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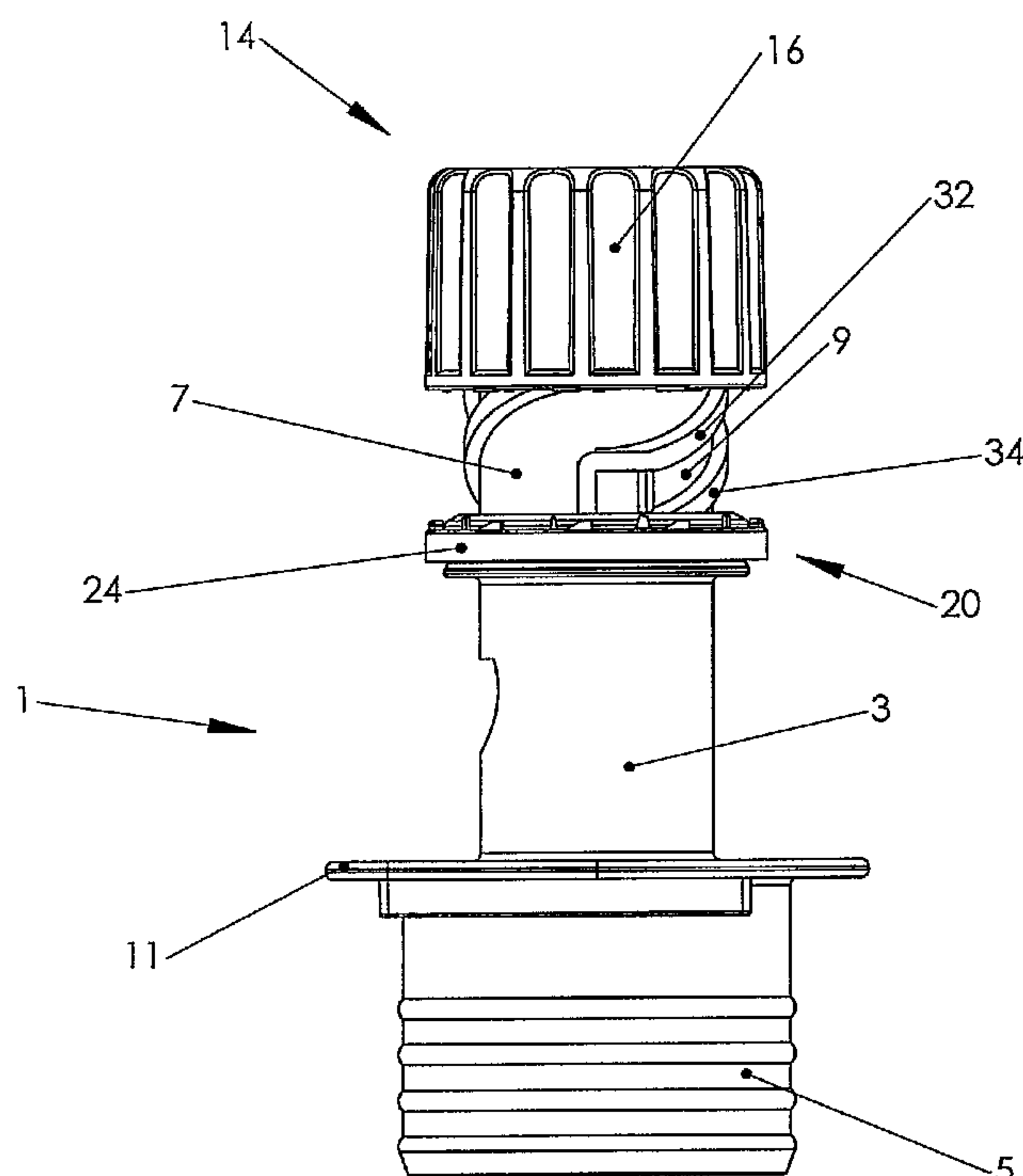
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(54) Title: DELIVERING TAP AND PROCESS FOR MANUFACTURING SUCH TAP



(57) Abrégé/Abstract:

A delivering tap (1) is disclosed for a liquid vessel of the "bag in box" type comprising: a substantially cylindrical elongated body (3) equipped with an end (7) comprising cam means (9) and a plane abutting member (11) against the vessel; and a plug (14) comprising a cylindrical end (15) and an operating knob (16) operatively connected to the body (3). The plug (14) is made in a single piece; the plug (14) is equipped with tamper-preventing warranty sealing means (20) adapted to signal a possible tampering of said tap when opening; and the body (3) is equipped with housing means (22) adapted to contain the tamper-preventing warranty sealing means (20). A process is also disclosed for manufacturing such tap (1).



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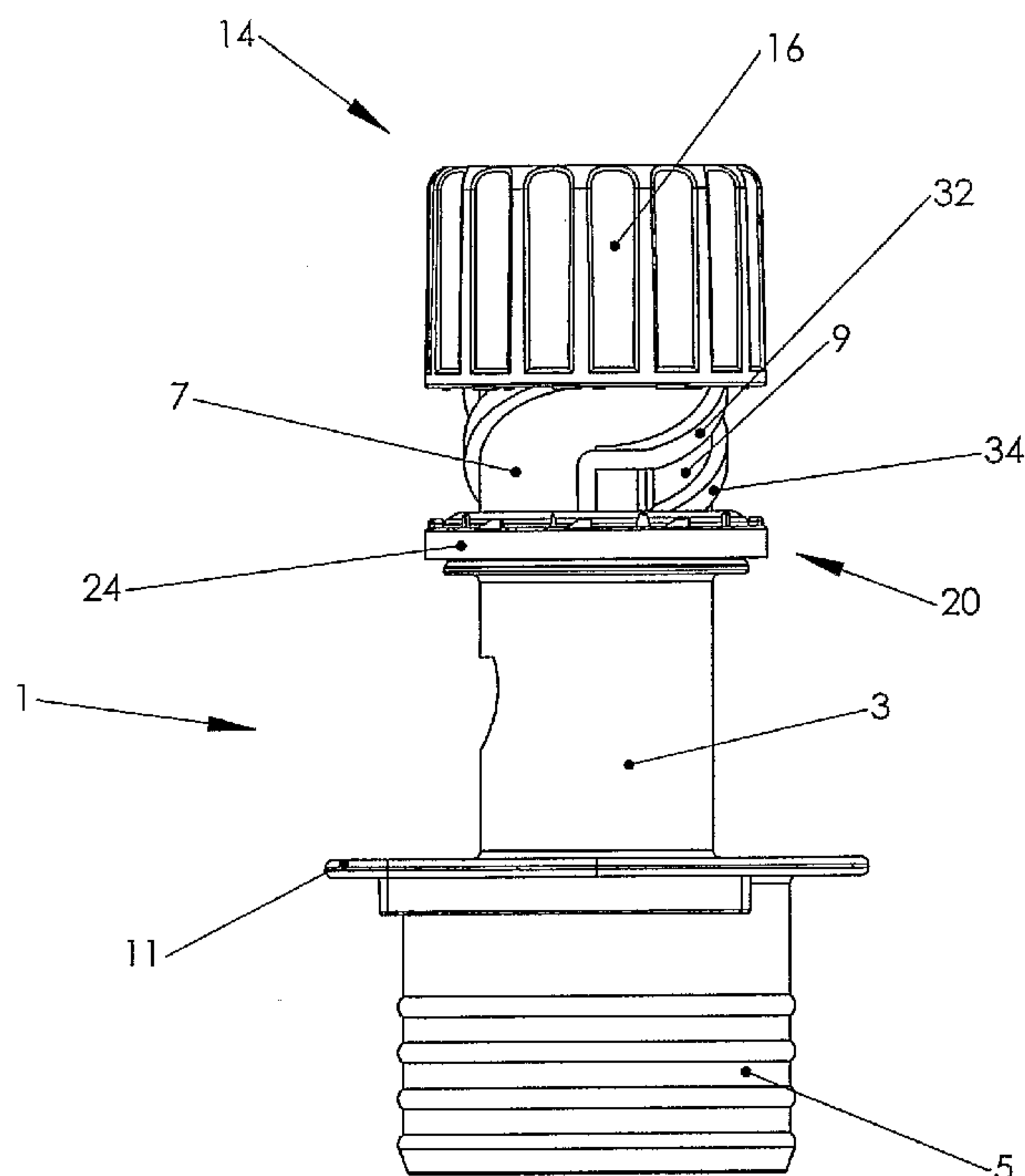
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(54) Title: DELIVERING TAP AND PROCESS FOR MANUFACTURING SUCH TAP



