in Figure 1. Like similar portions of the forward shaft section, the intermediate shaft section 25 has a small diameter bore 17' leading into an enlarged squared bore 18' opening through the rear end of the portion 27, to receive the pin 26' and the squared portion 27', and abut the shoulder 29' on the forward end of the portion 28' of the rear shaft section 30.

The rear shaft section 30 terminates in a rounded axial projection 31 supportably turning in a conforming recess 32 in the forward face of the housing back plate 6.

The vaned rotor or impeller 24 is mounted concentrically in the portion 28' of the rear shaft section 30 and fixed in position thereon by a pin 33 extending the rotor hub 34 and through a transverse bore 35 in the portion 28', the rotor having a conformably bevelled part 36 running close to the pump housing bevelled part 23.

Longitudinally slidably mounted on the portion 28 of the intermediate shaft section 25 is the seal, generally designated 37, which is constantly urged toward engagement with the face 21 of the seat 20 by an expanding helical spring 38, circumposed on the shaft sections 25 and 30 and compressed between the rotor hub 34 and the seal 37.

The seal 37 comprises a relatively thick carbon ring or disk 39, having its rear side cemented or otherwise suitably secured in a shallow cup-like metal disk 40, which is engaged by the forward end of the spring 38. The spring 38 keeps the carbon ring 39 constantly against the face 21 of the seat 20, in a manner to provide anti-friction contact therewith and to preclude leakage of liquid forwardly past the seat 20 as well as forwardly along the pump shaft.

What is claimed is:

1. A rotary pump for liquid, comprising a pump housing having a back plate formed with a bearing recess, and a tubular part containing an axial anti-friction bearing aligned with said bearing recess, said tubular part terminating at its rearward end in an annular seat, a pump shaft journaled in said anti-friction bearing and extending rearwardly through said annular seat with its rearward end supportably engaged in said bearing recess, a vaned impeller fixed on said shaft to the

rear of said annular seat, a seal on said shaft adjacent to said seat, spring means on said shaft between said impeller and said seal and maintaining said seal engaged with said seat, said shaft comprising forward, intermediate and rearward sections, with said seal mounted on said intermediate section, said back plate being removable, means separably connecting and providing positive axial alignment and non-rotary assembly of said shaft sections, whereby upon removal of said back plate said rear shaft section can be disconnected from said intermediate shaft section to provide access for removing and reinstalling said spring means and said seal on said intermediate shaft section.

2. A rotary pump for liquid, comprising a pump housing having a back plate formed with a bearing recess, and a tubular part containing an axial anti-friction bearing aligned with said bearing recess, said tubular part terminating at its rearward end in an annular seat, a pump shaft journaled in said anti-friction bearing and extending rearwardly through said annular seat with its rearward end supportably engaged in said bearing recess, a vaned impeller fixed on said shaft to the rear of said annular seat, a seal on said shaft adjacent to said seat, spring means on said shaft

between said impeller and said seal and maintaining said seal engaged with said seat, said shaft comprising forward, intermediate and rearward sections, with said seal mounted on said intermediate section, said back plate being removable, means separably connecting and providing positive axial alignment and non-rotary assembly of said shaft sections, whereby upon removal of said back plate said rear shaft section can be disconnected from said intermediate shaft section to provide access for removing and re-installing said spring means and said seal on said intermediate shaft section, and whereby said intermediate shaft section including said seal can be disconnected from said forward shaft section and removed as a unit from said pump housing.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
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