(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 769 449 A1

(12) EUROPEAN PATENT APPLICATION

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

(51) Int. Cl.[6]: **B63H 25/08**

(21) Application number: **96116516.4**

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

(84) Designated Contracting States:
DE FR GB

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

(71) Applicant: **RWO (Marine Equipment) Ltd.**
Benfleet Essex SS7 4QW (GB)

(72) Inventors:
- **Owen, John Robert**
  Leigh-on-Sea, Essex SS9 2NA (GB)
- **Atkins, Stephen Roy**
  Pitsea, Basildon, Essex SS13 2AS (GB)

(74) Representative: **Frankland, Nigel Howard**
FORRESTER & BOEHMERT
Franz-Joseph-Strasse 38
80801 München (DE)

(54) A tiller connection

(57) A tiller connection to connect a tiller extension arm to a tiller, the connection comprising a support component(1) to be connected to the tiller, a ball(2) with means(22) to connect the ball to the support component and a claw(3) to engage the ball and to be connected to the tiller extension arm. The support component(1) has an annular(9) which supports a resilient ring(11) which defines 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(2) and the claw(3) being made of a self-lubricating plastics material.

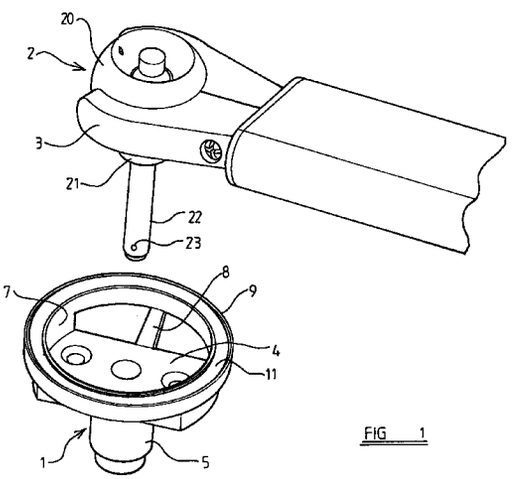


FIG 1

EP 0 769 449 A1

Description

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

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.

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

Some of the prior proposed tiller connections have comprised universal joints. 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.

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.

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 a claw to engage the ball and to be connected to the tiller extension arm, the support component 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 being made of a self-lubricating plastics material.

Preferably the support surface is defined by a ring element, the ring element being co-axial with the connection between the ball and the support component.

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.

Conveniently the ring element and 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.

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.

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

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.

A major component of the plastics used to form the ball and the claw may comprise nylon 66.

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

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

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

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,

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

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.

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.

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.

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.

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.

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

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.

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.

It is to 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.

With the button 25 depressed the ball may 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.

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 32, 33 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.

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

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.

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.

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.

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

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.

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.

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.

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.

The features disclosed in the foregoing description, in the following Claims and/or in the accompanying drawings may, both separately and in any combination thereof, be material for realising the invention in diverse forms thereof.

Claims

1. 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 a claw to engage the ball and to be connected to the tiller extension arm, the support component 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 being made of a self-lubricating plastics material.

2. A tiller connection according to claim 1 wherein the support surface is defined by a ring element, the ring element being co-axial with the connection between the ball and the support component.

3. A tiller connection according to claim 2, wherein the support component has a base, and 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.

4. A tiller connection according to claim 3 wherein 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.

5. A tiller connection according to any one of the preceding claims wherein the plastic materials utilised to form the ball and the claw 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 and the claw is fibre reinforced.

7. A tiller connection according to claim 6 wherein the plastics material used to form the ball and the claw 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 which are interconnected to define the claw.

