(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 987 983 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
27.04.2022 Bulletin 2022/17

(21) Application number: **20202723.1**

(22) Date of filing: **20.10.2020**

(51) International Patent Classification (IPC):
A47G 21/18 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A47G 21/18; A47G 2400/10

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **Capri Sun AG**
6300 Zug (CH)

(72) Inventors:
- **KORBMANN, Andreas**
  69214 Eppelheim (DE)
- **SCHEHL, Beatus**
  69214 Eppelheim (DE)

(74) Representative: **Grünecker Patent- und Rechtsanwälte**
PartG mbB
Leopoldstraße 4
80802 München (DE)

(54) **PAPER DRINKING STRAW FOR A BEVERAGE CONTAINER AND BEVERAGE CONTAINER**

(57) The invention refers to a paper drinking straw (1) for a beverage container (81,83) with a penetration opening (80,84) for inserting the paper drinking straw, wherein the paper drinking straw comprises a paper tube (2) with a bevelled tip (7) at a first end (3) , wherein paper of paper tube is more compressed at the first end compared to other portions (6) of the paper tube.

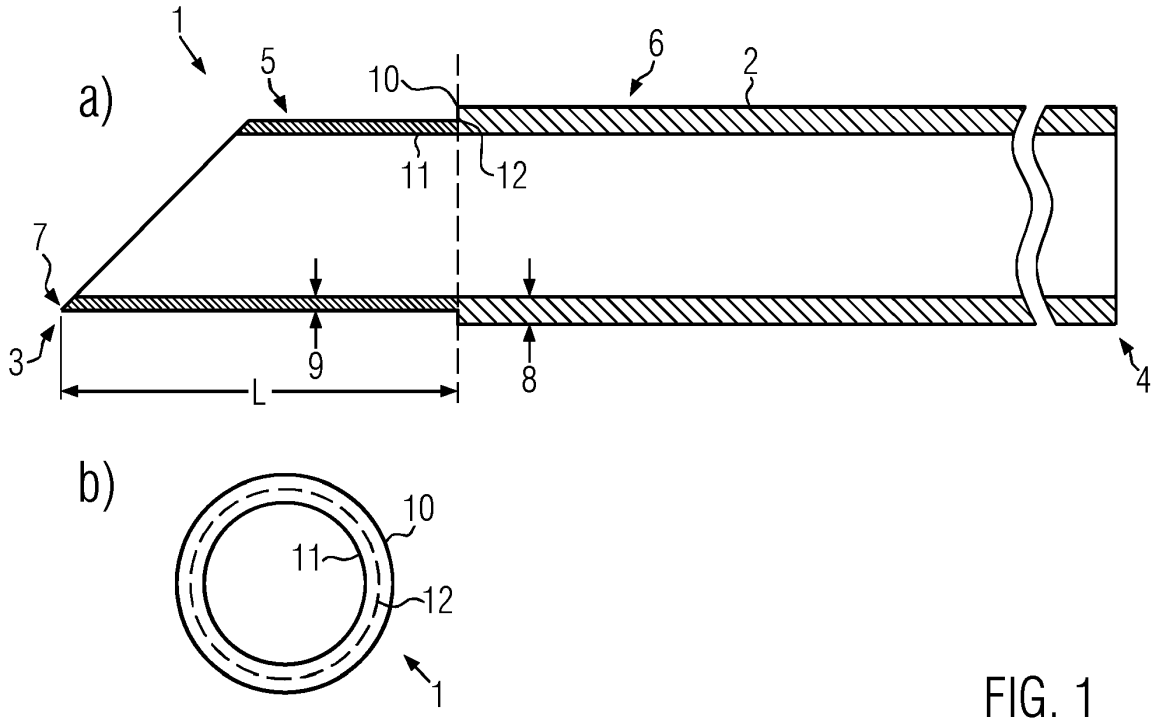

FIG. 1

EP 3 987 983 A1

Description

[0001] The invention refers to a paper drinking straw for a beverage container and to a beverage container.

[0002] Beverage containers with a penetration opening for inserting a drinking straw are known from the art. The drinking straw may be made of plastic or of paper. A drinking straw made of paper, however, has a disadvantage that mechanical rigidness is not easy to achieve. This holds in particular in the case that the drinking straw is to open the penetration opening with a bevelled tip at one of its ends. The tip needs to be sufficiently sharp and rigid in order to penetrate the wall of the container.

