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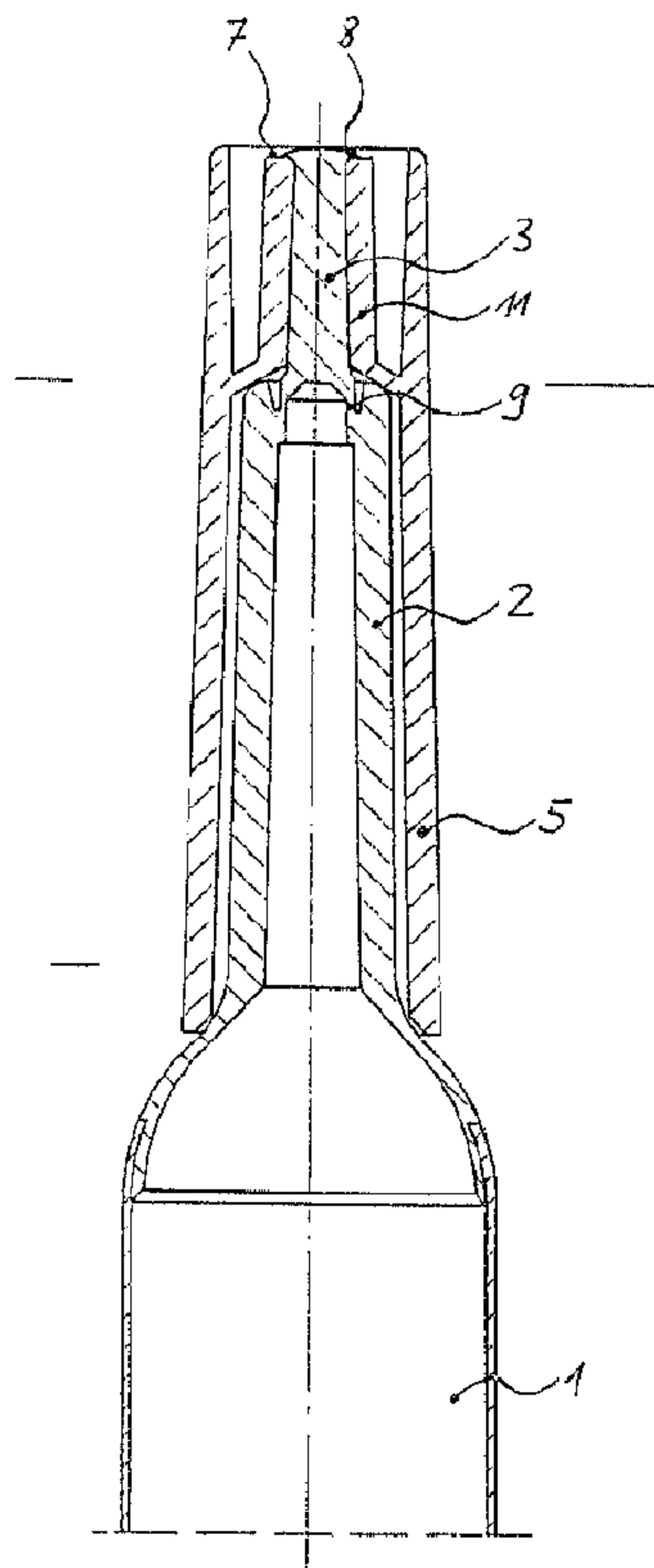
(72) Inventeur/Inventor:  
Butterbrodt, Gerhard, DE

(73) Propriétaire/Owner:  
HOFFMANN NEOPAC AG, CH

(74) Agent: MARKS & CLERK

(54) Titre : TUBE AVEC FERMETURE INVOLABLE ET PROCEDE DE FABRICATION

(54) Title: TUBE WITH TAMPERPROOF CLOSURE AND PROCESS FOR MAKING



(57) Abrégé/Abstract:

Disclosed is a tube and a process of producing a tamperproof closure on a tube for a liquid, pasty or powdery material, especially a pharmaceutical agent. The tube includes a neck with a delivery opening and a breakoff neck projection molded onto the neck and closing the delivery opening off, which breakoff neck projection engages, positively or non-positively, a cap applied onto the breakoff neck, which cap includes an opening having a rim. After the tube has been filled and closed off, a section of the breakoff neck projection or a projection formed thereon is inserted through the opening of the cap and is thereafter deformed to produce an engaging flange extending over the rim of the opening.

