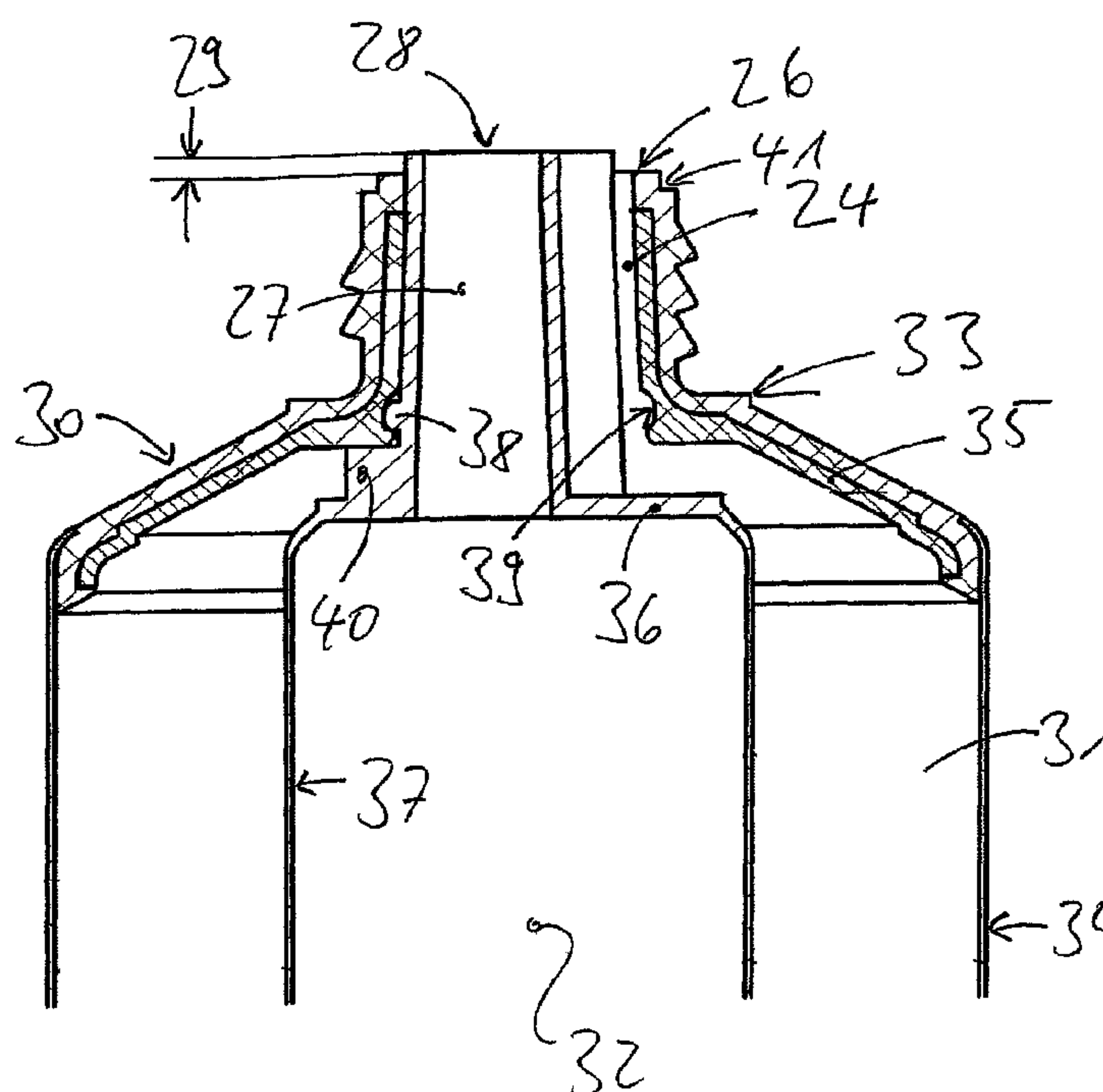




(86) Date de dépôt PCT/PCT Filing Date: 2005/02/23  
(87) Date publication PCT/PCT Publication Date: 2005/09/01  
(85) Entrée phase nationale/National Entry: 2007/02/09  
(86) N° demande PCT/PCT Application No.: EP 2005/001878  
(87) N° publication PCT/PCT Publication No.: 2005/080215  
(30) Priorité/Priority: 2004/02/24 (DE10 2004 009 424.1)

(51) Cl.Int./Int.Cl. *B65D 35/22* (2006.01)  
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(54) Titre : TUBE COMPORTANT DEUX OU PLUSIEURS CHAMBRES  
(54) Title: DUAL OR MULTI-CHAMBER TUBE



(57) **Abrégé/Abstract:**

The invention relates to a multi-chamber tube, especially a dual-chamber tube, which comprises an outer tube pipe (34) having a tube neck sitting on a tube shoulder (30) and leading to an outlet. A first chamber can be filled with a first preparation (A) and a second chamber with a second preparation (B). The tube neck is provided with a first passage channel (24) for the passage of the first preparation and with a second passage channel (27) for the passage of the second preparation. The passage channels lead to the outlet where the first preparation and the second preparation meet to form a common strand. According to the invention, the two chambers have different volumes that have a defined ratio to each other, the cross-sections of the passage channels having a ratio that is at least substantially the same. The invention is further characterized in that one passage channel can be subdivided into one or more parallel branches and/or the first passage channel and the second passage channel have one respective orifice enclosed by an orifice rim. The orifice rim (26) of the first passage channel lies on a different plane relative to the tube shoulder than the orifice rim (28) of the second passage channel.

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES  
PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG(19) Weltorganisation für geistiges Eigentum  
Internationales Büro(43) Internationales Veröffentlichungsdatum  
1. September 2005 (01.09.2005)

PCT

(10) Internationale Veröffentlichungsnummer  
**WO 2005/080215 A1**(51) Internationale Patentklassifikation<sup>7</sup>: **B65D 35/22**

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(21) Internationales Aktenzeichen: PCT/EP2005/001878

(22) Internationales Anmeldedatum:  
23. Februar 2005 (23.02.2005)

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(25) Einreichungssprache: Deutsch

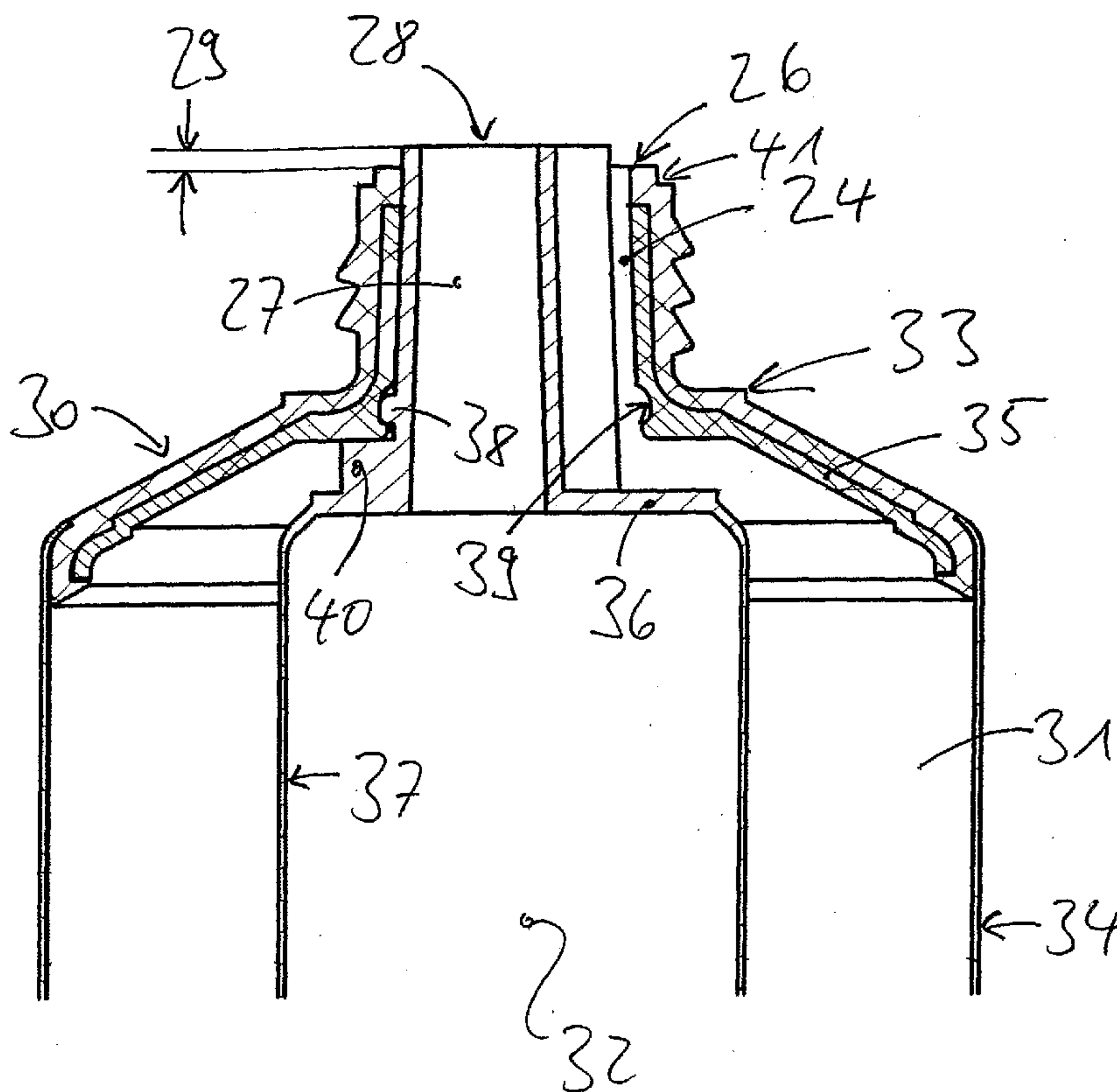
(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:  
10 2004 009 424.1  
24. Februar 2004 (24.02.2004) DE(81) Bestimmungsstaaten (*soweit nicht anders angegeben, für jede verfügbare nationale Schutzrechtsart*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,

[Fortsetzung auf der nächsten Seite]

(54) Title: DUAL OR MULTI-CHAMBER TUBE

(54) Bezeichnung: ZWEI- ODER MEHRKAMMERTUBE



(57) Abstract: The invention relates to a multi-chamber tube, especially a dual-chamber tube, which comprises an outer tube pipe (34) having a tube neck sitting on a tube shoulder (30) and leading to an outlet. A first chamber can be filled with a first preparation (A) and a second chamber with a second preparation (B). The tube neck is provided with a first passage channel (24) for the passage of the first preparation and with a second passage channel (27) for the passage of the second preparation. The passage channels lead to the outlet where the first preparation and the second preparation meet to form a common strand. According to the invention, the two chambers have different volumes that have a defined ratio to each other, the cross-sections of the passage channels having a ratio that is at least substantially the same. The invention is further characterized in that one passage channel can be subdivided into one or more parallel branches and/or the first passage channel and the second passage channel have one respective orifice rim (26, 28). The orifice rim (26) of the first passage channel lies on a different plane relative to the tube shoulder (36) than the orifice rim (28) of the second passage channel.

enclosed by an orifice rim. The orifice rim (26) of the first passage channel lies on a different plane relative to the tube shoulder than the orifice rim (28) of the second passage channel.

