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(11) **EP 0 769 449 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
16.01.2002 Bulletin 2002/03

(51) Int Cl.7: **B63H 25/08**

(21) Application number: **96116516.4**

(22) Date of filing: **15.10.1996**

(54) **A tiller connection**

Verbindung für Steuerausleger

Articulation pour barre de bateau

(84) Designated Contracting States:
DE FR GB

(30) Priority: **20.10.1995 GB 9521557**
07.02.1996 GB 9602501

(43) Date of publication of application:
23.04.1997 Bulletin 1997/17

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Description

[0001] THE PRESENT INVENTION relates to a tiller connection and more particularly relates to a tiller connection for use in connecting an extension arm to the main part of a tiller in a yacht or dinghy.

[0002] A tiller in a yacht or dinghy is connected to the rudder used to steer the vessel. It has been proposed previously to provide an extension arm which is connected to the tiller, permitting the yachtsman to control the yacht or dinghy from a position which is, relatively, a long way from the tiller.

[0003] Various tiller connections have been proposed previously to connect an extension arm to a tiller but all have suffered from one or more disadvantages.

[0004] Some of the prior proposed tiller connections have comprised universal joints. See, for example, US-A-4,228,756 which shows an arrangement in which one component defines a recess, which recess is a substantially spherical ball. Here a difficulty has arisen in that if the tiller extension arm is released, it can drop to a position where subsequently the yachtsman cannot regain access to the tiller extension. A further problem has arisen in that the materials utilised for the connection have been inappropriate and either have worn out relatively rapidly, or have, when partially worn, exhibited very high friction, or have resulted in a loose or "sloppy" connection.

[0005] There is a need for a tiller connection which provides a substantially universal action, to enable the position of the tiller extension to be readily adjusted relative to the position of the tiller, but which provides a secure connection between the tiller extension and the tiller. Furthermore there is a requirement for a tiller connection where, if the tiller extension is released, it does not fall to a position in which it is inaccessible. The present invention seeks to provide a tiller connection of this type.

[0006] According to this invention there is provided a tiller connection to connect a tiller extension arm to a tiller, the tiller connection comprising a support component to be connected to the tiller, a ball with means to connect the ball to the support component and means to engage the ball and to be connected to the tiller extension arm, wherein the means to engage the ball comprise a claw having two components to engage the ball to exert a substantial frictional force on the ball, the support component incorporating a ring element located above a base of the support component, the ring element being co-axial with the connection between the ball and the support component and defining a support surface adapted to engage the claw, or the tiller arm to prevent the tiller arm from moving beneath a predetermined limiting position, the ball and the claw forming components being made of a self-lubricating plastics material.

[0007] Conveniently the two claw-forming components are secured together by a bolt.

[0008] In one embodiment the ring element lies in a single plane. In another embodiment the ring element has a portion in a plane and a further region off-set from the plane.

5 **[0009]** Conveniently the ring element is carried by the base of the support component, the base of support component defining a hollow spigot adapted to receive a pin carried by the ball to connect the ball to the support component.

10 **[0010]** In one embodiment the ball has a pin to be received in the hollow spigot, the pin carrying retractable protruding elements that engage the spigot to retain the ball whilst permitting rotation of the ball, and which can be retracted to permit the ball to be separated from the support component.

15 **[0011]** Preferably the plastic materials utilised to form the ball and the claw contains between 10 and 20% PTFE, conveniently substantially 15% PTFE.

20 **[0012]** Preferably the plastics material utilised to form the ball and the claw is fibre reinforced, advantageously is carbon fibre reinforced. Conveniently the proportion of carbon fibre in the plastic comprises between 20 and 40% by weight, preferable substantially 30% by weight.

25 **[0013]** A major component of the plastics used to form the ball and the claw may comprise nylon 66.

[0014] The claw may comprise two substantially identical components which are interconnected to define the claw.

30 **[0015]** In order that the invention may be more readily understood, and so that further features thereof may be appreciated, the invention will now be described, by way of example, with reference to the accompanying drawings in which

35 FIGURE 1 is a perspective partially exploded view of a tiller connection in accordance with the invention,

40 FIGURE 2 is a sectional view illustrating the support component of the connection,

FIGURE 3 is a perspective view illustrating the ball and connecting pin of the connection,

45 FIGURE 4 is a perspective view illustrating the claw of the connection,

50 FIGURE 5 is a perspective partially exploded view, corresponding to Figure 1, showing a modified embodiment of the invention, and

FIGURE 6 is a sectional view illustrating the support component of Figure 5.

55 **[0016]** Referring initially to Figure 1 of the accompanying drawings a tiller connection in accordance with invention comprises three elements namely a support component 1, a ball 2 and a claw 3.

