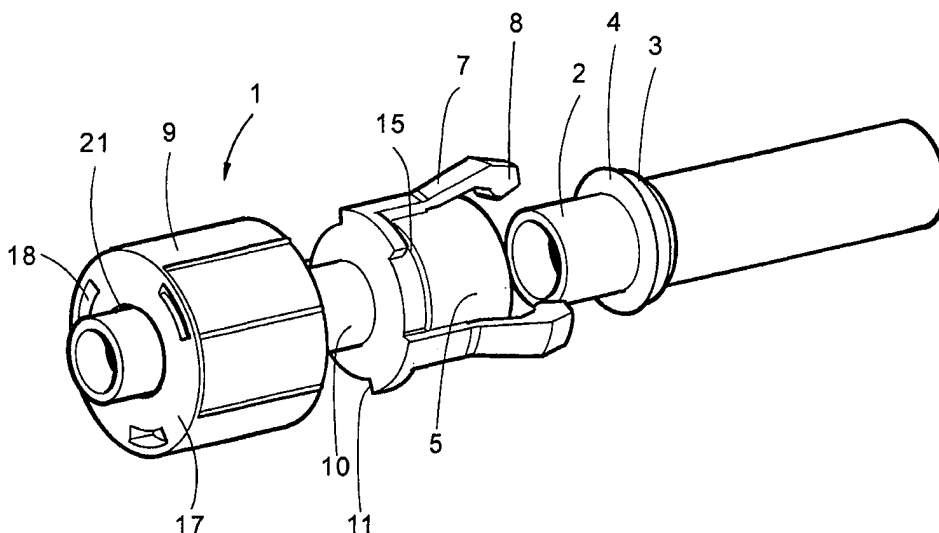




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(54) Title: COUPLING DEVICE FOR DETACHABLE CONNECTION TO THE END OF A TUBE



(57) Abstract

Coupling device (1) for detachable fixing at a pipe end (2), which around its periphery has a radially projecting flange (3) against which an O-ring seal (4) bears. The coupling device (1) is characterised by a tubular inner part (5), which at a first end has a sealing surface (6), conforming to the O-ring seal (4). The inner part (5) has at least three arms (7) arranged around the periphery, which resiliently project radially out past the first end of the tubular inner part and are directed so that hooks (8), formed at their ends and directed radially inwards, can pass freely over the flange (3) and O-ring seal (4) when pushed onto the pipe end (2). A tubular outer part (9) is adapted to be passed over the inner part (5) from its second end and to press the spring arms (7) radially inwards until the hooks (8) are brought into engagement behind the radially projecting flange (3). The inner and outer parts have interacting elements (11, 12), which allow these to be fixed to one another by means of a twisting movement relative to one another. At least one window (18), through which a part of the inner part (5) is adapted to become visible when fixing has been accomplished, is incorporated into the outer part (9).

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Coupling-device for detachable connection to the end of a tube

The present invention relates to a coupling device for detachable fixing to a pipe end, which around its periphery has a radially projecting flange against which an O-ring seal bears on the side facing the pipe end, as indicated in the pre-characterising clause of claim 1.

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In a known solution according to US-A-3,826,523 a coupling device is shown, which can be fixed at a pipe end, which around its periphery has a radially projecting flange, against which an O-ring seal bears on the side facing the pipe end. A casing provided with backwardly/upwardly directed spring fingers is arranged behind the flange. A
10 tubular coupling part is adapted to be attached on the pipe end. The fingers of the casing are then allowed to spring into recesses in the tubular coupling part, thereby fixing this to the pipe end. The spring fingers can be acted upon at the rear edge of the tubular coupling part and can be pressed inwards so that the coupling part can thereby be released. The said coupling, however, requires separate fitting, both of the casing inside
15 the flange on the pipe end and of the tubular coupling part. Fitting the coupling therefore becomes time-consuming. Nor is there any facility for easily verifying that the coupling device is correctly connected.

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One object of the present invention is to produce a coupling device of the type referred to above, which in one single operation will rapidly and easily produce a pressure-tight fixing at the pipe end, with clear indication that the coupling device is correctly connected, a coupling device which moreover can easily be fully dismantled without damaging the sealing ring but cannot be accidentally released from the pipe end. The object has been achieved by an arrangement having the characteristics indicated in claim
25 1.

Preferred embodiments of the arrangement also have any or some of the characteristics indicated in the subordinate claims.

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The invention will be explained in more detail below with the aid of examples of embodiments of the present invention and with reference to the attached drawings in which:

- Fig. 1a shows an exploded view of a coupling device according to the invention, which permits further coupling of a fluid flow, seen from a first angle
- 5 Fig. 1b shows an exploded view of the coupling device according to fig. 1a, seen from a second angle
- Fig. 2a shows an exploded view of a coupling device according to the invention, which stops a fluid flow through the coupling device, seen from a first angle
- 10 Fig. 2b shows an exploded view of the coupling device according to fig. 2a, seen from a second angle
- Fig. 3a shows a detached view of the outer part of the coupling device according to fig. 1a and 1b
- 15 Fig. 3b shows a detached view of the outer part of the coupling device according to fig. 2a and 2b
- 20 Fig. 4 shows the coupling device according to the invention with inner and outer part fixed to one another, but for the sake of clarity not fixed at a pipe end
- Fig. 5 shows a partial section through the coupling device according to the invention fixed at a pipe end

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The same reference numbers are used for identical or similar details when describing all figures.

30 Fig. 1a and 1b show a coupling device 1 for detachable fixing at a pipe end 2, which around its periphery has a radially projecting flange 3 against which an O-ring seal 4 bears on its side facing the pipe end.