[0003] The object of the present invention is to provide a paper drinking straw and a beverage container in combination with a paper drinking straw which provides for sufficient mechanical stiffness in order to allow a proper opening of a beverage container with such a paper drinking straw.

[0004] The object of the invention is met by the paper drinking straw with the features of claim 1 and the beverage container with the features of claim 12.

[0005] Optional embodiments are disclosed in the dependent claims.

[0006] The paper of the paper tube is more compressed at the first end, which has a bevelled tip, compared to other portions of the paper tube. By having the paper more compressed it turns out to be mechanically more rigid. This is helpful in providing a sufficiently rigid and sharp bevelled tip for opening a beverage container. The paper in other portion(s) may be not compressed at all or less compressed. Typically, paper is compressed to some extent by a paper production process where paper is passed through rollers such as compression rollers.

[0007] A higher degree of compression of paper is typically related to a higher density of the paper, which can be indicated in g/cm^3.

[0008] The paper may comprise at least one of: wood fibres, bamboo fibres, bagasse fibres, seaweed fibres, fibres of banana plant, fibres of Abaca plant, synthetic fibres, polymer-based fibres, plastic fibres.

[0009] The paper of the paper tube may be, for example, more compressed at its first end compared to the second end of the paper tube. It may also be more compressed compared to other portions of the paper tube such as any portion between the compressed portion at the first end and the second end.

[0010] The paper of the paper tube is compressed such that it has a reduced wall thickness at its first end compared to its other portions. This allows to start with a paper tube with a uniform wall thickness and that by compressing the paper at the first end leads to an increased rigidness of the paper although it has a reduced wall thickness.

[0011] The part of the paper of the paper tube that is compressed at the first end may be only a portion of the circumference of the tube, or it may be the entire circumference of the tube. Compressing the entire circumference gives an enhanced mechanical stability and rigidness to the entire first end of the tube, while compressing only a portion of the circumference provides for an easier way to compress that portion and may be sufficient in order to obtain a sharp and rigid bevelled tip.

[0012] Optionally, along the length of the paper tube starting at its first end the compressed paper is provided only in a range of up to or less than 5%, 10% or 20% of the length of the paper tube. Thereby the increased mechanical stability is provided only in the area starting at the first end and extending to some extent into the direction of the second end while the remainder of the paper tube remains flexible because of being uncompressed or less compressed. Such flexibility can help in that the remainder of the tube may adapt to the shape of a flexible beverage container. As the beverage container may, for example, be a beverage carton, a foil bag or a stand up pouch, some flexibility of the major portion of the paper tube is helpful for the paper straw to adapt to the package it is attached to. Thereby, if the beverage container is deformed the paper drinking straw can adapt to the deformation at least to some extent, without breaking or otherwise being damaged.

[0013] Optionally, the density of the compressed paper may be 1.2, 1.5, 2.0 or 3.0 times higher than in the other portions of the paper tube. The density can be indicated in e.g. g/cm^3. These other portions may be the second end or any portion between the first end and the second end or between the compressed portion and the second end.

[0014] The thickness of the compressed paper may be less than 0.9, 0.8, 0.7, 0.6 or 0.5 times the thickness of the other portions of the paper tube such as the thickness at the thickest portion of the paper tube. The higher the compression of a paper tube that was uniform in thickness before a compressing step, the thinner its thickness is. Nevertheless, being more compressed it provides a higher stiffness although being less thick.

[0015] Additionally, a portion of the compressed paper or all of the compressed paper may be impregnated with a moisture resistant agent such as silicate or sodium silicate. A moisture resistant agent may further increase the stiffness of the bevelled tip or of the first end or the portion of compressed paper.

[0016] Optionally, the paper straw is having a circular cross section along its entire length of the paper tube, or at least in the portion where the compressed paper is present. A paper straw with a circular cross section is relatively easy to fabricate and at the same time it provides optimum resistance against being radially compressed in different radial directions. It may, however, also have a non-circular cross section along the entire length or at the first end or at the portion of compressed paper.

[0017] Optionally, the paper tube comprises a winded paper layer. A winding of a paper layer allows to fabricate paper tubes in a continuous manner such that the drink-

ing straw can be cut from a continuous tube or a continuously fabricated tube.

[0018] From a continuous tube or from a continuously fabricated tube a length may be cut, which is then itself cut into two paper drinking straws by a slanted cut providing both paper drinking straws with the bevelled tip.