[0017] As can be seen in Figure 1 and in Figure 2 the support component 1 comprises a substantially planar base 4 provided with two screw holes to enable the base to be secured to a tiller. Depending beneath the base is a hollow tubular spigot 5, which incorporates a metal tube 6.

[0018] Upstanding at either end of the base are two arcuate walls 7, and extending from opposed sides of the base are upwardly inclined support arms 8. The arcuate walls and the support arms together support an annulus or ring element 9.

[0019] The upper part of the annulus 9 is provided with a groove 10 which receives a rubber ring 11. The rubber ring defines an upper surface which performs a support function as will become clear hereinafter. The ring 11 is co-axial with the hollow spigot 5.

[0020] The main part of the support component 1 may be made of any appropriate plastic material.

[0021] The ball 2, as can be seen in Figure 1 and in Figure 3, comprises a substantially spherical outer surface 20, and has depending from it a cylindrical spigot 21. Projecting axially from the spigot 21 is a stainless steel pin 22. The pin 22 is hollow, and has two ball bearings, only one of which, 23, is visible in figure 3, projecting from the lower part of the pin 22, through apertures formed in the pin at diametrically opposed positions.

[0022] The upper part of the ball 2 is hollowed out, and the upper most part of the ball 2 is open 24. Within the upper open part 24 of the ball 2 is an actuating button 25. The actuating button 25 can be depressed, causing an element (not shown) which extends down the hollow pin 22 to move axially. The element within the pin has cam faces that act on the ball bearings. As the element within the hollow pin moves axially as a consequence of movement of the actuating button, the two opposed ball bearings 23 may retract within the pin 22.

[0023] It is to be appreciated that the pin 22 is dimensioned to be snugly received within the hollow interior of the spigot 5 of the support component 1. With the button 25 depressed, the balls 23 are retracted within the pin 22 enabling the pin to be inserted into the hollow spigot 5. When the button 25 is released, the balls 23 are moved outwardly, thus preventing the ball 2 from being separated from the support component 1.

[0024] With the button 25 depressed the ball may be connected to, or released from, the support component 1. When connected to the support component 1 the ball 2 may freely rotate, the ball bearings 23 projecting from the pin 22 at a position beneath the lower end of the spigots, thus preventing the ball 2 from moving upwardly.

[0025] The claw 3, as can be seen from Figures 1 and 4 comprises two mirror-image claw-forming components 30, 31 which are secured together by means of a bolt 32 which passes through co-aligned apertures formed in the two claw-forming components. The claw-forming components 30, 31 define two arcuate arms which have opposed part spherical inner faces 34,

which, as can be seen from Figure 1, engage the outer surface 20 of the ball 2. The arrangement is such that the claw exerts a substantial frictional force against the ball but, nevertheless, the claw can be moved relative to the ball if sufficient force is applied.

[0026] The claw 30 is rotationally mounted at end of a tiller extension arm 40, as can be seen in Figure 4.

[0027] It is to be appreciated that when the claw 3 has been connected to the ball 2, as shown in figure 1, the combination of the claw 3 and the ball 2 may be connected to the support component 1 by introducing the pin 22 into the hollow interior of the spigot 5. The ball may then freely rotate relative to the support component 1. The angle of inclination of the tiller extension arm 40 may be readily adjusted simply by moving the free end of the tiller extension arm up and down. The claw will move frictionally relative to the ball to permit this adjustment.

[0028] Should the tiller arm be released the weight of the tiller arm may overcome the frictional force between the claw and the ball, and the tiller arm may thus tend to fall downwardly. If the tiller arm does fall downwardly part of the claw will engage the rubber ring 11 carried on the support element, thus preventing the tiller arm from moving downwardly beyond a predetermined limit. Consequently it is to be understood that the support element provides a support surface (defined by the upper part of the ring 12) which engages the claw associated with the tiller extension arm, to prevent the tiller extension arm from moving downwardly beyond a predetermined limiting position. In the described embodiment, if the base 4 is on a horizontal support, the limiting position is substantially horizontal regardless of the orientation of the tiller arm. In an alternative embodiment the ring 11 may be of a greater diameter, with the support surface then engaging the tiller extension arm rather than engaging the claw.

[0029] In the embodiment described above, both the ball 20 and the claw-forming components 30 and 31 are made of a plastics material which is selected to have certain desirable properties. The plastic material is selected to be a self-lubricating material. In order to have self-lubricating properties the plastic preferably contains between 10 and 20% (and most preferably substantially 15%) PTFE (Poly- Tetra-Fluoro-Ethylene). The plastic material is preferably also fibre reinforced to have high strength. Whilst glass fibre reinforcement may be utilised, carbon fibre reinforcement is preferred. The carbon fibre reinforcement may comprise between 20 and 40% of the total weight of the plastic, but preferably comprises substantially 30% of the weight of the plastic. The rest of the plastic may be any appropriate plastic material, but it has been found advantageous to use a nylon material, in particular nylon 66.