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**WO 2005/080215 A1**

PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

— vor Ablauf der für Änderungen der Ansprüche geltenden Frist; Veröffentlichung wird wiederholt, falls Änderungen eintreffen

**(84) Bestimmungsstaaten** (soweit nicht anders angegeben, für jede verfügbare regionale Schutzrechtsart): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

**Veröffentlicht:**

— mit internationalem Recherchenbericht

**(57) Zusammenfassung:** Mehrkammertube, insbesondere Zweikammertube, aufweisend ein äusseres Tubenrohr (34) mit einem auf einer Tubenschulter (30) aufsitzenden Tubenhals, der in einem Auslass mündet, wobei eine erste Kammer mit einer ersten Zubereitung (A) und eine weitere Kammer mit einer zweiten Zubereitung (B) befüllbar ist, wobei im Tubenhals ein für den Durchgang der ersten Zubereitung vorgesehener erster Durchgangskanal (24) und ein für den Durchgang der zweiten Zubereitung vorgesehener zweiter Durchgangskanal (27) angeordnet sind, wobei die Durchgangskanäle im Auslass münden, wo die erste Zubereitung und die zweite Zubereitung zu einem gemeinsamen Strang zusammenkommen, wobei die beiden Kammern unterschiedliche Volumina haben, die in einem bestimmten Verhältnis zueinander stehen, wobei die Querschnitte der Durchgangskanäle ein zumindest nahezu entsprechendes Verhältnis aufweisen, wobei ein Durchgangskanal in einen oder mehrere parallele Zweigkanäle aufgeteilt sein kann und/oder wobei der erste Durchgangskanal (3) und der zweite Durchgangskanal jeweils eine von einem Mündungsrand umfasste Mündung aufweisen, wobei der Mündungsrand (26) des ersten Durchgangskanals (3) in Bezug auf die Tubenschulter auf einem anderen Niveau liegt, als der Mündungsrand (28) des zweiten Durchgangskanals.

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## TWO- OR MULTICHAMBER TUBE

[0002] The present invention relates to a multichamber tube, in particular to a two-chamber tube, having exterior tubing (tube jacket) with, located on a tube shoulder, a tube neck which leads to an outlet, where a first preparation can be charged to a first chamber and a second preparation can be charged to another chamber, and where a first passage channel intended for the passage of the first preparation and a second passage channel intended for the passage of the second preparation have been arranged in the tube neck, and where the passage channels lead to the outlet at which the first preparation and the second preparation coalesce to give a common strand.

[0003] Two- or multichamber tubes are previously known from the prior art, and in principle there are two familiar embodiments. In the first, particularly simple, embodiment, one tube in the form of a flexible tube material has been inserted into another, the tube top of the inner tube here having been inserted within the passage channel of the outer tube. The end of the two tubes of this "tube-in-tube" have a shared welded or folded joint. The two tubes define an interior and an exterior chamber, and these chambers lead to the shared top region or shared discharge region. In another embodiment, a separating wall separates a tube in the form of flexible tube material into two adjacent chambers ("side-by-side"). Again, in this embodiment, the design of the passage channels is such that the two compositions separately located in the chambers do not coalesce until they reach the orifice region at the end of the tube neck. The two preparations are jointly discharged from the tube as soon as pressure is exerted on the outer tube. The design of the outlet determines the strip pattern in which the preparations are discharged from the tube. Known commercially available tubes here have identical subvolumes of the various chambers, and reflect this ratio in a corresponding mixing ratio, in particular 50:50.

[0004] For products whose two phases have to be stored separately and whose mixing ratio deviates from the conventional 50:50 value, the known

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tubes are of no use. Although multichamber tubes with different chamber volumes have occasionally been disclosed, it has hitherto been difficult to reproduce the mixing ratio in the expelled strand. Multicomponent products are therefore still supplied in separate containers if the intention is that the components be mixed in an unequal ratio. This makes handling of the product rather inconvenient for the consumer.

[0005] Another disadvantage of the known tubes is that the preparations undergo undesired mixing in the discharge region, without pressure on the tube by the consumer. The tubes are sometimes provided with a tamper-proof seal, such as a peelable foil, which suppresses mixing prior to initial use. However, the known screw closures provide little prevention of mixing of the two components at least after initial use. This mixing is firstly disadvantageous to the esthetic perception of the product. If the two components have different colors, as known for example from toothpastes, a smeared product always appears initially on the toothbrush before separate color stripes appear in the toothpaste strand. Another problem is that the compositions contaminate one another chemically, and specifically in the case of aggressive components this has unattractive consequences.

[0006] This problem of mixing is highly dependent on the nature of the components. For example, direct dyes or precursors of nature-analogous dyes feature particularly high susceptibility to diffusion (susceptibility to creep). In such cases the mixing is not restricted solely to the discharge region, but rather the dye diffuses from one of the chambers into the other chamber, the result being that the composition present therein becomes permanently contaminated. This diffusion cannot be prevented via the familiar seals screwed onto the top, even if high torque is exerted.

[0007] The tendency to mix also severely restricts the shelf life of these products. For example, it has been found impossible to prevent diffusion of the components over the entire discharge region on storage for two or more weeks, even with the lid firmly screwed in place. The known foils intended to be peeled

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away prior to first use and therefore serving as tamper-proof seal have very little suitability in the case of multichamber tubes by virtue of the design of the outlet, because they cannot be applied so as to give a reliable seal.

[0008] The first object of the present invention is to provide a multichamber tube which can be produced simply and at low cost, and which is suitable as a reliable and storable dispenser for two-phase products. Another object of the invention is to provide a multichamber tube of this type having a mixing ratio which is as desired but is firmly established. Irrespective of this, another object of the invention is to modify the multichamber tube in such a way as to reduce the risk of mixing of the components in the discharge region and diffusion from chamber to chamber.

[0009] These objects are achieved via multichamber tubes with the characterizing features of claim 1 and of claim 7. The respective subclaims describe particular embodiments of the tube.

[0010] A first principle consists in providing the volumes of the individual chambers in a ratio which differs from the hitherto known uniform division. The intention here is that the invention encompasses any unequal distribution of the volumes which has a significant difference. In order to provide the possibility of ensuring that the mixture in the expelled strand corresponds to the ratio of the chamber volumes, the discharge region is appropriately designed according to the invention. For example, the ratio of the chamber volumes is also reflected in the cross sections of the passage channels which lead to the outlet. A passage channel here can have been divided into one or more parallel branch channels. The total of the cross sections of the branch channels then gave the cross section of the passage channel. It should be noted here that it is advantageous for the function of the multichamber tubes if each of the different components present in the chambers has approximately the same viscosity.

[0011] The advantage of the inventive design is that materials can be expelled entirely and relatively uniformly from the chambers to which different

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volumes have been charged, and that the mixing ratio of the product expelled here is the same over almost the entire period. Tubes of this type can be relatively simply manufactured and filled by the known methods. They can therefore serve as a secure and convenient container for a multicomponent product requiring careful handling.

[0012] A particularly preferred application sector for these two-chamber tubes is the sector of colorants and/or tinting compositions for keratinic fibers, in particular for human hair. The chemical formulations of these compositions demand mixing ratios deviating from equal distribution. Specifically for these two-component compositions, the two preparations can be packaged separately from one another in an inventive two-chamber tube. The disclosure of the applications DE 103 59 538.4, DE 103 59 557.0 and DE 103 59 539.2, all of which derive from the applicant of this application, and all of which have filing date December 17, 2003, is explicitly incorporated by way of reference into the text of the description of this application. Those documents describe fillings for two-chamber tubes, where the preparation intended for one of the chambers comprises at least one direct dye and/or comprises at least one precursor of a nature-analogous dye, while the preparation intended for charging to the second chamber comprises at least one conditioning substance.

[0013] A range of from 1:2 to 5:1, preferably from 2:1 to 3:1, is stated for the ratio of the volumes and therefore of discharge of the preparations, and the intention is to exclude the ratio 1:1. Furthermore, a preparation with at least one oxidation dye precursor is described as the material to be charged to one chamber and a preparation with at least one oxidant or one conditioning substance is described as material to be charged to the second chamber, the ratio of the volumes and therefore of discharge of the preparations being in the range from greater than 1:1 to 3:1.

[0014] In order to obtain the mixing ratios required by the mixing specification, and in order that product discharge is uniform, advantageous geometries of the tube openings have a mixing ratio not equal to 50:50, namely

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from 80:20 to 60:40, preferably 75:25. The outer tube:inner tube ratio of 75:25 is advantageous in the case of a color-pigmented phase and a conditioning substance with a volume of 100 ml. The design of the outer tube and/or of the inner tube can be transparent for esthetic reasons.

[0015] In view of the fact that in the case of a tinting composition the proportion of the color preparation is about 75% and the proportion of the conditioning preparation is about 25% and that therefore the color preparation is advantageously introduced into the outer tube with the greater volume in the case of a tube-in-tube arrangement, it is particularly advantageous for the shoulder region of the outer tube to be reinforced with disks which have particularly good barrier properties. This can exclude any diffusion of the dye from the shoulder region. In order to provide maximum effectiveness in preventing diffusion it is advantageous to incorporate aluminum or a suitable plastic, such as PTB, into the material of the tube shoulder.

[0016] As mentioned above, a general problem with multichamber tubes is that the components mix in the discharge region and that components diffuse into one another over the entire discharge region, the result being mixing in the chambers. In order to prevent discharge of the mixture during storage and to ensure that the tube is intact for the consumer, it can be advantageous in the case of an orifice region with relatively simple geometry, for example in the case of two coaxial cylinders, to seal the dispenser opening with a tamper-proof seal which is removed by the consumer prior to first use, for example composed of aluminum foil or of plastics foil. However, this type of tamper-proof seal is, as mentioned, difficult to install and moreover cannot prevent the components from mixing after first use. In particular the dyes addressed here have comparatively high susceptibility to creep or to diffusion.

