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(54) **Universal joints**

(57) A universal joint comprises a ring 3 interposed between a central spherical member 8 carried by a first shaft and the internal surface of a cylindrical member 4 carried by a second shaft. The spherical member 8 carries a transverse rod 2 with projecting ends pivotally received in bores 12 in the ring. The cylindrical member 4 carries rods 5 pivotally received in bores 13 in the ring.

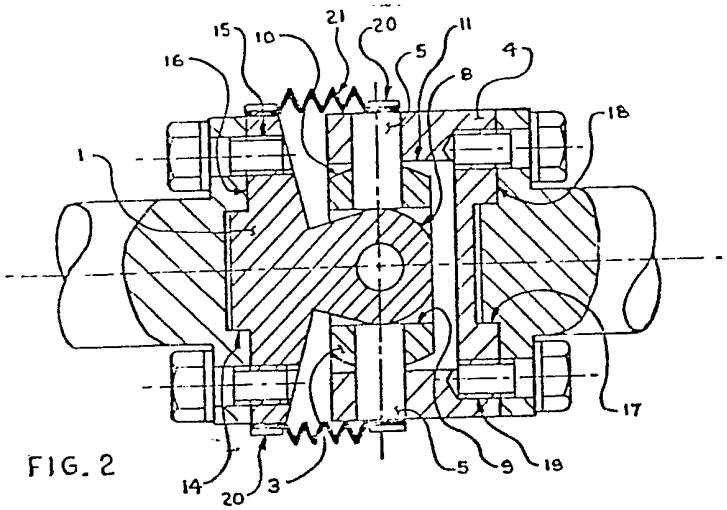

FIG. 2

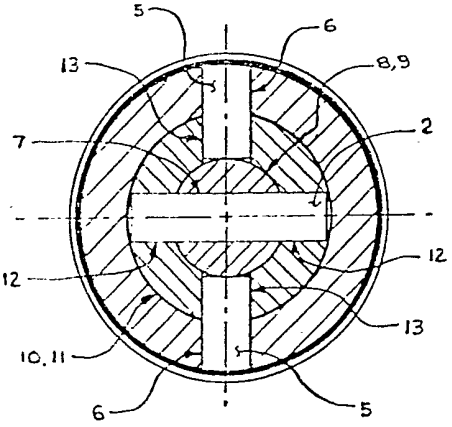

FIG. 4

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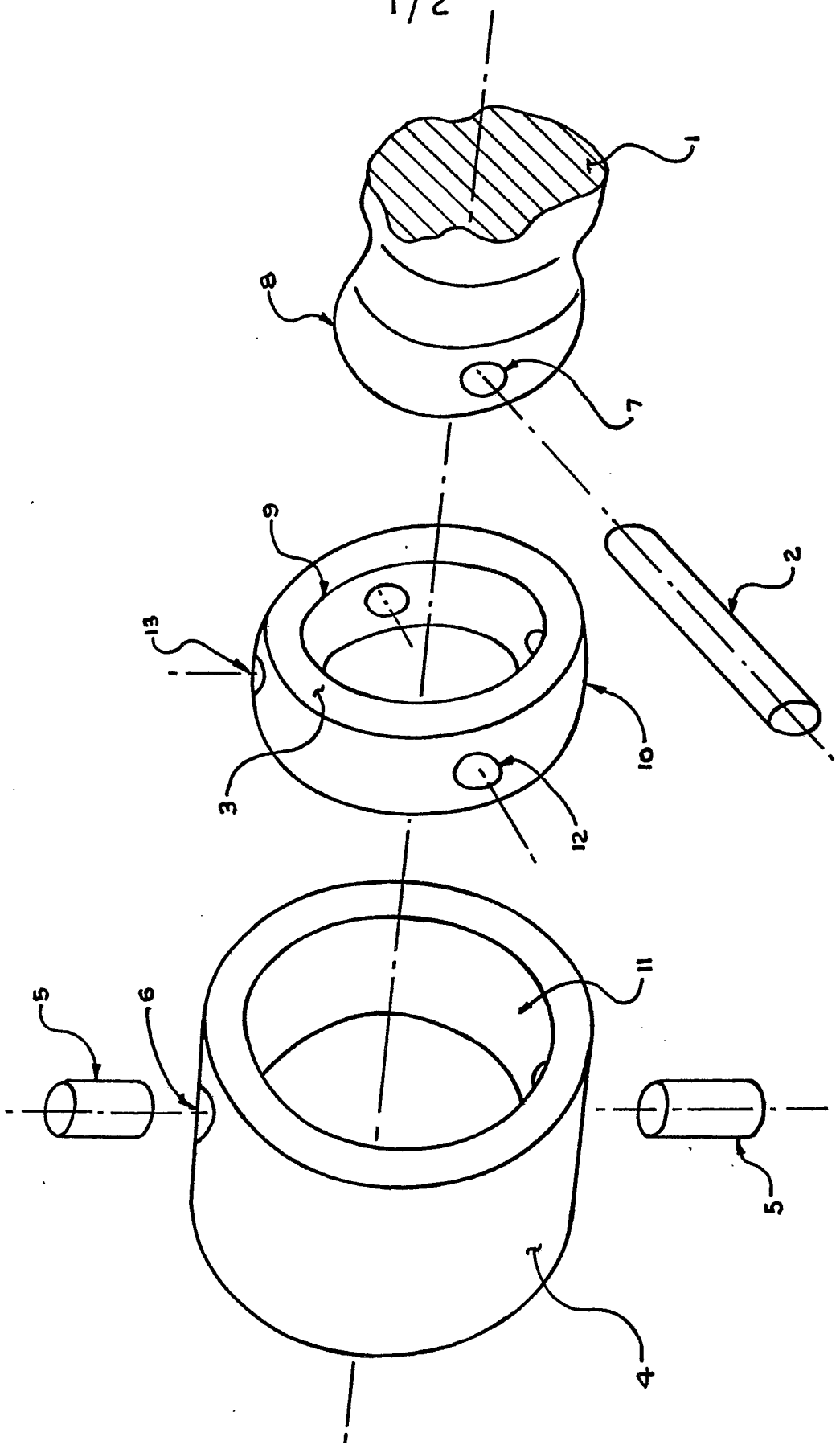