[0030] Such a plastic material is strong and durable and provides the desirable self-lubrication properties.

[0031] Figures 5 and 6 illustrate a modified embodiment of the invention. Whilst the embodiment of Figures

1 to 4 is quite satisfactory when used with a straight conventional tiller, since the limiting position for the tiller extension arm is horizontal, regardless of the orientation of the tiller, it has been found that a modified embodiment is appropriate for use on a cranked or swan neck tiller.

[0032] In the modified embodiment shown in Figures 5 and 6, where the same references have been used for parts which are identical with corresponding parts of the embodiment of Figures 1 to 4, it is to be seen that the upper part of the annulus 9 which is provided with the groove 10 to receive the rubber ring 11 no longer lies completely in a single plane.

[0033] In the modified embodiment there is only one arcuate wall 7 supporting the annulus 9. In the region 12, diametrically opposed to the arcuate wall 7, the annulus 9 is connected directly to the base 4, and thus in that region the upper surface of the annulus is at a lower level than in the region 13 supported by the arcuate wall 7 and the support arms 8. In other words, in the region 12, the upper surface of the annulus dips. Thus, the annulus or ring element has a portion 13 in a plane and a further region, namely the region 12 off-set from the plane.

[0034] The support surface engages the claw or the tiller arm to prevent the tiller arm moving beneath a predetermined limiting position. The limiting position is not the same for each orientation of the tiller. If the tiller is aligned with the region 12 of the annulus, the predetermined limiting position is lower than if the tiller is in a different orientation.

Claims

1. A tiller connection to connect a tiller extension arm (40) to a tiller, the tiller connection comprising a support component (1) to be connected to the tiller, a ball (2) with means (22, 23) to connect the ball to the support component and means (30, 31) to engage the ball and to be connected to the tiller extension arm (40), **characterised in that** the means to engage the ball comprise a claw having two components (30, 31) to engage the ball to exert a substantial frictional force on the ball, the support component (1) incorporating a ring element (9) located above a base (4) of the support component (1), the ring element (9) being co-axial with the connection between the ball (2) and the support component (1) and defining a support surface adapted to engage the claw (30), or the tiller arm (40) to prevent the tiller arm (40) from moving beneath a predetermined limiting position, the ball (2) and the claw forming components (30, 31) being made of a self-lubricating plastics material.
2. A tiller connection according to Claim 1 wherein the two-claw forming components (30, 31) are secured

together by a bolt (32).

3. A tiller connection according to Claim 1 or 2, wherein the ring element (9) is carried by the base (4) of the support component, the base (4) of the support component defining a hollow spigot (5) adapted to receive a pin (22) carried by the ball (2) to connect the ball to the support component.
4. A tiller connection according to Claim 3 wherein the ball has a pin (22) to be received in the hollow spigot, the pin carrying retractable protruding elements (23) that engage the spigot (5) to retain the ball (2) whilst permitting rotation of the ball, and which can be retracted to permit the ball to be separated from the support component (1).
5. A tiller connection according to any one of the preceding Claims wherein the plastic materials utilised to form the ball (2) and the claw (30, 31) contains between 10 and 20% PTFE.
6. A tiller connection according to any one of the preceding Claims wherein the plastics material utilised to form the ball (2) and the claw (30, 31) is fibre reinforced.
7. A tiller connection according to Claim 6 wherein the plastics material used to form the ball (2) and the claw (30, 31) is carbon fibre reinforced.
8. A tiller connection according to Claim 7 herein the proportion of carbon fibre in the plastic comprises between 20 and 40% by weight.
9. A tiller connection according to any one of the preceding Claims wherein a major component of the plastics used to form the ball and the claw comprises nylon 66.
10. A tiller connection according to any one of the preceding Claims wherein the claw comprises two substantially identical components (30, 31) which are interconnected to define the claw.

Patentansprüche

1. Verbindung für Steuerausleger zum Verbinden eines Steuerauslegerarms (40) mit einem Steuer, wobei die Verbindung für Steuerausleger eine mit dem Steuer zu verbindende Haltekomponente (1), eine Kugel (2) mit Mitteln (22, 23) zum Verbinden der Kugel mit der Haltekomponente und Mittel (30, 31), um die Kugel zu erfassen und mit dem Steuerauslegerarm (40) verbunden zu werden, umfaßt, **dadurch gekennzeichnet, daß** die Mittel zum Erfassen der Kugel eine Klaue mit zwei Komponenten (30, 31)

