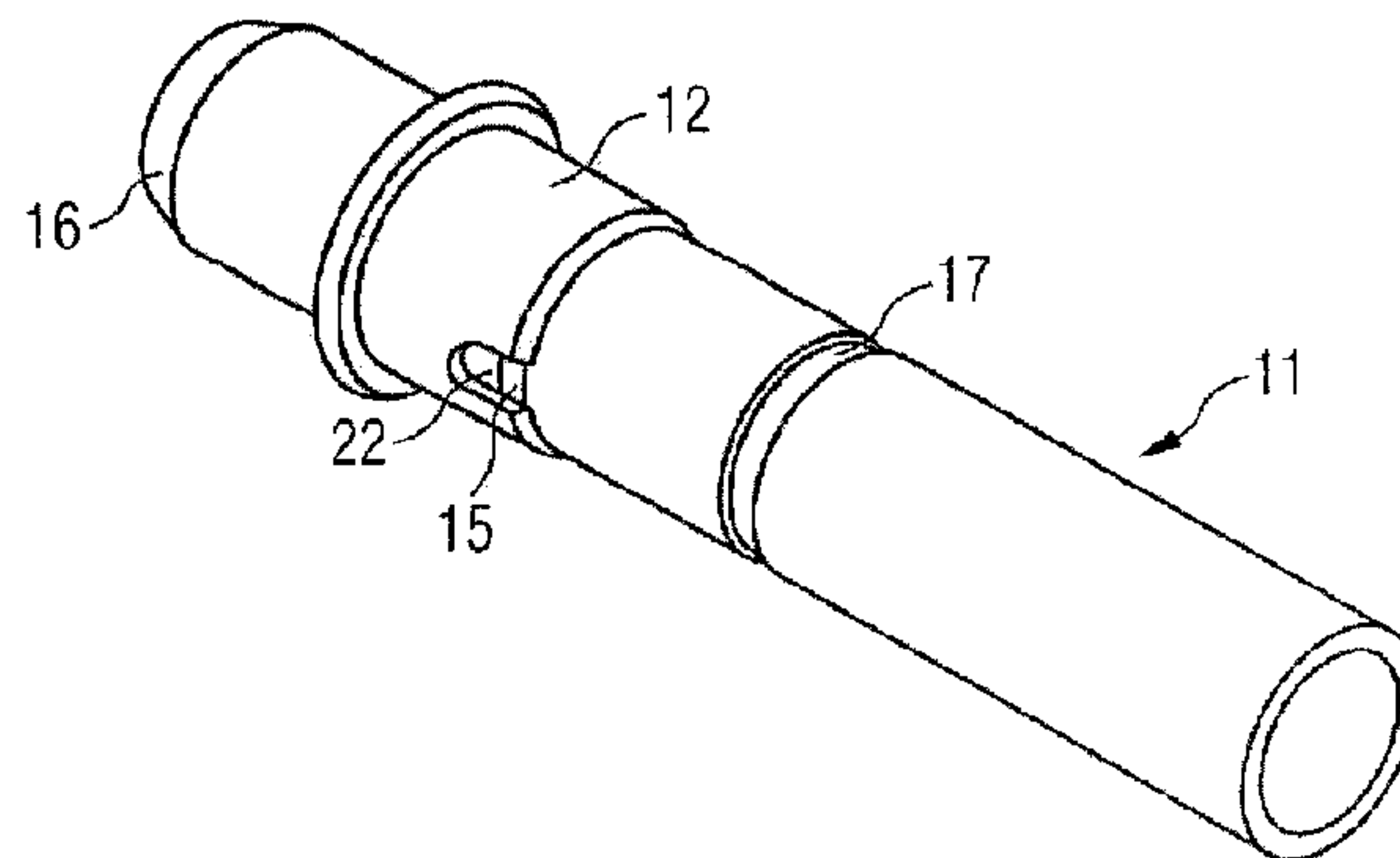




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(54) Title: RAPID COUPLING



(57) **Abrégé/Abstract:**

In a rapid coupling, a pipe nipple engages a through hole of a socket. A first annular groove provided on the pipe nipple serves to catch a locking ring provided in the socket, in order to lock the coupled condition. A sleeve is movable on the pipe nipple, the sleeve having an inner projection to be retained by the first annular groove of the pipe nipple in a pre-assembled condition. When the pipe nipple is inserted into the socket, the sleeve abuts the socket and is then moved along the pipe nipple until the inner projection is caught by a second annular groove if the coupling is properly locked, If the pipe nipple is not moved into the socket to such an extent that the locking ring is caught by the first annular groove, the second annular groove remains visible outside the sleeve to indicate the improper coupling condition.

