

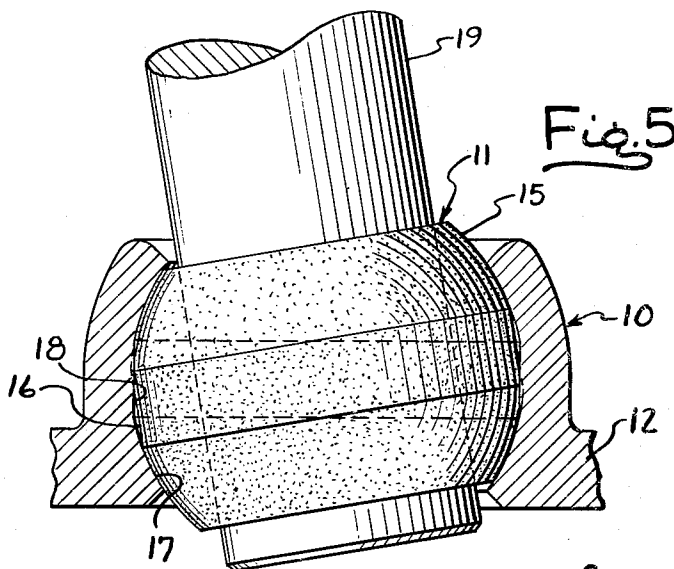
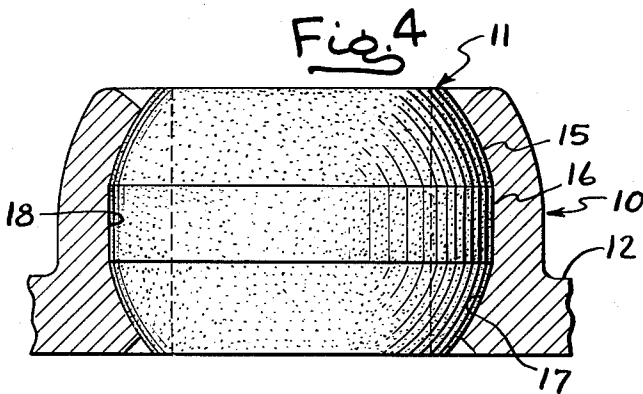
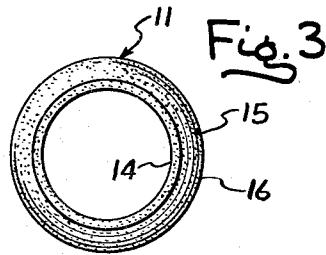
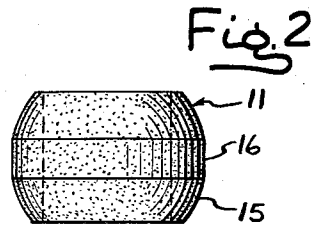
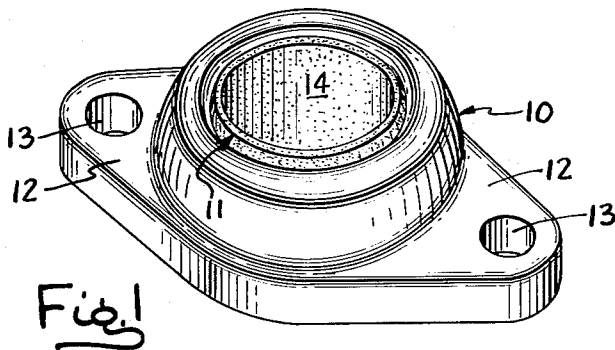
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3,205,027

PILLOW BLOCK

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3,205,027

PILLOW BLOCK

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This invention relates to the production of a novel pillow block.

More particularly the present invention relates to a new and improved self-aligning pillow block.

It is a particular object of the present invention to provide a novel one-piece pillow block wherein the bearing is non-rotatably but pivotally retained therein whereby self-aligning bearings are provided for journaling the ends of a rotatable shaft.

In general, the unit of the present invention comprises an inner bearing member of elastic material such as sintered powdered metal having a spherical outer diameter and a cylindrical inner diameter or bore. The spherical outside diameter of the bearing is substantially enclosed by a rigid one-piece metal housing cast thereabout. The spherical outer diameter of the bearing permits it to pivot within the rigid housing to allow for alignment of a shaft journaled in the bearing.

Large scale commercial production of a unit of the foregoing type has been restricted at the present time, the basic problem therein being casting of a movable spherical insert into a rigid housing and to compensate for the contraction of the housing on cooling. Without some method of compensating for this contraction, the insert is locked in place and as a result cannot be pivoted. One method for compensating for this contraction is to coat the insert with some material such as a lubricant which will be dissipated either in the casting process or afterward. The prime reason for making the latter impractical for consistent large scale commercial production is that of maintaining a uniform coating on the insert and controlling the dissipation of the coating. Another disadvantage of the aforesaid method is that when sufficient coating is obtained for subsequent pivoting of the insert, some means must be introduced to keep the insert from spinning on its axis.

The difficulties of the prior practices are overcome by the present invention which employs a pre-formed bearing composed of elastic material such as the aforesaid porous sintered powdered metal composition. Such porous sintered powdered metal material is elastic within limits and has properties of expansion and contraction and a high degree of elasticity, which properties are taken advantage of in the present invention.

Other objects and advantages of the present invention together with its details of construction, arrangement of parts and economies thereof will be apparent from a consideration of the following specification and accompanying drawings, wherein:

FIG. 1 is a perspective view of a unitary pillow block formed in accordance with the present invention, and wherein a bearing of the character aforesaid is pivotally disposed and retained within a one-piece metal housing cast thereabout, the housing being of the two-bolt flange mounting type.

