

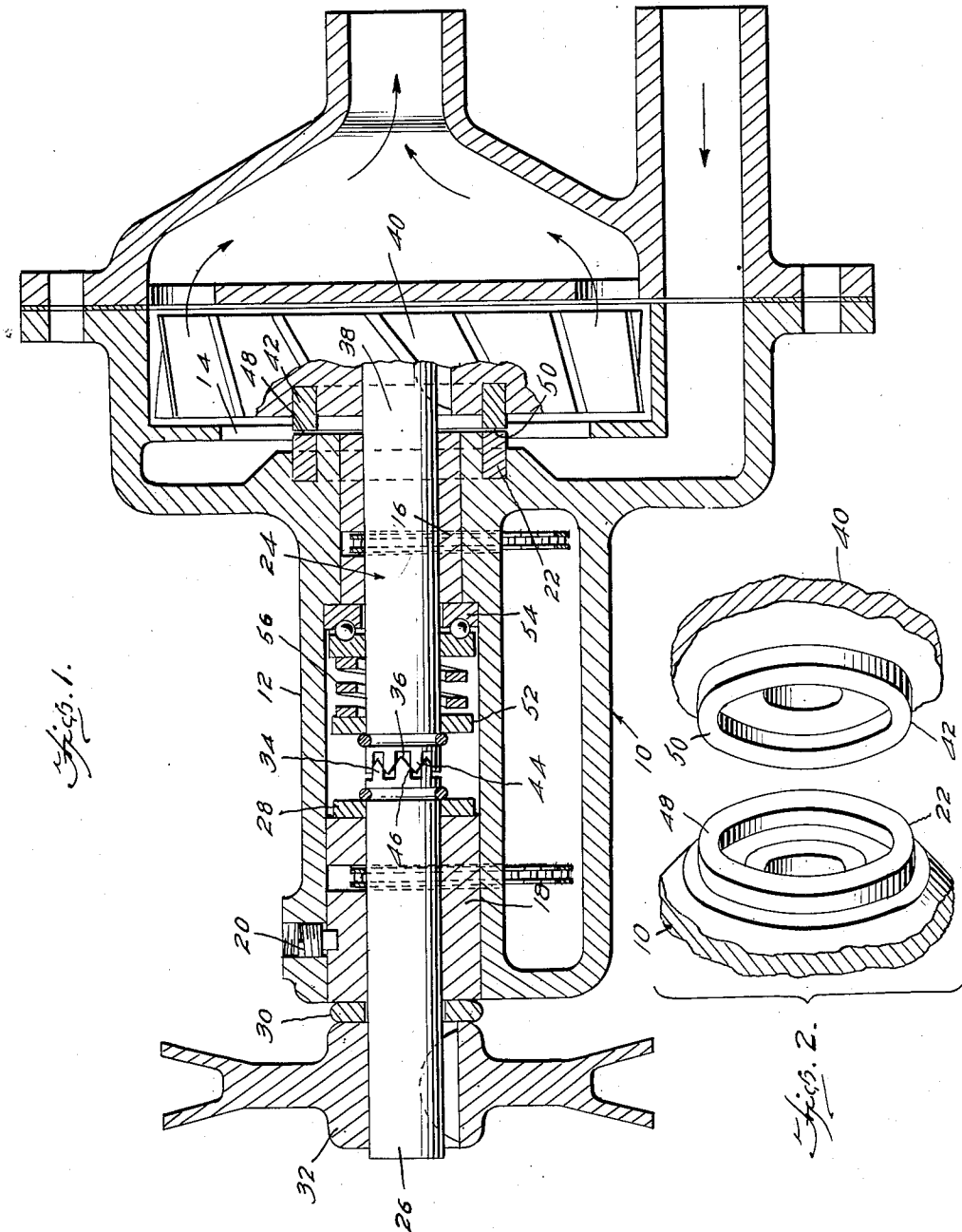
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CENTRIFUGAL PUMP DRIVE AND SEAL MEANS

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CENTRIFUGAL PUMP DRIVE AND SEAL MEANS

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2 Claims. (Cl. 103—87)

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This invention relates to a pump and more particularly to a pump of the type employing a rotary impeller.