(57) Abstract: A delivering tap (1) is disclosed for a liquid vessel of the "bag in box" type comprising: a substantially cylindrical elongated body (3) equipped with an end (7) comprising cam means (9) and a plane abutting member (11) against the vessel; and a plug (14) comprising a cylindrical end (15) and an operating knob (16) operatively connected to the body (3). The plug (14) is made in a single piece; the plug (14) is equipped with tamper-preventing warranty sealing means (20) adapted to signal a possible tampering of said tap when opening; and the body (3) is equipped with housing means (22) adapted to contain the tamper-preventing warranty sealing means (20). A process is also disclosed for manufacturing such tap (1).

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DELIVERING TAP AND PROCESS FOR MANUFACTURING SUCH TAP

The present invention refers to a delivering tap and to a process for manufacturing such tap, in particular to a process for manufacturing the plug of such tap.

Taps are known in the art for delivering liquids, in particular of the type used for vessels called "bag in box". Such vessels are composed of two external boxes, usually made of cardboard, inside which there is a bag containing the liquid to be delivered, to which bag usually a mouth, which is used for anchoring and constraining the delivering tap, is thermally welded.

An example of such prior art tap 50 is shown in Fig. 8 and is marketed by Conro Precision in Cape Town, South Africa. The tap 50 is applied to the bag with liquid, by inserting the body inside it through the above-described mouth and, upon using it by the end user, it is made go out of the cardboard box through an hole, opened by operating on a pre-dinked part for such purpose. Then the tap 50 itself is actuated, by rotating the plug 52 with which it is equipped around a cam end 56.

These taps 50, though being simple from the constructive point of view, however have two types of deficiencies:

- 1) they are not equipped with warranty elements or seals, which signal tampering or unauthorised access attempts; and

- 2) the plug 52 with which they are composed is made

of two parts (52, 54), thereby increasing the number of pieces and the end product cost, which instead, due to its manufacturing simplicity, should be kept as low as possible. Plugs are marketed in which the part 54 is not placed on the part 52, but such plugs have aesthetic problems, since in this way the injection spot of the part 52 remains visible from the outside.

Object of the present invention is solving the above prior art problems, by providing a delivering tap which is equipped with warranty seals that state its lack of unauthorised opening and is at the same time equipped with a head made of a single piece, reducing the number of pieces and the related end cost. Such tap, moreover, being of a shorter thickness, removes problems of anomalous shrinkages of plastic materials, with a consequent better quality warranty of the moulded piece and the end product (complete tap), in addition to liquid tightness.

A further object of the present invention is providing a tap of the above-mentioned type which is equipped, in at least two of its critical points, with sealing surfaces that allow a seal which is at least the same as the one available in nowadays known plugs.

A further object of the present invention is providing a tap of the above-mentioned type, whose head is realised through an injection moulding process, which in this case is innovative and allows removing one piece from the end product, optimising manufacturing costs and times. Such moulding further allows improving the tap aesthetic appearance, since it almost completely reduces (making it unable to be perceived) the injection spot that in the prior art had to be covered by part 54.

A further object of the present invention is

providing a tap of the above-mentioned type which is equipped of a particular geometry of the plug sliding cam, which is improved with respect to the prior art.

The above and other objects and advantages of the invention, as will appear from the following description, are reached by a delivering tap and by a process for manufacturing such tap as claimed in the respective independent claims. Preferred embodiments and non-trivial variations of the present invention are the subject matter of the dependent claims.

The present invention will be better described by some preferred embodiments thereof, provided as a non-limiting example, with reference to the enclosed drawings, in which:

- Figure 1 is a perspective view of an embodiment of the tap according to the present invention in an open position;
- Figure 2 is a side view of the tap of Fig. 1;
- Figure 3 is a sectional view of the tap of Fig. 1 and 2;
- Figure 4 is an exploded perspective view of the tap of Fig. 1;
- Figure 5 is a sectional view of the tap of Fig. 4;
- Figure 6 is a sectional view similar to Fig. 3, but with the tap in a closed position;
- Figure 7 is a detailed view of the actuating cam of the inventive tap;
- Figure 8 is an exploded side view of a prior art tap;
- Figure 9 is a sectional view of the inventive tap which points out a sealing variation thereof;
- Figure 10 is a detailed view of Fig. 9; and

- Figure 11 is a further detailed view of Fig. 9.

With reference to the Figures, a preferred embodiment of the tap of the present invention is shown and described. It will be immediately obvious that numerous variations and modifications (for example related to shape, sizes and parts with equivalent functionality) can be made to the described tap, without departing from the scope of the invention as appears from the enclosed claims.

