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2,888,283

ROTARY SHAFT JOINT ASSEMBLY

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FIG. 1

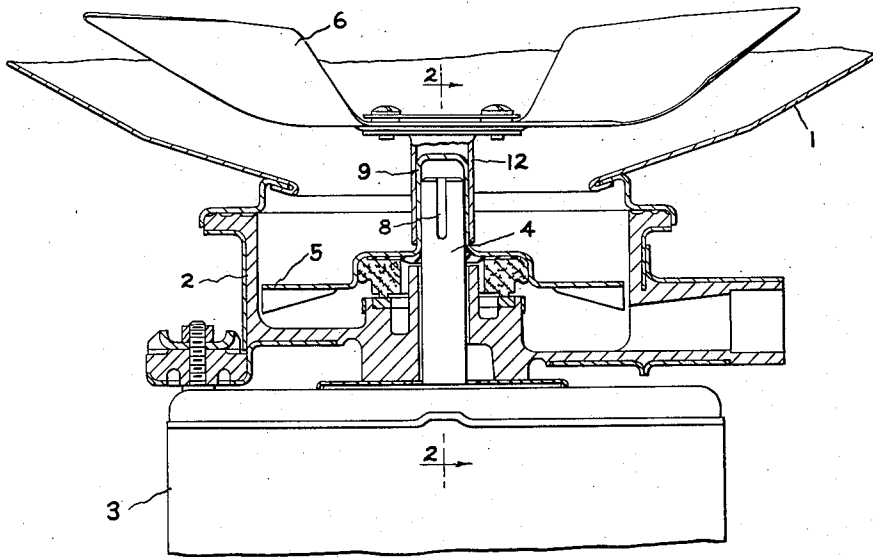


FIG. 2

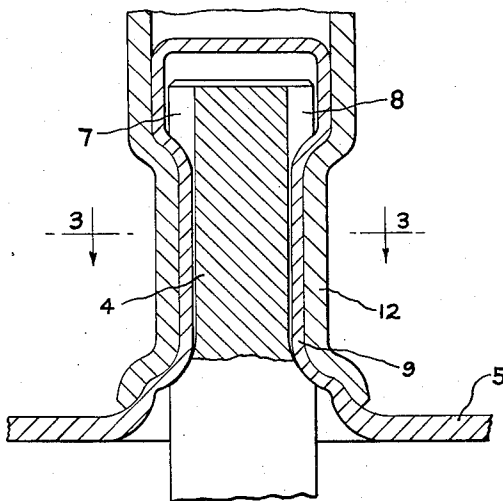
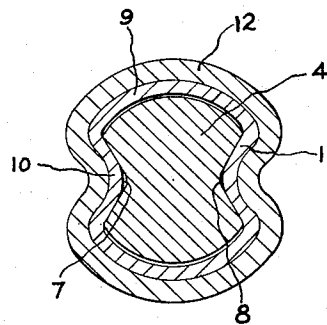


FIG. 3



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ROTARY SHAFT JOINT ASSEMBLY

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2 Claims. (Cl. 287—53)

This invention relates to rotary shaft joints, and has as its principal object the provision of an improved joint assembly of this type possessing inherent resiliency whereby shocks resulting from sudden changes in torque, speed and direction of rotation are absorbed without over-stressing of the parts.

Further objects and advantages of this invention will become apparent as the following description proceeds, and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

Briefly stated, in accordance with the one aspect of this invention there is provided a shaft joint including an axially grooved shaft of generally circular cross section, and an axially indented sleeve adapted to fit over the shaft and be supported solely by engagement of the indented portions of the sleeve and the grooves in the shaft, the two parts being so shaped that the sleeve is elastically stressed when assembled on the shaft so as to provide a resilient connection.

For a better understanding of this invention, reference may be made to the following description and the accompanying drawing in which:

Fig. 1 is a fragmentary elevation view, partially in section, of a water circulating impeller and pump arrangement for a dishwasher in which the present invention is utilized.

Fig. 2 is a sectional view taken along the line 2—2 in Fig. 1.

Fig. 3 is a sectional view taken along the line 3—3 in Fig. 2.