FIG. 2 is a side elevational view of a bearing employing the present invention.

FIG. 3 is an end elevational view thereof.

FIG. 4 is an enlarged transverse fragmentary sectional view of the assembly of FIG. 1.

FIG. 5 is a similar view illustrating the method and means of causing the bearing to be pivotally disposed within the housing component of the self-aligning pillow block of the present invention.

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Referring to the drawings, the reference numeral 10 generally indicates a one-piece metal housing, for example, aluminum, cast about the bearing generally indicated as 11. The housing is formed with a pair of flanges 12, 12 each having a hole 13 for reception of a mounting bolt. It will, of course, be understood that the illustrated pillow block unit is for the purpose of illustration and not limitation. Thus, for example, the housing may have a three-bolt flange mounting and in lieu of the axis of the bearing 11 being parallel to the axes of the bolt holes 13, 13, it will be understood that the unit may be in the form of the standard mounting wherein the axes of the bolt holes 13, 13 are perpendicular to the axis of the bearing 11. Of course, the flanges 12, 12 are then at an angle of 90° to that shown in the illustration of FIG. 1. Alternatively the housing may be formed without attachment flanges so that the outer surface of the portion which embraces bearing 11 is cylindrical and is later pressed into a cylindrical holder by the user.

The bearing 11, as employed in the present invention, is pre-formed of conventional powdered metals, typical compositions of which are 90% copper and 10% tin; 77.5% copper, 7.5% tin and 15% lead; 25% copper and 75% iron; 20% copper, 79.5% iron, and 0.5% carbon, and the like. A further alternative can be straight iron. These compositions are given for the purpose of illustration and not limitation. The bearings are composed of compressed powders which are sintered in conventional manner to result in compositions having a resilient sponge-like character. These are conventionally employed for self-lubricating bearings in that they are porous and can contain approximately 25% of lubricating oil by volume stored in the tiny interconnected pores of the pre-formed bearing, this type being known as "Oilite" bearings.

As shown in for example FIG. 2, the bearing 11 is formed initially with a cylindrical bore 14 and a spherical outer surface 15.

The spherical outer surface 15 of the bearing is, however, further formed with or medially interrupted by a flat annular surface area component 16. In casting the housing 10 about the bearing 11 in a suitable mold or die, not shown, the bearing 11 is first seated on a core pin and then the one-piece housing 10 is cast thereabout. As a result, the housing 10 is formed with a mating spherical surface bore 17, the medial portion of which is likewise formed with a flat area or band 18 corresponding to the flat area 16 on bearing 11. Desirably also for facility in subsequent pivoting, as will be explained, the diameter of the spherical seat 16 of the housing 10 is less than that of the spherical segment surface 15 of the bearing 11.

The housing metal as it cools, shrinks tightly around the bearing 11. It will be understood that no coating has been employed between the outer surface of the bearing 11 and the cast face of the housing bore. The bearing 11 as employed in the practice of the present invention is initially dry during casting, and subsequently impregnated with oil. Thus, when the assembly as shown in FIG. 4 is removed from the die, the housing 10 snugly embraces the bearing 11.

In order to result in the bearing 11 being pivotally disposed in the housing 10, in accordance with the practice of the present invention, I insert an arbor 19 within the bore 14 of the bearing 11 and cause relative movement of the two so as to forcibly pivot the bearing 11 through an arc as illustrated in FIG. 5. As the bearing 11 is forced to pivot within the housing 10, the flat surface 18 of the housing 10, being of smaller diameter than the spherical diameter of the bearing 11 at the surfaces 15 thereof, causes compression and peening of the resilient and compressible bearing 11, particularly at the conjugation of

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the spherical and flat surface components thereof, to cause permanent deformation thereat since the bearing 11 has a lower compressive strength than the housing 10. This results in an adequate freeing or separation of the two so that the bearing 11 is pivotally retained within the housing 10. However, this degree of separation is very small. Separation occurs in the area of interference, about 60% of the center section of the bearing. The remaining 20% at each end supplies sufficient friction to resist spinning of the insert on its axis.

Thus, the device of the present invention provides a self-aligning bearing surface with a simple means by fastening the bearing to a suitable support and eliminates the need for costly alignment since the unique construction and arrangement of the parts automatically provides for self-alignment and the assembly relieves undue stress of the engaged rotating shaft in the bearing through application of a ball-joint-like unit.

Although I have shown and described the preferred embodiment of my self-aligning pillow block and preferred method and means for forming the same, it will be understood by those skilled in the art that various changes may be made in the details thereof without departing from the spirit and scope of my invention as comprehended by the following claims.

I claim:

1. A pillow block comprising a one-piece rigid housing formed with a spherical bore medially interrupted by a flat annular surface area component, and a bearing composed of elastic material and formed with a cylindrical axial bore and having a substantially spherical outer surface snugly and pivotally disposed in and embraced by the defines of said substantially spherical bore.

2. A pillow block comprising a one-piece rigid housing formed with a spherical bore medially interrupted by

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a flat annular surface area component, and a bearing composed of elastic sintered powdered metal material and formed with a cylindrical axial bore and having a compressed spherical outer surface conforming substantially to that of said first bore and snugly and pivotally disposed in and embraced by the defines of said first bore.

3. A self-aligning pillow block comprising a one-piece rigid cast metal bearing block formed with a substantially spherical bore medially interrupted by a flat annular surface area component, and a bearing composed of porous sintered powdered metal formed with a cylindrical axial bore and having a compressed spherical outer surface conforming substantially to that of said first bore and of greater segment than that of said spherical bore snugly and pivotally disposed in and embraced by the defines of said spherical bore, said bearing being frictionally retained against spinning on its axis within said housing.

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