According to the Figures, the improved delivering tap 1 of the invention, particularly for a liquid vessel of the "bag in box" type (not shown), substantially comprises:

- a substantially-cylindrical elongated body 3 equipped with an end 5 comprising rings adapted to perform a seal on a mouth (not shown) with which the vessel bag is equipped, and with an opposite end 7 comprising cam means 9, in which the elongated body 3 further comprises a planar member 11 placed in a plane which is perpendicular to an axis of the body 3; and
- a plug 14 comprising a cylindrical end 15 and an operating knob 16 equipped with engaging means 18 of the cam means 9, in which the plug 14 is adapted to be operatively connected to the end 7 of the body 3 in order to assume, upon a driving from the cam means 9, an opening position in which liquid contained in the vessel is delivered and a closing position of the vessel.

The major characteristics of the inventive delivering tap 1 are that the plug 14 is made in a single piece; the plug 14 is equipped with tamper-preventing warranty sealing means 20 adapted to signal a

possible tampering when opening the tap; and the body 3 is equipped with housing means 22 adapted to contain the tamper-preventing warranty sealing means 20.

In particular, but not in a limiting way, as shown, the tamper-preventing warranty sealing means 20 are composed of at least one ring 24 which surrounds the cylindrical end 15 and is connected to the knob 16 through a plurality of connecting members 26: such connecting members 26 are adapted to be detached from the knob 16 and/or the ring 24 upon firstly rotating the plug 14 when opening.

Moreover, the housing means 22 of the tamper-preventing warranty sealing means 20 are composed of at least one groove adapted to immovably house the ring 24.

A tap can be thereby realised which is inexpensive, easy to assemble and which guarantees the end user with respect to authenticity of delivered liquid, demonstrating the lack of its tampering when there is the related seal.

The tap 1 as described above weighs less than the prior art taps, given the lower use of material (plastics) of which it is composed and given the presence of a shorter moulding cycle.

Moreover, Fig. 7 shows a detail of the geometry of the cam 9 of the body 3 of the inventive tap 1. Such cam 9 is lightened with respect to the one in known taps, which further optimises the amount of used material and therefore the related moulding cycles, which, by becoming quicker, also optimise the manufacturing costs. Moreover, such geometry decreases the thicknesses (important aspect in this type of taps) decreasing the risk of anomalous post-moulding shrinkages, with consequent improvement of piece quality, above all in

the area that can be found near the front area, which is the most important for the liquid seal. Lightening of the cam 9 is obtained by building the cam 9 itself through two walls 32, 34 projecting outwards from the surface of the end 7 of the body 3 and spirally wound around the end 7 itself. Such end 7 is thereby made with the same diameter of the corresponding parts of prior art taps 50 (for example see reference 56 in Fig. 8), but discharging, with respect to prior art taps 50, the cylindrical cam areas which were previously made thick. In practice, the thickness of the inventive cam 9 allows avoiding anomalous shrinkages, while the two walls 32, 34 have been made grow by a necessary amount to allow the accurate and safe sliding of the small tooth, which will transform the rotary movement also in a translating movement, and allows opening the plug through an accurate sliding.

Moreover, in order to guarantee an optimum seal at least equal to the one guaranteed by known taps, the inventive tap 1 provides, in addition to the mutual operating engagement of body 3 and cylindrical end 15 through their respective elongated cylindrical surfaces which guarantee an optimum seal every time, also the fact that the body 3 and the cylindrical end 15 of the plug 14 are in mutual contact in at least two sealing points (B, D in Fig. 9). As can be well seen in Fig. 10 and 11, in each one of said sealing points (B, D), the body 3 surface in contact with the cylindrical end 15 is plane and the cylindrical end 15 surface in contact with the body 3 is spherical. This guarantees a further seal in critical positions of the tap 1.

As mentioned above, the inventive tap 1 also provides realising the related plug 14 in a single

piece, reducing the number of component parts and improving the aesthetics (and above all reducing or removing some manufacturing steps) such as the injection spots that are present in prior art taps. The process which allows manufacturing such plug 14 in a single piece provides the use of an injection-moulding process whose use in this field is wholly new. Such process, first of all, provides, in order to make the body 3, common injection-moulding steps of the body 3 itself.

The process further comprises, in order to mould the plug 14, the steps of:

- providing an injection mould (not shown) composed of two half-moulds, in which one of the half-moulds is fixed and has inserted an injector or injecting bush (not shown), while another of the half-moulds is movable and has inserted an expulsion device (not shown): the plug 14 to be moulded is placed next to the separation surface between the half-moulds;
- closing the injection mould;
- performing the injection of material for making the plug 14;
- opening the mould, firstly next to a separating area of the half-moulds;
- moving the movable half-mould away;
- simultaneously with the step of moving the movable half-mould away, dragging outwards the saddles, connected, through slanted pegs, to the movable half-mould, which saddles are used for making the sealing means 20, thereby freeing the sealing means 20;
- simultaneously with dragging the saddles, freeing a

front part of the plug 14, since to the fixed half-mould a female member is connected, which remains unmoving, and therefore goes away from the moving half-mould (not shown), in which two insert members are inserted (which, being integral with the female member will remain inserted in the female member itself and unmoving on the fixed mould side), whose function is creating, during coupling with the external male part (not shown) being present on the movable half-mould, the internal teeth of the knob 16 of the plug 14 and to tear away an end part of the injection spot (not shown);

- simultaneously to freeing, dragging, through the movable half-mould and by means of a connecting member between the two half-moulds, the intermediate male part (not shown) being present on the fixed mould part, by means of a mould plate (not shown), thereby realising a first forward advancement of the plug 14;
- going on opening the mould, a hydraulic extractor (not shown), connected to a rear mould area, will operate on mould members adapted to completely free the plug 14 from the inserts being present on the fixed half-mould; and
- completing the mould closure through the hydraulic extractor which, being anchored to the rear mould part through a threaded bar (not shown), drags in an opposite movement various plates and small tables completing the closure.

Some preferred embodiments of the present invention have been previously shown and described: obviously, numerous variations and modification, functionally equivalent to the previous ones, will be immediately

clear to the skilled people in the art and will fall within the scope of the invention as pointed out by the enclosed claims. For example, the tap 1, previously shown in a version with horizontal installation and use (namely, delivery) with respect to the box-shaped vessel to which it is applied, can also be realised in a version with horizontal installation but vertical use (namely, delivery), by only suitably configuring the outlet plug in a known way (and therefore not shown). It is obvious that what has been described can be equally well applied to this further version of the inventive tap.

CLAIMS

1. Improved delivering tap (1), particularly for a liquid vessel of a "bag in box" type, comprising:

- a substantially-cylindrical elongated body (3) equipped with an end (5) comprising rings adapted to perform a seal on a mouth with which the vessel bag is equipped, and with an opposite end (7) comprising cam means (9), said elongated body (3) further comprising a planar member (11) placed in a plane which is perpendicular to an axis of said body (3); and
- a plug (14) comprising a cylindrical end (15) and an operating knob (16) equipped with engaging means (18) of said cam means (9), said plug (14) being adapted to be operatively connected to said end (7) of said body (3) in order to assume, upon a driving from said cam means (9), an opening position in which liquid contained in said vessel is delivered and a closing position of said vessel;

characterised in that:

- said plug (14) is made in a single piece;
- said plug (14) is equipped with tamper-preventing warranty sealing means (20) adapted to signal a possible tampering when opening said tap; and
- said body (3) is equipped with housing means (22) adapted to contain said tamper-preventing warranty sealing means (20).