- zum Ergreifen der Kugel umfassen, um eine im wesentlichen Reibungskraft auf die Kugel auszuüben, wobei die Haltekomponente (1) ein über einer Basis (4) der Haltekomponente (1) angeordnetes Ringelement (9) einschließt, das Ringelement (9) koaxial mit der Verbindung zwischen der Kugel (2) und der Haltekomponente (1) ist und eine Haltefläche definiert, die gestaltet ist, um die Klaue (30) oder den Steuerauslegerarm (40) zu erfassen und den Steuerauslegerarm (40) am Bewegen unter eine vorab festgelegte Grenzposition zu hindern, wobei die Kugel (2) und die eine Klaue bildenden Komponenten (30, 31) aus einem selbstschmierenden Kunststoffmaterial hergestellt sind.
2. Verbindung für Steuerausleger nach Anspruch 1, **dadurch gekennzeichnet, daß** die zwei klauenbildenden Komponenten (30, 31) durch einen Bolzen (32) gemeinsam gesichert sind.
3. Verbindung für Steuerausleger nach Anspruch 1 oder 2, **dadurch gekennzeichnet, daß** das Ringelement (9) von der Basis (4) der Haltekomponente getragen wird, wobei die Basis (4) der Haltekomponente einen hohlen Zapfen (5) definiert, der gestaltet ist, um einen von der Kugel (2) getragenen Stift (22) aufzunehmen und die Kugel mit der Haltekomponente zu verbinden.
4. Verbindung für Steuerausleger nach Anspruch 3, **dadurch gekennzeichnet, daß** die Kugel einen in dem hohlen Zapfen aufzunehmenden Stift (22) aufweist, wobei der Stift einziehbares vorragende Element (23) trägt, die den Zapfen (5) erfassen, um die Kugel (2) zu halten, während sie eine Drehung der Kugel erlauben, und die zurückgezogen werden können, um die Kugel von der Haltekomponente (1) zu trennen.
5. Verbindung für Steuerausleger nach irgendeinem der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** das zum Bilden der Kugel (2) und der Klaue (30, 31) verwendete Kunststoffmaterial zwischen 10 und 20 % PTFE enthält.
6. Verbindung für Steuerausleger nach irgendeinem der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** das zum Bilden der Kugel (2) und der Klaue (30, 31) verwendete Kunststoffmaterial faserverstärkt ist.
7. Verbindung für Steuerausleger nach Anspruch 6, **dadurch gekennzeichnet, daß** das zum Bilden der Kugel (2) und der Klaue (30, 31) verwendete Kunststoffmaterial kohlefaserverstärkt ist.
8. Verbindung für Steuerausleger nach Anspruch 7, **dadurch gekennzeichnet, daß** der Anteil von Koh-

lefaser im Kunststoff zwischen 20 und 40 Gew.% umfaßt.

9. Verbindung für Steuerausleger nach irgendeinem der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** eine Hauptkomponente des zum Bilden der Kugel und der Klaue verwendeten Kunststoffes Nylon 66 umfaßt.
10. Verbindung für Steuerausleger nach irgendeinem der vorangehenden Ansprüche, **dadurch gekennzeichnet, daß** die Klaue zwei im wesentlichen identische Komponenten (30, 31) umfaßt, die miteinander verbunden sind, um die Klaue zu definieren.

Revendications

1. Une liaison de barre de gouvernail, pour relier un bras extension de barre de gouvernail (40) à une barre de gouvernail, la liaison de barre de gouvernail comprenant un composant support (1), à relier à la barre de gouvernail, et des moyens (30, 31) pour mettre en prise la boule et pour être reliés au bras d'extension de barre de gouvernail (40), **caractérisée en ce que** les moyens prévus pour être mise en prise avec la boule comprennent une griffe ayant deux composants (30, 31) devant venir en prise avec la boule afin d'exercer une force de fiction notable sur la boule, le composant support (1) incorporant un élément annulaire (9) placé au-dessus de la base (4) du composant support (1), l'élément annulaire (9) étant coaxial avec la connexion entre la boule (2) et le composant support (1) et définissant une surface support adaptée pour venir en prise avec la griffe (30), ou le bras de barre de gouvernail (40), afin d'empêcher que le bras de barre de gouvernail (40) se déplace au-dessous d'une position limite prédéterminée, la boule (2) et les composants formant griffe (30, 31) étant réalisés en matière plastique autolubrifiante.
2. Une liaison de barre de gouvernail selon la revendication 1, **caractérisée en ce que** les composants formant deux-griffes (30, 31) sont fixés ensemble par un boulon (32).
3. Une liaison de barre de gouvernail selon la revendication 1 ou 2, dans laquelle l'élément annulaire (9) est portée par la base (4) du composant support, la base (4) du composant support définissant un tourillon (5) creux, adapté pour recevoir un téton (22) porté par la boule (2), pour assurer la liaison de la boule au composant support.
4. Une liaison de barre de gouvernail selon la revendication 3, dans laquelle la boule comporte un téton (22) à loger dans le tourillon creux, le téton portant

des éléments (23) en saillie, rétractables, devant venir en prise avec le tourillon (5) pour retenir la boule (2) tout en permettant la rotation de la boule, et pouvant être rétracté pour permettre à la boule d'être séparée du composant support (1).