Abstract

In a rapid coupling, a pipe nipple engages a through hole of a socket. A first annular groove provided on the pipe nipple serves to catch a locking ring provided in the socket, in order to lock the coupled condition. A sleeve is movable on the pipe nipple, the sleeve having an inner projection to be retained by the first annular groove of the pipe nipple in a pre-assembled condition. When the pipe nipple is inserted into the socket, the sleeve abuts the socket and is then moved along the pipe nipple until the inner projection is caught by a second annular groove if the coupling is properly locked. If the pipe nipple is not moved into the socket to such an extent that the locking ring is caught by the first annular groove, the second annular groove remains visible outside the sleeve to indicate the improper coupling condition.

Rapid Coupling

Field of Disclosure

[1] A rapid coupling comprising a socket and a pipe nipple having an insertion end adapted to be inserted into the socket and a first depression for locking the pipe nipple within the socket is known from WO 2005/05243. There, the pipe nipple is pushed into the socket against the force of a compression spring until a circumferential groove provided on the pipe nipple catches in a locking ring disposed within the socket. The compression spring is so dimensioned that it pushes the pipe nipple out of the socket as long as the coupling is not locked by the circumferential groove catching the locking ring. The annular groove thus remains visible outside of the socket thereby indicating that the coupling is not locked.

Summary

[2] It is the general object of the invention to overcome, at least in part, drawbacks as occur with comparable prior art rapid couplings. A more specific object may be seen to reside in the provision of a rapid coupling in which the locking condition between the pipe nipple and the socket can be detected by an inexpensive additional element.

[2a] Certain exemplary embodiments can provide a rapid coupling comprising: a socket; a pipe nipple having an insertion end adapted to be inserted into the socket and a first depression for locking the pipe nipple within the socket; and a sleeve adapted to be slid onto the pipe nipple, the sleeve having a formation adapted to be placed against the socket and an inner projection for engaging the first depression of the pipe nipple, wherein the pipe nipple has a second depression on the side remote from the insertion end, the second depression receiving the inner projection of the sleeve in the locked condition of the pipe nipple and the socket thereby rendering the locked condition recognizable in that the second depression retreats behind a front end of the sleeve.

[3] According to other embodiments a rapid coupling can include a socket and a pipe nipple having an insertion end adapted to be inserted into the socket and a first depression for locking the pipe nipple within the socket, wherein a sleeve adapted to be slid onto the pipe nipple is provided, the sleeve having a formation adapted to be placed against the socket and an inner projection for engaging the first depression of the pipe nipple, and the pipe nipple has a second depression on the side remote from the insertion end, the second depression receiving the inner projection of the sleeve in the locked condition of the pipe nipple and the socket. The sleeve is a simple and light-weight structural element which presents the following advantages over the known rapid coupling:

(a) The compression spring, which is present in the known rapid coupling and increases the required space within the coupling, is omitted. The coupling of the invention has a smaller overall length.

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(b) Because no spring force has to be overcome when the pipe nipple is moved into the socket, the coupling of the invention is more effortless to handle.

(c) The sleeve employed in the invention is disposed on the outer side of the pipe nipple and – other than the compression spring of the known coupling – does not contact the fluid being conducted.

(d) The sleeve has no influence on the interior design of the socket.

(e) The outer sleeve may be used to protect the socket of the coupling against dirt.

[4] In a preferred embodiment, both depressions on the pipe nipple are formed as annular grooves. The projection in the sleeve may be annular, the sleeve may have an outer projection for abutting the socket, and the outer projection may be an annular flange integral with the end of the sleeve. These features are particularly useful in view of its manufacture and handling.

[5] In another embodiment, the outer projection may be formed as a sealing lip on the periphery of the sleeve. In this case, the sleeve has the additional function of protecting the coupling against pollution.