2. Delivering tap (1) according to claim 1, characterised in that said tamper-preventing warranty sealing means (20) are composed of at least one ring

(24) which surrounds said cylindrical end (15) and is connected to said knob (16) through a plurality of connecting members (26), said connecting members (26) being adapted to be detached from said knob (16) and/or said ring (24) upon firstly rotating said plug (14) when opening.

3. Delivering tap (1) according to claim 2, characterised in that said housing means (22) of said tamper-preventing warranty sealing means (20) are composed of at least one groove adapted to immovably house said ring (24).
4. Delivering tap (1) according to claim 1, characterised in that said cam (9) is composed of two walls (32, 34), said walls (32, 34) being projecting outside a surface of said end (7) of said body (3) and being spirally wound around said end (7).
5. Delivering tap (1) according to claim 1, characterised in that said body (3) and said cylindrical end (15) of said plug (14) are in mutual contact in at least two sealing points (B, D), in each one of said sealing points (B, D) the surface of said body (3) in contact with said cylindrical end (15) being plane and the surface of said cylindrical end (15) in contact with said body (3) being spherical.
6. Process for manufacturing a delivering tap (1) according to claim 1, characterised in that it comprises the steps of:
 - Injection-moulding said body (3);
 - in order to mould said plug (14), providing an injection mould composed of two half-moulds, one of said half-moulds being fixed and having inserted an injector or injecting bush, another of said half-

- moulds being movable and having inserted an expulsion device, said plug (14) to be moulded being placed next to the separation surface between said half-moulds;
- closing the injection mould;
 - performing the injection of material for making said plug (14);
 - opening the mould, firstly next to a separating area of said half-moulds;
 - moving said movable half-mould away;
 - simultaneously with the step of moving said movable half-mould away, dragging outwards saddles, connected, through slanted pegs, to said movable half-mould, said saddles being used for making said sealing means (20), thereby freeing said sealing means (20);
 - simultaneously with dragging the saddles, freeing a front part of said plug (14), since to said fixed half-mould a female member is connected, in which two insert members are inserted, said insert members being integral with said female member and remaining inserted in said female member and unmoving on the fixed mould side, said insert members functioning to create, during coupling with the external male part being present on said movable half-mould, internal teeth of said knob (16) of said plug (14) and to tear away an end part of the injection spot;
 - simultaneously, dragging, through said movable half-mould and by means of a connecting member between the two half-moulds, the intermediate male part being present on the fixed mould part, by

means of a mould plate, thereby realising a first forward advancement of said plug (14);

- going on opening the mould, actuating a hydraulic extractor, connected to a rear mould area, in order to operate on mould members adapted to completely free said plug (14) from the inserts being present on said fixed half-mould; and
- completing the mould closure through the hydraulic extractor which, being anchored to the rear mould part through a threaded bar, drags in an opposite movement various plates and small tables completing the closure.