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5. Une liaison de barre de gouvernail selon l'une quelconque des revendications précédentes, dans laquelle les matières plastiques utilisées pour former la boule (2) et la griffe (30, 31) contiennent entre 10 et 20 % de PTFE. 10
6. Une liaison de barre de gouvernail selon l'une quelconque des revendications précédentes, dans laquelle les matières plastiques utilisées pour former la boule (2) et la griffe (30, 31) sont renforcées par des fibres. 15
7. Une liaison de barre de gouvernail selon la revendication 6, dans laquelle les matières plastiques utilisées pour former la boule (2) et la griffe (30, 31) sont renforcées par des fibres de carbone. 20
8. Une liaison de barre de gouvernail selon la revendication 7, dans laquelle la proportion de fibres de carbone dans la matière plastique est comprise entre 20 et 40 % en poids. 25
9. Une liaison de barre de gouvernail selon l'une quelconque des revendications précédentes, dans laquelle le composant principal des matières plastique utilisées pour former la boule et la griffe comprend du nylon 66. 30
10. Une liaison de barre de gouvernail l'une quelconque des revendications précédentes, dans laquelle la griffe est constituée de deux composants (30, 31) sensiblement identiques, interconnectés pour définir la griffe. 35

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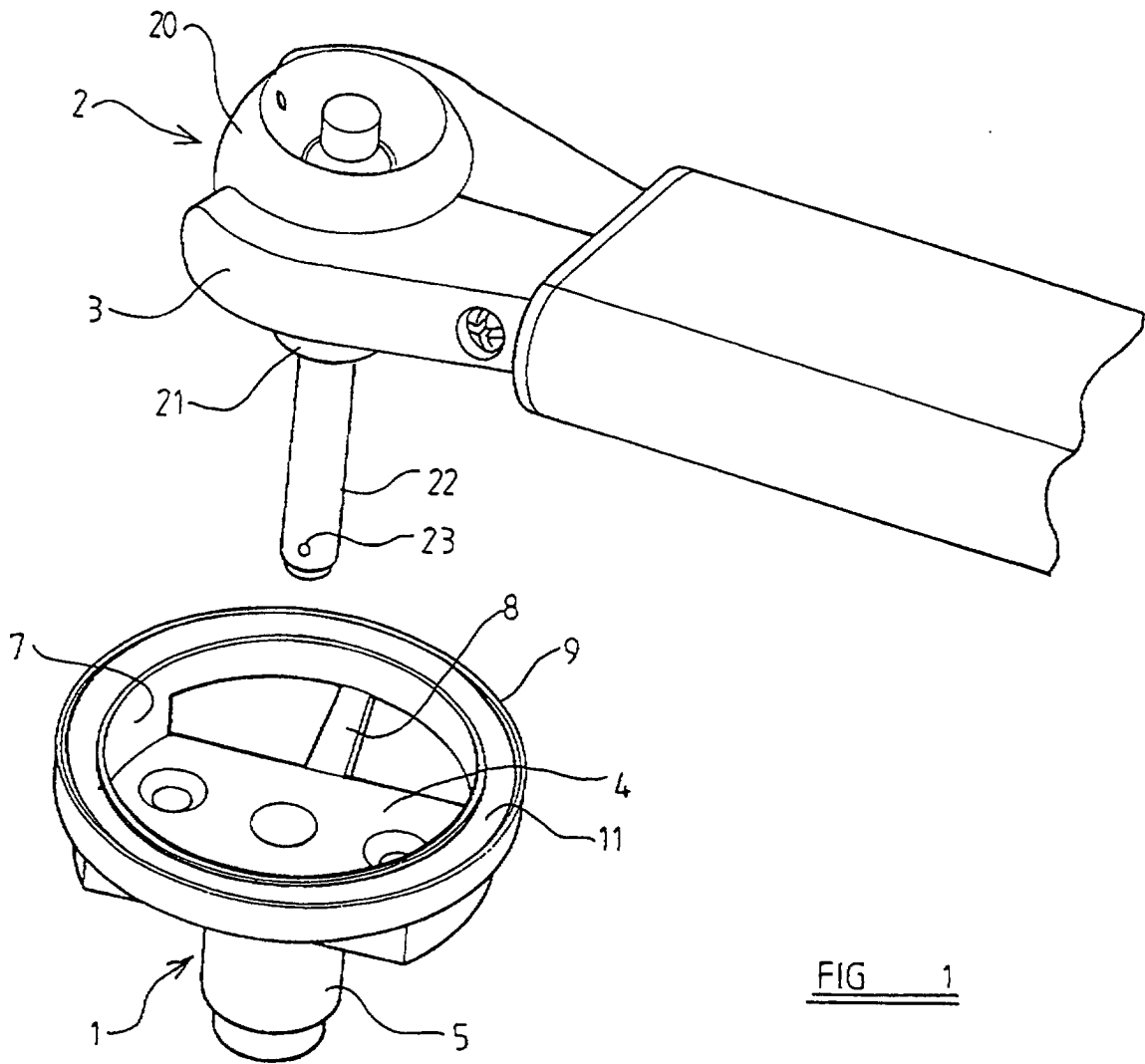