35 The coupling device 1 comprises an essentially tubular inner part 5, the inside diameter of which essentially corresponds to the outside diameter of the pipe. At a first end the inner part has a sealing surface 6, which is adapted to bear tightly against the O-ring seal 4. The inner part 5 moreover has three arms 7, arranged around the periphery, which resiliently project radially past the first end of the tubular inner part. The arms 7 are

directed so that hooks 8, formed at their ends and directed radially inwards, can pass freely over the flange 3 and the O-ring seal 4 when the inner part 5 is pushed on to the pipe end 2.

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The coupling device 1 moreover comprises an essentially tubular outer part 9, which from a first end is adapted to be passed over the inner part 5 from its second end and is thereby adapted to press the spring arms 7 radially inwards into an essentially axial orientation in which the hooks 8 are adapted to be brought into engagement behind the radially projecting flange 3. At a second end the inner part 5 has a fluid-tight connection to a flow element 10 in such a way that, when the coupling device 1 is fixed on the pipe end 2, fluid flow through the pipe via the inner part 5 and on into the flow element 10 is permitted.

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The inner and outer parts have interacting elements, which allow them to be fixed to one another by means of a twisting movement relative to one another. The said elements comprise at least one projection 11, formed on the periphery of the inner part and directed in the circumferential direction, which is adapted, when a twisting movement is applied, to engage in a complementary recess 12 formed on the inside of the outer part (see also fig. 3a and 3b), thereby preventing axial displacement of the inner and outer part relative to one another. The projection 11 and the recess 12 have locking elements interacting with one another, which are adapted by means of snap locking to prevent the projection 11 being accidentally dislodged from the recess 12. The said locking elements here take the form of interacting locking projections 13, 14 formed on the projection and in the recess respectively.

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The inner part 5 is also provided with a first bead 15 extending in a circumferential direction around its outer surface. The outer part is in the same way provided with a corresponding second bead 16 extending in a circumferential direction around its inner surface, this bead being adapted to snap over the bead 15 of the inner part and stay behind this when the outer part 9 is passed over the inner part 5. At its second end the outer part 9 has an inwardly directed flange 17, which defines to what extent the outer part 9 can be pushed on to the inner part 5. The first and second bead, interacting together with the flange 17, are adapted to limit the displacement of the parts relative to one another in an axial direction and thereby to ensure that inner and outer part maintain their solidarity when they are not fixed to one another by means of the projection 11 and the recess 12.

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At least one window 18 is incorporated into the outer part 9 through which a part of the inner part 5 is adapted to become visible when fixing of the inner part 15 to the outer part 9 has been accomplished.

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Fig. 2a and 2b show an alternative embodiment of a coupling device 1, the inner part 5 of which at a second end has a fluid-tight connection 19, which is adapted to prevent a flow of fluid out through the coupling device 1 when it is fixed to the pipe end 2. The outer part 9 is also completely closed at its second end, since in this embodiment no opening for a flow element is required. Otherwise the coupling device according to fig. 10 2a and 2b has all the same characteristics as the coupling device according to fig. 1a and 1b.

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Fig. 3a and 3b show, by means of detached views, how the respective insides of the outer parts are formed in the embodiment according to fig. 1a and 1b and 2a and 2b respectively. On the insides of the outer parts there is the recess 12 formed to complement the projection 11 on the inner part, the recess also having the locking projection directed into the recess 12. The locking projection 13 formed on the projection 11 is adapted to be snapped over the locking projection 14 formed in the recess 12 when the projection 11 is made to engage in the recess 12 on the application of a twisting movement. When undoing the fixing between the inner and outer parts, the locking projection 13 formed on the projection 11 must then first be made to snap over the locking projection 14 of the recess before the projection 11 can be twisted out of the recess 12. This prevents the projection 11 being accidentally dislodged from the recess 25 12. The insides of the outer parts are furthermore formed in such a way that they permit a twisting movement of the inner and outer part relative to one another, in that recesses 20 with a width greater than the arms 7 are formed on the inside of the outer part. The window is located on the inwardly directed flange 17 formed at the second end of the outer part, so that the projection 11 will become visible through this when fixing has been accomplished. It is obvious that a window can be incorporated at any point on the outer part 9 where any part of the inner part 5 only becomes visible when the fixing has 30 been accomplished. Fig. 3a shows the outer part 9 for the embodiment in which the inner part 5 has a fluid-tight connection to a flow element 10. The flow element 10 can then pass through the opening 21 defined by the flange 17. Fig. 3b shows the outer part for the embodiment in which the inner part 5 has a fluid-tight connection 19 at a second 35 end. The flange 17 can then be formed so that its edges coincide, i.e. so that the second end of the outer part is entirely closed, apart from the window 18.

Fig. 4 shows the coupling device 1 according to the invention as in fig. 1a and 1b with inner and outer part fixed to one another, but for the sake of clarity not fixed to a pipe end. The arms 7 are here pressed radially inwards into the essentially axial orientation, in which they would have been made to engage behind the radially directed flange 3 if the inner part 5 had been pushed on to the pipe end 2.

Fig. 5 shows a partial section through the coupling device according to the invention in fig. 2a and 2b fixed on a pipe end 2. The section shows how the essentially tubular outer part 9 from a first end is passed over the inner part 5 from its second end, thereby pressing the spring arms 7 radially inwards into an essentially axial orientation in which the hooks 8 have been made to engage behind the radially projecting flange 3. It will also be seen how a part of the inner part 5 has been rendered visible through a window 18 incorporated in the outer part 9 in that the rear section of an arm has been twisted in front of this.