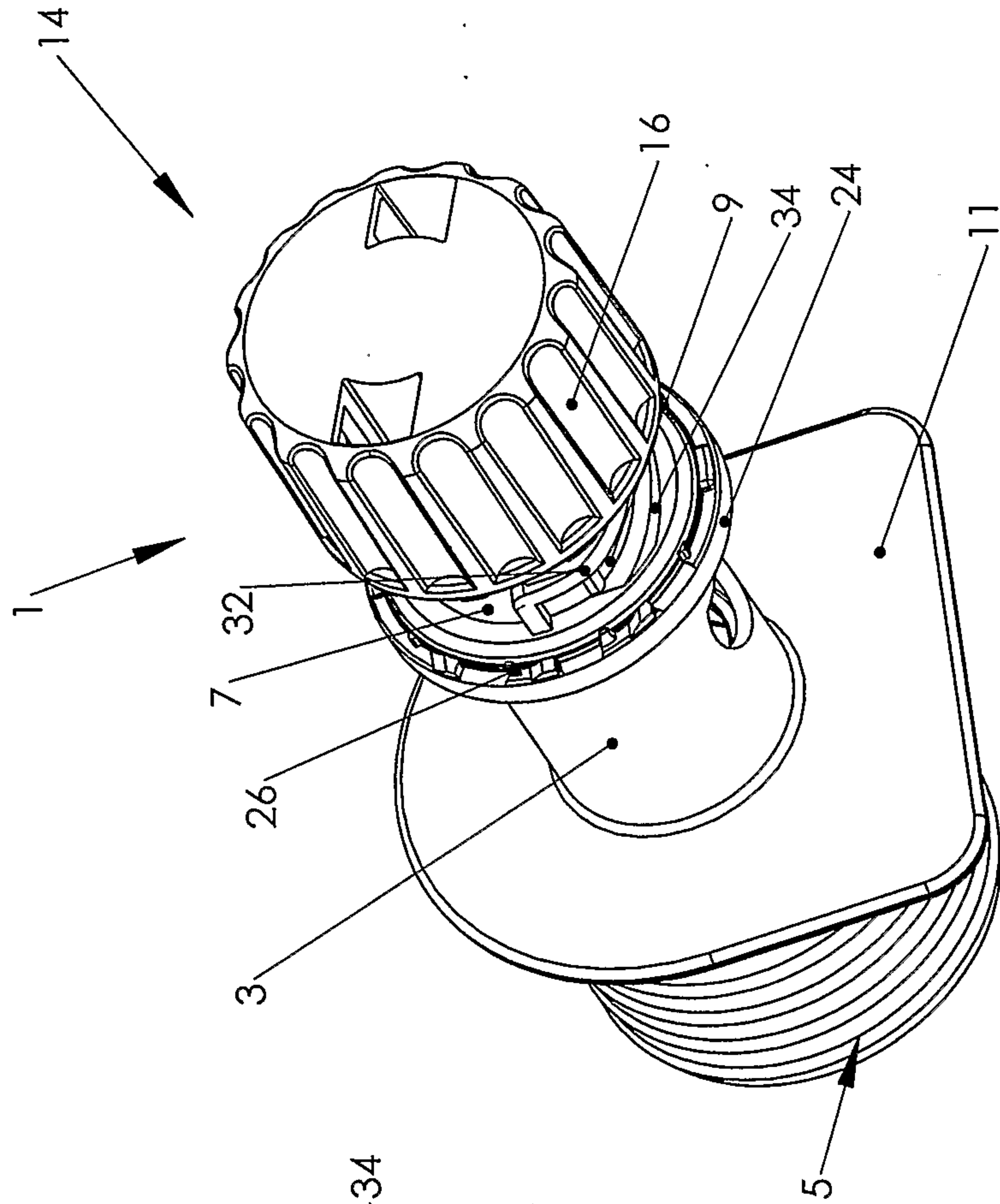


FIG. 1

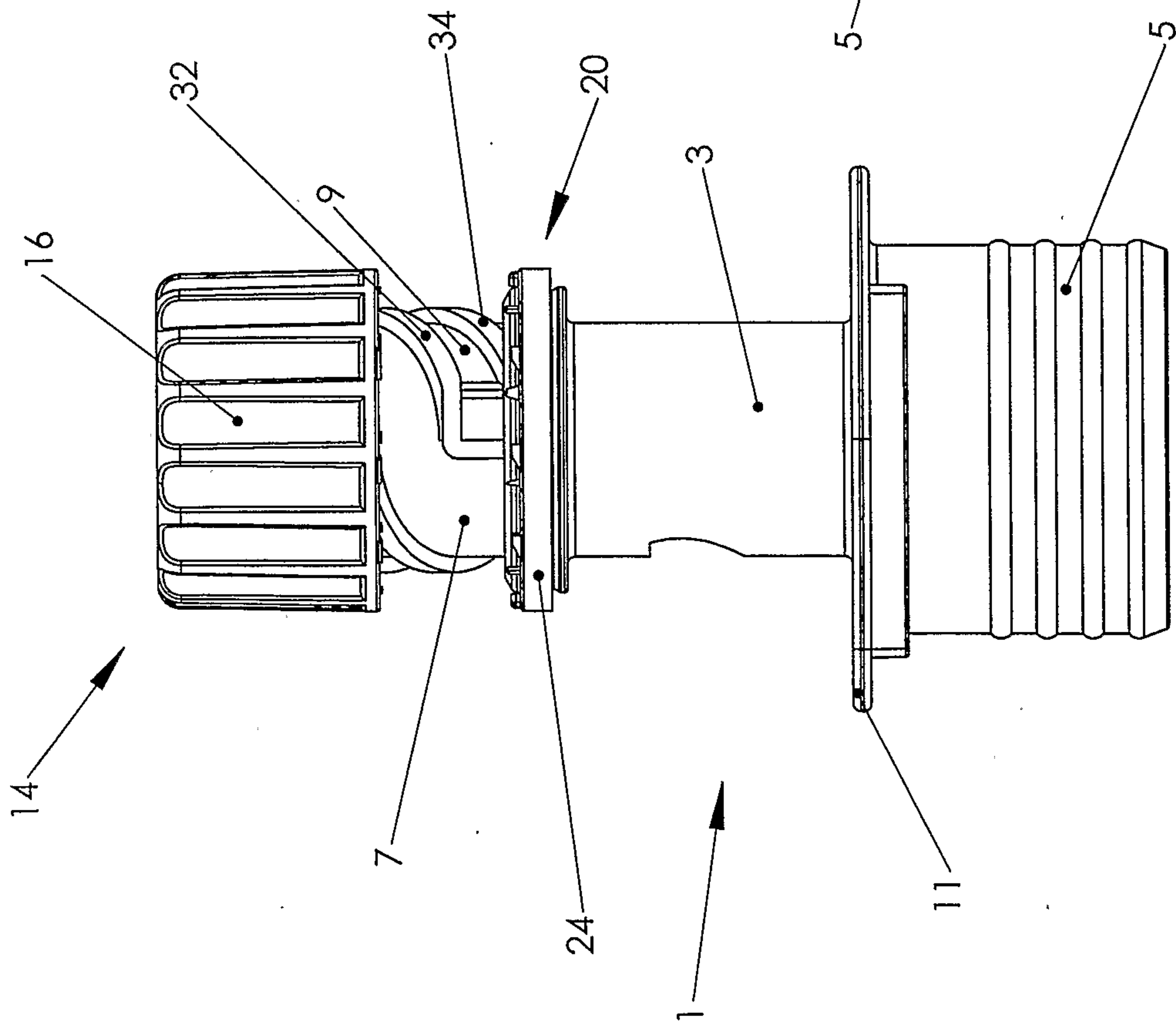