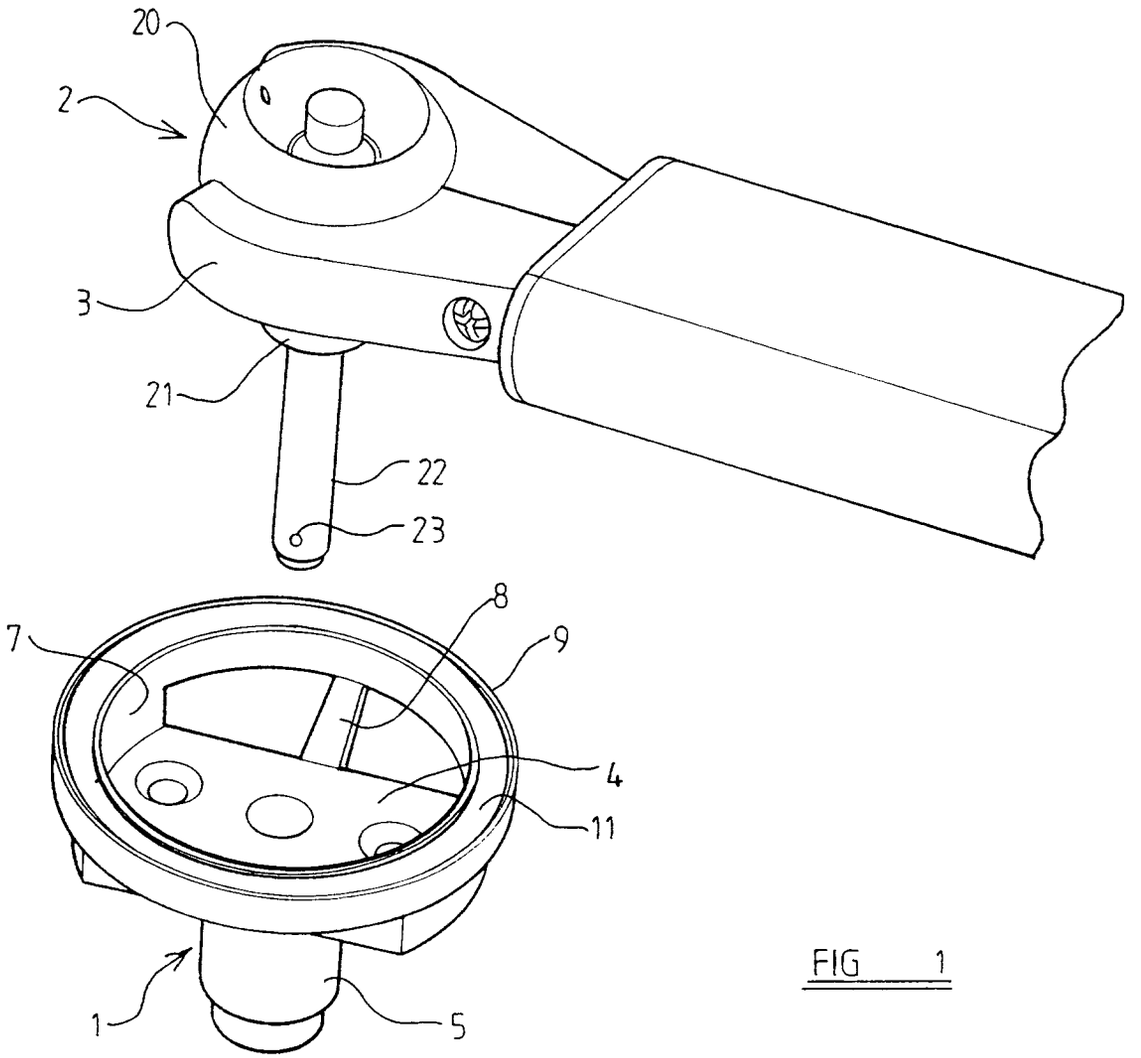


FIG 1