[6] The sleeve may have two opposite cut-outs which leave the second depression of the pipe nipple visible in the locked condition of the coupling. This provides the sleeve with an elasticity advantageous for its functioning. In addition, the locking condition of the coupling is precisely visible.

[7] US 5,749,606 discloses a coupling which differs from that of the present invention in that the pipe nipple has no depression for locking the nipple within the socket, and the sleeve or retainer, which is slidable along the nipple, lacks an inner projection for engagement by such depression. This prior-art coupling thus has a considerably different structure and does not provide the advantages achieved by the invention.

Brief Description of the Drawings

[8] Embodiments of the invention will be explained below with reference to the drawings, wherein:

Fig. 1 shows the rapid coupling in the locked condition,

Fig. 2 shows the pipe nipple used in the coupling of Fig. 1,

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Figs. 3 and 4 show the sleeve used in the coupling of Fig. 1, and Figs. 5 and 6 show an alternative embodiment of the sleeve.

Detailed Description

[9] The rapid coupling shown in Fig. 1 has a socket **10**, a pipe nipple **11** adapted to be inserted into the socket, and a sleeve **12** slidable on the pipe nipple **11**.

[10] In accordance with Fig. 2, pipe nipple **11** is provided with a first annular groove **15** and a second annular groove **17** spaced therefrom and disposed on the side of the pipe nipple **11** remote from an insertion end **16**. The first annular groove **15** serves to catch a locking ring (not shown) disposed inside the socket and also to hold the sleeve **12** in a pre-assembled position. The second annular groove **17** serves as an indicator for the locking condition of the coupling.

[11] The sleeve **12** shown in Figs. 3 and 4 has at its one end an outward projecting flange **20** which abuts the socket **10** in the assembled condition of the coupling. Near its opposite end inside the sleeve **12** there is an annular projection **21** which is so dimensioned that it can catch in the annular grooves **15**, **17**. At this end, the sleeve **12** further has two opposite cut-outs **22** which extend beyond the axial width of the projection **21**. These cut-outs are necessary for the projection **21** to catch in the annular grooves **15** and **17**.

[12] When assembling the coupling, the sleeve **12** is first mounted on the pipe nipple **11** until it is caught by the first annular groove **15** and retained there. The pipe nipple **11** is pushed into the socket **10** until the first annular groove **15** is caught by the locking ring disposed inside the socket **10**, thereby locking the coupling. During this movement, the sleeve **12** first abuts with its flange **20** at the end wall of the socket **10** and is then pushed along the pipe nipple **11**.

[13] In the locked condition, in which the locking ring is caught by the first annular groove **15** of the pipe nipple **11**, the inner projection **21** is caught by the second annular groove **17**. This is recognizable by the fact that the second annular groove **17** disappears in the sleeve **12**. In addition, the catching of the projection **21** of the sleeve **12** by the second annular groove **17** becomes visible in the area of the cut-outs **22**. If the annular groove **17** is visible after the assembly, this indicates that the assembling process was incomplete.

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[14] In addition to this indicator function, the cut-outs **22** give the sleeve **12**, which may be made of metal or plastic, a certain elasticity so that the sleeve **12** is retained on the pipe nipple **11** also outside the annular grooves **15**, **17**.

[15] To release the coupling, the pipe nipple **11** is pulled out of the socket **10**. The release process is done with a release tool which may take the form shown for instance in Fig. 12 of EP 0 467 381. After the sleeve **12** has been pushed back, the two tubular halves of that tool may be inserted in the gap between the pipe nipple **11** and the opening of the socket **12** to release the locking ring from the first annular groove **15**.

[16] The same release tool may be used for pushing the sleeve **12** from the annular groove **17** back into annular groove **15**. This permits a multiple use of the sleeve **12**.

[17] In the alternative embodiment of Figs. 5 and 6, the end flange of the sleeve **12** is replaced by an outer sealing lip **30** spaced from the end of the sleeve which sealing lip not only serves as a limit stop at the end of the socket **10** but additionally provides a protection against the entry of dirt into the inside of the coupling.