FIG. 2

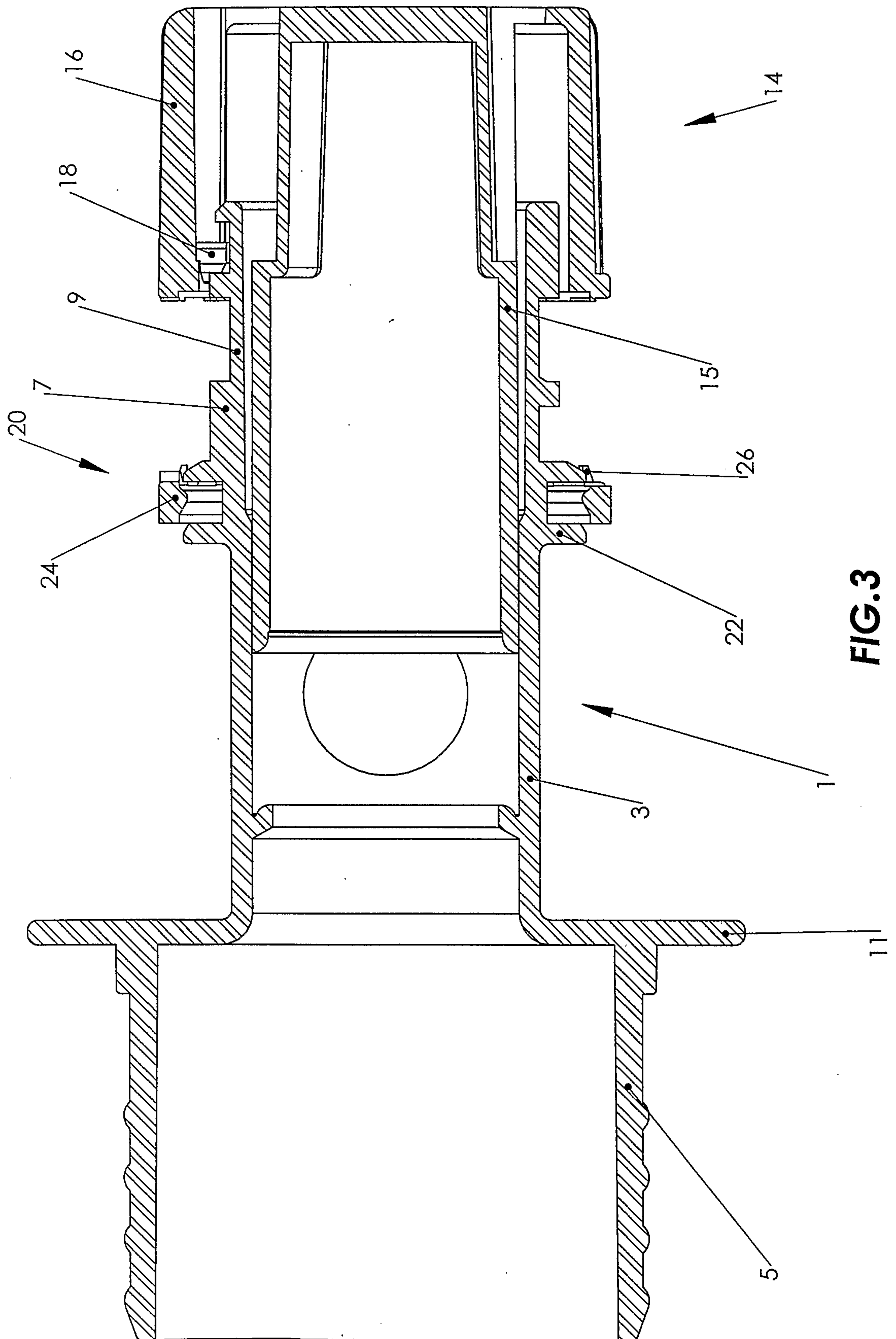
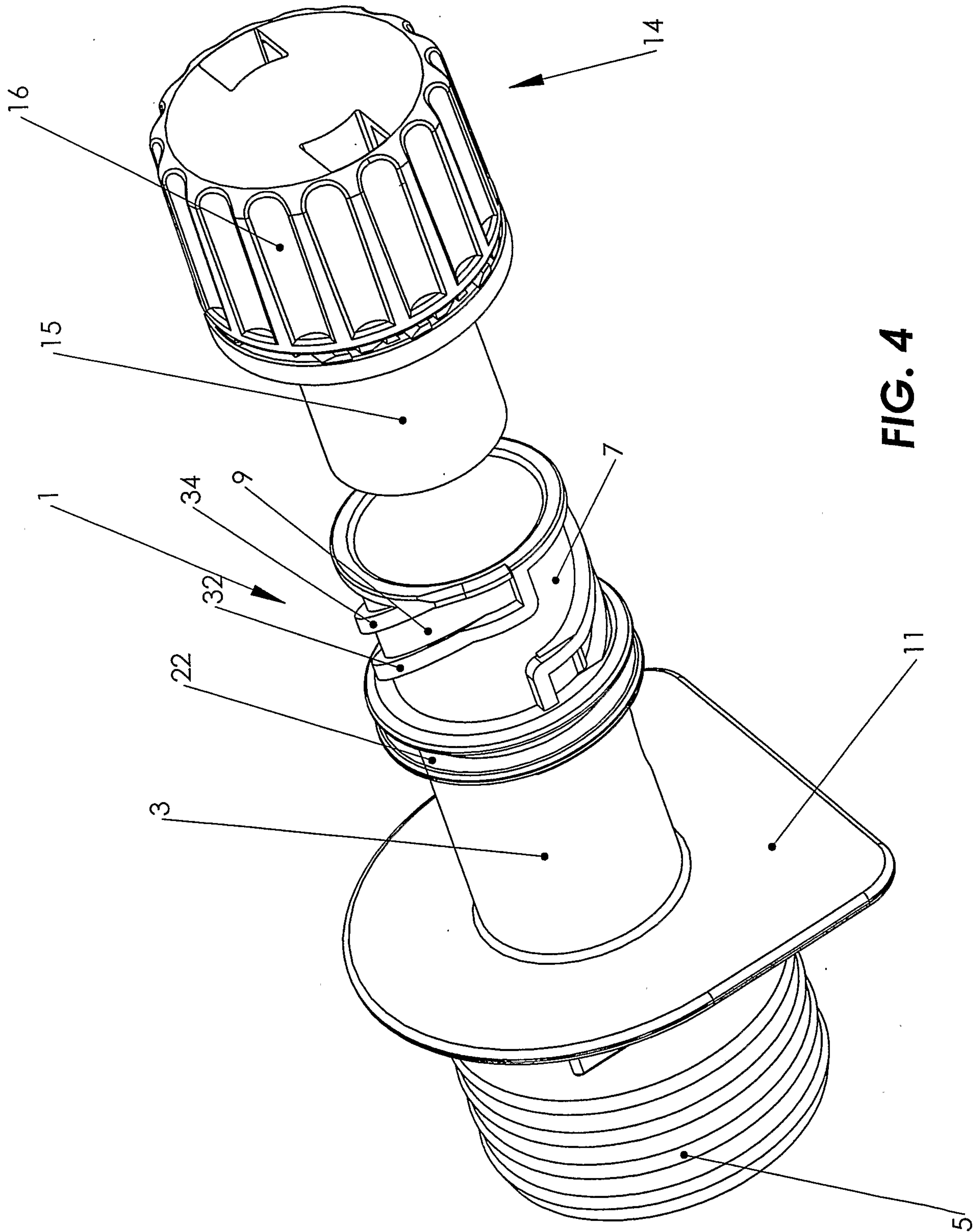