## ABSTRACT

Disclosed is a tube and a process of producing a tamperproof closure on a tube for a liquid, pasty or powdery material, especially a pharmaceutical agent. The tube includes a neck with a delivery opening and a breakoff neck projection molded onto the neck and closing the delivery opening off, which breakoff neck projection engages, positively or non-positively, a cap applied onto the breakoff neck, which cap includes an opening having a rim. After the tube has been filled and closed off, a section of the breakoff neck projection or a projection formed thereon is inserted through the opening of the cap and is thereafter deformed to produce an engaging flange extending over the rim of the opening.

Tube With Tamperproof Closure And Process For Making

The invention relates to a process for the production of a tamperproof closure on a tube for liquid, pasty or powdery material, especially pharmaceutical agents, on whose neck is molded a breakoff neck projection closing an output opening, which is engaged nonpositively or positively with a slipped-on cap, and a tube for liquid, pasty or powdery material, especially pharmaceutical agents, on whose neck is molded a breakoff neck projection closing an output opening, which is engaged nonpositively or positively with a slipped-on cap.

A container with a breakoff closure for receiving and metered dispensing of liquid, pasty or powdery material, for example, pharmaceutical agents, is known from DE-PS 26 53 993. With the known container, on the front end of the container neck a breakoff neck projection is molded on a preshaped recessed predetermined breaking point in tightly closing covering of the outlet opening. In addition, a cap that can be slipped on the front end of the neck is provided. After the first use, this container can again be closed with the cap, which is held to the container either by a locking engagement or a press fit. The manipulation of a second or other subsequent opening and the necessary expenditure of force are the same as in the first opening, so that the user cannot determine whether the container still has the original closure.

In the removal of certain materials, especially pharmaceutical agents, from containers, a tamperproof closure, i.e., a definite indication for the user that the container has not yet been opened, is often necessary.

The object of the invention is to make available a simple tamperproof closure for tubes of the above-described type.

In one aspect, the invention provides a process of producing a tamperproof closure on a tube for a liquid, pasty or powdery material, especially a pharmaceutical agent. The tube includes a neck with a delivery opening and a breakoff neck projection molded onto the neck and closing the delivery opening. The breakoff neck projection engages, positively or non-positively, a cap applied onto the breakoff neck, which cap includes an opening having a rim. After the tube has been filled and closed off, a section of the breakoff neck projection or a projection formed thereon is inserted through the opening of the cap and is thereafter deformed to produce an engaging flange extending over the rim of the opening.

In another aspect, the invention provides a tube useful for containing a flowable material. The tube has a neck on which is initially fixed a breakoff neck projection closing an output opening through the neck with a frangible connection when the tube is in an initial sealed



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configuration. The tube includes a superimposed cap fitting over the neck. The cap includes an interior with an internal sleeve fixed therein. The sleeve has an upper end and a lower end and has an opening therethrough for receiving the breakoff neck projection. The breakoff neck projection has a portion projecting through and out of the upper end of the sleeve and being deformed over the upper end of the sleeve to secure the breakoff neck projection within the sleeve when the tube is in the initial sealed configuration. When the cap is rotated, the breakoff neck projection is detached from the neck, but the cap may be loosely mounted on the neck to surround the neck without being fixed thereto to provide an indication that the tube has been opened.

A positive connection between the neck projection of the tube and the cap slipped on the latter is advantageously produced by the process according to the invention. It is necessary only to make an opening on the front of the cap, i.e., to open the previously closed sleeve section of the cap, which receives the neck projection nonpositively or positively, and to guide a section of the neck projection or a projection formed on the latter through the opening thus resulting. Then, a deformation of this section or projection takes place to form a flange engaging over the edge of the opening. In this way, a positive connection is produced like a rivet joint.