It is obvious to a person skilled in the art that the invention is not confined to the embodiments described above but rather lends itself to modifications within the framework of the idea of the invention defined in the following claims. The inner and outer parts may, for example, be adapted to be fixed to one another by means of threads or bayonet fitting.

Claims

1. Coupling device (1) for detachable fixing at a pipe end (2), which around its periphery has a radially projecting flange (3) against which an O-ring seal (4) bears on its side facing the pipe end, **characterised in that** the coupling device (1) comprises an essentially tubular inner part (5), the inside diameter of which
5 essentially corresponds to the outside diameter of the pipe and which at a first end has a sealing surface (6), which is adapted to bear tightly against the O-ring seal (4), and that the inner part (5) has at least three arms (7) arranged around the periphery, which resiliently project radially out past the first end of the tubular inner part and are directed so that hooks (8), formed at their ends and directed radially inwards, can
10 pass freely over the flange (3) and the O-ring seal (4) when the inner part (5) is pushed on to the pipe end (2), and in that the coupling device (1) comprises an essentially tubular outer part (9), which from a first end is adapted to be passed over the inner part (5) from its second end and is thereby adapted to press the spring arms (7) radially inwards into an essentially axial orientation in which the hooks (8) are
15 adapted to be brought into engagement behind the radially projecting flange (3) and in that the inner and outer parts have interacting elements, which allow these to be fixed to one another by means of a twisting movement relative to one another, and in that at least one window (18), through which a part of the inner part (5) is adapted to become visible when fixing has been accomplished, is incorporated into the outer
20 part (9).
2. Coupling device (1) according to claim 1, **characterised in that** the said interacting elements which permit fixing of the inner and outer part to one another by means of the twisting movement comprise at least one projection (11), formed on the
25 periphery of the inner part and directed in the circumferential direction, which is adapted, under the application of a twisting movement, to engage in a complementary recess (12) formed on the inside of the outer part, thereby preventing axial displacement of the inner and outer part relative to one another.
- 30 3. Coupling device (1) according to claim 2, **characterised in that** the projection (11) and the recess (12) have locking elements (13, 14) interacting with one another, which by snap locking are adapted to prevent the projection (11) being accidentally

dislodged from the recess (12).

4. Coupling device (1) according to any of claims 1 to 3, **characterised in that** the inner part (5) at a second end has a fluid-tight connection to a flow element (10) in such a way that, when the coupling device (1) is fixed at the pipe end (2) the said connection permits a flow of fluid through the pipe via the inner part (5) and on into the flow element (10).
5
5. Coupling device (1) according to any of claims 1 to 3, **characterised in that** the inner part (5) at a second end has a fluid-tight connection (19) adapted to prevent a flow of fluid out through the coupling device (1) when this is fixed on the pipe end (2).
10
6. Coupling device (1) according to any of the preceding claims, **characterised in that** the inner part (5) is provided with a first bead (15) extending in a circumferential direction around its outer surface and that the outer part is in the same way provided with a corresponding second bead (16) extending in a circumferential direction around its inner surface which is adapted to snap over the bead (15) of the inner part and stay behind this when the outer part (9) is passed over the inner part (5), and in that at its second end the outer part (9) has an inwardly directed flange (17), which defines to what extent the outer part (9) can be pushed on to the inner part (5), and in that the first and second beads (15, 16) interacting together with the flange (17) are adapted to limit the displacement of the parts relative to one another in an axial direction and thereby to ensure that inner and outer part maintain their solidarity when they are not fixed to one another.
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Fig. 1a