FIG. 1

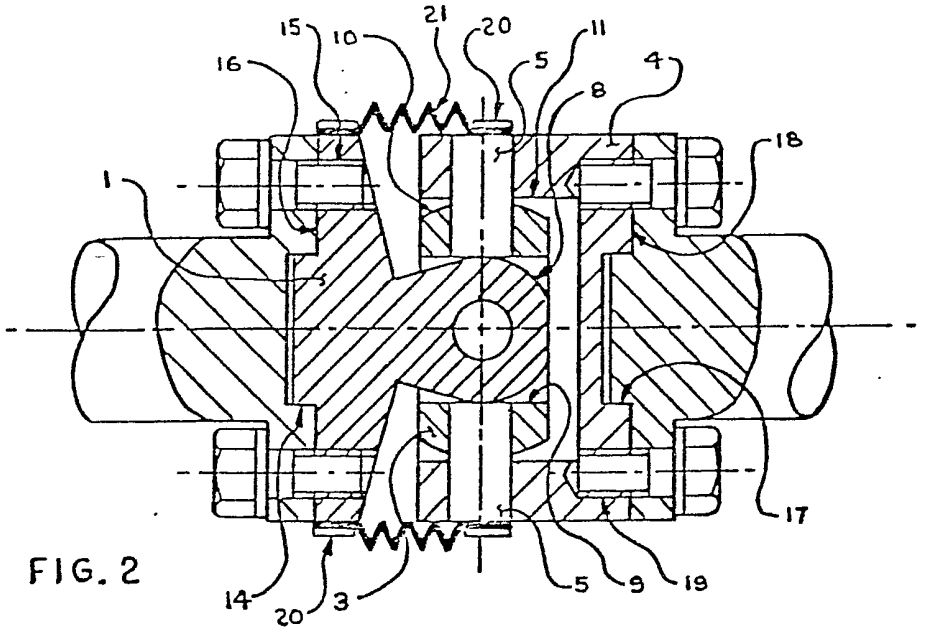

FIG. 2

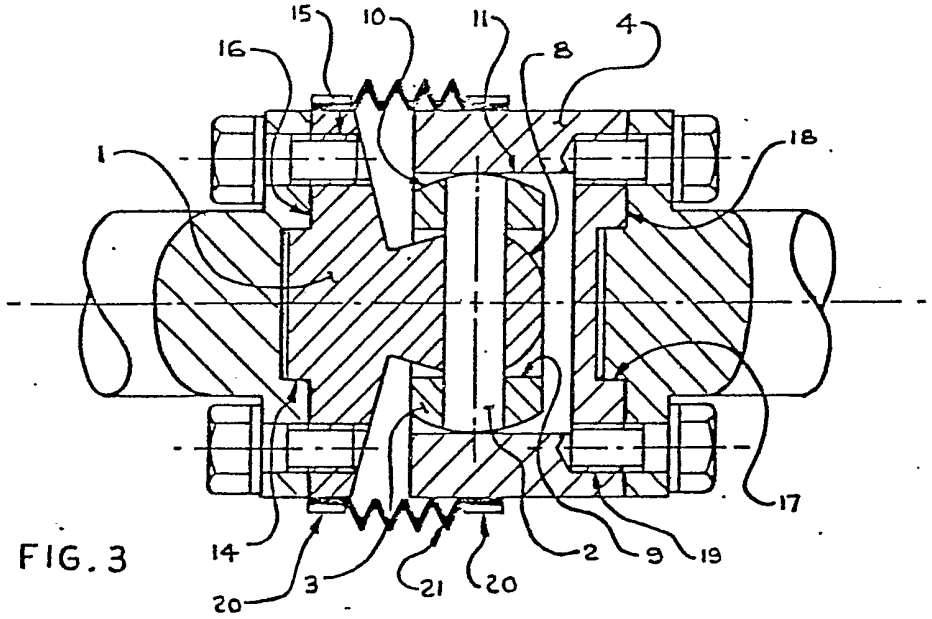

FIG. 3

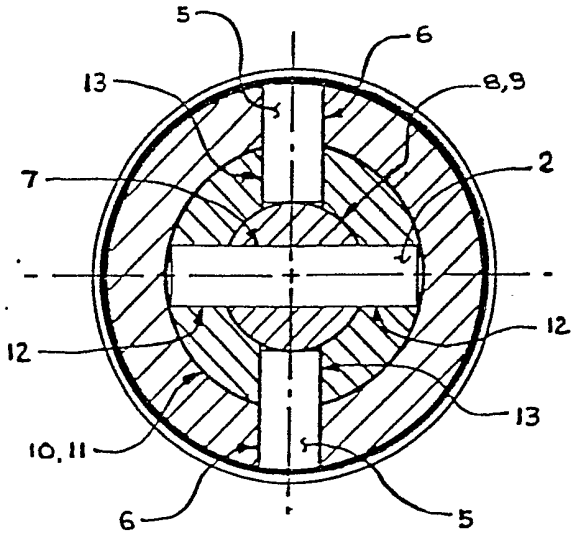

FIG. 4

SPECIFICATION

Angular displacement coupling improvements relating to universal joints

An in depth description of the coupling's features and working principles is on the basis of two shafts rotating at the same speed and in the same direction joined together by the invention and driving against a resistive torque.

The text of this description should be read with reference to the accompanying drawings denoted Sheets 1 and 2, Figures 1, 2, 3 and 4.

Figure 1 is an exploded view of the main functional parts of the coupling.

Figure 2 is a section along the rotational axis of the coupling with the plane through the centre of the outer pivot pin.

Figure 3 is a section along the rotational axis of the coupling with the plane through the centre of the inner pivot pin.

Figure 4 is a transverse section of the coupling with the plane through the centres of both sets of pivot pins.