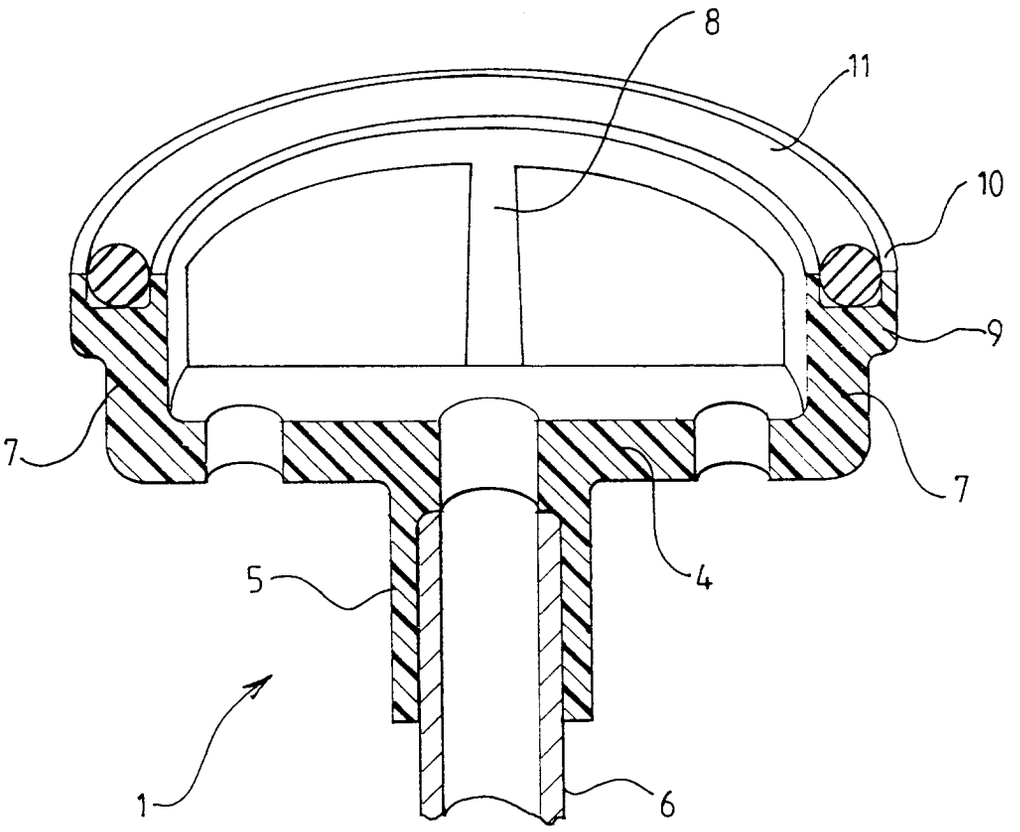
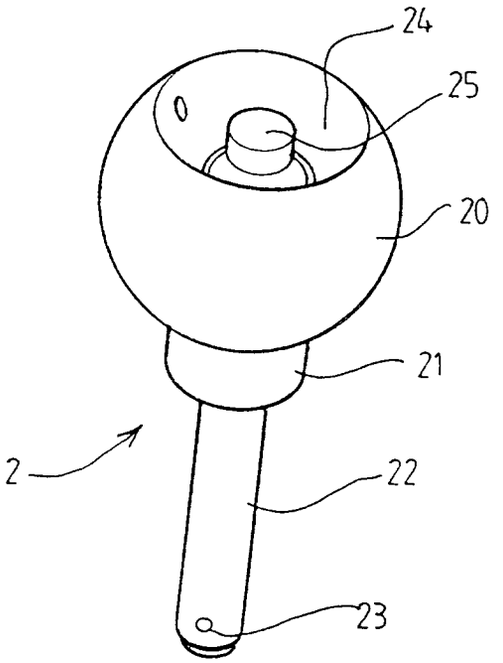