The primary object of the invention is to protect the pump bearings from contact with the fluid which is being handled by the pump.

Another object is to avoid leakage around the pump impeller drive shaft where it enters the impeller chamber and to thus enable lubricants to be used in the pump bearings, even though the pump may be handling lubricant solvents such as gasoline, naptha and the like.

A further object is to avoid the transmission of end play or sidewise cramping to the pump impeller shaft by the impeller driving means and thereby to assure complete sealing of the bearings from the fluid even though the driving means may tend to float the pump drive shaft longitudinally relative to its axis.

A still further object is to assure complete sealing of the pump impeller shaft and bearing even though there might be a mis-alignment of the drive shaft due to side strain of the driving means.

The above and other objects may be attained by employing this invention which embodies among its features a rotary pump of the type having a casing carrying a laterally extending tubular drive shaft housing and an impeller chamber in substantial axial alignment therewith, a sectional drive shaft mounted in the tubular drive shaft housing and extending through said housing, an impeller mounted on one section of said drive shaft within the impeller chamber, impeller driving means mounted on another section of said drive shaft adjacent the end thereof remote from the impeller chamber, driving means carried by the drive shaft sections within the housing to establish flexible and extensible driving connection between said drive shaft sections, whereby endwise movement of the drive shaft section carrying the impeller driving means will not be transmitted to the drive shaft section carrying the impeller, and slight mis-alignment of the drive shaft sections can be tolerated.

Other features include a sealing ring carried by the pump casing and projecting into the impeller chamber in concentric spaced relation to the shaft section carrying the impeller, a second sealing ring carried by the shaft section carrying the impeller in concentric spaced relation thereto for engaging the first mentioned sealing ring and effecting a fluid tight seal at the junction of the rings, and means within the drive shaft housing and engaging the shaft section car-

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rying the impeller to urge it longitudinally toward the shaft section carrying the impeller driving means and hold the adjacent faces of the sealing rings in close contact with one another.

In the drawings:

Figure 1 is a longitudinal sectional view through a pump embodying the features of this invention showing one type bearing of lubricating means; and

Figure 2 is a fragmentary perspective view of the pump casing and impeller showing the sealing rings in detail.

Referring to the drawings in detail a pump casing designated generally 10 includes a tubular drive shaft housing 12 and contained within said pump casing is an impeller chamber 14 which aligns substantially axially with the tubular housing 12. Carried by the tubular housing 12 in the end thereof adjacent the impeller chamber 14 is a shaft bearing 16, and a similar shaft bearing 18 is held in the tubular housing 12 adjacent the end thereof remote from the impeller chamber 14 by a suitable set screw 20.

Carried by the casing 10 and projecting into the impeller chamber 14 is a sealing ring 22 which lies concentric about the axis of the bearings 16 and 18 in spaced concentric relation to the bearings 16.

Mounted for rotation in the bearings 16 and 18 is a sectional drive shaft designated generally 24, one section 26 of which is mounted for rotation in bearing 18 but held against longitudinal movement relative thereto by stops 28 and 30. As illustrated in Figure 1, the shaft section 26 projects beyond the end of the housing 12 remote from the chamber 14 and has keyed or otherwise secured thereto an impeller driving member 32 which may take the form of a conventional pulley. The end of the shaft section 26 contained within the housing 12 is provided with longitudinally extending peripherally spaced teeth 34, the outer ends of which are preferably tapered as at 36 for a purpose to be more fully hereinafter described.