If the tube is opened by the breaking off of the neck projection, the cap can indeed be slipped again on the neck of the tube, but it immediately drops from the tube, if the latter is grasped, so that the user sees that this tube had already been opened.

Advantageously, a tube whose cap exhibits an opening in the front is used to perform the process. The sleeve section of the cap receiving the neck projection nonpositively or positively is made as a sleeve open on both sides. The neck projection exhibits a section or projection projecting from this opening of the slipped-on cap. In an embodiment, the neck projection is made longer than the sleeve section on the cap receiving the neck projection. In another embodiment, a nipple-type projection is made on the neck projection, which extends through the opening of the slipped-on cap.

It is especially advantageous to use the process according to the invention in tubes whose neck is designed as a rectal cannula. With these tubes, the tube body with special advantage consists of a laminate, especially an Al/PE laminate and has a molded-on or incorporated neck.

An embodiment of the invention is to be explained with reference to the figures of the drawing. There are shown in:

Fig. 1 a diagrammatic sectional view of a tube,

Fig. 2 a diagrammatic sectional view of a cap,

Fig. 3 a sectional view of a tube with a slipped-on cap, in which a part of the neck projection has been broken away, and

Fig. 4 a tube with the tamperproof closure produced according to the invention.

A tube 1 is represented in fig. 1. This tube 1 consists of a laminate, especially of an Al/PE laminate. A neck 2 is incorporated in this tube in the represented embodiment. This neck 2 is designed as a rectal cannula.

A neck projection 3 is molded-on to form a predetermined breaking point 9 on neck 2. This neck projection 3 closes the mouth of neck 2. Neck projection 3 exhibits a toothing 10 made on its periphery.

In fig. 2, in addition to tube 1 represented in fig. 1, a cap 5 is represented relative to the tube at a level which this cap 5 occupies in the slipped-on position on tube 1.

Cap 5 exhibits a sleeve section 11, in which an inside toothing 12 is made. If, as fig. 3 shows, cap 5 is slipped on



neck 2 of tube 1, section 4, represented in fig. 1, of neck projection 3 projects from opening 6 of sleeve section 11. When cap 5 is slipped on neck 2, toothings 10 and 12 engage with one another, so that a positive, torsion-resistant connection is provided.

By a deformation of section 4 of neck projection 3 represented in figures 1 and 3, flange 8 represented in fig. 4, which engages over edge 7 at opening 6 or on sleeve section 11, is formed. In this way, a rivet-type connection between cap 5 and neck 2 or neck projection 3 is produced. This rivet-type connection assures, on the one hand, a secure fit of cap 5 on tube 1, as long as tube 1 has never been opened. On the other hand, this rivet connection makes it possible to configure the fit of cap 5 on neck 2 so loose that after breaking open the tube by twisting off neck projection 3, cap 5 can again be slipped-on loosely on the neck, that it is detached immediately from tube 1 in the case of an attempted reuse and indicates to the user that tube 1 had already been opened once.



The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A process of producing a tamperproof closure on a tube for a liquid, pasty or powdery material, which tube includes a neck with a delivery opening and a breakoff neck projection molded onto the neck and closing the delivery opening, which breakoff neck projection engages, positively or non-positively, a cap applied onto the breakoff neck, which cap includes an opening having a rim;

wherein after the tube has been filled and closed, a section of the breakoff neck projection or a projection formed thereon is inserted through the opening of the cap and is thereafter deformed to produce an engaging flange extending over the rim of the opening.

2. A tube for a liquid, pasty or powdery material, which tube includes a neck with a delivery opening and a breakoff neck projection molded onto the neck and closing the delivery opening, which breakoff neck projection engages, positively or non-positively a cap applied onto the breakoff neck, which cap includes an opening having a rim, wherein the cap comprises at its front end an opening and the breakoff neck projection comprises a section or a projection formed thereon projecting through and beyond the opening of the cap, which section or the projection of the breakoff neck projection is deformed to produce an engaging flange extending over the rim of the opening.