[0017] The problem of undesired mixing here is certainly not solely restricted to the multichamber tubes with different chamber volumes, but occurs in all multichamber tubes, including those with the same volumes. Another general concept of the invention therefore consists in designing the discharge

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region of the multichamber tubes in such a way as to reduce dramatically the risk of mixing. According to the invention, this problem is solved in that the orifice edge of the first passage channel is at a different level from the orifice edge of the second passage channel. The result is that, with respect to the strand being discharged, the location of one of the orifice edges is above or behind the other, this orifice edge forming a barrier for the composition present in the chamber with the lower-lying orifice edge. The final result is that the composition has difficulty in passing over the step created via the elevated orifice edge. It therefore acts to some extent as "diffusion retarder".

[0018] At this point, express reference is again made to the fact that the idea of placing the orifice edges of the passage channels at a different level is not restricted to multichamber tubes with different sizes of the chamber volumes, but is a useful invention for any multichamber tube. It is, of course, possible to combine in any desired manner the two inventions described, which are actually independent: the multichamber tube with different chamber volumes and the multichamber tube with a difference in the levels of the orifice edges.

[0019] A prime advantage provided by this inventive idea is that it is possible to reduce greatly the mixing of the components. This advantage first gives benefits during the storage of the multicomponent products, where the inventively packaged products feature high storage stability with respect to mixing and/or diffusion. This firstly permits compliance with the esthetic requirements of consumers, which in the case of differently colored components can now perceive clear separation of the colors during first use and also after first use. Consumers are substantially spared the unattractive smearing of the components in the region of the tube top. Furthermore, chemical reactivity sometimes makes it advantageous to avoid mixing. This applies in particular when the two components react with one another to give an end product which may be relatively unstable, volatile or aggressive.

[0020] The increased storage stability here was confirmed in experiments.

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Indeed, it has been found that dyes do not, as was assumed, diffuse through the wall of the inner tube, with resultant distribution at the interior tube edge, but rather that diffusion takes place over the entire discharge region. According to the invention, this diffusion is now greatly reduced via the stepwise arrangement of the orifice edges.

[0021] There are various possible designs for implementing stepped orifice edges in the tube top. One particularly simple and advantageous method forms the separate chambers as separate tubes, each with its own passage channel. The passage channels here are designed with different length, starting at the tube shoulder. If the tubes are then brought together in the tube neck by being inserted alongside one another into a shared holder, as known from "side-by-side" tubes, or are simply inserted into one another as in "tube-in-tube" tubes, the result, because of the different length of the passage channels, is a difference in the level of the orifice edges. It is advantageous here in the case of the "tube-in-tube" arrangement that the arrangement has the passage channel of the interior tube coaxial with the passage channel of the exterior tube and protruding somewhat further. There is almost complete suppression of diffusion in the direction from the exterior to the interior tube. An advantage of the invention in the case of "tube-in-tube" tubes is that the tolerances which necessarily arise when a tube is inserted into another tube are no longer important. When the level difference is designed, care should advantageously be taken that it is greater than the maximum possible tolerance.

[0022] In principle, the present invention is intended to encompass any type of distribution of the chambers within the shared tube. In the "side-by-side" tube, the two individual chambers are arranged alongside one another in an exterior shell, whereas the abovementioned "tube-in-tube" has an exterior tube which entirely surrounds an interior tube. This embodiment features consistent metering of the two preparations.

[0023] It is, of course, particularly advantageous that the composition whose diffusion is to be avoided, for example the component admixed with

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intensive color pigments, is provided in the chamber whose orifice edge is at a lower level.

[0024] For the purposes of this invention, a level difference means that this is greater than the conventional tolerances in the manufacturing process, which can certainly amount to a tenth of a millimeter. For the purposes of the invention, the size of level differences is at least 0.3 millimeter, preferably more than 0.5 millimeter, and particularly preferably more than 1.0 millimeter. This can reliably provide a level difference which inhibits diffusion, despite manufacturing tolerances. The level difference formed in the present case can be about 1.5 millimeters. Level differences of more than about 3 millimeters have proven impracticable specifically in the case of the present multilayer tubes.

[0025] The inventive two-chamber tube has preferably been manufactured from a material suitable for the packaging of this type of tinting composition and colorant. A factor to be taken into account here is that the barrier properties of commercially available plastics tubes are not always adequate, because of the oxidation properties of the product. A material that can clearly be used for direct dyes or their precursors, and also for oxidants and oxidation dyes precursors, is an aluminum laminate or straight aluminum, although straight aluminum tubes have only limited usefulness because of their mechanical properties. An aluminum laminate here means an aluminum layer coated with multilayer plastic. A tube which has proven very particularly preferred according to the invention has not only the inner tube but also the outer tube manufactured from aluminum laminate. Tubes composed of plastics laminate (PE, PET, PP) or from plastics coextrudate (PE, PET, PP) with barrier properties, for example EVOH, can also be considered for the less aggressive preparations. In one embodiment, furthermore, the material of the inner tube can be selected irrespective of the material of the outer tube. As mentioned above, it can be advantageous for reasons of attractive design to manufacture the outer tube, and also the inner tube, from transparent plastic.

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[0026] The closure is particularly significant in the multichamber tube designed according to the invention. This preferably takes the form of a screw cap whose inner shell, as is known from such screw caps, seals the outlet. In the present case it is advantageous that there is, in contact with the base of the inner shell, a gasket whose thickness is more than one millimeter, for example 3 millimeters, and which is composed substantially of a foam. This is covered with respect to the outlet with paper applied by adhesive bonding and an aluminum foil thereon. This gasket can press the orifice edges into the material, thus providing leakproof sealing of the passage channels. In order to limit the pressure applied it is advantageous for there to be restriction on the torque used for screw-on of the cap. To this end, an edge is provided on the inner diameter of the shell and protrudes above the inner screw thread. During screw-on of the cap, this edge makes contact with contact area which surrounds the face side of the outlet.

[0027] Although in principle there is no intention to restrict the invention in any way with regard to this discharge pattern, it can be preferred according to the invention that the first preparation is discharged as main strand and the second preparation forms two or more colored strips running along this main strand. Nor is there any intention to restrict the invention with respect to the number of these strips. A number of from two to four strips can be particularly preferred according to the invention for reasons of applications technology or of appearance. The strips can increase the esthetic quality of the product. In a first embodiment here, the first preparation can form the strips, while the second preparation forms the main strand, and in a second embodiment the second preparation can form the strips while the first preparation forms the main strand. However, it is advantageous to ensure that the colored preparation has been stored in the chamber whose orifice edge is at the lower level.

[0028] In another embodiment it can be preferred that the two preparations in particular to some extent form the main strand together alongside one another. In another embodiment, the discharge strand can be composed of an

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interior region formed from a first preparation and of an exterior region formed from the second preparation, the preparations here forming the discharge strand in accordance with their arrangement in the tube.

[0029] The invention is illustrated in more detail below using the attached figures 1 to 8:

**Figure 1** shows a section through a two-chamber tube,

**Figure 2** shows various cross-sectional geometries of the outlet,

**Figure 3** shows a plan view of the top of a two-chamber tube,

**Figure 4** shows a section through the top of a two-chamber tube,

**Figure 5** shows a view of the top of a two-chamber tube,

**Figure 6** shows tube tops with varying mixing ratios,

**Figure 7** shows an open two-chamber tube with difference in the levels of the orifice edges, and

**Figure 8** shows a closed two-chamber tube with difference in the levels of the orifice edges.

[0030] Figure 1 shows a section through the upper region of a two-chamber tube. This has been formed in "tube-in-tube" manner and is suitable for two reactive preparations, which are stored in a shared tube in chambers separate from one another. The mixing or the confluence of the two preparations does not occur until the product is used. The two-chamber tube has exterior tubing 1 onto which a tube shoulder 2 has been molded, and which comprises an outer passage channel 3. The exterior tubing 1 forms an outer tube which is a first chamber 21 for a preparation A. This first exterior chamber 21 coaxially

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surrounds a pipe-like inner tube 4 which forms a further chamber 22 for a preparation B, and the inner tube 4 has an interior tube shoulder 5 with a corresponding inner passage channel 6. The inner tube 4 has been inserted into the exterior tubing 1 and held by way of latching projections not shown in the outer passage channel 3. Fillets 7 form a contact site during the insertion process and reliably provide the distance between the tube shoulders 2 and 5, thus retaining a passage with respect to the passage channel 3. The passage channels 3 and 6 lead to a shared outlet.

[0031] In the passage channel 3, the inner passage channel 6 arranged therein forms a means of separation, permitting initially separate conveying of the preparations A and B when pressure is exerted on the tube. After the separate conveying, the preparations unite in the region of the outlet prior to the dispenser opening, and are discharged therefrom in a shared strand. In this case, outer tube and inner tube have been formed from flexible tubes which have been sealed at the rear end by means of a shared folded joint.

[0032] Without proceeding beyond figure 1, it can be seen that the outer wall 6a of the inner passage channel 6 has a star shape. Various geometries for the walls of the inner passage channel 6 have been shown in figures 2a to 2i. In the embodiments of 2a, 2c, 2d, 2h, and 2i the cross-sectional area 9 of the star, which can have three or four points, defines the size of the substream for the preparation B (hatched) located in the inner tube. In contrast, the remaining interstitial spaces 11 between the outer wall 8 of the inner passage channel and the round outer wall 10 of the outer passage channel define the branch streams for the preparation located in the outer tube. The entirety of the branch streams sets the size of the substream for the second preparation A.

[0033] The two chambers 21 and 22 have different volumes which are in a prescribed ratio to one another. According to the invention, the passage channels generate two substreams with at least almost the same ratio, where one of the substreams, for example as in 2a or 2c, can have been divided into two or more parallel branch streams. The embodiment of 2c is particularly

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preferable for generating a striped effect visible from all viewing angles on the product stream being discharged. Using the geometries 2a to 2i shown it is possible to produce orifice variants which form mixing ratios of at least 60:40 and preferably 75:25. The maximum achievable difference is about 80:20.