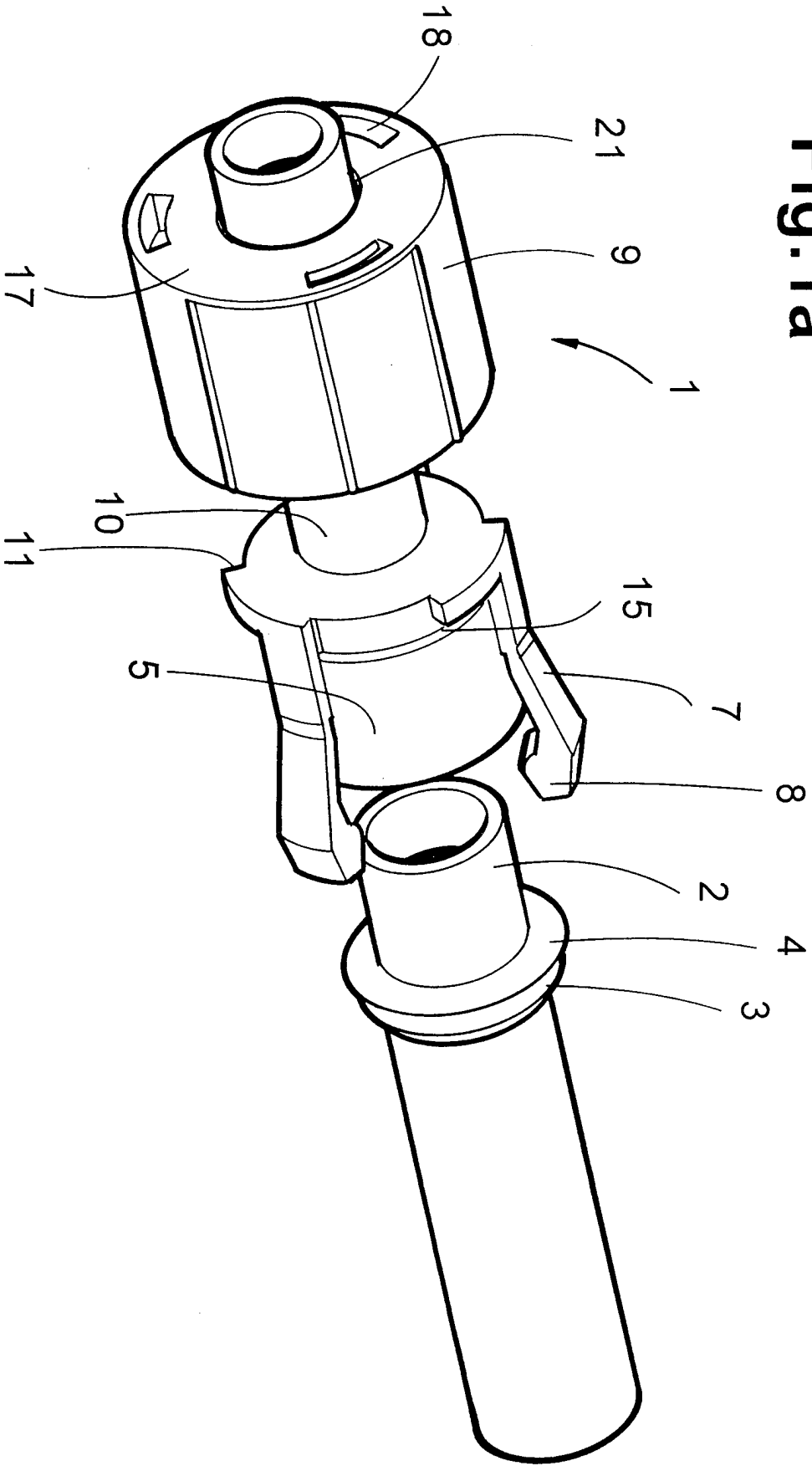
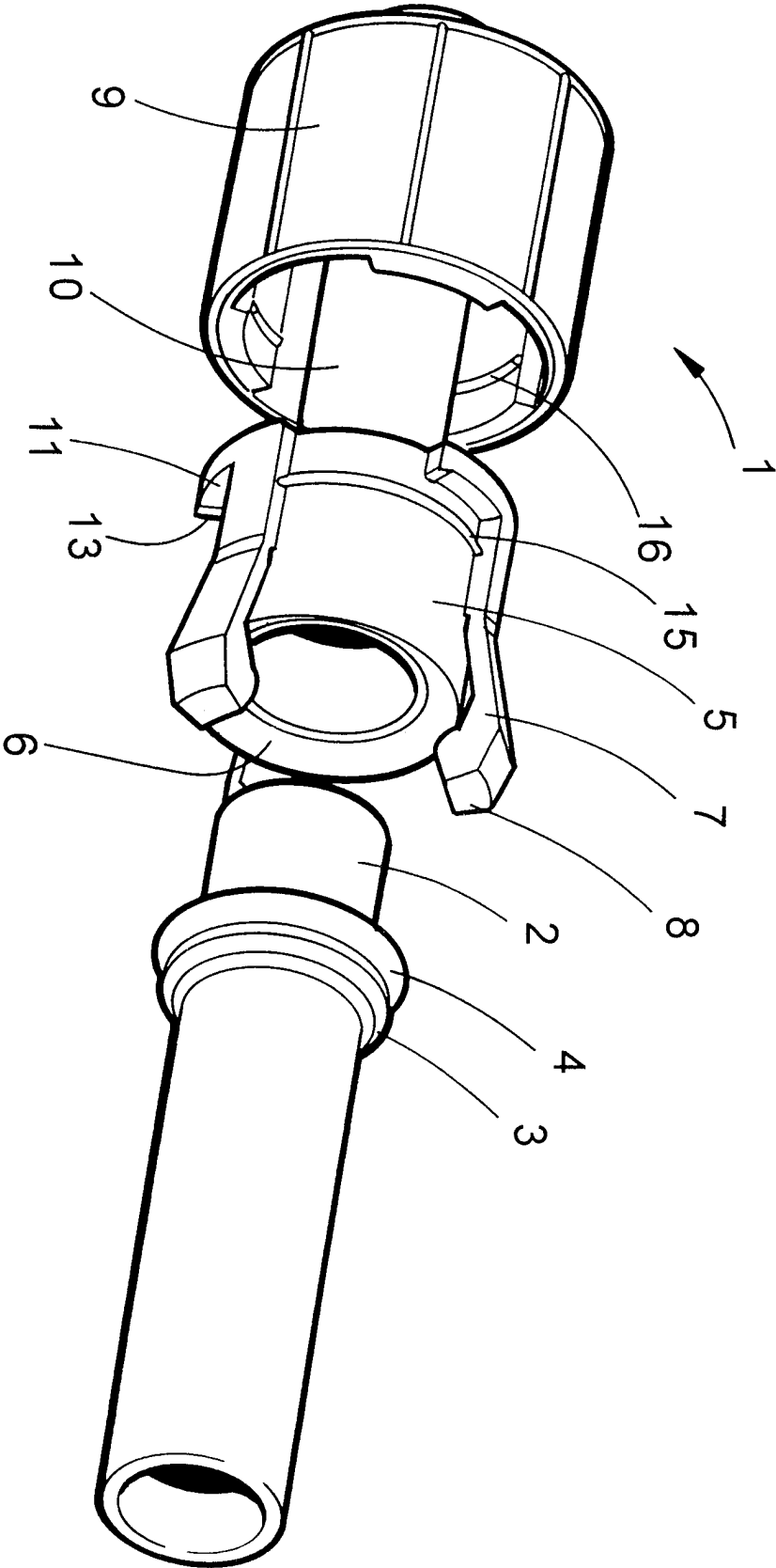