[0019] The paper tube comprises a single kind of paper which can be provided in one single layer or several layers, which are attached to each other. Optionally, the paper tube comprises several layers of paper of which some of the layers are of a different kind. This allows, for example, to combine different kinds of paper in order to improve mechanical and moisture resistance of the paper drinking straw. The different layers may have themselves different density due to their production, their composition etc. The different layers may be joined by some adhesive.

[0020] In case of several distinct layers that make up the paper tube, each of those layers is more compressed at the first end compared to the corresponding layers of other portions of the paper tube. E.g. the outermost layer of the paper tube is more compressed at the first end compared to the outermost layer of the paper tube of other portions of the paper tube. The same can apply to the innermost and/or and any middle layer between an innermost and an outermost layer.

[0021] A beverage container is configured for receiving a liquid product such as a beverage, which is hermitically sealed by the beverage container. The beverage container contains a penetration opening which is provided for introducing the paper straw as described above or below. The penetration opening typically has a reduced mechanical stability compared to the remainder of the beverage container e.g. by having a reduced wall thickness or less layers of the material that makes up the beverage container or a weakened portion of the wall of the beverage container which can be prepared e.g. by laser perforation of the wall or of some layers of the wall of the beverage container. The penetration opening can also be prepared by providing a through hole through the wall of the beverage container, which is closed by another material, such as a foil material, which can be opened with the paper drinking straw by perforating the other material. The beverage inside of the beverage container can be consumed by a user through the paper drinking straw.

[0022] The beverage container may be a beverage carton, a foil bag or a stand up pouch.

[0023] The following figures are provided in order to provide a better understanding of the invention.

[0024] The figures show:

Figure 1: A cut through first embodiment of the paper drinking straw;

Figure 2: A cut through second embodiment of the paper drinking straw;

Figure 3: A cut through third embodiment of the paper drinking straw;

Figure 4: A cut through fourth embodiment of the paper drinking straw and a three dimensional view thereof;

Figure 5: A schematic view of a method of fabrication of the paper drinking straw in a first embodiment;

Figure 6: A second embodiment showing a fabrication method of the paper drinking straw;

Figure 7: A third embodiment of a fabrication of the paper drinking straw;

Figure 8: Beverage containers in combination with the paper drinking straw.

[0025] In figure 1a, a paper drinking straw 1 is shown in a cross section along a longitudinal axis of the paper drinking straw.

[0026] The paper drinking straw has a first end 3 and the second end 4 opposite to the first end.

[0027] The paper drinking straw 1 comprises a paper tube 2. At the first end 3, the paper tube is provided with a bevelled tip 7. In a portion 5 at the first end 3, the paper tube is having paper that is compressed. This can be seen by the more dense hatch and by the reduced wall thickness 9 compared to the wall thickness 8 in the portion (other portion) 6 which has a larger wall thickness 8.

[0028] The bevelled tip 7 is provided at the first end 3 by the paper drinking straw 1 having a slanted cut.

[0029] In figure 1b a view onto the paper drinking straw 1 from its first end 3 towards the second end 4 along a longitudinal axis of the paper drinking straw is shown. The inner circumference 11 of the paper drinking straw 1 is shown together with its outer circumference 10. Between the inner circumference 11 and the outer circumference 10, the circumference of a step portion between the compressed and the other portions of the paper tube is shown with reference sign 12.

[0030] As can be seen from figure 1a and 1b, the paper that is compressed is provided on the entire circumference of the paper tube 2.

[0031] The portion 5 in which the paper is more compressed than in portion 6 extends along the length of the paper drinking straw starting at its first end 3 towards the second end 4. The length L of the portion 5 is less than 5%, 10% or 20% of the length of the paper tube. A length L may be several millimetres such as at least or not more than 5, 10 or 15 millimetres.

[0032] The transition from the compressed portion 5 to the other portion 6 is provided in a stepwise fashion as can be seen in figure 1a. The transition may, however, also be continuous such that the wall thickness increases from the reduced wall thickness 9 to the larger wall thickness 8 over an extended portion along the length of the tube. Such a continuous transition facilitates the insertion

of the paper drinking straw in the beverage container as a stepwise transition may impede inserting the paper drinking straw trough the material of the penetration opening.

