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⑭ Name of Invention Double-Layer Bearings

⑵ Application number S. 56-126125 ⑹5 Publication S. 58-28016

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⑤6 Reference

S. 50-143849 (J P, A) S. 54-45440 (J P, A) 56-48277 (J P, A)

Scope of claims for labor patents

(1) A double layer bearing obtained by impregnating and coating a porous layer lined with a metal slush and its surface with a composition consisting of 0.1 ~ 50% of a Poly(tetrafluoroethylene-co-perfluoro(propyl vinyl ether)) in volume% and substantially PTFE in the remainder.

Detailed description of the invention

The present invention relates to the improvement of a multi-layer bearing.

For example, Japanese Patent Laid-Open Publication Nos. 54 to 45440 exists as a conventional multi-layer bearing. First, the conventional multi-layer bearing is described as a multi-layer bearing which is formed by impregnating and coating a porous layer lined with a metal sluice and a surface thereof with a composition consisting, by weight, of 4 fluorinated polyethylene -6 fluorinated propylene copolymer resin (hereinafter referred to as FEP) 5 ~ 40% and the remainder substantially of PTFE (60 ~ 95%).

However, the cavitation resistance (In lubricating oil, precipitation of gas or steam is generated, and this gas or steam can withstand damage such as abrasion, separation, and cracking even if the bearing surface or bearing end surface is severely impacted at a high speed.), wear resistance and friction resistance which are very important for the sliding bearing characteristics of the conventional multi-layer bearing are not always satisfactory.

It is an object of the present invention to provide cavitation resistance, wear resistance and friction resistance more than those of the conventional multi-layer bearing.

It is an object of the present invention to provide a more excellent multi-layer bearing. That is, the gist of the present invention is to provide a porous layer backed by a metal backing and a surface thereof with 4% by volume of Poly(tetrafluoroethylene-co-perfluoro(propyl vinyl ether)) (hereinafter referred to as PFA.) 0.1.

The multi-layer bearing is obtained by impregnating and coating a composition consisting of from to 50% and substantially PTFE (from 50 to 99.9%).

A feature of the present invention is that PFA is used instead of FEP in the conventional composition for impregnating and coating the multi-layer bearing *10*. In other words, the present inventors found by trial and error that PFA has better adhesion (stickiness) to PTFE, the main component, and metal backing than FEP.

Next, the reason for limiting the composition for impregnation coating in the double layer bearing of the present invention as described in the claims (Reasons for determining upper and lower limits) and the effect of its action will be explained. In the case of PFA 0.1 volume% or less, the abrasion resistance and the resistance to vibration, which is the object of the present invention, will be significantly reduced. Abbreviated amount When the ratio exceeds 50 volume %, PFA becomes the main component, and the vibration resistance and abrasion resistance are improved, but the friction coefficient and friction temperature are increased, and the bearing performance is lowered, so the ratio of 50 volume % was limited.

The following describes the embodiment.

Example

Porous bronze powder on copper plated steel backing

3

Then, after applying the impregnation coating composition shown in Table 1, the porous bronze layer was passed between the rolls to impregnate and coat the pores and the surface of the porous bronze layer with the composition, and then fired at a temperature of 327 ~ 40CTC, and then passed through the rolls to obtain the conventional product (sample No1 ~ 4) and the present invention (Sample No. 5 ~ 8) with uniform thickness.

The test conditions and the test results are shown in Tables 2 and 3, respectively, and the friction wear test conditions and the test results are shown in Tables 4 and 5, respectively.

The slush metal used in the present invention may be a metal other than steel, the slush metal may not be plated or may be plated with other metals or alloys other than copper plating, and the porous layer formed in the slush metal may be made of other metals or alloys other than copper-based alloys such as bronze.

In addition, the application of the present invention is most suitable for operating in a liquid, especially for operating under conditions where cavitation occurs. For example, it is for a shock absorber.

Next, the operation effect in the above embodiment will be described in detail.

As can be seen from Tables 3 and 5, when compared with the conventional product (Sample blood 1 to No. 4) and the present invention (Sample Nos. 5 to 8) (However, the same content should be compared with each other. That is, sample No. 2 and sample No. 6 are compared, sample blood 3 and sample No. 7 are compared, and sample No. 4 and sample No. 8 are compared.), the volume reduction of the bearing action surface due to cavitation, the amount of wear, and the coefficient of friction are improved to about 1/2 or less in the present invention. 5-No. Compared with the conventional sample No. 1 and the present invention No. 8, the cavitation resistance, the wear resistance, and the friction resistance of the present invention are greatly improved, and the present invention can achieve the desired objective.

Table 1

Product name	Sample No.	Impregnated coating composition (% by volume)		
		PTFE	PFA	FEP
Conventional Products	1	100	—	—
	2	90	—	10
	3	80	—	20
	4	60	——	40

Product Name	Sample No.	Impregnated coating composition (% by volume)		
		PTFE	PFA	FEP
Inventions	5	95	5	——
	6	90	10	—
	7	80	20	—
	8	60	40	—

Table 2

Cavitation test conditions	
Test machine for use	Special testing machine for cavitation
Tested material dimensions	Length 40 x Width 40 x Thickness 1.5 (mm)
Resonant frequency	19KHz
Out Force	600W
Test solution	Water
Temperature of the test solution	Room temperature
Clearance between horn and test material	1 *mm*
Radial amplitude of the horn diameter	45 ～50 μ
Test time	5 minutes

Table 3

Cavitation Test Results		
Product Name	Sample No.	Loss on Volume 10^{-3} cm^3'
Conventional Products	1	8.5
	2	6.3
	3	4.5
	4	3.9
Inventive product	5	3.7
	6	3.2
	7	2.8
	8	1.9

Table 4

Friction and wear test conditions	
Used testing machine	Thrust washer type friction and wear testing machine
Tested material dimensions	Length 40 x Width 40 x Thickness *1.5(mm)*
Load	100 kg/cm2
Circumferential velocity	0, 5m/sec
Test time	4 Hr
Lubricating oil	lubricating oil for shochu absorber

Table 5

Friction and wear test results			
Product name	Sample No.	Wear Amount (μ)	Coefficient of friction
Conventional Products	1	70	0.1 or more
	2	3.3	0.031
	3	1.5	0.018
	4	5.1	0.041

Friction and wear test results			
Product name	Sample No.	Wear Amount (μ)	Coefficient of friction
Inventive product	5	2.8	0.020
	6	1.8	0.015
	7	1.3	0.016
	8	2.7	0.020