3. The tube of claim 2, wherein the neck is designed as a rectal cannula.

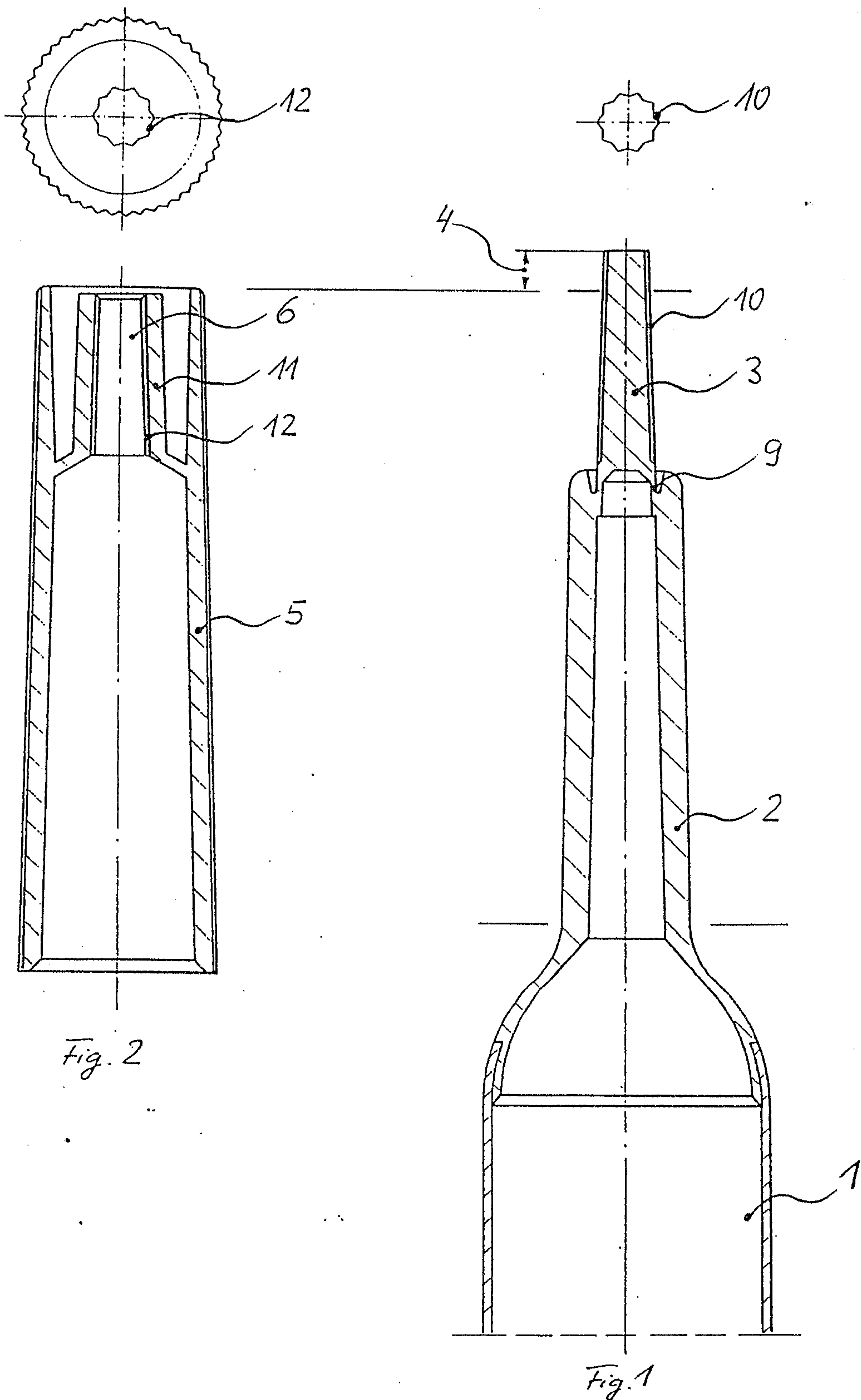
4. The tube of claim 2 or 3, wherein the tube body consists of a laminate and the breakoff neck is molded onto or set into the tube body.