[0033] In figure 2 another embodiment of a paper drinking straw is shown. The paper drinking straw 15 has a paper tube 2 with a first end 3 and an opposite second end 4. A bevelled tip 7 is provided at the first end 3. In the portion 5 at the first end 3, the paper of the paper tube 2 is more compressed than in the other portion 6. In comparison to figure 1, the difference resides in that the change of thickness 8, 9 between the portion 5 and portion 6 is given by a step on the inner side of the tube 2, while in figure 1 the step is on the outer side of the paper tube 2. On the outer side of paper drinking straw 15 the transition from the smaller thickness 9 to the larger wall thickness 8 is smooth.

[0034] As can be seen in figure 2b, the inner circumference 17 is provided by the inner circumference of the other portion 6, the inner circumference of the compressed paper in portion 5 is given by the reference numeral 18, and the outer circumference 16 is the outer circumference of both portions 5 and 6. The three circumferences are concentric as can be seen in figure 2b and the circumference 18 of the compressed paper in the portion 5 is between the inner circumference 17 of the other portion 6 and the outer circumference 16 of portion 5 and 6.

[0035] As already explained with respect to figure 1, also in the embodiment of figure 2, the transition of the reduced thickness 9 to the larger thickness 8 of the other portion 6 is not necessarily provided in a stepwise manner but can also be a smooth transition which extends over a portion along the length of the paper tube 2.

[0036] While in figure 1 the change of circumference is provided on the outer side and in figure 2 the change is provided on the inside of the paper tube 2, it may also be present on both sides (inside and outside) which means that e.g. a (smaller) step is provided on the outside and another (smaller) step on the inside. Also in this case transitions from the compressed paper in the portion 5 at the first end 3 to the paper of the other portion 6 of the paper tube 2 is not necessarily provided by a step but can also be provided by a smooth transition along the length of the paper tube 2.

[0037] A further embodiment is shown in figure 3, which shows a paper drinking straw 20 with a paper tube 2 having a first end 3 and the second end 4 wherein a bevelled tip 7 is provided at the first end 3. Here in portion 5 at the first end 3, the paper is more compressed than in the portion 6 which, however in this case, does not lead to a change of the wall thickness 23 in portion 5 compared to the wall thickness 24 in portion 6. This can be achieved by, for example, preparing a paper tube which is thicker at its first end 3 in portion 5, and this thicker portion is then compressed to have the same thickness as the other portion 6. The paper being more compressed is shown in figure 3 by a more dense hatching compared to the hatching in portion 6.

[0038] As shown in figure 3b, this paper tube 2 has only one inner circumference 22 and an outer circumference 21.

[0039] In figure 4 a further embodiment of a paper drinking straw 25 is shown with a second end 4 and a first end 3, opposite to the first end 4, the first end 3 having a bevelled tip 7 at its end. In this embodiment only a section of the circumference of the first end 3 has paper being compressed in the portion 5. The thickness 26 of this portion is smaller than the wall thickness 27 of another portion 6. Here the transition between the thickness 26 to the thickness 27 is stepwise, but as is explained with respect to figures 1 and 2 the change of thickness may also be a smooth transition which extends over a certain length along the paper tube 2.

[0040] Also as explained with respect to figures 1 and 2, the change of the wall thickness (step wise or continuous or by a smooth transition as explained above) from a smaller wall thickness 26 to a larger wall thickness 27 does not necessarily have to be provided on the inside of the paper tube 2, but it may also be provided on the outside or at the inside and the outside of the paper tube 2.

[0041] In the embodiment of figure 4, it is in particular that bevelled tip 7 which is provided with an increased mechanical strength by having the paper being more compressed in portion 5 at the first end 3 than in portion 6.

[0042] As can be seen in figure 4b, the compressed paper is only provided in a section of the circumference of the paper tube 2. A portion of the circumference which has a changed geometry compared to a circular shape is indicated by reference numeral 30, while the outer circumference of the tube is indicated by the reference numeral 28 and the inner circumference of the paper tube 2 is indicated by reference numeral 29.

[0043] In figure 4c the three dimensional view of an embodiment of figure 4a and 4b is shown which indicates the portion 5 in which the paper is compressed providing a stiffened bevelled tip 7.

[0044] The wall thickness of the paper in the portion of the compressed paper can have a uniform density or a uniform wall thickness. It may however also have a non-uniform density and/or a non-uniform wall thickness (not shown in the figures). This can be given by e.g. certain parts inside of the portion 5 that are more compressed than other parts in portion 5. It is for example possible to provide ribbons in the portion 5, which extend e.g. along the longitudinal axis of the paper tube 2. The ribbons are formed by having elongated sections next to each other that have a changing or different density and that extend e.g. in the direction of the length of the paper tube 2 (although not along the entire length). Such ribbons can provide an increased mechanical stability.