FIG. 3

**FIG. 4**

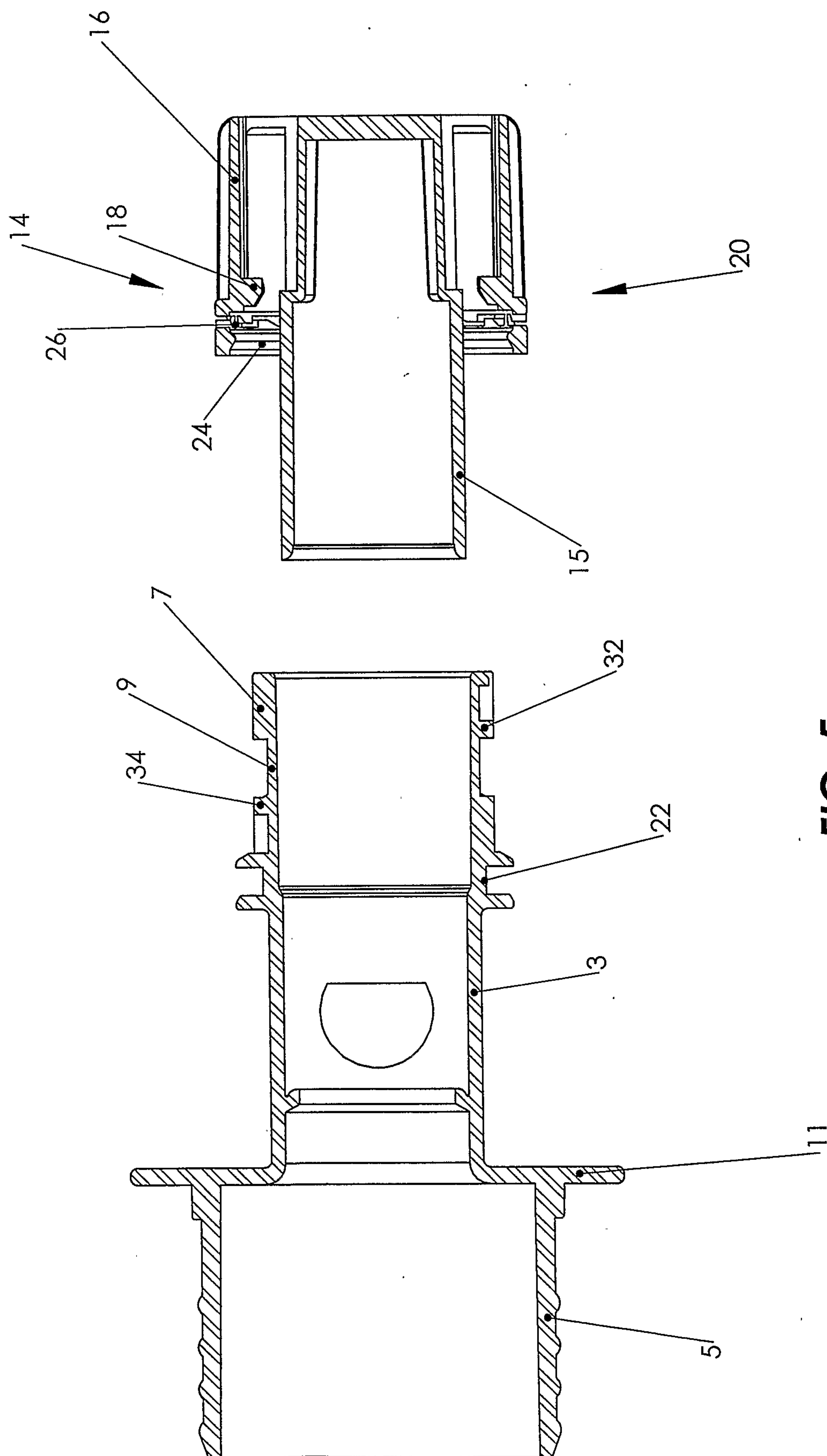
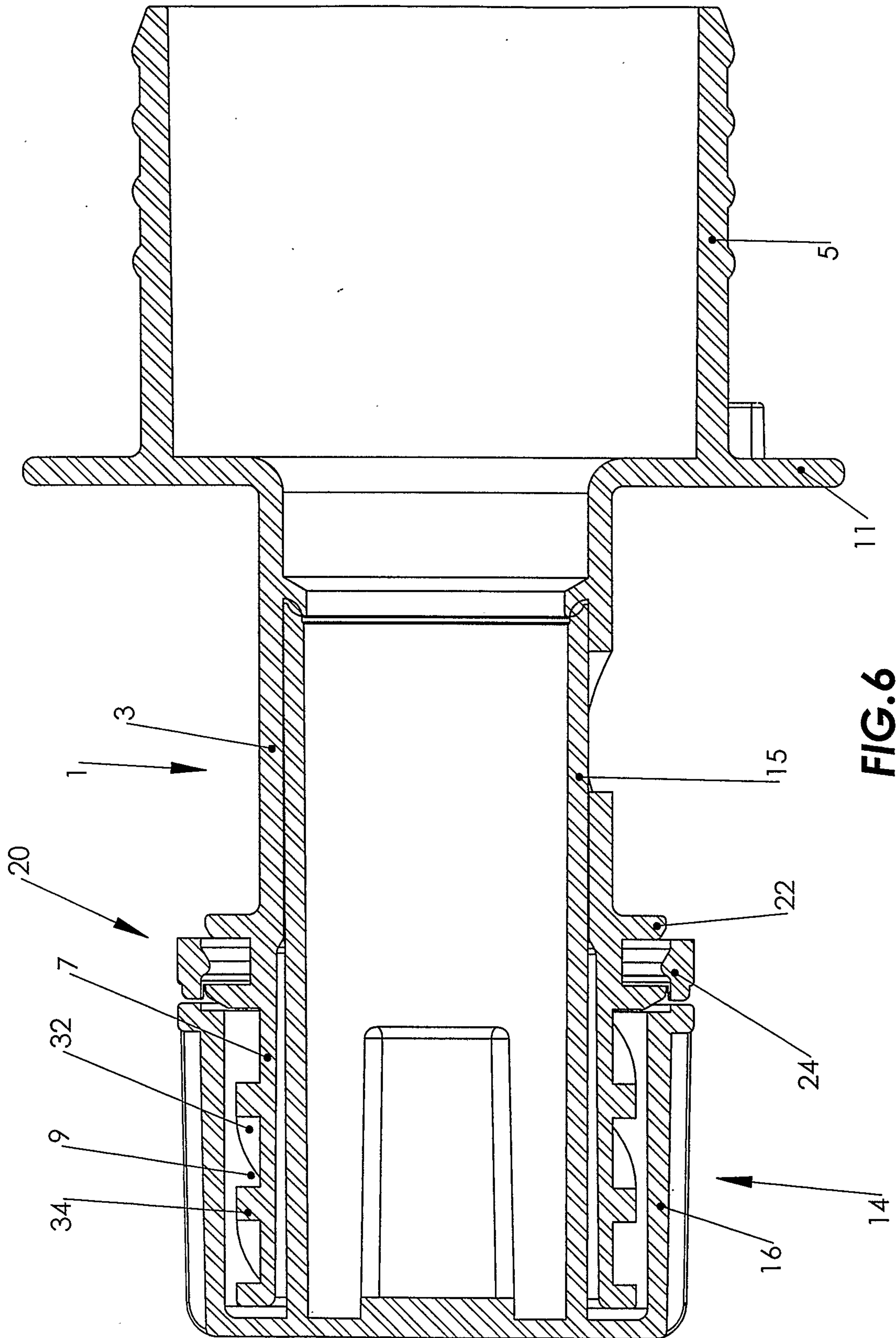