Mounted for rotation in the bearing 16 is the section 38 of the drive shaft 24 which projects into the chamber 14 and has keyed or otherwise secured thereto a suitable impeller 40. The shaft section 38 is not only rotatable in the bearings 16, but may move longitudinally therein, and carried by the impeller 40 is a sealing ring 42 which lies concentric about the shaft section 38 in spaced relation thereto as will be readily understood upon reference to the drawings.

The end of the shaft section 38 remote from

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that carrying the impeller 40 is provided with longitudinally extending teeth 44 which like the teeth 34, are tapered as at 46. The teeth 34 mesh with the teeth 44 so as to establish flexible and extensible driving connection between the shaft sections 26 and 38 of the drive shaft 24.

In order to hold the adjacent faces 48 and 50 of the sealing rings 42 in close contact, I provide on the shaft section 38 within the tubular housing 12 an outwardly extending annular collar 52, and mounted on the shaft section 38 for longitudinal sliding movement relative thereto and adjacent the bearing 16 is an anti-friction bearing 54. A compression coil spring 56 encircles the shaft section 38 between the anti-friction bearing 54 and the collar 52 so as to exert yielding pressure on the collar and advance the shaft section 38 longitudinally toward the shaft section 26 to thus yieldingly hold the faces 48 and 50 of the sealing rings 22 and 42 in close contact.

In operation, the drive shaft 24 is driven in a conventional manner by the impeller driving means 32 to cause the impeller 40 to rotate within the chamber 14. Owing to the extensible and flexible connections of the shaft section 26 with the shaft section 38, it will be evident that any longitudinal movement of the shaft section 26 by impeller driving member 32 will not be transmitted to the shaft section 38 so that the adjacent faces 48 and 50 of the sealing rings 22 and 42 respectively at all times will be held in sealing engagement with one another under the influence of the spring 56. By thus sealing the bearings 16 and 18 from the chamber 14, it will be obvious that fluids handled by the impeller 40 will be excluded from contact with the drive shaft 24, and bearings 16 and 18.

By thus excluding fluids handled by the impeller 40 from contact with the bearings 16 and 18, and with the drive shaft 24, it is obvious that lubricants may be supplied to the bearings 16 and 18 without danger of dissolution by solvents, such as gasoline and naptha. Also by avoiding mechanical disengagement of the faces 48 and 50 of the sealing rings 22 and 42, it is evident that the efficiency of the seals will be greatly increased over those of a pump employing a solid drive shaft in place of the sectional drive shaft 24, herein described.

While in the foregoing there has been shown and described the preferred form of this invention, it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

I claim:

1. In a universal driving shaft for rotary pumps and the like, a casing having a fluid inlet and

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outlet, an elongated extension projecting from one side of said casing and having a bore extending longitudinally therethrough and opening into said casing, sleeve bearings fitted within the opposite ends of said bore, a shaft section extending through one of said bearings and projecting into said casing, an impeller mounted on the shaft end within said casing, a second shaft section extending through the other of said bearings, interengaged teeth formed on the adjacent ends of said shaft sections, the teeth on said second shaft section having their free ends tapered, a pulley mounted on the outer end of said second shaft section, the portion of said bore in which the inner of said bearings is fitted being of a somewhat lesser diameter than that of the remainder of the bore length to provide an annular shoulder in the plane of the inner end of that bearing, an antifriction bearing mounted on the first shaft section in abutted relation with respect to said shoulder, a collar mounted on the inner end of the first shaft section, cooperative seal rings carried by said casing and said impeller in concentric relation with respect to the first shaft section, and a coil spring on the first shaft section between said antifriction bearing and said collar to maintain said teeth and said seal rings in cooperative engagement irrespective of any non-alignment of said shaft sections due to wear of said sleeve bearings occasioned by belt strain on said pulley.

2. The invention as defined in claim 1, with the said extension having a chamber, constituting a lubricant reservoir, below said bore, and means operable by said shaft sections for conveying the lubricant from the reservoir for its discharge onto the shaft sections at said sleeve bearings.

WALTER M. HOWSER.

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