[0045] In figure 5 schematically a way of preparing a paper drinking straw 1 is shown. The paper drinking straw 1 is provided in a hollow tool 50. The paper drinking straw 1 fits just in the opening of the hollow tool 50. Inside the

paper drinking straw 1, a tool 51 comprising three portions 51a, 51b and 51c is provided which can be moved outwards as indicated by the arrows in Fig. 5 a). When those tool portions 51a, 51b and 51c are moved outwards, the paper of the paper tube of the paper drinking straw 1 becomes compressed as the paper is pressed against the wall of the hollow tool 50. Instead of having three portions 51a, 51b and 51c, the tool inside of the paper drinking straw 1 may also have only two portions or four or more portions that can move outwardly. By any gaps between the three portions 51 a, 51b and 51c ribbons of a less densely compressed paper extending along the length of the tube can be provided.

[0046] Such a method can lead to a paper drinking straw 15 as shown in figure 2 wherein the transition from the compressed paper in portion 5 to the paper in the other portion 6 is on the inside of the paper tube 2.

[0047] In figure 6, another embodiment is shown for preparing a paper drinking straw 1. Inside of the paper drinking straw 1, a tool 61 is provided which fills the paper tube 2 of the paper drinking straw 1, optionally entirely. Two outer tools 60a and 60b can be provided that can be moved relative towards the tool 61 as indicated by the arrows in figure 6. When the tools 60a and 60b move towards the tool 61 they compress the paper of the paper tube 2 on the outside of the paper tube 2. The space provided in the closed configuration as shown in figure 6b between the tools 60a and 60b and the tool 61 is less than the space required by the paper of the paper tube of the paper drinking straw 1 before compressing it. Instead of two outer tools 60a and 60b more then two outer tools can be used each covering a section of the circumference of the inner tool 61. By any gaps between the outer tools ribbons extending along the direction of the length of the tube can be created.

[0048] Such a version of preparing a paper tube can be used to prepare a paper drinking straw 1 according to figure 1, where the transition of the reduced thickness 9 to a larger thickness 8 is provided on the outside of the paper tube 2.

[0049] A paper drinking straw as shown in figure 3 can be prepared either with the tools of figure 5 or the tools of figure 6 or corresponding methods.

[0050] Figure 7 shows a further embodiment illustrating a way of preparing a paper drinking straw 1. Here the bevelled tip 7 at the first end 3 of the paper drinking straw 1 is provided between two tools 70a and 70b which can be pressed against each other. By pressing the two tools 70a and 70b against each other the portion with the bevelled tip 7 becomes compressed. This method can be used to prepare a paper drinking straw as shown in figure 4.

[0051] While in Figure 7 the tools are having a smooth surface they can also have a surface with a pattern, which is then impressed into the paper. This can be used to created ribbons in the portion 5 of any kind, such as e.g. extending along the direction of the length of the paper tube 2.

[0052] Figure 8 shows two embodiments of beverage containers. Figure 8a shows a beverage carton 81 with a penetration opening 80 through which a paper drinking straw 1 has been inserted.

[0053] This paper drinking straw 1 has a paper tube with the paper being more compressed in the region 82.

[0054] Figure 8b shows a foil bag or a stand up pouch 83 with a penetration opening 84 through which a paper drinking straw 1 has been inserted, the paper drinking straw 1 having a portion of compressed paper 82.

[0055] The paper drinking straw 1 can be attached at the outside of the beverage container e.g. sealed into a wrapping (such as a paper wrapping) so that it is readily available for opening the beverage container by inserting the paper drinking straw into the penetration opening 80, 84.

Claims

1. Paper drinking straw (1) for a beverage container (81, 83) with a penetration opening (80, 84) for inserting the paper drinking straw (1), wherein the paper drinking straw (1) comprises a paper tube (2) with a bevelled tip (7) at a first end (3),
   characterised in that
   paper of paper tube (2) is more compressed at the first end (3) compared to other portions (6) of the paper tube (2).

2. Paper drinking straw according to claim 1, wherein the paper tube (2) comprises a second end (4) opposite to the first end (1) and the paper is more compressed at the first end (3) compared to the second end (4).