Preference Numbers

10	Socket
11	pipe nipple
12	Sleeve
15	first annular groove
16	insertion end of the pipe nipple 11
17	second annular groove
20	Flange
21	Projection
22	cut-outs
30	sealing lip

Claims:

1. A rapid coupling comprising:
a socket;
a pipe nipple having an insertion end adapted to be inserted into the socket and a first depression for locking the pipe nipple within the socket; and
a sleeve adapted to be slid onto the pipe nipple, the sleeve having a formation adapted to be placed against the socket and an inner projection for engaging the first depression of the pipe nipple,
wherein the pipe nipple has a second depression on the side remote from the insertion end, the second depression receiving the inner projection of the sleeve in the locked condition of the pipe nipple and the socket thereby rendering the locked condition recognizable in that the second depression retreats behind a front end of the sleeve.
2. The rapid coupling of claim 1, wherein both depressions on the pipe nipple are formed as annular grooves.
3. The rapid coupling of claim 1 or 2, wherein the projection in the sleeve is annular.
4. The rapid coupling of any one of claims 1 to 3, wherein the sleeve has an outer projection for abutting the socket.
5. The rapid coupling of claim 4, wherein the outer projection is an annular flange integral with an end of the sleeve.
6. The rapid coupling of claim 4, wherein the outer projection is formed as a sealing lip on the periphery of the sleeve.

7. The rapid coupling of any one of claims 1 to 6, wherein the sleeve is slotted at an end thereof that is remote from the socket.

8. The rapid coupling of claim 7, wherein the sleeve has two opposite cut-outs for leaving the second depression of the pipe nipple visible in the non-locked condition of the coupling.