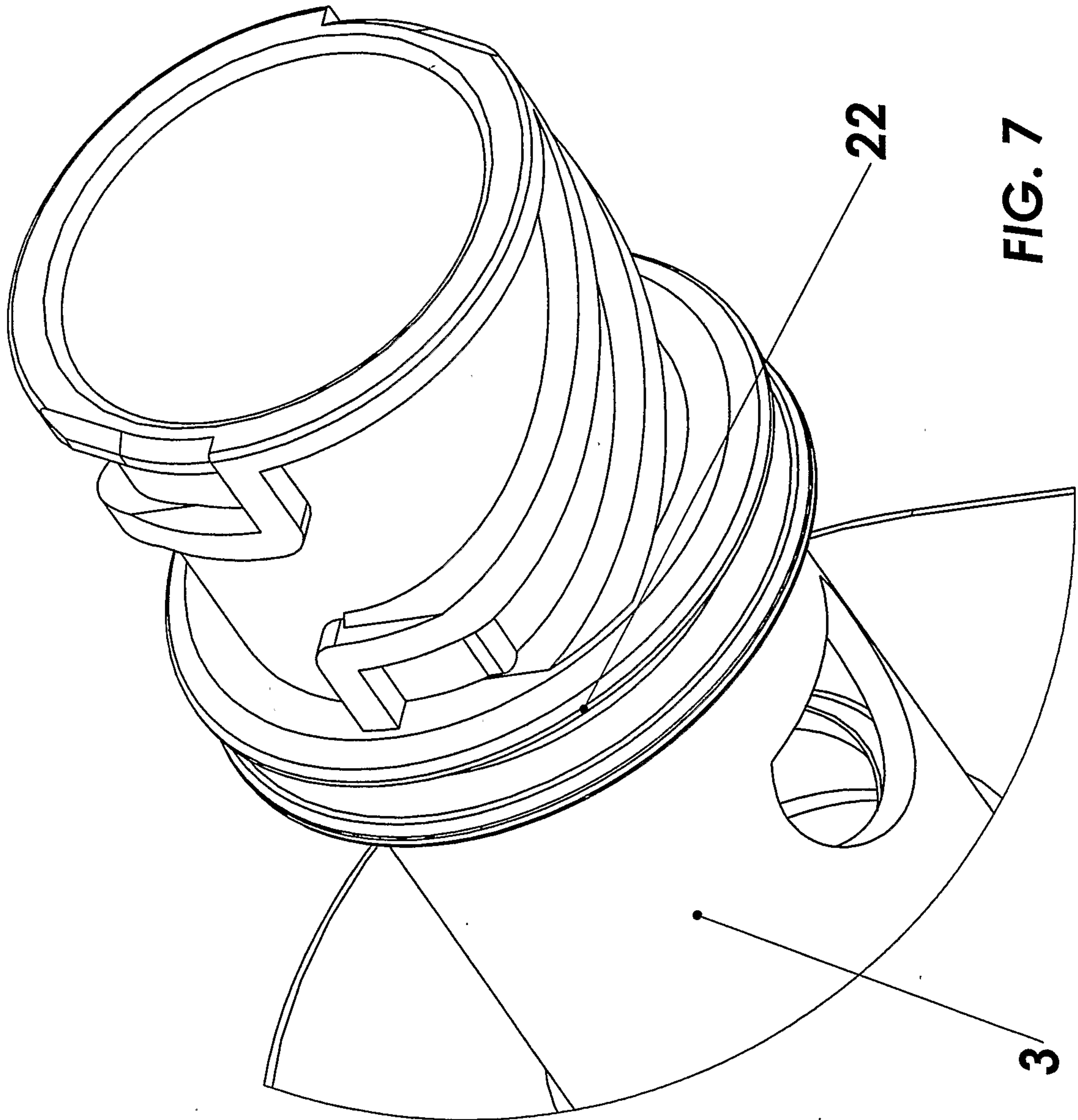
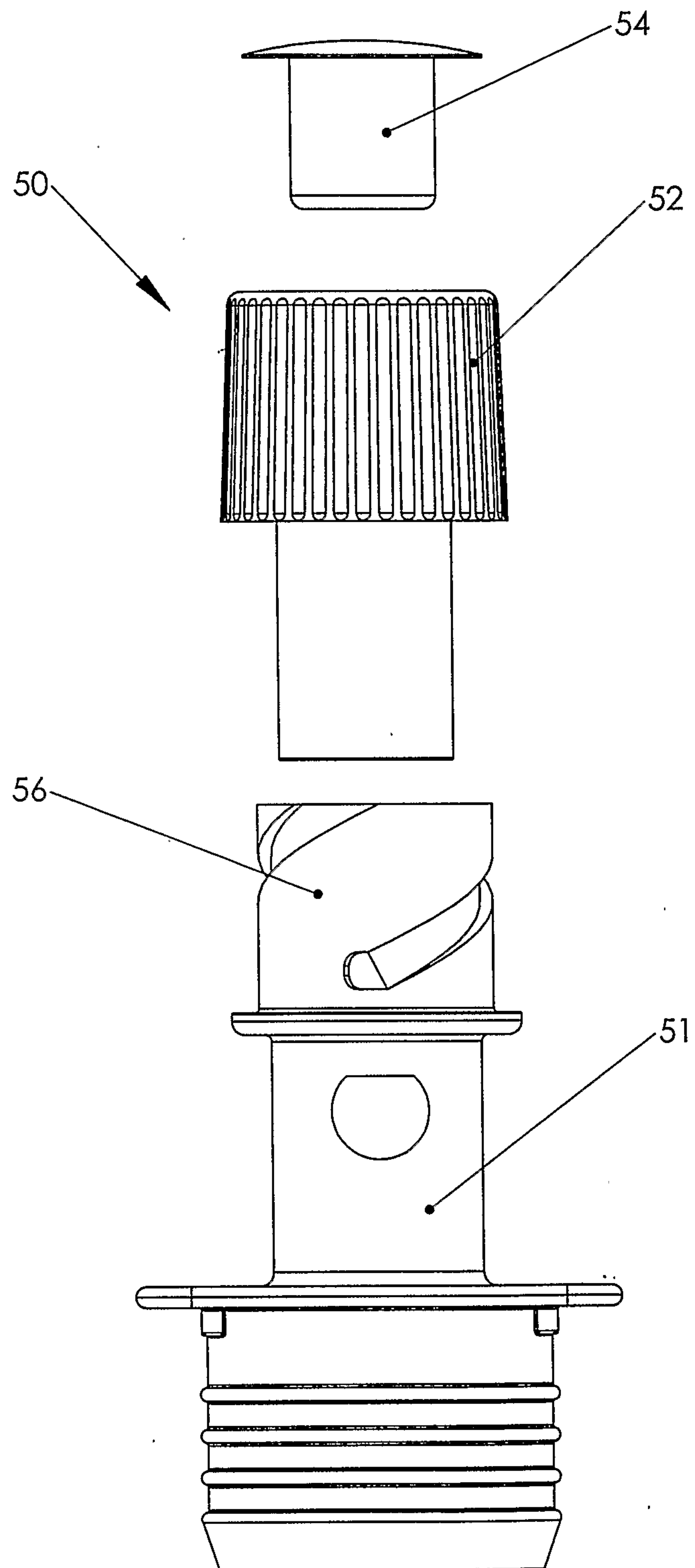


FIG. 5

**FIG. 6**



**FIG. 8**