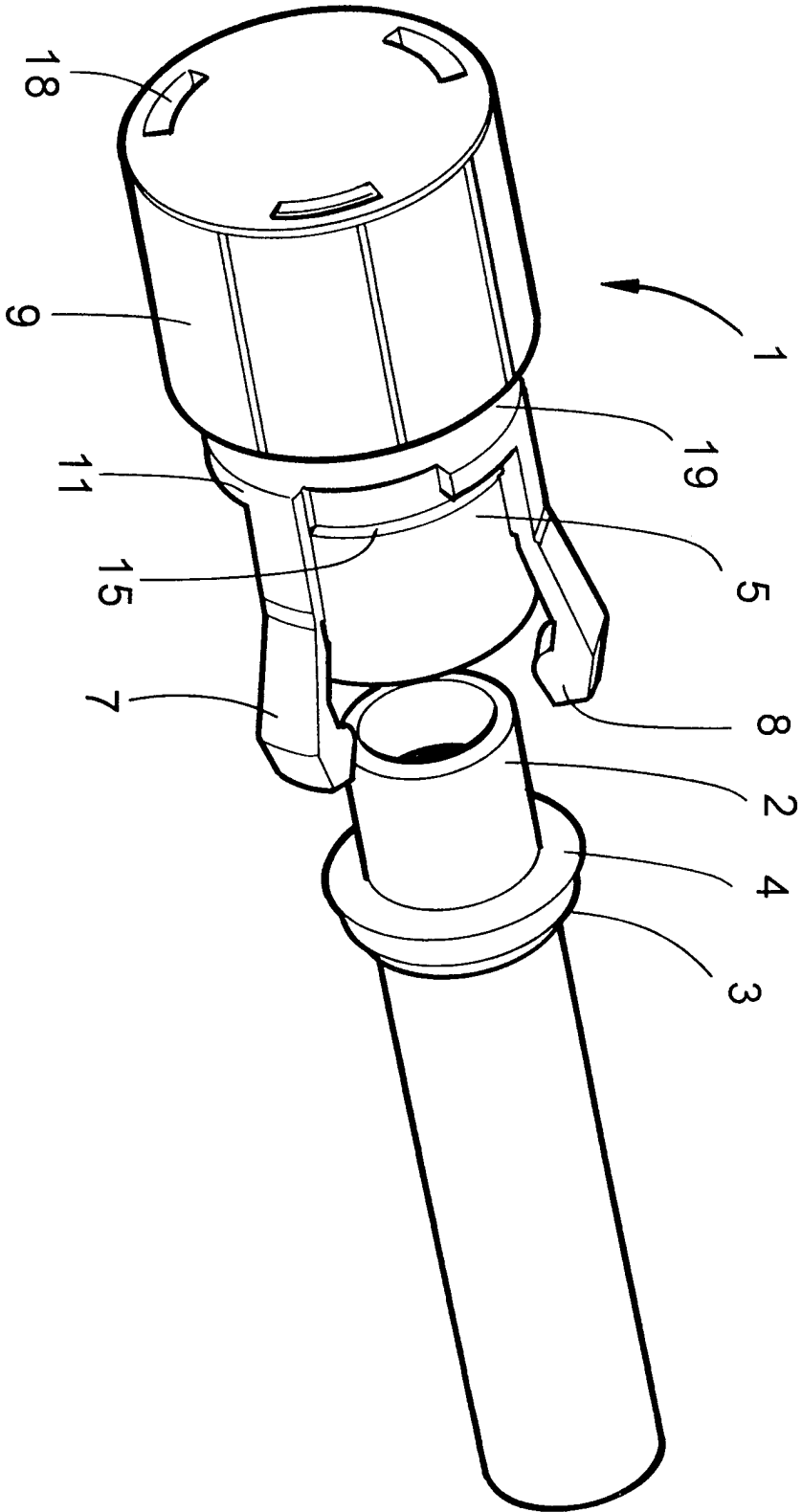