Referring to the drawing, the numeral 1 designates the bottom wall of the tub of a dishwasher on which is supported a drain pump assembly 2 which in turn supports a reversible electric motor 3. Motor 3 includes a rotary drive shaft 4 which projects up through the pump chamber of pump 2 and which is arranged to carry both the impeller 5 of pump 2 and a wash impeller 6 adapted to circulate water throughout the washing compartment of the dishwasher. The washing and pumping mechanism illustrated in Fig. 1 is the invention of Lawrence W. Guth and Russell M. Sasnett, and is disclosed and claimed in application Serial Number 671,070, filed July 10, 1957, and assigned to the assignee of the present application. As more fully described in that application, wash impeller 6 is adapted to circulate water throughout the washing compartment when shaft 4 rotates in one direction, and pump impeller 5 is adapted to supply substantial positive discharge pressure in the pump drain line when shaft 4 rotates in the opposite direction. During each dishwashing cycle in which a load of dishes may be washed and rinsed by half a dozen separate charges of water, shaft 4 may be reversed as many as twelve times or more and is also subjected to a pulsating load resulting from impact of water on impellers 5 and 6.

In order to minimize both wear and noise, it is important that impellers 5 and 6 be connected to shaft 4 so as to prevent backlash, and in accordance with this

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invention there is provided a shaft joint assembly which fulfills this requirement. Shaft 4 includes a pair of axial grooves 7 and 8 on diametrically opposite sides thereof, the shaft being adapted to support a tubular sleeve 9 having a pair of axial indentations 10 and 11 on diametrically opposite sides thereof adapted to mate with grooves 7 and 8. In the illustrated embodiment of the invention sleeve 9 is an integral part of pump impeller 5, but it will be understood that the invention is not limited to such an arrangement. The inner diameter of sleeve 9 is greater than the diameter of shaft 4 and the radial distance between grooves 7 and 8 is greater than the radial distance between the inner surfaces of indentations 10 and 11 before the sleeve is assembled on the shaft, i.e., when the sleeve is not stressed. Thus when the parts are assembled as shown in Fig. 2, sleeve member 9 is elastically stressed and is supported on shaft 4 solely by engagement of indentations 10 and 11 with grooves 7 and 8 respectively. It will be observed that there is a positive clearance between the inner surface of sleeve 9 and the outer surface of shaft 4 on the curved portions of these members lying between the grooves 7 and 8. An important advantage of the present invention is that close tolerances (which are needed in conventional press fits) need not be maintained. Since sleeve 9 is in contact with shaft 4 only at peripherally spaced points and is held in place by a spring-like gripping force, the dimensions of the parts need not be precise.

As illustrated in the drawing, wash impeller 6 is supported on shaft 4 by means of a second sleeve member 12 in telescopic engagement with sleeve member 9. However, for the purposes of this specification, sleeves 9 and 12 may be considered to be a single sleeve inasmuch as they are pressed together and function as a single member in providing a resilient connection between motor shaft 4 and impellers 5 and 6. It will be evident that sleeve members 9 and 12 perform a spring-like function each time the torque, speed or direction of rotation of shaft 4 changes rapidly, so long as the impact stresses set up in sleeves 9 and 12 do not exceed the elastic limit of the material from which these parts are made. Furthermore, it will be seen that the engagement of indentations 10 and 11 with grooves 7 and 8 provides for accurate axial location of the parts since the lower ends of the indentations and grooves are in engagement when the parts are properly fitted together.

While I have shown and described a specific embodiment of my invention, I do not desire the invention to be limited to the particular construction shown and described and I intend by the appended claims to cover all modifications within the true spirit and scope of the invention.

What I claim is:

1. A rotary shaft joint assembly comprising a generally circular shaft having a plurality of axial grooves equally spaced around the surface thereof, and a generally cylindrical sleeve member having an inner diameter greater than the diameter of said shaft, said sleeve member having a plurality of axial indentations having inner surfaces adapted to mate with said grooves, the radial distance between said grooves and the axis of said shaft being greater prior to assembly than the radial distance between the inner surfaces of said indentations and said axis, whereby said sleeve member is elastically stressed when assembled on said shaft and is supported thereon solely by engagement of the inner surfaces of said indentations and said grooves.

2. A rotary shaft joint assembly comprising a generally circular shaft having a pair of axial grooves on diametrically opposite sides thereof, and a generally cylindrical sleeve member having an inner diameter greater than the diameter of said shaft, said sleeve member having a pair

of axial indentations on diametrically opposite sides thereof having inner surfaces adapted to mate with said grooves, the radial distance between said grooves being greater prior to assembly than the radial distance between the inner surfaces of said indentations, whereby said sleeve member is elastically stressed when assembled on said shaft and is supported thereon solely by engage-

ment of the inner surfaces of said indentations and said grooves.

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