[0034] Figure 3 shows a plan view of the top of a two-chamber tube, and the cross-sectional geometry in the discharge region prior to the dispenser opening can be seen clearly here. This corresponds approximately to the example in 2c. A disk composed of plastic is shown and forms a tube shoulder 16 onto which the neck 17 has been molded. The exterior tubing, in particular manufactured from aluminum laminate, has been welded onto the edge 18. Figure 4 shows a section through the disk of figure 3. The tube top 12 of the inner tube can be seen, and has been securely inserted into the tube top 13 of the outer tube. In this example, the orifice edge 19 of the outer tube is at the level of the orifice edge 20 of the inner tube. The passage channels 3 and 6 can be clearly seen. The shoulder region 16 of the outer tube in this case has reinforcement via an incorporated plastics layer which has particularly good barrier properties with respect to the diffusion of dyes. Figure 5 shows the view from below through the disk of figure 3 and figure 4. The fillets 7 can be seen and are in contact from the inside with the shoulder 16.

[0035] Figure 6 shows how modification of the outer wall 8 of the inner passage channel firstly can adjust the mixing ratio and secondly can adjust the width of the strips and therefore the appearance. Each of figures 6a to 6c shows an outer wall 8 in the shape of a star, and each star here has three points. The width of the points 14 here defines the width of the strips in the strand expelled. The geometry of the tube top of 6a gives a mixing ratio of 60:40 for the ratio between the cross-sectional area 11, composed of three parts, of the outer passage channel and the cross-sectional area 9 of the inner passage channel. The tube top of 6b has a mixing ratio of about 75:25 with comparatively narrow strips. The top of 6c shows deeper curves of the walls 8, nevertheless generating relatively wide strips with a relatively small mixing ratio of about 73:27. The two ratios last mentioned are clearly useful for two-

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chamber tubes which serve as a dispenser for a tinting composition with about 75% color content and 25% conditioning content. Any desired mixing ratios and any desired strip design can, of course, be produced via modification of the walls.

[0036] The embodiment of figure 6d shows a tube top which implements a cylindrical inner strand 15 within the likewise cylindrical outer strand 25. The mixing ratio can be adjusted as desired by way of the diameter of the inner strand. This embodiment is particularly suitable if the outer strand 23 is formed by a transparent preparation while a colored preparation forms the inner strand.

[0037] Figure 7 then shows a section through an open two-chamber tube with a difference in the levels of the orifice edges. This is a "tube-in-tube" as described at an earlier stage above. The first passage channel 24 of the tube has an orifice edge 26, and the second passage channel 27 has an orifice edge 28. It can be seen that, with respect to the tube shoulder 30, the level of the orifice edge 26 is markedly below the level of the orifice edge 28. The level difference has been indicated as 29. The double tube illustrated in this figure is particularly suitable for dispensing of colored tinting compositions. The component admixed with color pigments here has been stored in the chamber 31 formed by the outer tube. The level difference 29 is sufficient to prevent the diffusion of the color pigments from the passage channel 24 by way of the discharge region into the passage channel 27.

[0038] The inner tube forms the chamber 32 and comprises a conditioning substance. The tube top of the outer tube is in turn formed by a top-piece 33, to which the flexible tube material 34 of the outer tube has been attached. The shoulder region has an inlay 35 as reinforcement. The inner tube itself has a top-piece 36, which takes the geometry of the passage channels. A flexible tube material 37 of the inner tube has been molded onto the top-piece 36. The flexible tube materials 34 and 37 have been sealed together and thus closed at the end not shown. The top-piece 36 has been inserted into the passage channel 24 and latched by way of latching projections 38 which grip within a

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groove 39. Fillets 40 in turn reliably provide the distance. Before proceeding, reference may be made to the contact area 41 provided at the upper end of the neck and, during screw-on of the cap, having contact with an edge located in the screw cap.

[0039] Figure 8 then shows the "tube-in-tube" of figure 7, but with screwed-on screw cap 42. A screw thread of the known type permits screw-on of the screw cap 42. In the interior of the double-walled screw cap 42 an interior shell 43 has been provided and seals the outlet. There is a gasket 44 whose thickness is more than one millimeter in contact with the base of the shell and composed substantially of a foam covered with respect to the outlet with paper applied by adhesive bonding and an aluminum foil thereon. It can be seen that the orifice edge 28 protrudes into the gasket 44, whereas the gasket 44 is in adjacent contact with the orifice edge 26. Leakproof sealing of the passage channels has thus been provided. On the inner diameter of the shell 43, an edge 45 has been provided which protrudes above the inner screw thread. On screw-on of the cap, this edge 45 bears on the contact area 41 (figure 7) surrounding the face side of the outlet. This provides a limit on the torque. Furthermore, the skirt 46 of the screw cap 42 is prevented from pressing on the tube shoulder.

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**WHAT IS CLAIMED IS:**

1. A multichamber tube, in particular two-chamber tube, having exterior tubing (1) with, located on a tube shoulder, a tube neck which leads to an outlet, where a first preparation (A) can be charged to a first chamber and a second preparation (B) can be charged to another chamber, and where a first passage channel intended for the passage of the first preparation and a second passage channel intended for the passage of the second preparation have been arranged in the tube neck (3), and where the passage channels lead to the outlet at which the first preparation and the second preparation coalesce to give a common strand,  
**characterized in that**  
the two chambers have different volumes which are in a certain ratio to one another, where the cross sections of the passage channels have an at least approximately corresponding ratio, and where one passage channel may have been divided into one or more parallel branch channels.
2. The multichamber tube as claimed in any of the preceding claims,  
**characterized in that**  
the preparation (A) intended for charging to one of the chambers comprises at least one direct dye and/or at least one precursor of a nature-analogous dye, and the preparation (B) intended for charging to the second chamber comprises at least one conditioning substance.
3. The multichamber tube as claimed in claim 2,  
**characterized in that**  
the ratio of the volumes of the chambers and therefore the ratio of the cross sections of the passage channels is in the range from 1:2 to 5:1, preference being given to the range from 4:1 to 2.3:1 and particular preference being given to the ratio 3:1, the ratio 1:1 being excluded.

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4. The multichamber tube as claimed in any of the preceding claims,  
**characterized in that**  
the preparation (A) intended for charging to one of the chambers comprises at least one oxidation dye precursor, and the preparation (B) intended for charging to the second chamber comprises at least one oxidant.
5. The multichamber tube as claimed in any of the preceding claims,  
**characterized in that**  
the preparation (A) intended for charging to one of the chambers comprises at least one oxidation dye precursor, and the preparation (B) intended for charging to the second chamber comprises at least one conditioning substance.
6. The multichamber tube as claimed in claim 4 or 5,  
**characterized in that**  
the ratio of the volumes of the chambers, and therefore the ratio of the cross sections of the passage channels for the preparations (A) and (B) is in the range from greater than 1:1 to 3:1.
7. The multichamber tube, in particular two-chamber tube, having exterior tubing (1) with, located on a tube shoulder, a tube neck which leads to an outlet, where a first preparation (A) can be charged to a first chamber and a second preparation (B) can be charged to another chamber, and where a first passage channel intended for the passage of the first preparation and a second passage channel intended for the passage of the second preparation have been arranged in the tube neck (3), and where the passage channels lead to the outlet at which the first preparation and the second preparation coalesce to give a common strand,  
**characterized in that**  
each of the first passage channel (3) and the second passage channel leads to an orifice encompassed by an orifice edge, where, with respect

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to the tube shoulder, the orifice edge of the first passage channel (3) is at a level different from that of the orifice edge of the second passage channel.

8. The multichamber tube as claimed in claim 7,  
**characterized in that**  
the level difference is at least 0.3 millimeter and preferably more than 0.5 millimeter and particularly preferably more than 1.0 millimeter.
9. The multichamber tube as claimed in claim 7 or 8,  
**characterized by**  
an inner tube which has been inserted into the passage channel (24) of an outer tube, where the passage channel (27) of the inner tube protrudes to the extent of the level difference from the orifice opening of the passage channel (24).
10. The multichamber tube as claimed in any of claims 7 to 9,  
**characterized in that**  
the composition whose diffusion is to be avoided, in particular the component admixed with intensive color pigments, has been provided in the chamber whose orifice edge is at a lower level.
11. The multichamber tube as claimed in any of claims 7 to 10,  
**characterized in that**  
the volumes of the chambers are different and are in a certain ratio to one another, where the cross sections of the passage channels (24,27) have an at least approximately corresponding ratio, and where a passage channel can have been divided into one or more parallel branch channels.
12. The multichamber tube as claimed in any of claims 7 to 11,  
**characterized by**  
a screw closure (42) into which a gasket (44) has been introduced,

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where the orifice edge (28) with higher level protrudes into the material of the gasket (44) by about the difference in level, whereas at the orifice edge (26) with lower level the gasket (44) has sealing contact.

13. The multichamber tube as claimed in claim 12,  
**characterized in that**  
a stop has been provided and limits the torque during screw-on of the screw closure (42).
14. The multichamber tube as claimed in any of the preceding claims 1 to 13,  
**characterized in that**  
the exterior tubing (1) forms an outer tube which coaxially surrounds a pipe-like inner tube (4), where the inner tube (4) comprises an inner passage channel (6), and where the inner passage channel (6) has been inserted into the passage channel (3), and where the outer wall (8) of the inner passage channel forms a means of separation.
15. The multichamber tube as claimed in any of the preceding claims 1 to 14,  
**characterized in that**  
the outer wall (8) of the inner passage channel (9) has the shape of a star, where the cross-sectional area of the star defines the substream for the preparation located in the inner tube (4), and where the interstitial spaces (11) remaining between the outer wall (8) of the inner passage channel (9) and the round outer wall (10) of the outer passage channel (3) define branch streams for the preparation located in the outer tube (1).
16. The multichamber tube as claimed in any of the preceding claims 1 to 15,  
**characterized in that**  
outer tube (1) and inner tube (4) have been formed by flexible tubes

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which have been sealed at the rear end by means of a shared folded joint.