Fig. 1b



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Fig.2a



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Fig. 2b

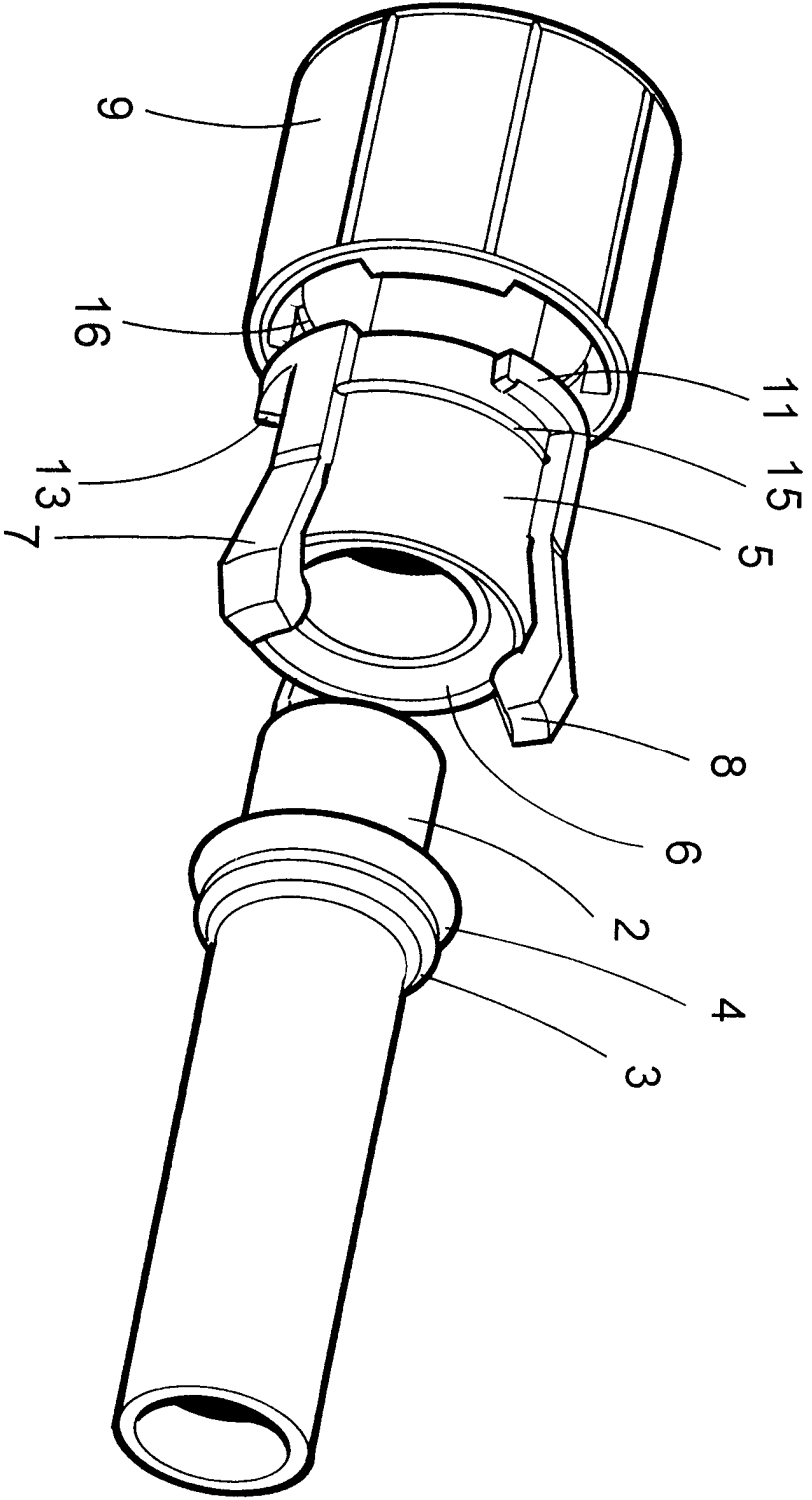


Fig 3a

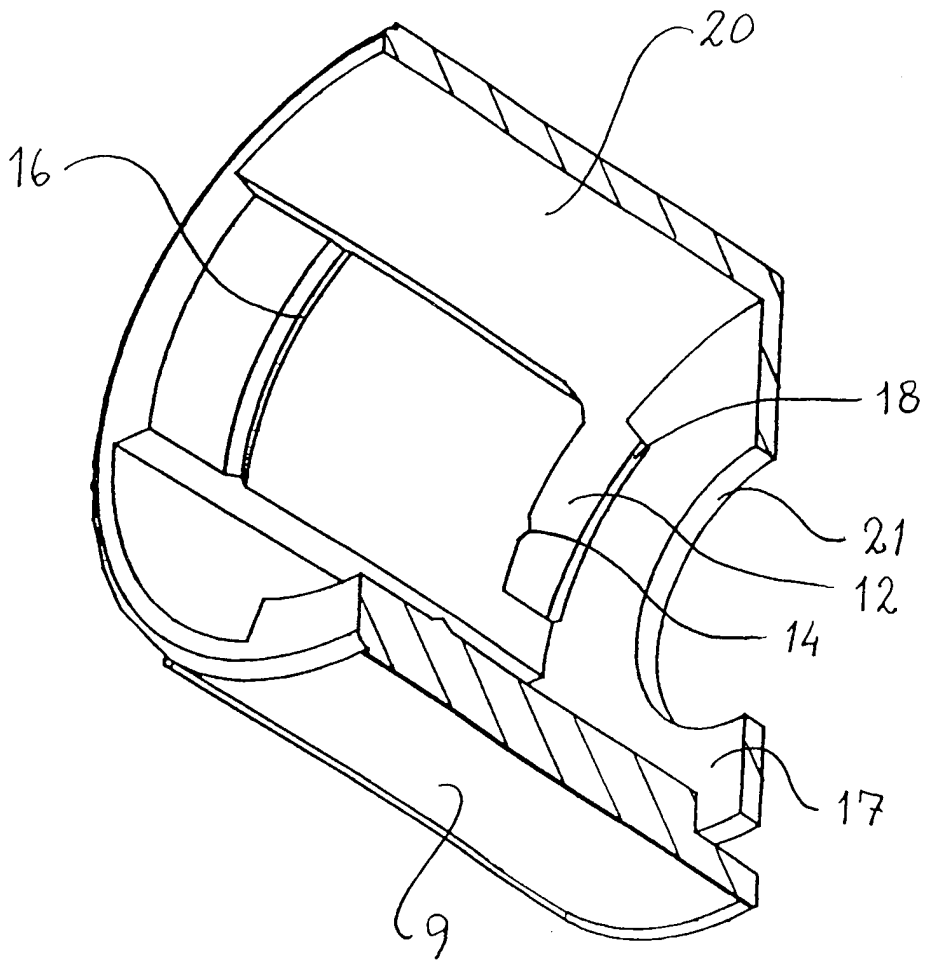
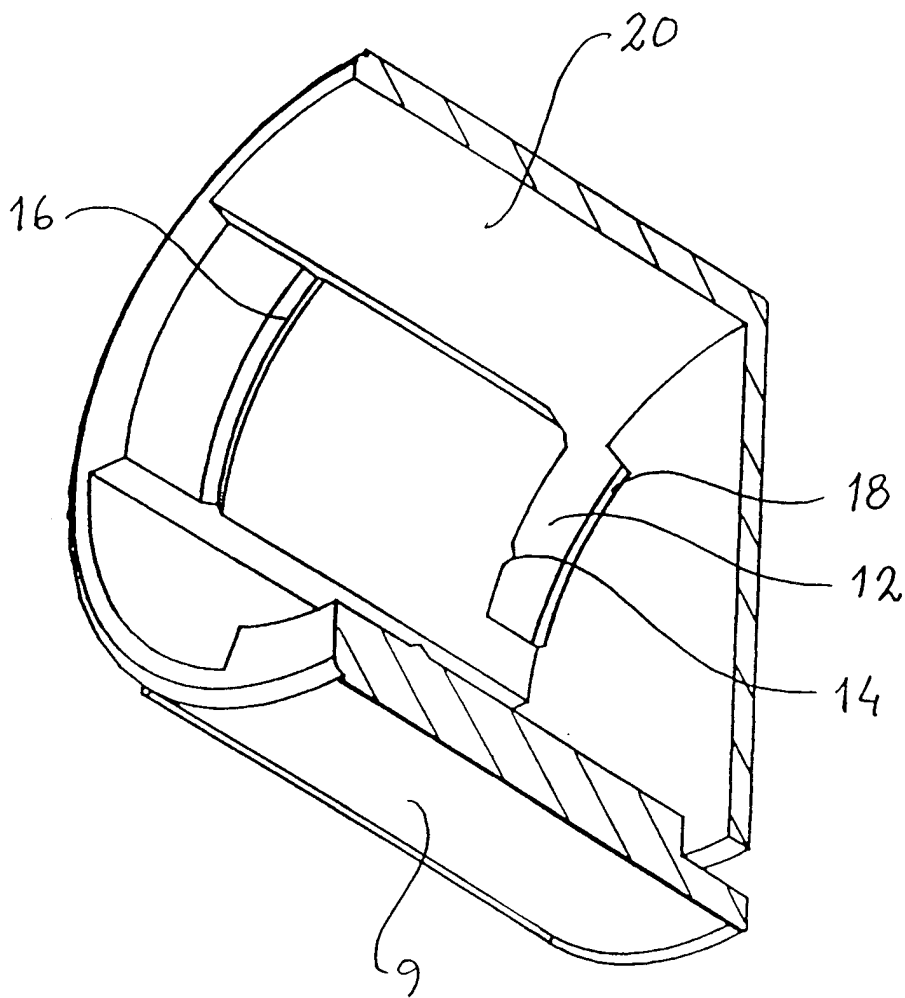