5. A tube useful for containing a flowable material, the tube having a neck, a breakoff neck projection which is initially fixed on the neck, said breakoff neck projection closing an output opening through the neck with a frangible connection when the tube is in an initial sealed configuration, and a superimposed cap fitting over the neck, the cap including an interior with an internal sleeve fixed therein, the sleeve having an upper end and lower end and having an opening therethrough for receiving the breakoff neck projection, the breakoff neck projection having a portion projecting through and out of the upper end of the sleeve and being deformed over the upper end of the sleeve to secure the breakoff neck projection within the sleeve when the tube is in said initial sealed configuration;

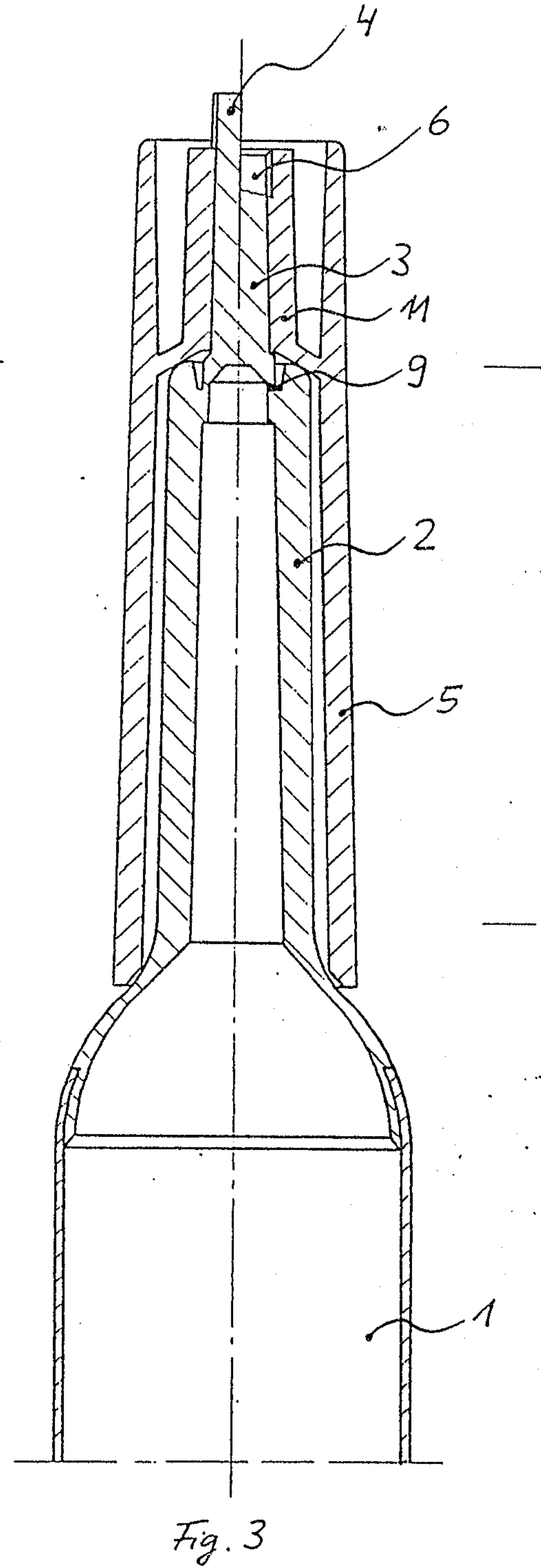
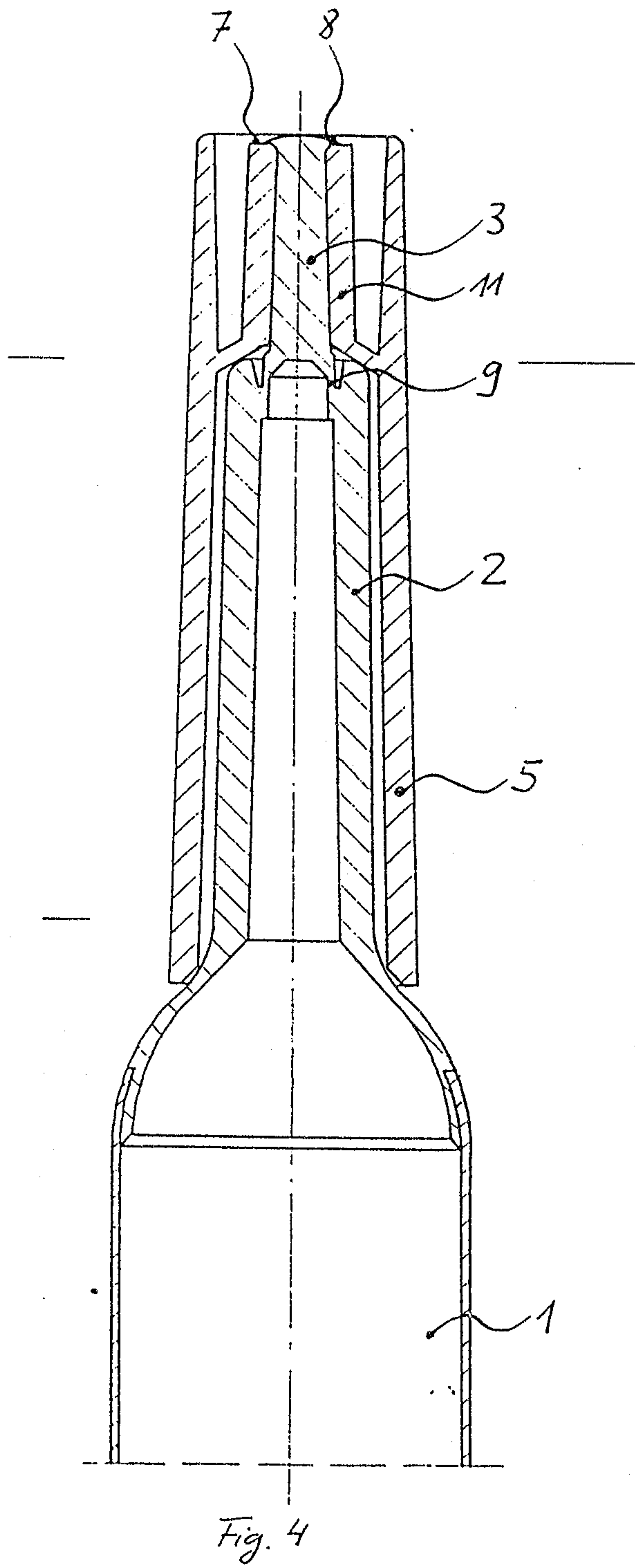
whereby when the cap is rotated, the breakoff neck projection is detached from the neck but the cap may be loosely mounted on the neck to surround the neck without being fixed thereto to provide an indication that the tube has been opened.

6. The tube of claim 5, wherein the sleeve is fixed to the interior of the cap by a web disposed at the lower end of the sleeve, and wherein there is a space between the sleeve and the cap.
7. The tube of claim 5 or 6, wherein the breakoff neck projection has a scalloped outer surface which mates with a scalloped inner surface of the sleeve.
8. The tube of any one of claims 5 to 7, wherein the neck is useful as a rectal cannula.
9. The tube of any one of claims 5 to 8, wherein the tube has a body made of a laminate and wherein the neck is molded thereon.
10. The tube of any one of claims 5 to 9, wherein the breakoff neck projection has a scalloped external surface and the sleeve has a scalloped internal surface, which scalloped surfaces inter-engage when the tube is in the initial sealed configuration, whereby the breakoff neck projection is rotated upon rotating the cap to fracture the connection between the breakoff neck projection and output opening.





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