FIG 1

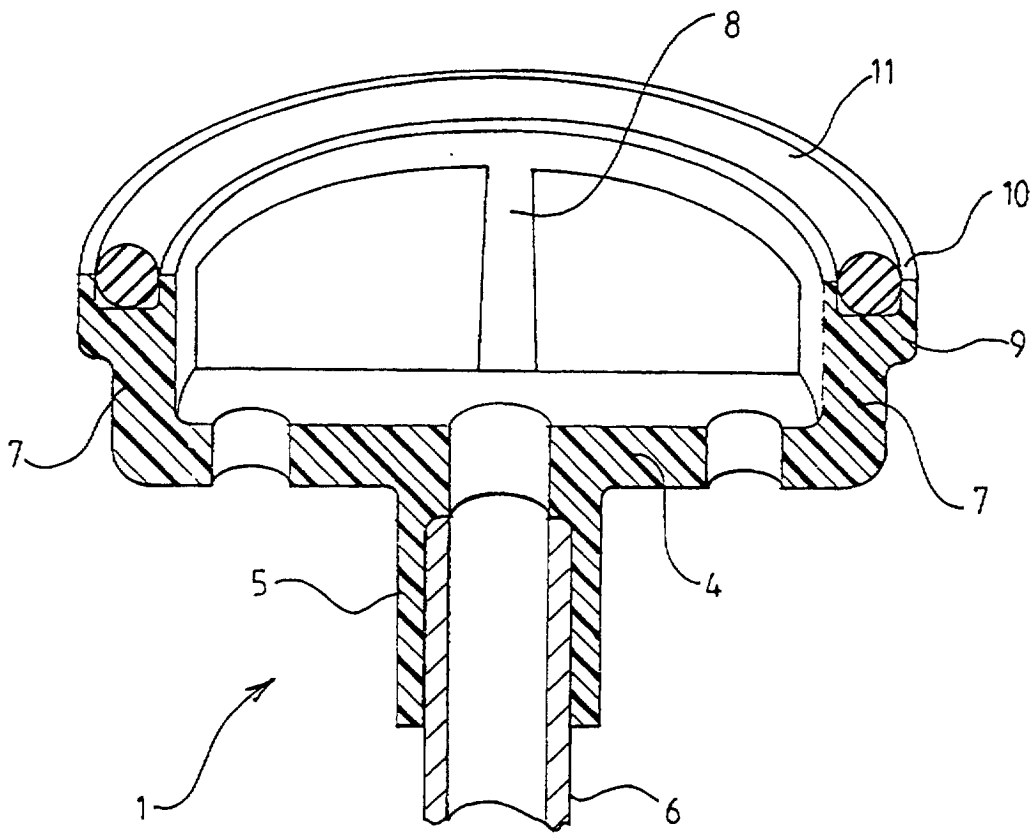


FIG 2

FIG 3

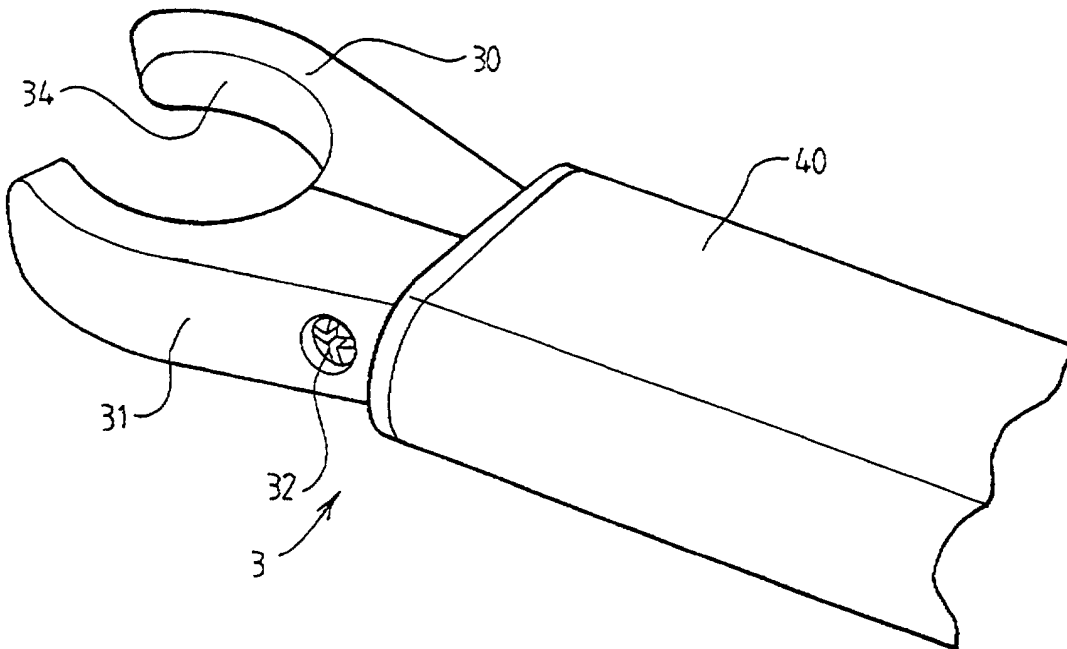
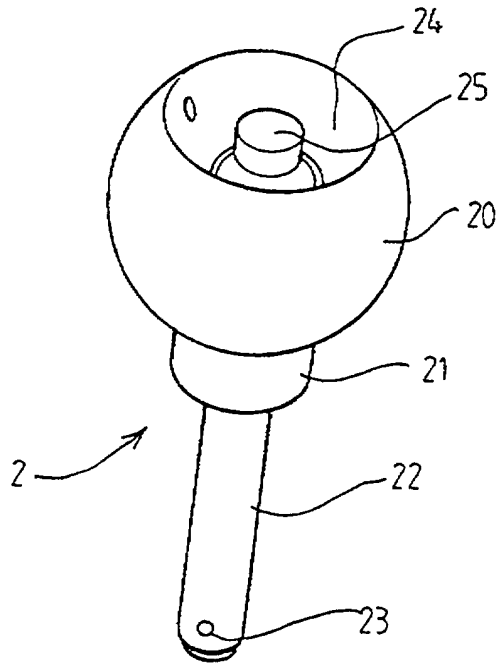


