

- (21) Application No. 43488/77 (22) Filed 19 Oct. 1977  
 (31) Convention Application No. 7 631 880 (32) Filed 22 Oct. 1976 in  
 (33) France (FR)  
 (44) Complete Specification published 18 Feb. 1981  
 (51) INT. CL.<sup>3</sup> F16C 23/08  
 (52) Index at acceptance  
 F2A 5C5 5C7 5CQ 7F D16  
 (72) Inventor PIERRE ANTOINE JANSSEN



## (54) SELF-ALIGNING BEARINGS

(71) We, NADELLA, of 133-137 Boulevard National, 92505 Rueil-Malmaison, France, a French Body Corporate, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to self-aligning bearings of the ball and socket type having an outer radial bearing ring with a part-spherical or part-ellipsoidal exterior surface movably mounted within a casing having a complementary internal shape.

Bearings of this type are used whenever it is necessary to obtain automatic alignment at the time of assembly.

However, known bearings of this type are not capable of compensating, during operation, for shaft flexion or other effects, such as deformations, needing self-alignment of the bearing under load. In fact the sliding friction of the bearing ring (the ball) in the casing (the socket) under load has a tendency to oppose any self-alignment made necessary by the aforementioned operating conditions with the result that the ends of the bearing members are overloaded and therefore subjected to accelerated wear shortening bearing life.

According to the present invention, in a self-aligning bearing of the ball and socket type, the outer radial bearing ring has at each end a radial end face carrying a bearing race with an axial thrust bearing mounted thereon.

In case of stress during operations under load, the invention enables the friction of the ball in the socket to be overcome by preventing overloading of the bearing member ends absorbing the radial load, by means of the movement transmitted by at least one of the thrust bearings. Whilst fulfilling this function, the thrust bearings also ensure that a bearing is constructed which is capable of transmitting axial loads.

In another embodiment of the invention, the inner radial bearing ring and the back plate of one of the thrust bearings are formed as a single piece. The back plate for

the second thrust bearing may also be made integral, such an arrangement forming a unitary bearing that is easy to handle and assemble.

The above and other features of the invention are illustrated by way of example on the accompanying drawing of an axial section of a self-aligning bearing of the ball and socket type in accordance with the invention.

As shown, the self-aligning bearing comprises an outer radial bearing ring 1 having, on its interior surface, a sunken race 3 for roller or needles 5 that are axially located between flanges 7. The exterior surface 9 of the ring is preferably part-spherical (but could be part-ellipsoidal) and is assembled so that it can move within a casing 11 having a complementary internal shape 13 (preferably part-spherical). The outer bearing ring 1 also has a pair of radial end faces 18 forming the inner races for a pair of axial thrust bearings 14 each having cylindrical bearing members 15 held and guided by cages 17.

The inner radial bearing ring 19 and the backplate 21 of one of the two thrust bearings 14 are formed as a single piece 23. The piece 23 is also provided with axial greasing holes 25 and, at its free end remote from back-plate 21, the piece is provided with a radial shoulder 29 against which the back-plate 31 of the second thrust bearing is abutted. The back-plate 31 is rendered integral with piece 23 by a clip 33 in a peripheral groove about the free end of piece 23 and co-operating with a groove in the outer end of back-plate 31.

Both back-plates could be integrally assembled with the inner radial bearing ring in this manner.

The ball and socket type self-aligned bearing of this invention is therefore formed as a unitary assembly. The casing 11 being separable from the outer bearing ring 1 in known manner upon rotation to be perpendicular to the bearing axis.

A lip face seal 37 is mounted on an annular plate 39 anchored to the back-plate 21 to bear against the end of casing 11 and

seal the thrust bearing. A similar seal may be provided at the other end to seal the other thrust bearing.

The casing 11 includes at one end a radially outwardly extending flange 42 to enable the bearing to be located and immobilised in a support (not shown). The casing could have such flanges at both ends to locate and immobilise the bearing in a two part support.

In alternative and unillustrated embodiments of the invention, the radial bearing members 5 could be held and guided in a cage having one or more rows of needles or rollers.

Also the thrust bearing cages 17 could be held against either the radial end faces 18 or the back-plates by ferrules set on the outer radial bearing ring or the back-plates in a known manner.

#### WHAT WE CLAIM IS:—

1. A self-aligning bearing having an outer radial bearing ring with a part-spherical or part-ellipsoidal exterior surface movably mounted within a casing having a complementary internal shape, the outer radial bearing ring having at each end a radial face carrying a bearing race with an axial thrust bearing mounted thereon.

2. A bearing as claimed in claim 1, in which the inner radial bearing ring and one of the thrust bearing back-plates are formed

as a single piece.

3. A bearing as claimed in claim 1 and claim 2, in which the second thrust bearing back-plate is made integral with said piece.

4. A bearing as claimed in claim 1, in which both thrust bearing back-plates are made integral with the inner radial bearing ring.

5. A bearing as claimed in any one of the previous claims, in which the casing has at least one outwardly extending radial flange.

6. A bearing as claimed in any one of the previous claims, in which at least one of the thrust bearings is sealed by a seal mounted between the back-plate and the casing.

7. A bearing as claimed in any of claims 2 to 6, in which each thrust bearing has a guide cage for the rolling bearing members, the cage being held against the outer radial bearing ring or the respective back-plate by means attached to one of these components.

8. A self-aligning bearing substantially as described with reference to or as shown by the accompanying drawing.

PHILLIPS & LEIGH,  
Chartered Patent Agents,  
7 Staple Inn,  
Holborn,  
London WC1V 7QF.  
Agents for the Applicants.

1584784

COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*