FIG 2

FIG 3



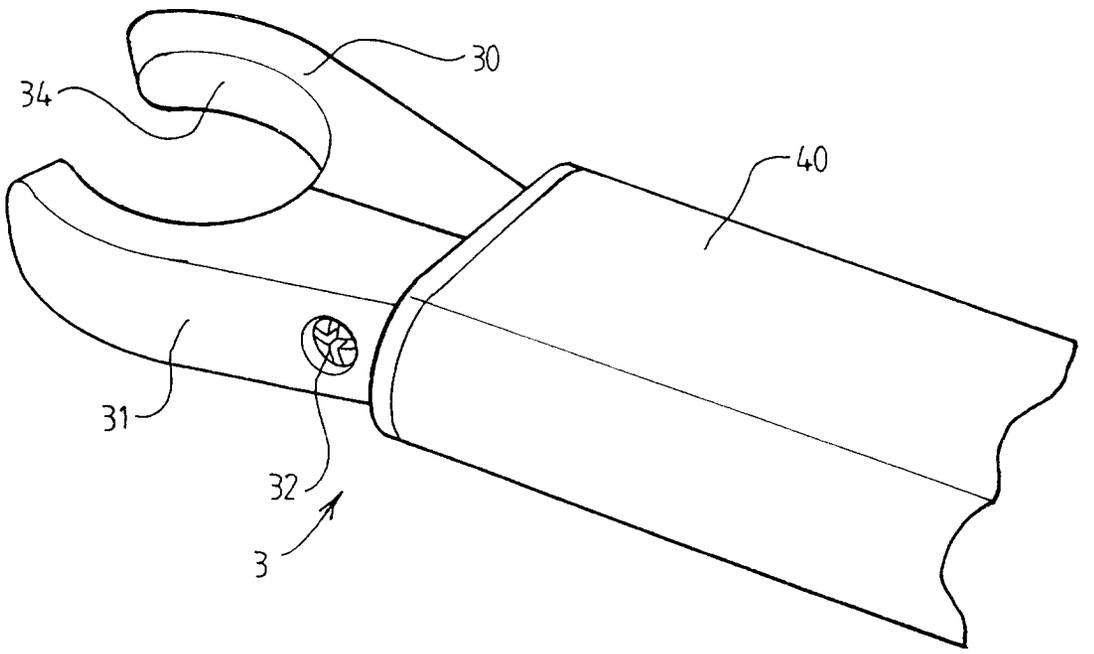


FIG 4

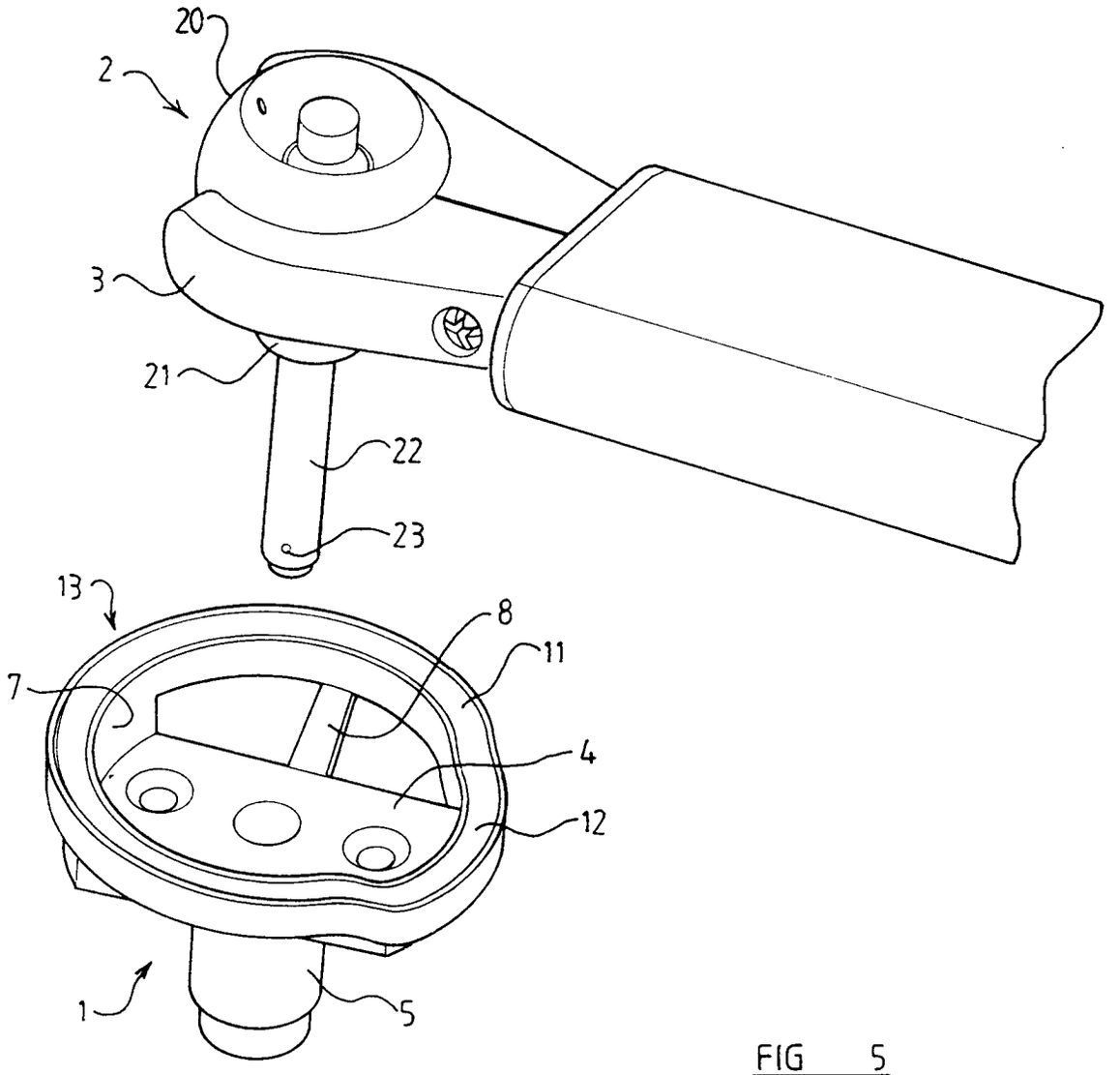


FIG 5

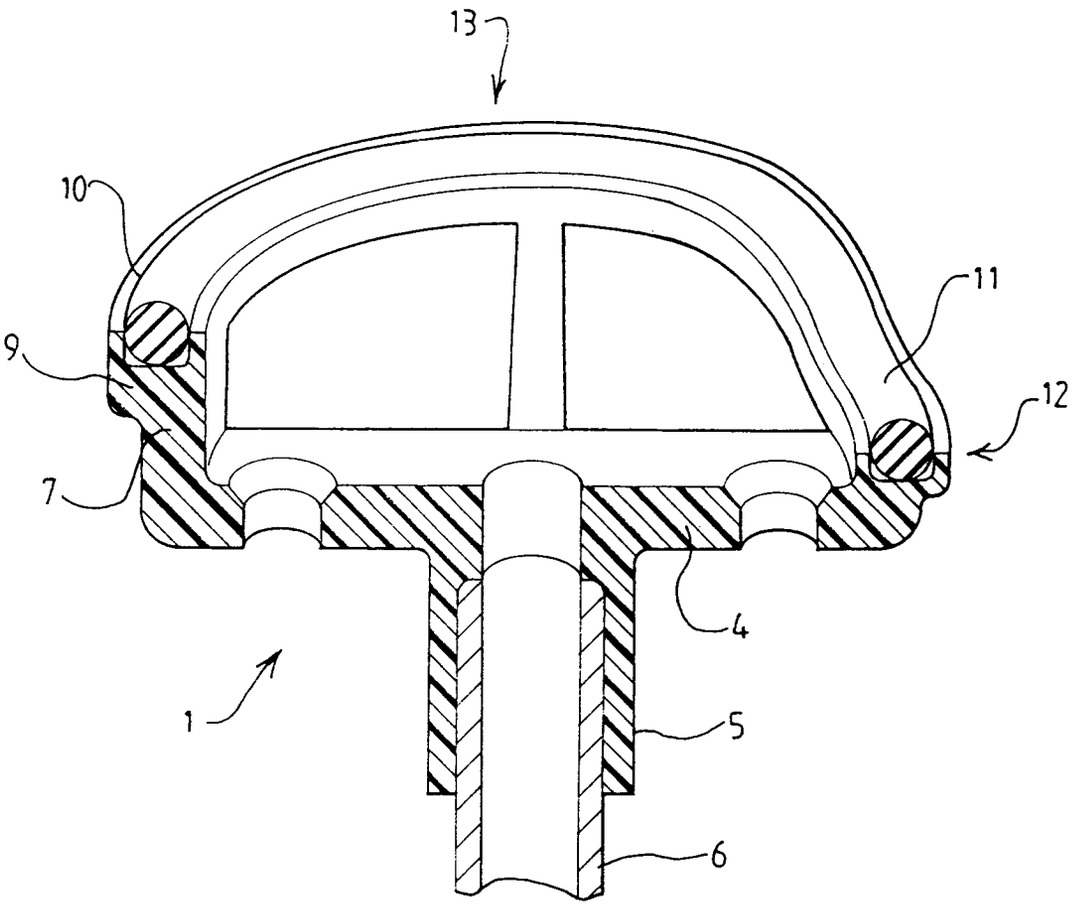


FIG 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 11 6516

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US-A-4 228 756 (STORER) * column 8, line 10 - line 27; figures 2-4 * ---	1-3,9,10	B63H25/08
Y	GB-A-2 085 068 (HEDMAN) * the whole document * ---	1-3,9,10	
A	WO-A-91 17082 (DAVENPORT) * page 8, line 22 - line 27; figures 1-4 * ---	1,5	
A	DE-A-29 46 158 (HAUSER) * page 5, paragraph 2; figures 1,2 * ---	1	
A	US-A-4 553 496 (FORESMAN) * column 4, line 42 - line 56; figures 1-4 * ---	4	
A	US-A-4 802 430 (KRAMER) * column 2, line 27 - line 32; figures 1,2 * -----	8	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B63H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21 January 1997	DE SENA, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)