FIG 4

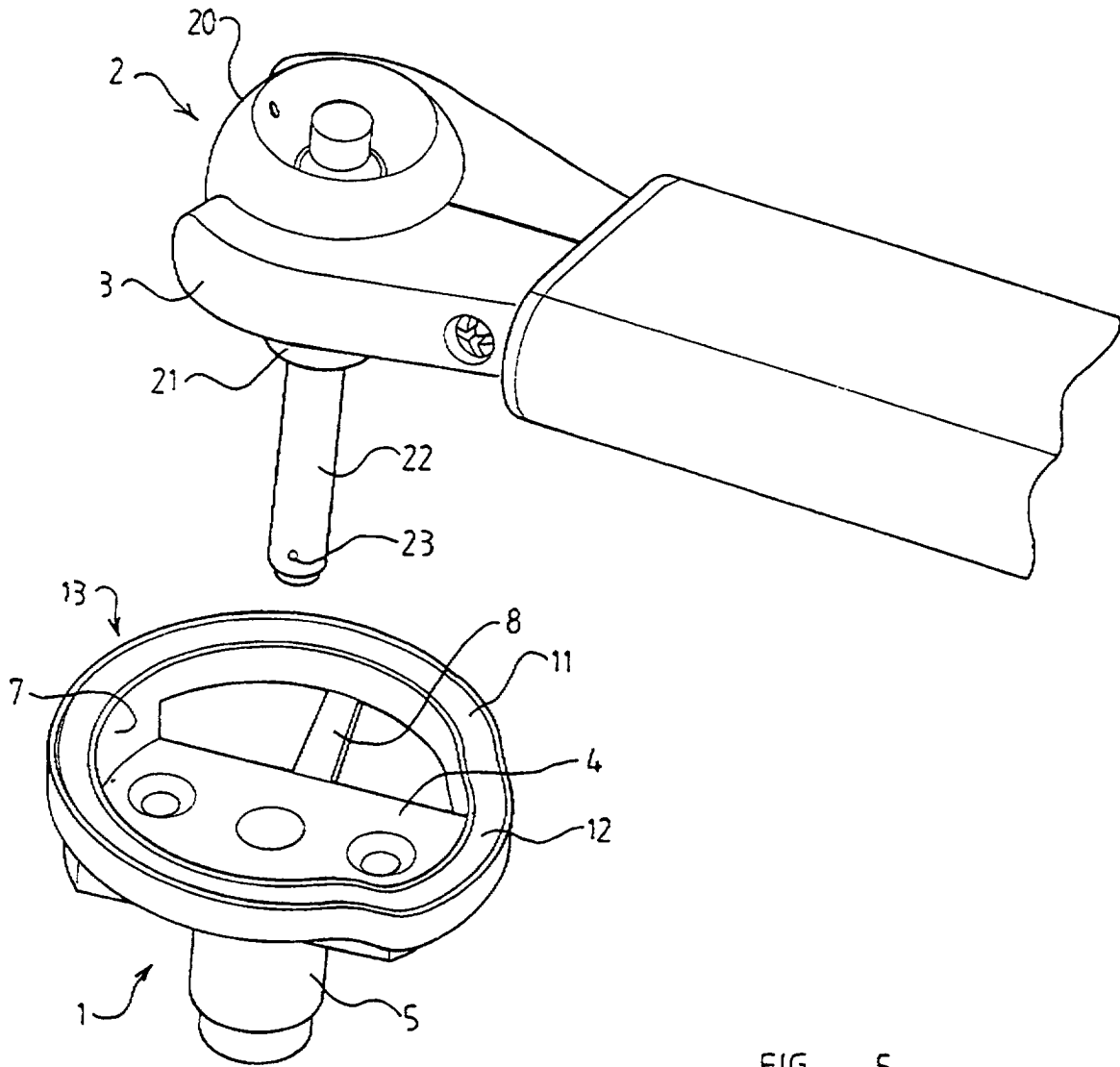