Fig 3b



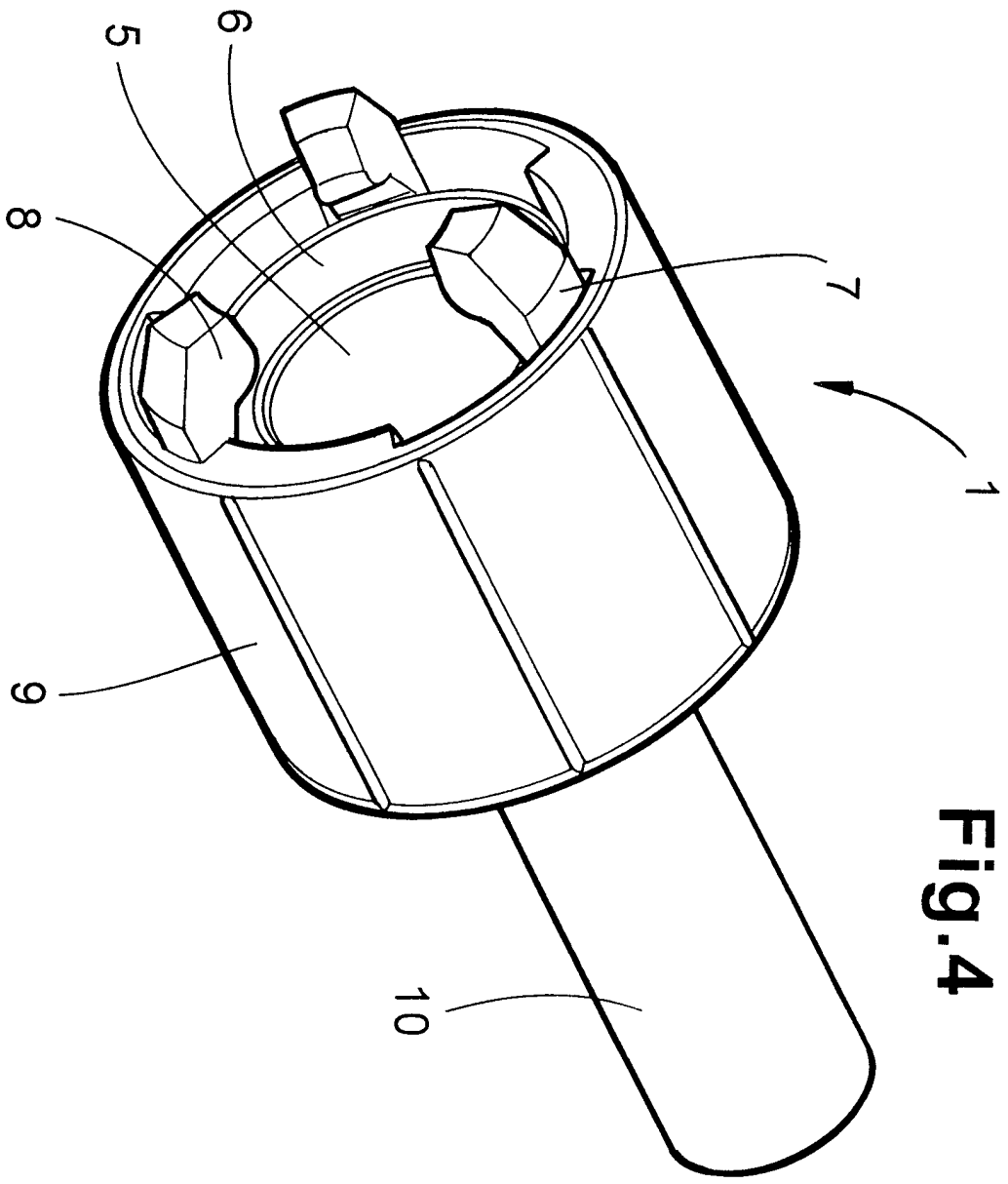
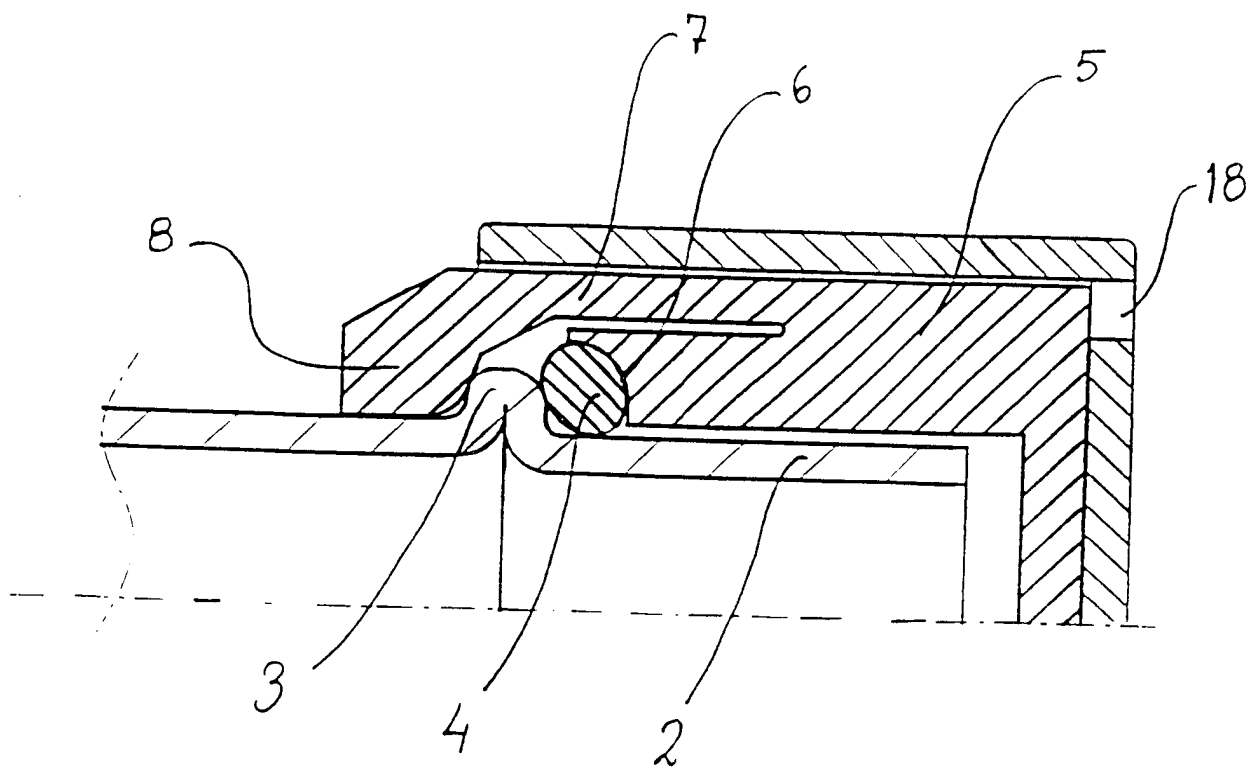


Fig. 4

Fig 5



INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 97/02095

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: F16L 37/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: F16L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 1936766 A (WOLF-GERÄTE GMBH), 19 February 1970 (19.02.70) --	
A	EP 0340194 A1 (DIAMANT BOART CRAELIUS AKTIEBOLAG), 2 November 1989 (02.11.89) --	
A	US 2468849 A (F.J. TRAINOR), 3 May 1949 (03.05.49) --	
A	US 5441313 A (KALAHASTHY), 15 August 1995 (15.08.95) --	

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Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3826523 A (ESCHBAUGH), 30 July 1974 (30.07.74) ----- -----	

INTERNATIONAL SEARCH REPORT
Information on patent family members

03/02/98

International application No.
PCT/SE 97/02095

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 1936766 A	19/02/70	AT 296703 A CH 510227 A DK 132907 B,C FR 2015398 A GB 1275273 A NL 6911961 A US 3601361 A	15/01/72 15/07/71 23/02/76 24/04/70 24/05/72 11/02/70 24/08/71
EP 0340194 A1	02/11/89	SE 466416 B,C SE 8801634 A	10/02/92 30/10/89
US 2468849 A	03/05/49	NONE	
US 5441313 A	15/08/95	NONE	
US 3826523 A	30/07/74	NONE	