17. The multichamber tube as claimed in any of the preceding claims 1 to 16,

**characterized in that**

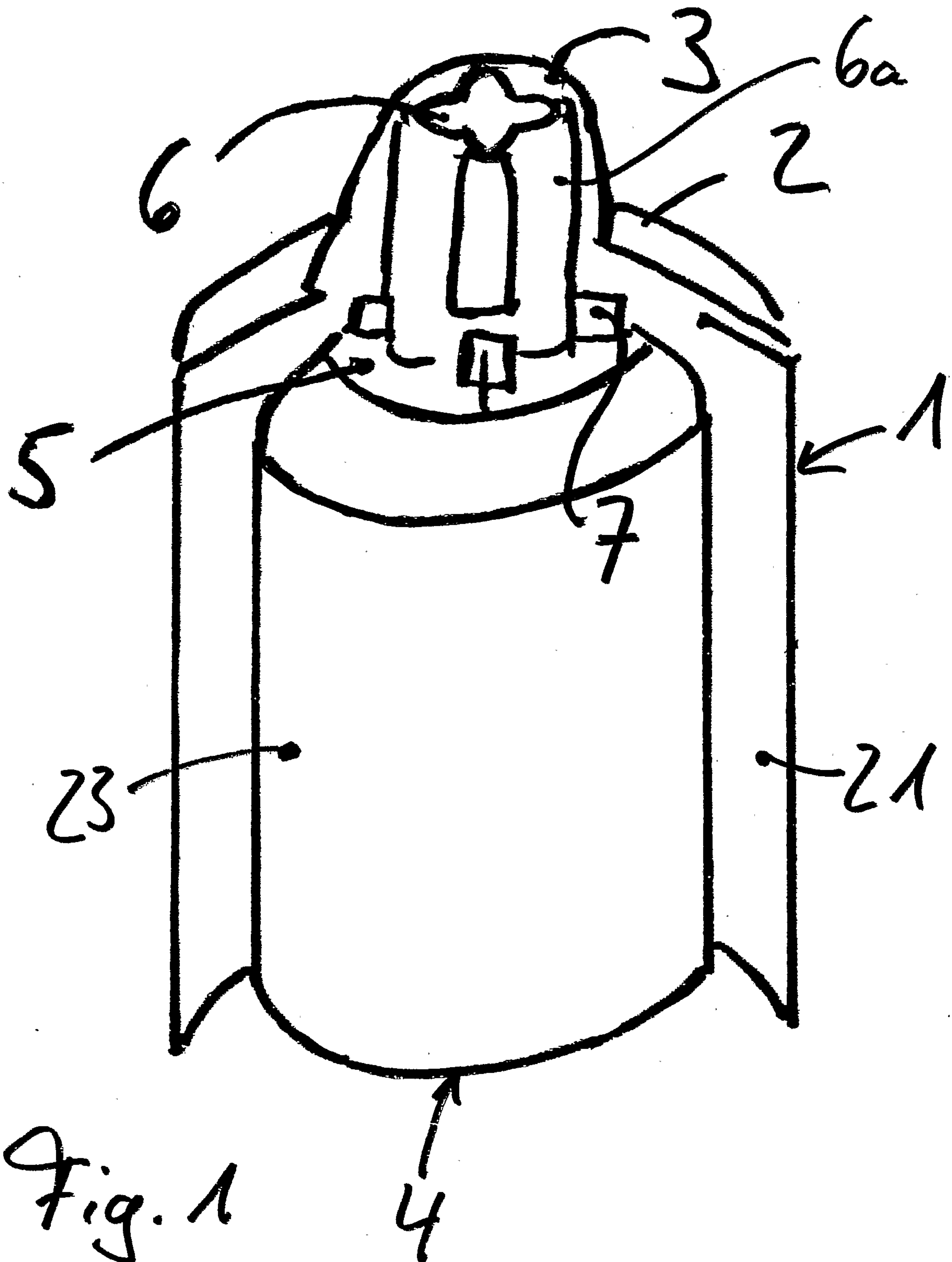
the outer tube and/or the inner tube has been manufactured from a plastics-coated aluminum foil, in particular from an aluminum laminate, or from plastics laminates.

18. The multichamber tube as claimed in any of the preceding claims 1 to 17,

**characterized in that**

the outer tube and/or the inner tube have been manufactured from transparent plastic.

19. A method for the tinting of keratinic fibers, in particular human hair, which comprises expelling a two-component composition from the tube as claimed in any of claims 1 to 18, applying the application preparation to the fibers, and in turn removing it by rinsing after an exposure time.