FIG 5

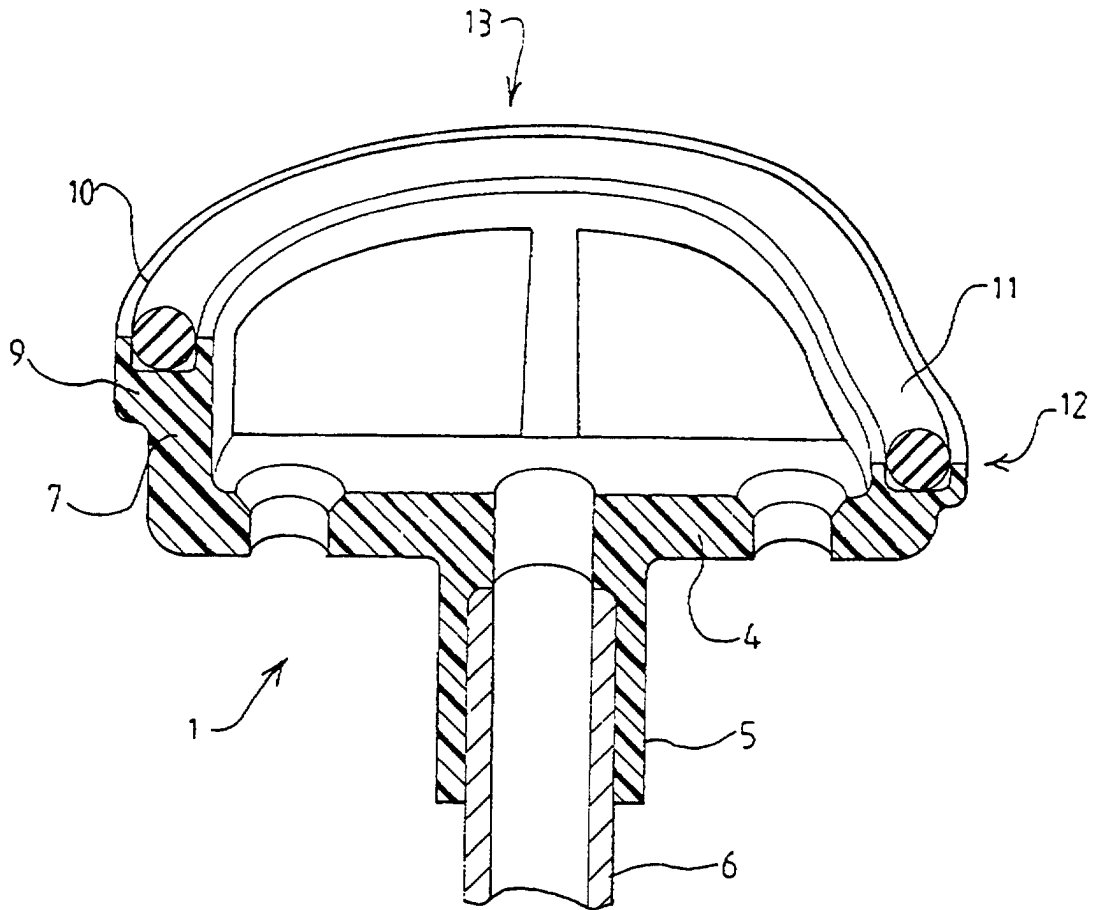


FIG 6