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FIG 1

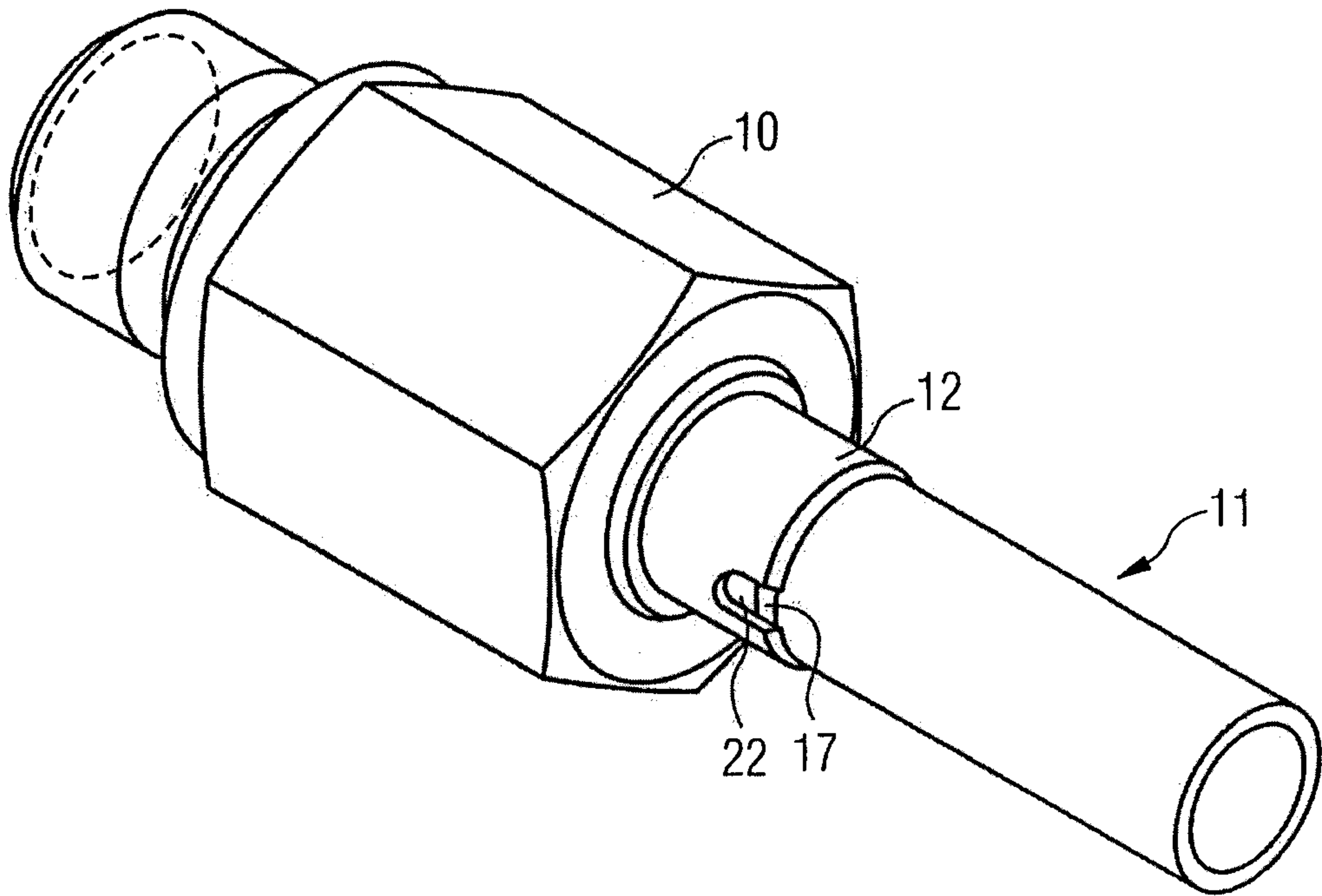


FIG 2

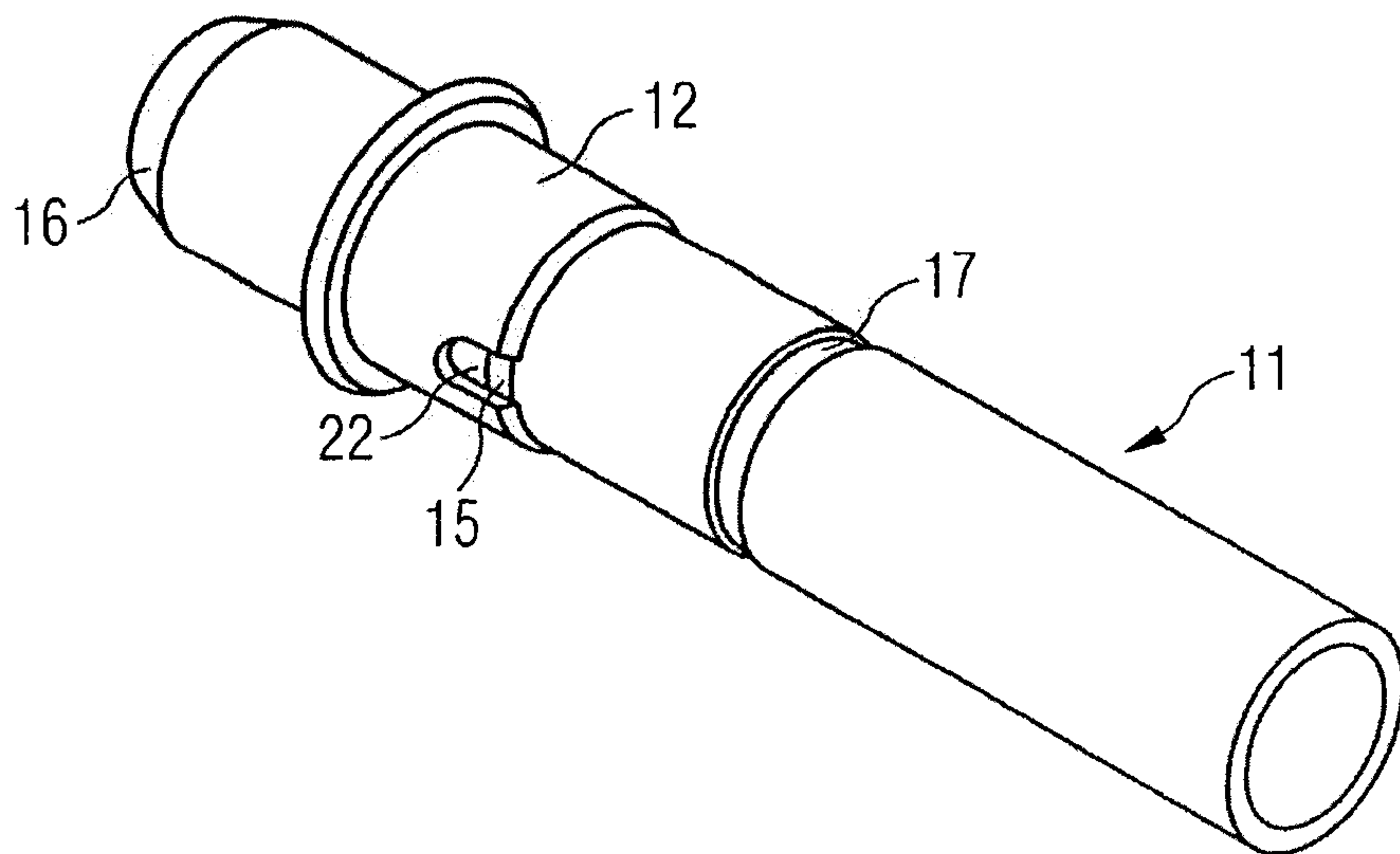