3. Paper drinking straw according to claim 1 or 2, wherein the paper of the paper tube (2) is compressed to a reduced wall thickness (9, 26) at the first end (3) compared to other portions (6) of the paper tube (2).

4. Paper drinking straw according to any of claim 1 to 3, wherein the paper of the paper tube (2) is compressed at the first end (3) in only a section (30) of the circumference of the paper tube (2) or on the entire circumference of the paper tube (2).

5. Paper drinking straw according to any of claims 1 to 4, wherein along the length of the paper tube (2) starting at the first end (3) the compressed paper is provided only in a range up to 5 %, 10% or 20% of the length of the paper tube (2).

6. Paper drinking straw according to any of claims 1 to 5, wherein the density of the compressed paper for example measured in g/cm3 is at least 1.2, 1.5, 2.0, or 3.0 times higher than in the other portions (6) of

the paper tube (2).

7. Paper drinking straw according to any of claims 1 to 6, wherein the thickness of the compressed paper is less than 0.9, 0.8, 0.7, 0.6 or 0.5 times the thickness of the other portions (6) of the paper tube (2) such as the thickness (8, 24) at the thickest portion of the paper tube (2).

8. Paper drinking straw according to any of claims 1 to 7, wherein a portion of the compressed paper or all of the compressed paper is impregnated with moisture resistant agent such as silicate such as sodium silicate.

9. Paper drinking straw according to any of claims 1 to 8, wherein the paper drinking straw (1) is having a circular cross section along the entire length of the paper tube (2) or at least in the region where the compressed paper is present and/or in the other portions (6).

10. Paper drinking straw according to any of claims 1 to 9, wherein the paper tube (2) comprises a winded paper layer.

11. Paper drinking straw of one of claims 1 to 10, wherein the paper tube (2) comprises a single paper layer or several layers of paper.

12. A beverage container for receiving liquid product, wherein the beverage container (81, 83) comprises a penetration opening (80, 84) for introducing a paper drinking straw (1) of one of the claims 1 to 11, and the paper drinking straw (1).

13. The beverage container of claim 12, wherein the beverage container is designed as a beverage carton (81), as a foil bag (83) or as a stand-up pouch (83), for example made of foil.

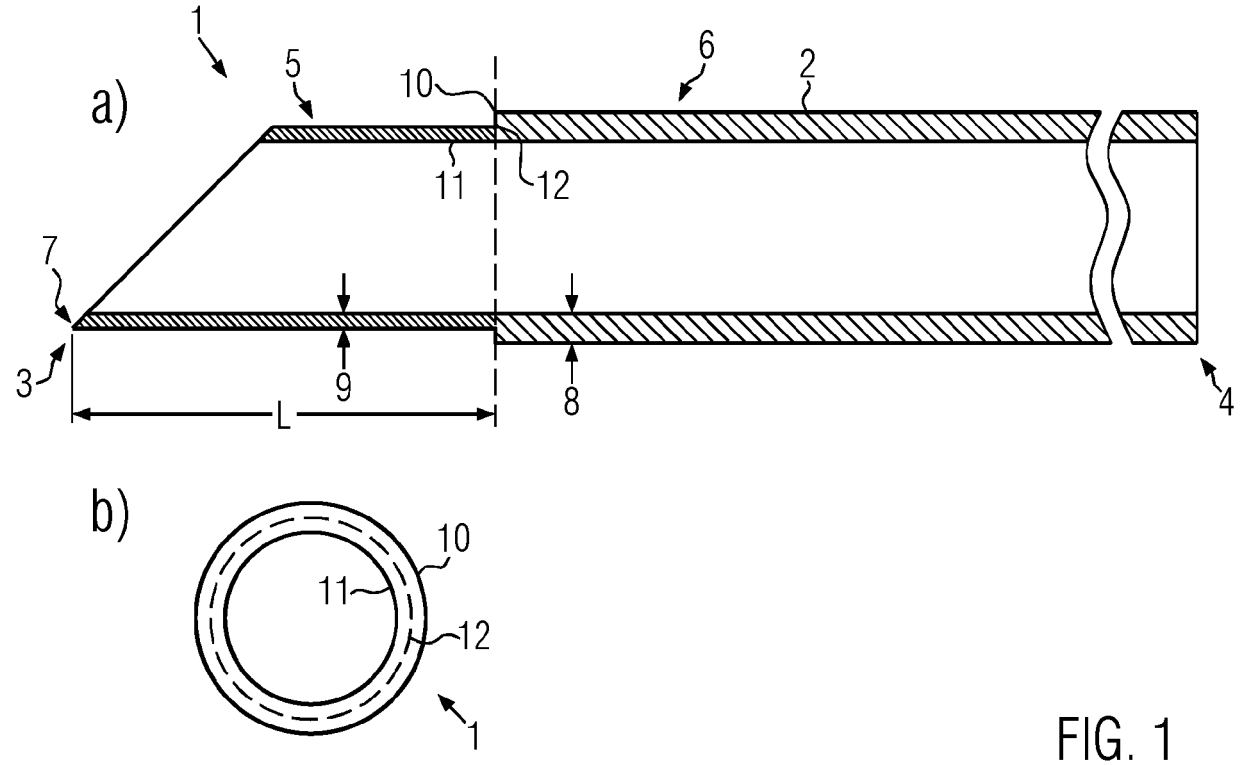
a)
1
5
10
6
2
11
12
7
3
9
L
8
4
b)
10
11
12
1