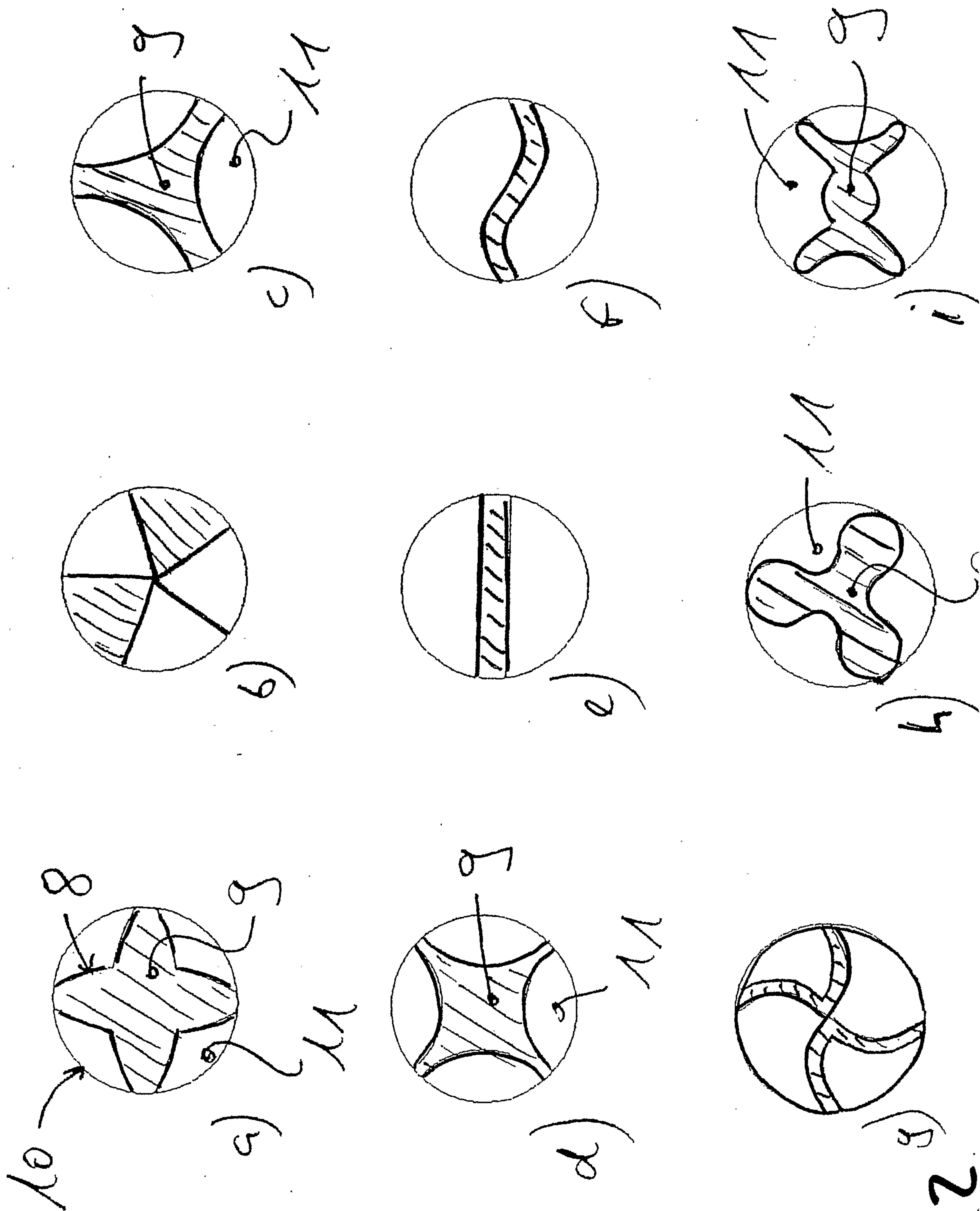


Fig. 2

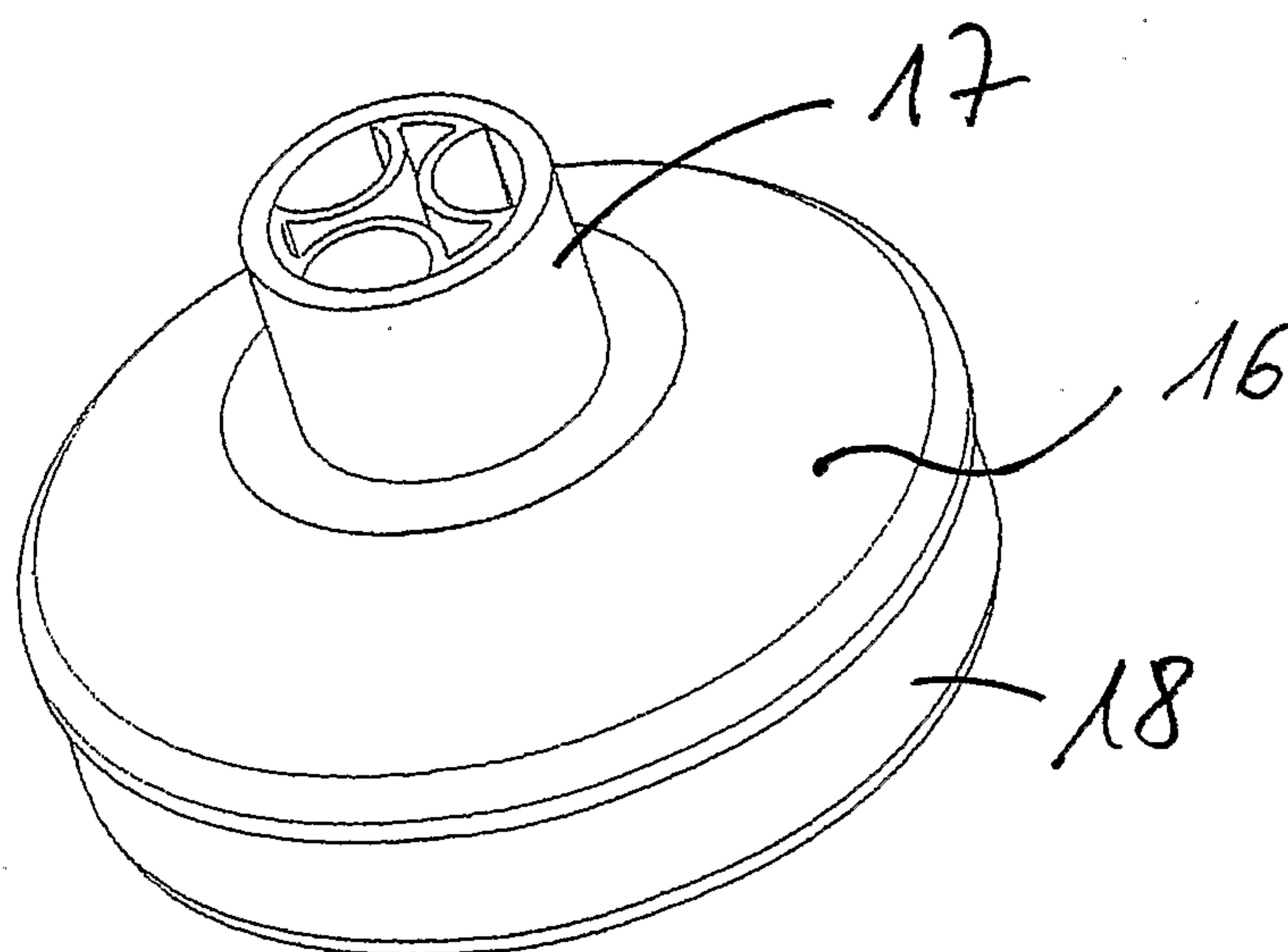


Fig. 3

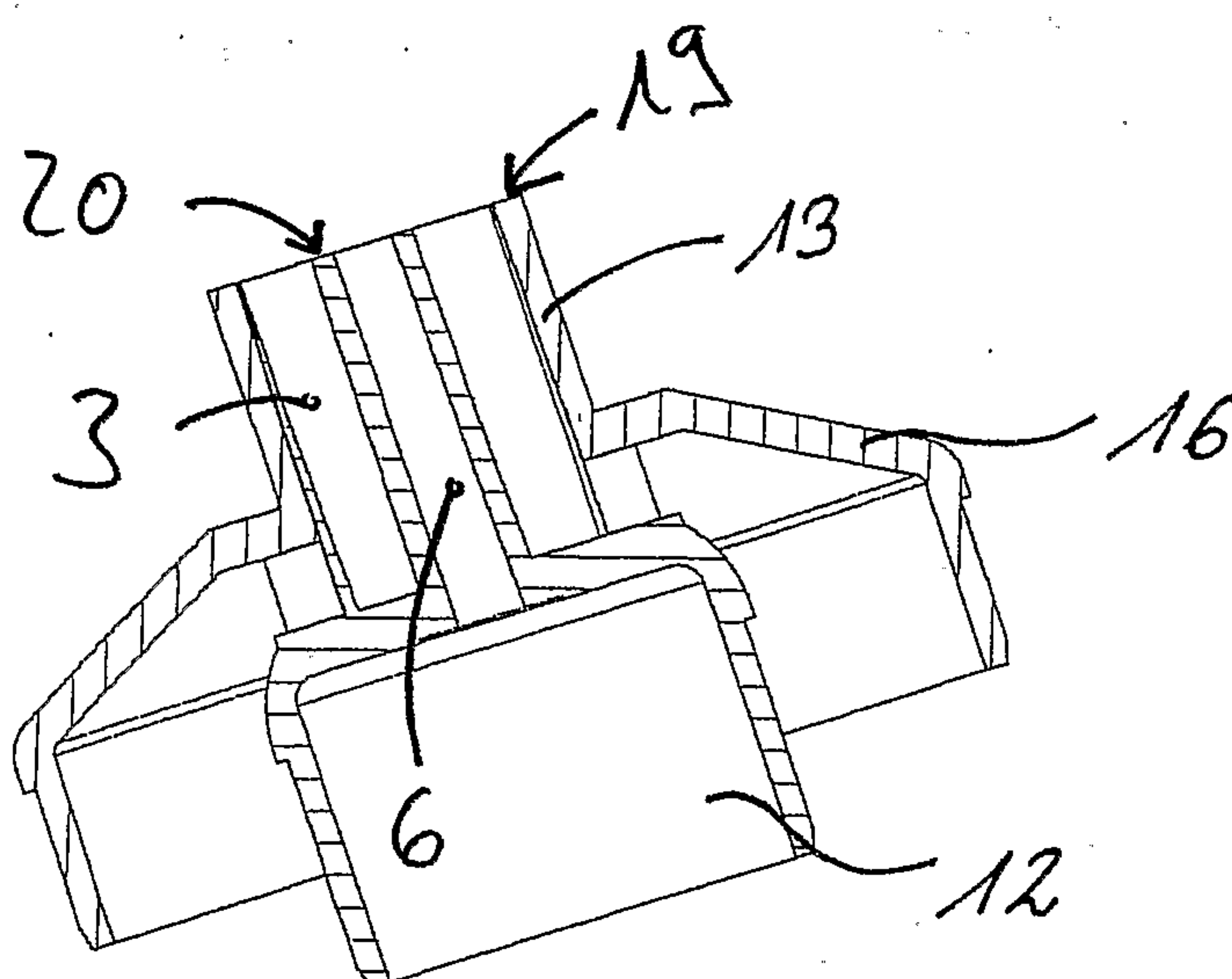


Fig. 4

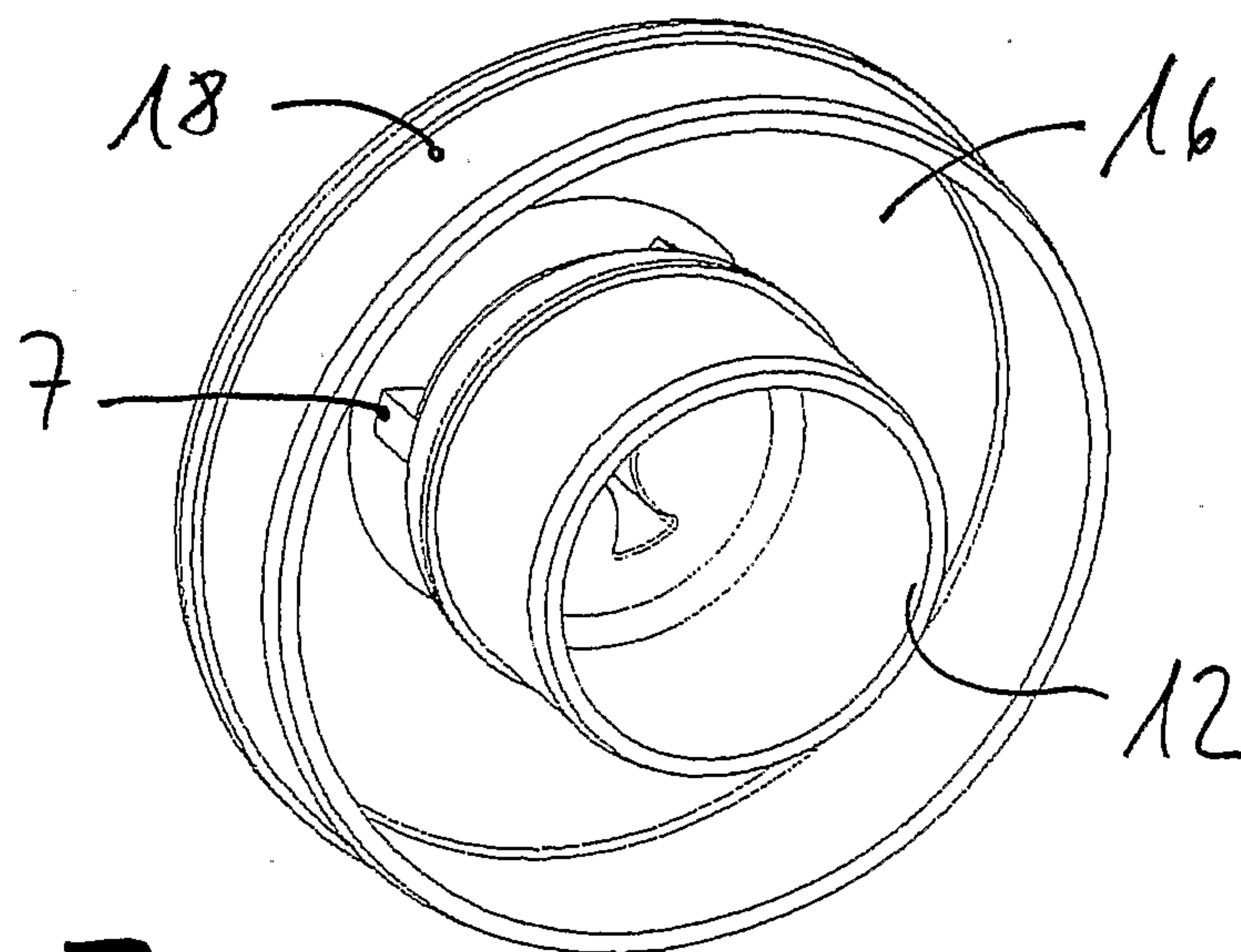