At the end of one shaft is secured one member (1), of a steel coupling which abuts to that shaft at juncture (16) and is located within that shaft by a raised circular register (14) engaging within a recessed circular register formed in that shaft. These members being maintained in close contact by threaded fasteners passing through said members into threaded holes (15) and in so doing drawing them together. The other end of member (1) is reduced in section and takes the form of a partial sphere (8) thriugh which is formed a circular hole (7) whose centre is at right angles to the central axis of the sphere (8) and is coincident with the true centre of the sphere. Into the hole (7) is fitted a cylindrical rod (2) whose diameter is such that it makes an interference fit within the hole. The rod ends protrude an equal distance beyond the surface of the sphere (8) at both sides. Both the sphere (8) and the rod (2) are caused to be harder than normal for that material by a process of infusion of nitrates into their surfaces during manufacture. The spherical member (8) is positioned within the close fitting inner confines of a ring (3) whose outer surface (10) is contoured into a spherical form, with the inner surface (9) taking the form of a cylinder whose axis passes through the centre of the spherical surface (10). The ends of the rod (2) in the spherical member (8) pass into close fitting circular holes (12) formed radially in the ring member (3) such to maintain the spherical surface (10) and the spherical surface (8) in a position of close concentricity. The assembly of members (1), (2) and (3) are contained within the cylindrical surface (11) of a steel cylindrical tube (4) such that the spherical surface (10) forms a close fitting liason with the cylindrical surface (11). Passing through the wall of the tubular member (4) are two round holes (6) which align with two more holes (13) formed through the wall of the ring (3). These four holes are in linear alignment, with their axes passing through the theoretical centre of the spherical members (8) and (10) and being geometrically square to the axes of the rod (2) and the cylindrical surface (11). Fitted into these holes, one from either side, are two short rods (5), whose diameters are such that they make an interface fit with the holes (6) and a close running fit with the holes (13). The length of these rods is such that they extend through the inner surface of the cylindrical tube (4) to finnish just short of the spherical surface (8).

Both the surfaces of rods (5) and the cylindrical surface (11) are caused to become hardened by the infusion of nitrates during the course of their manufacture. Crucial to the successful operation of this invention is that the material from which the ring (3) is constructed, is of Austenitic Stainless Iron which in contact with the hard surfaces of rods (5) and (2) and cylindrical surface (11) and spherical surface (8) make bearing pairs capable of withstanding high bearing pressures and having a long service life.

The end of the cylindrical tube member (4) which abuts to the other shaft being coupled, is formed into a recessed circular register (17) which when coupled with a raised register of similar dimensions on the shaft, will maintain the shaft and cylindrical member in close concentricity.

Passing through the end face (18) and a similar flat mating surface on the shaft will be threaded fasteners, into threaded holes (19) to maintain these surfaces in close contact.

Passing over and secured to the major diameters of both coupling members (4) and (8), by rings (20) is a convoluted tubular gaiter (21) constructed from synthetic rubber or plastic material; the purpose of which is to retain a quantity of lubricant within the working confines of the coupling assembly. The retaining rings (20) having a further purpose of reinforceing retention of the short rods (5).

CLAIMS

1. A power transmission coupling for transmitting rotational power between two shafts, subject to angular misalignment, through a part spherical member and into a cylindrical member having a part spherical exterior, by way of a driving rod on which the said cylindrical member is free to partially rotate within a straight sided cylinder, whereupon the said rotational power is transmitted between these two members through two rods set at right angles to the aforementioned rod, the spherical cylinder being free to partially rotate within the straight sided cylinder in a direction at right angles to the aforementioned partial rotation.

2. A coupling as described in claim 1 in which the rods are able to rotate in rolling bearing set within the spherical cylinder or in that the spherical cylinder is produced in another material other than that portion encompassing the rods.

3. A coupling as described in claim 1 in which the spherical member of the first part and the straight sided cylinder are free to partially rotate

on the rods, the rods being captive in the spherical cylinder.

4. A pair of couplings as described in claims 1, 2 and 3 manufactured with adjoining central spherical members giving constant velocity characteristics to the unit.

5. A pair of couplings as described in claims 1, 2 or 3 manufactured with adjoining outer cylindrical members giving constant velocity characteristics to the unit.

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