FIG 3

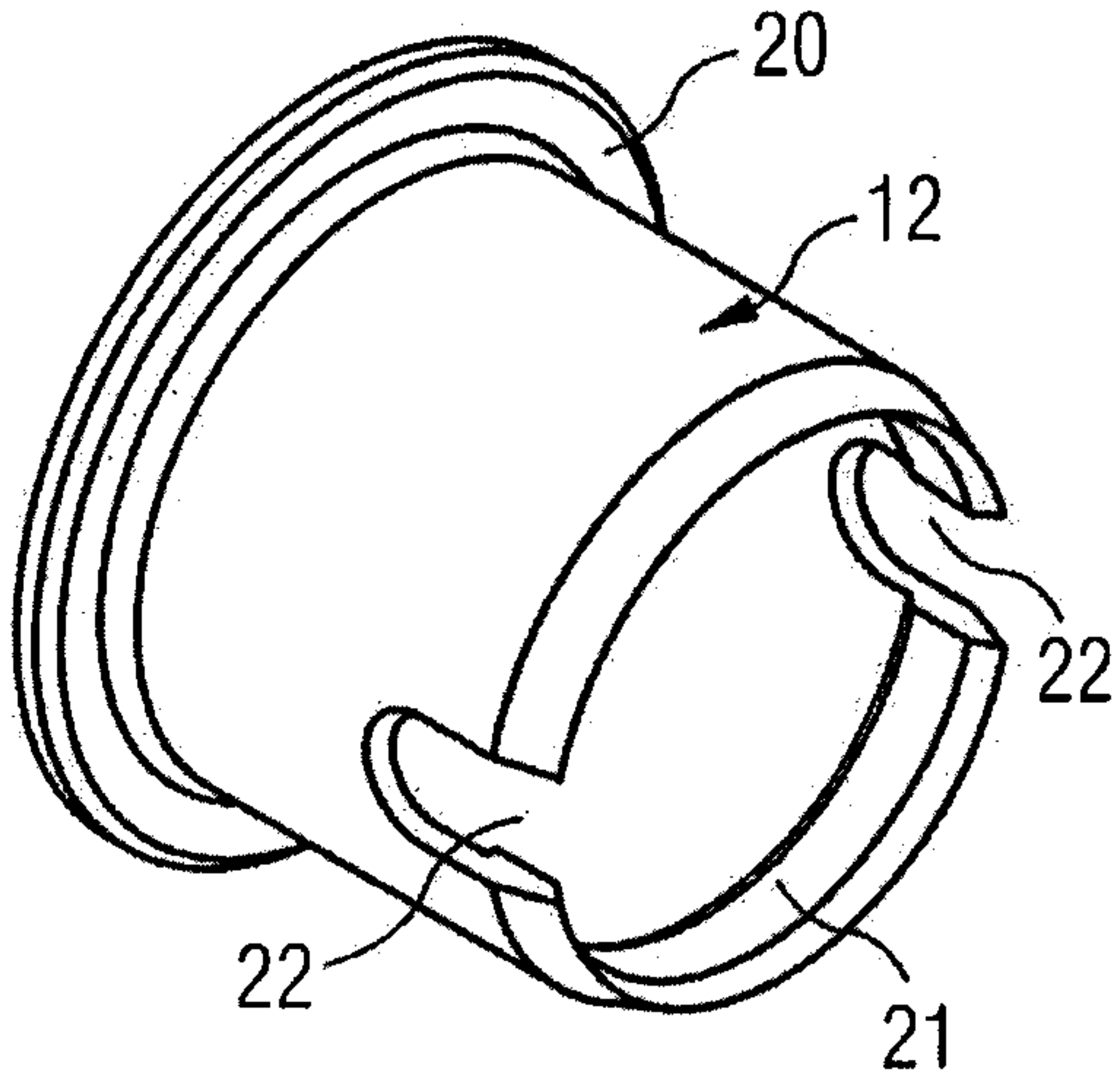


FIG 5

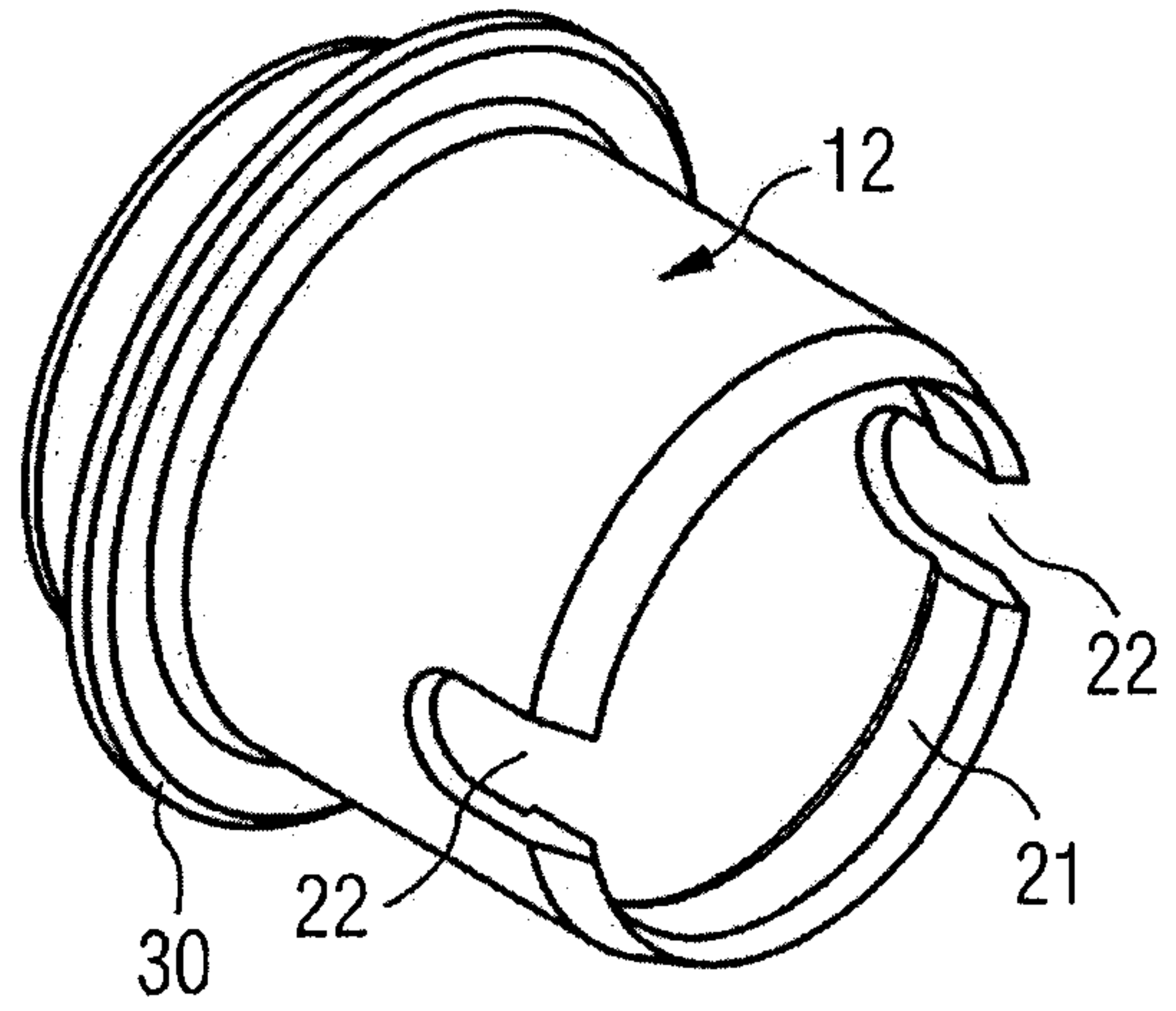