Fig. 5

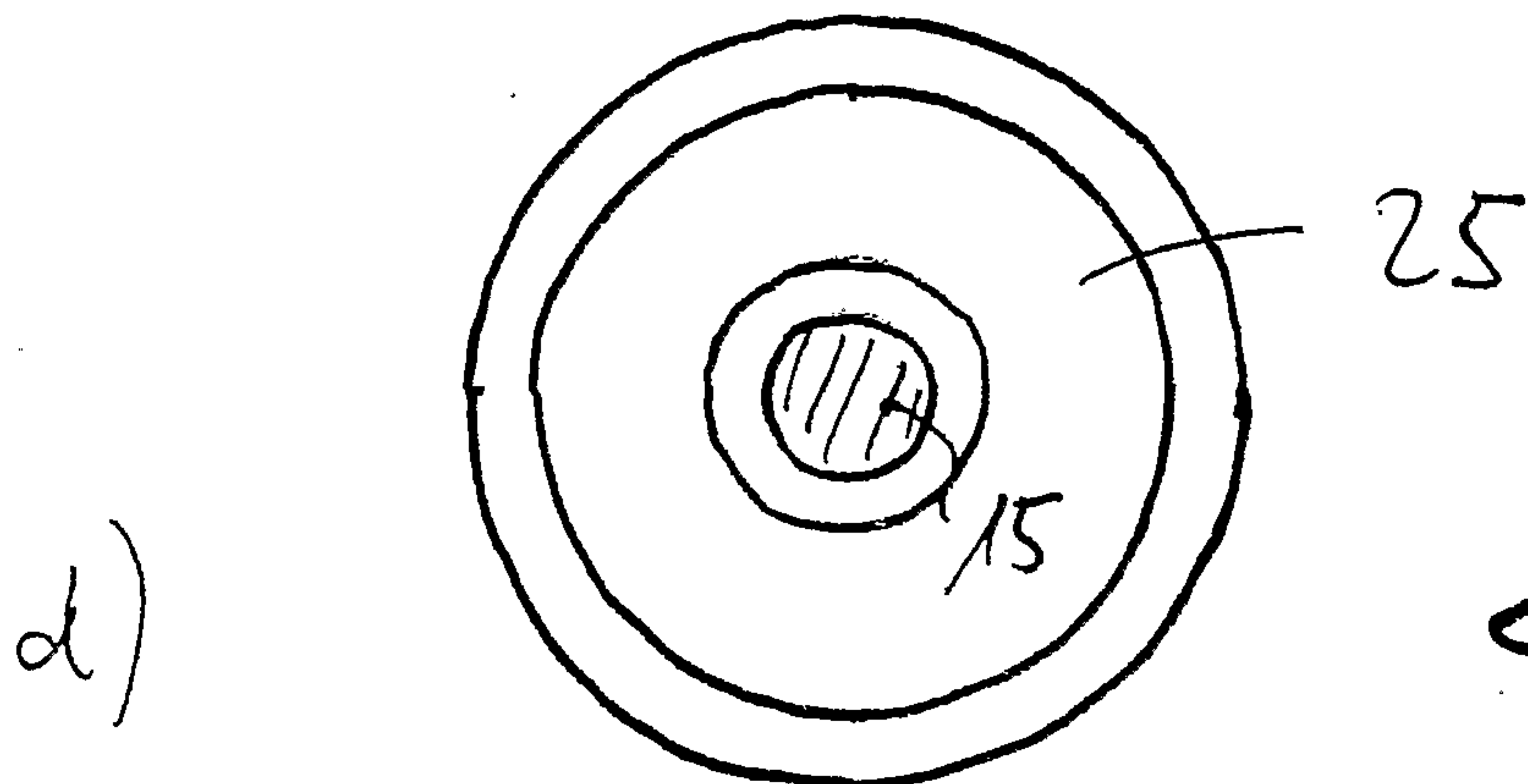
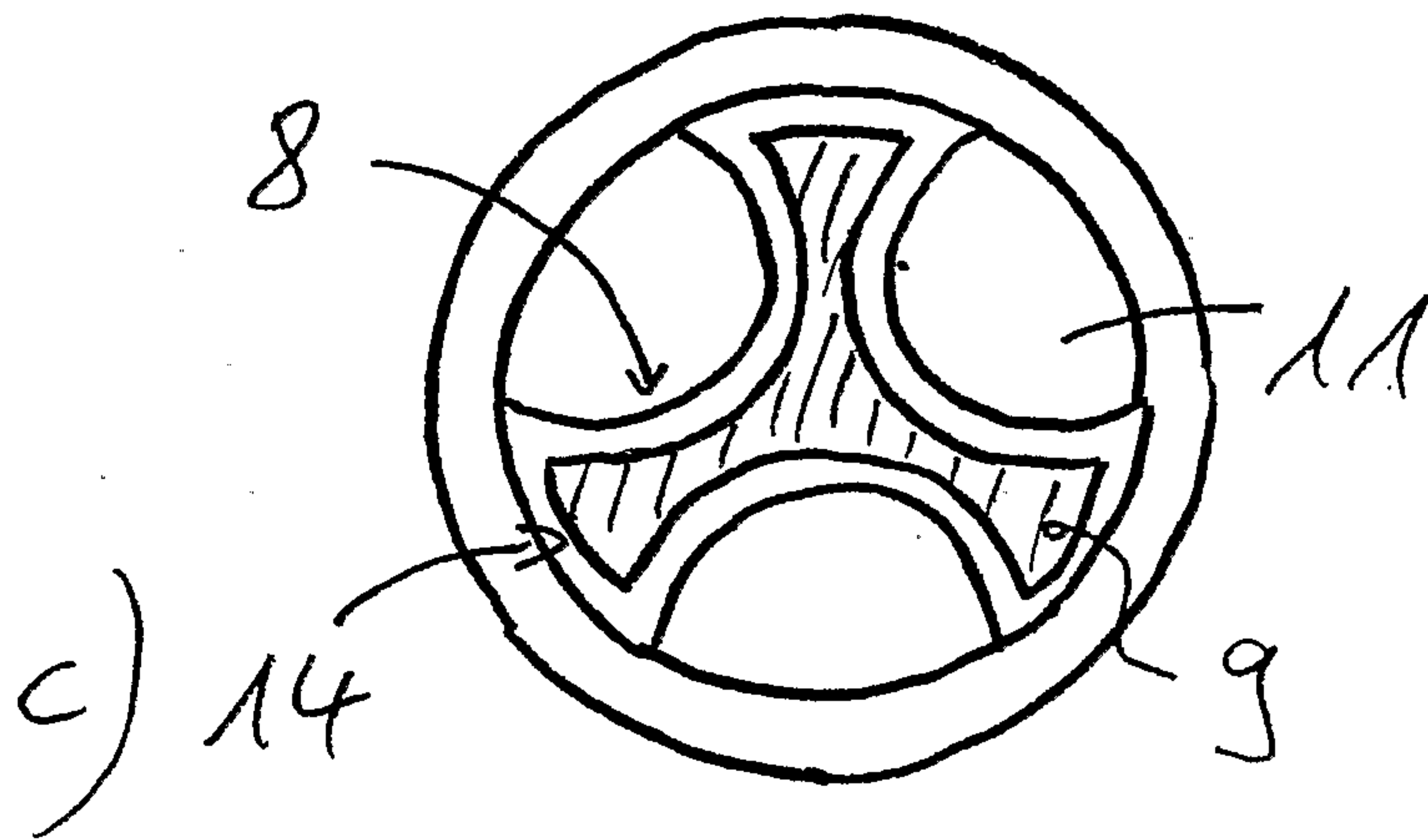
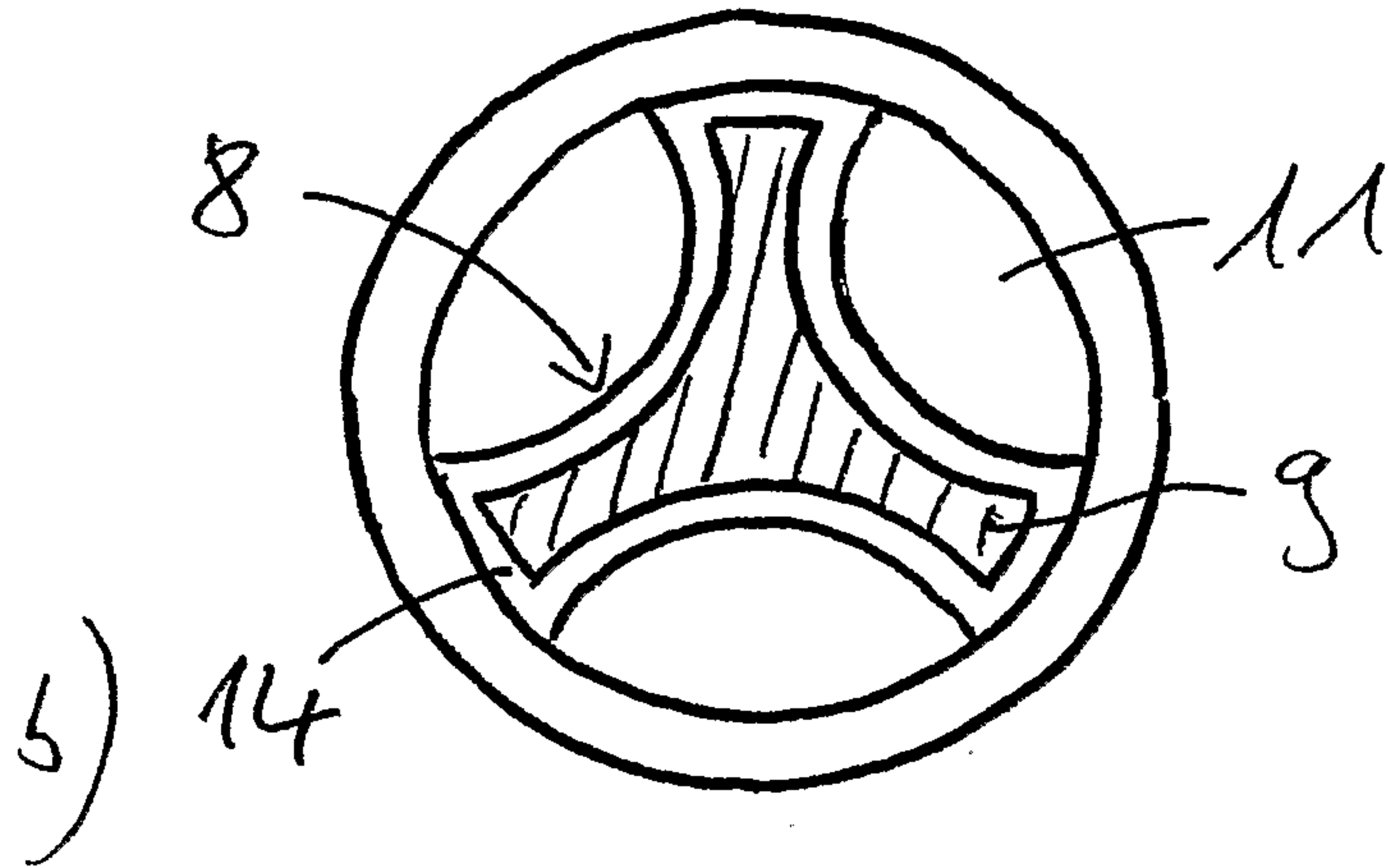
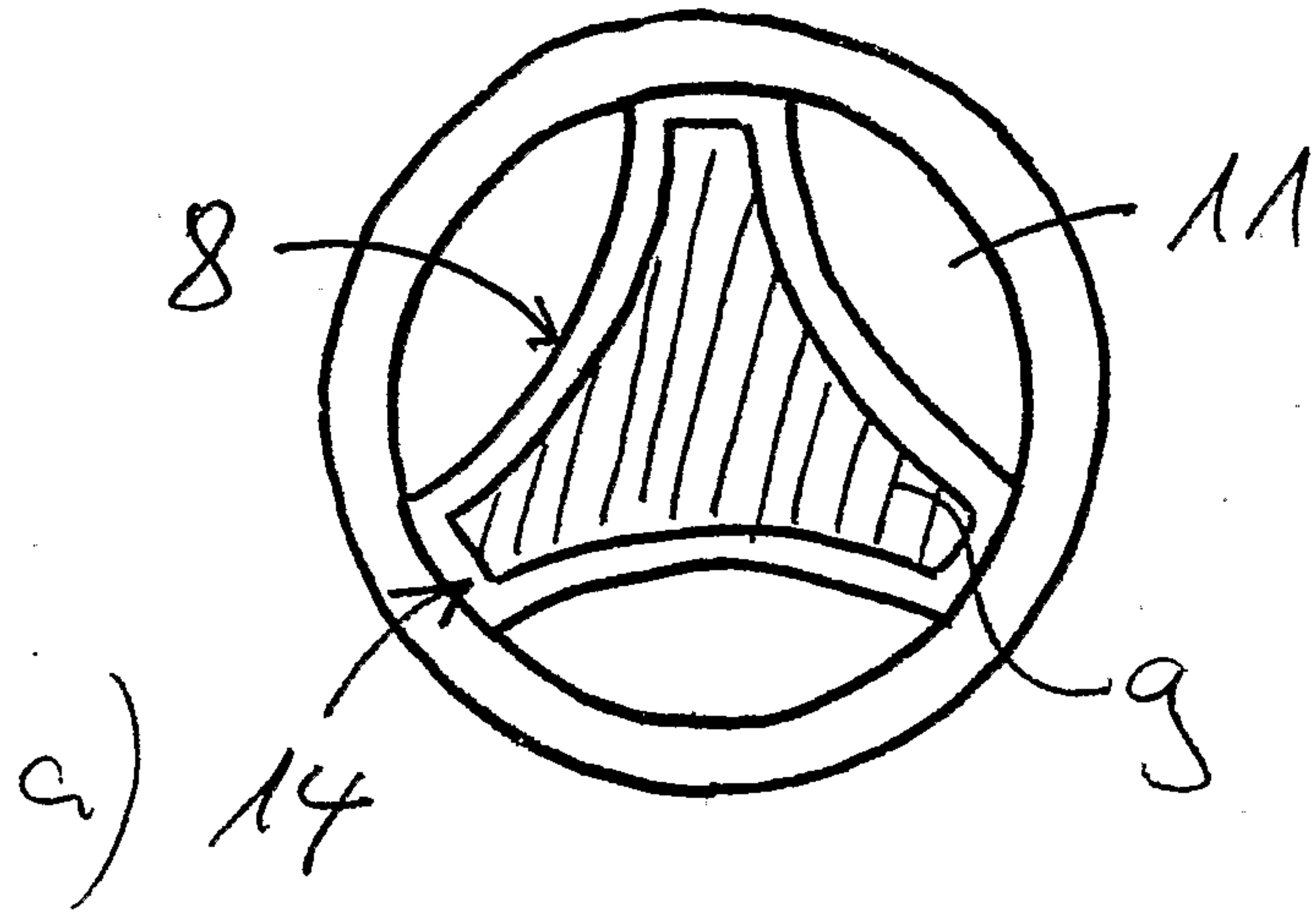


Fig. 6

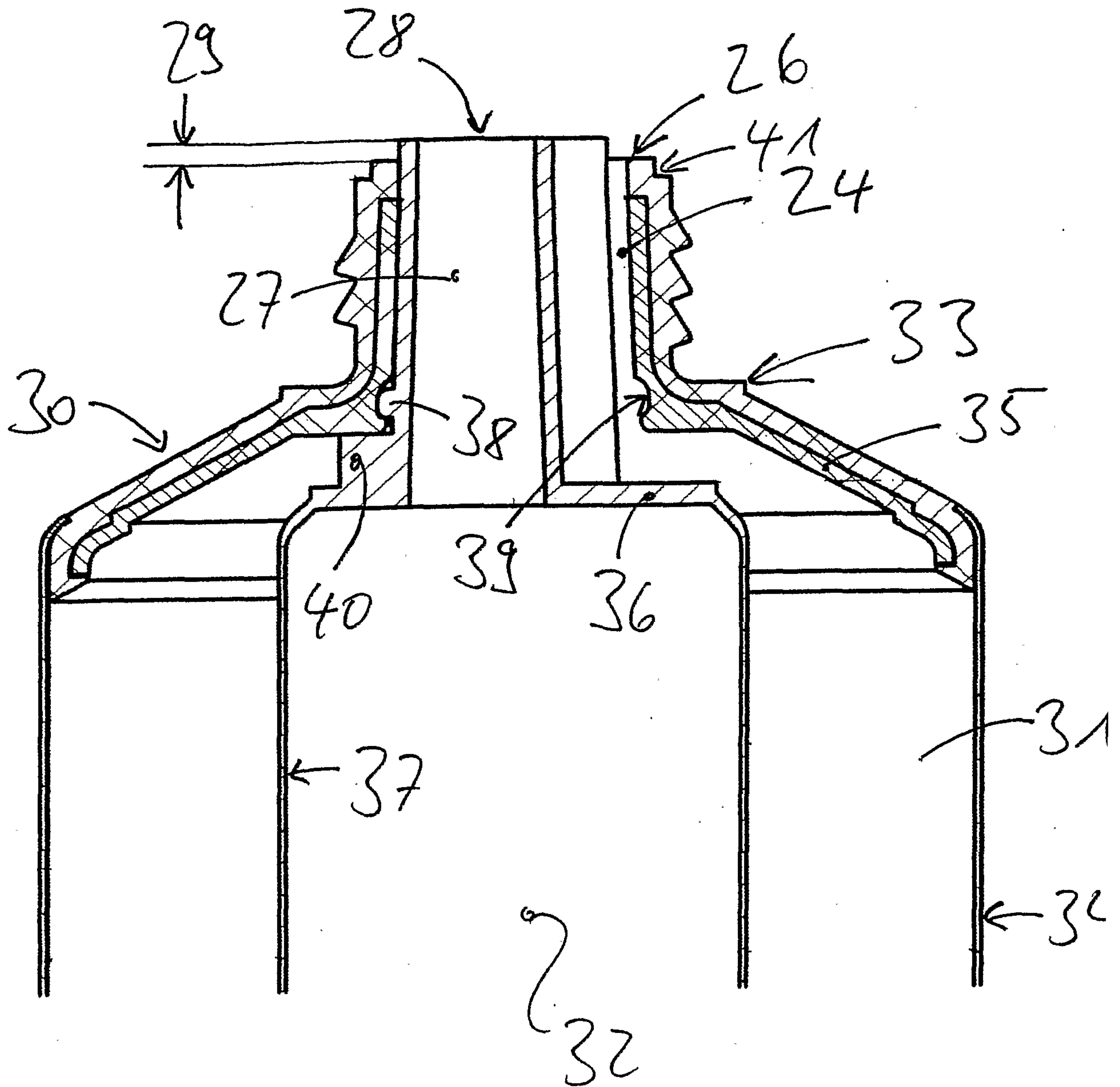


Fig. 7

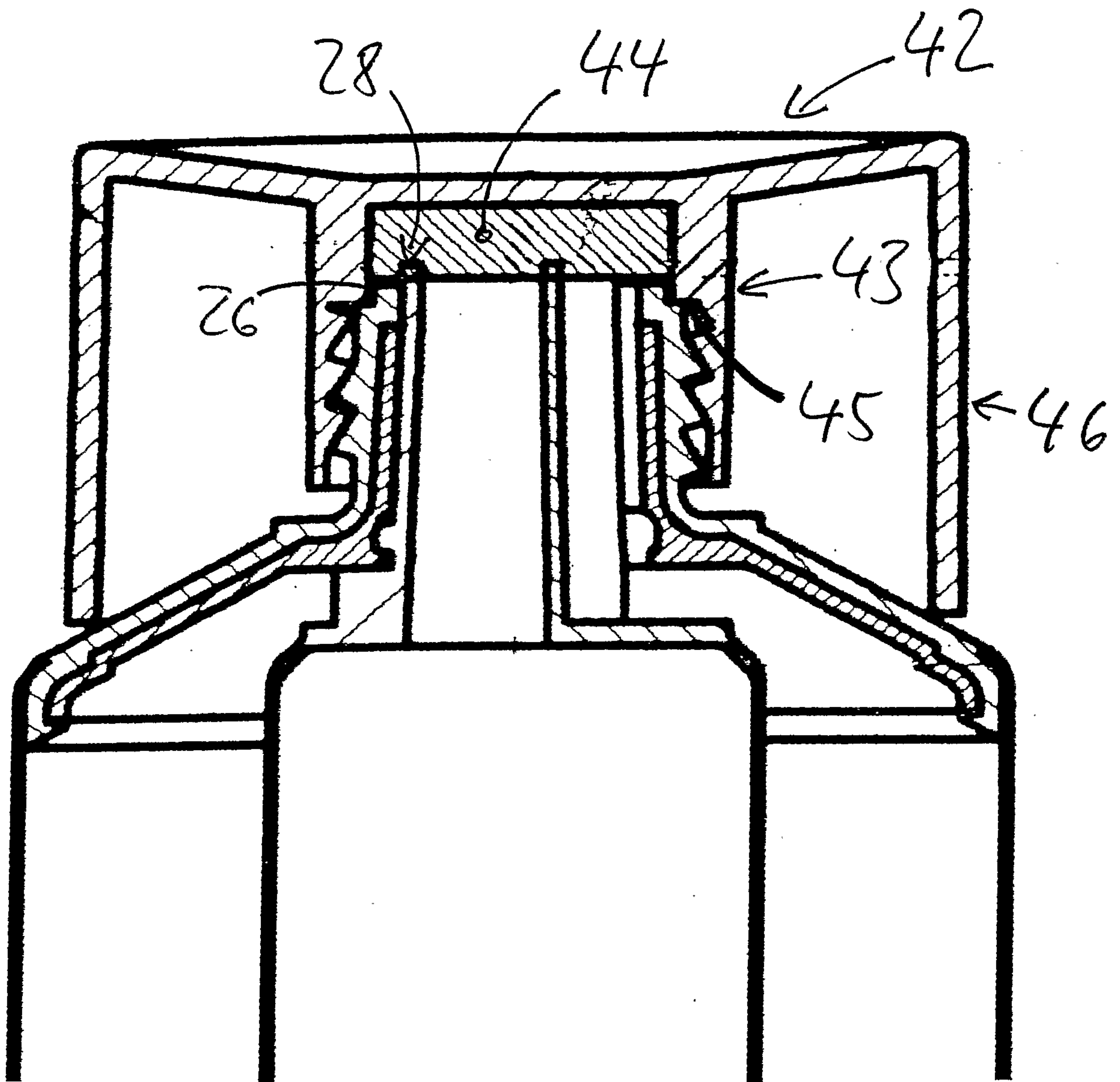


Fig. 8