FIG 4

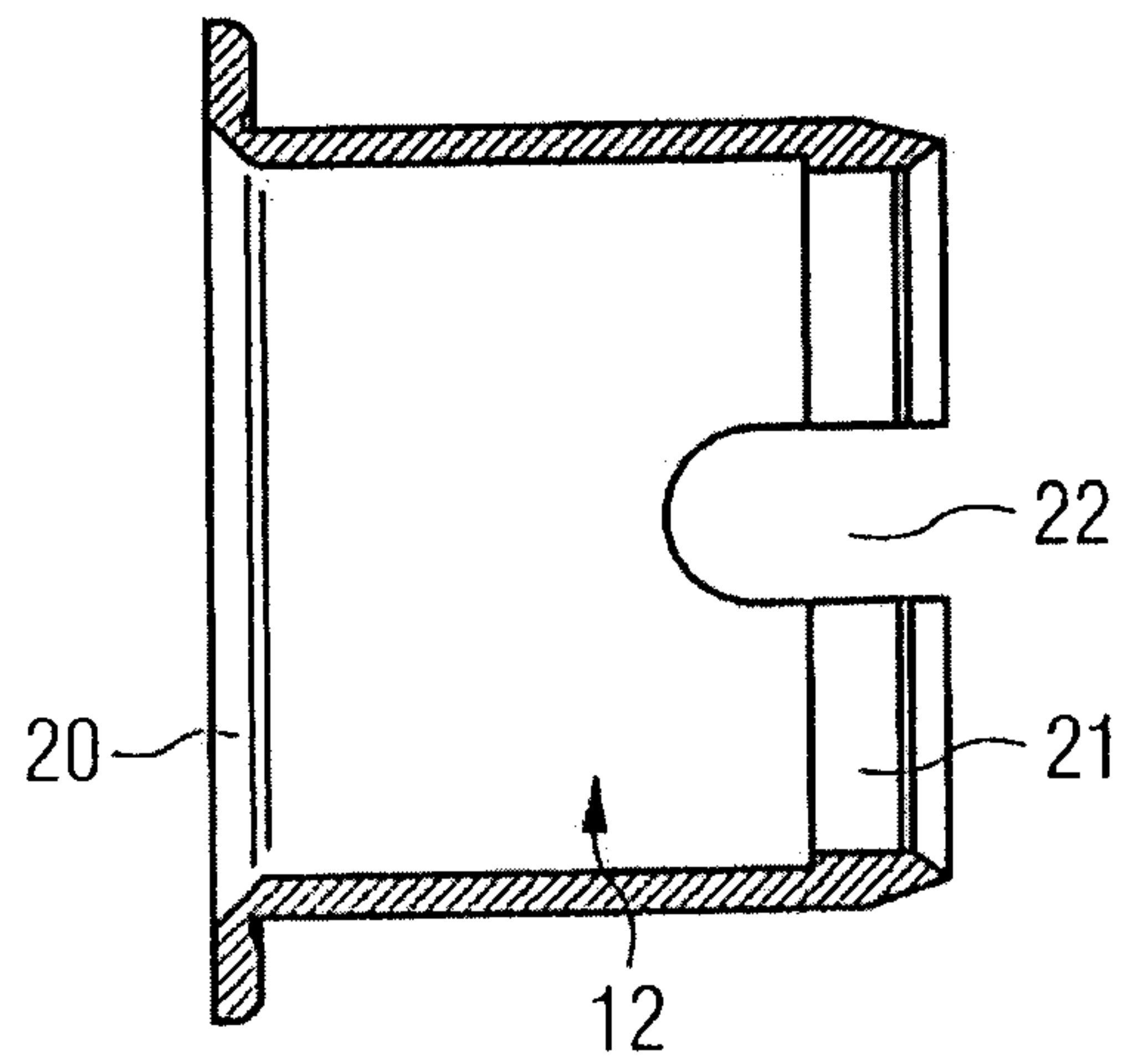


FIG 6