FIG. 1

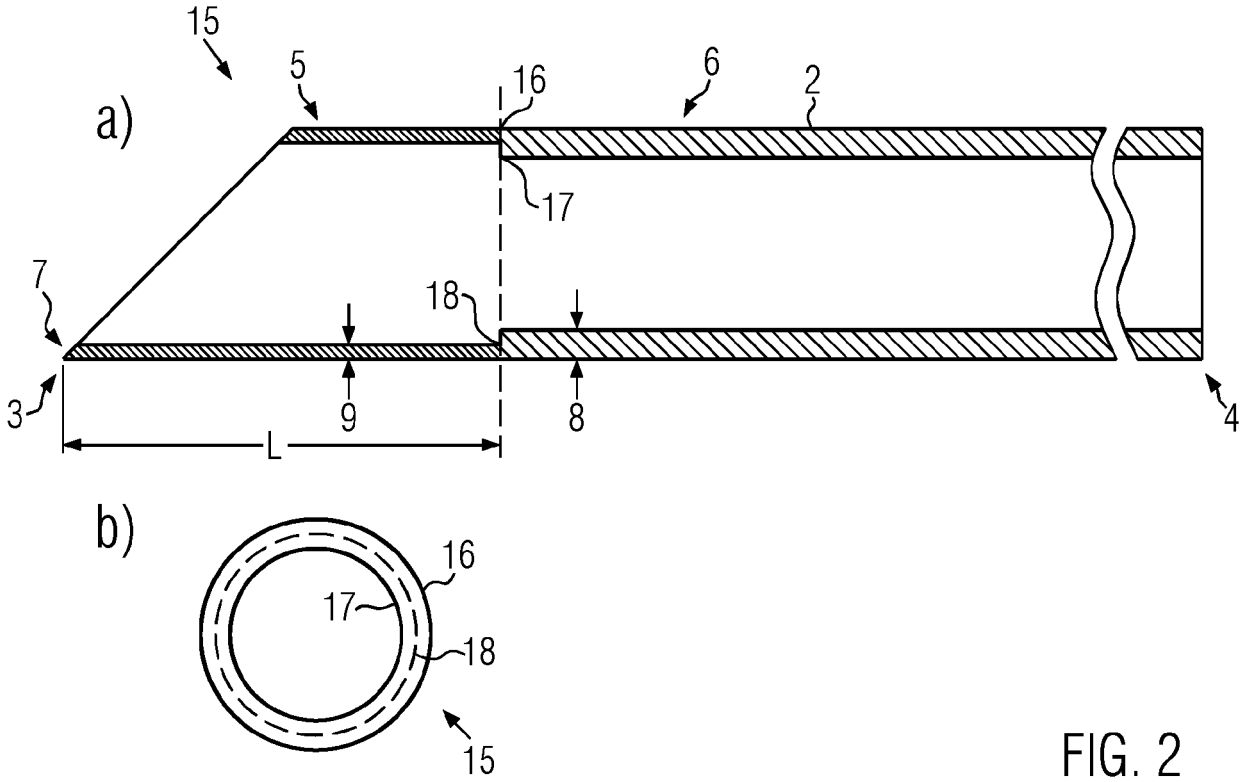
a)
15
5
16
6
2
17
7
18
3
9
L
8
4
b)
16
17
18
15

FIG. 2

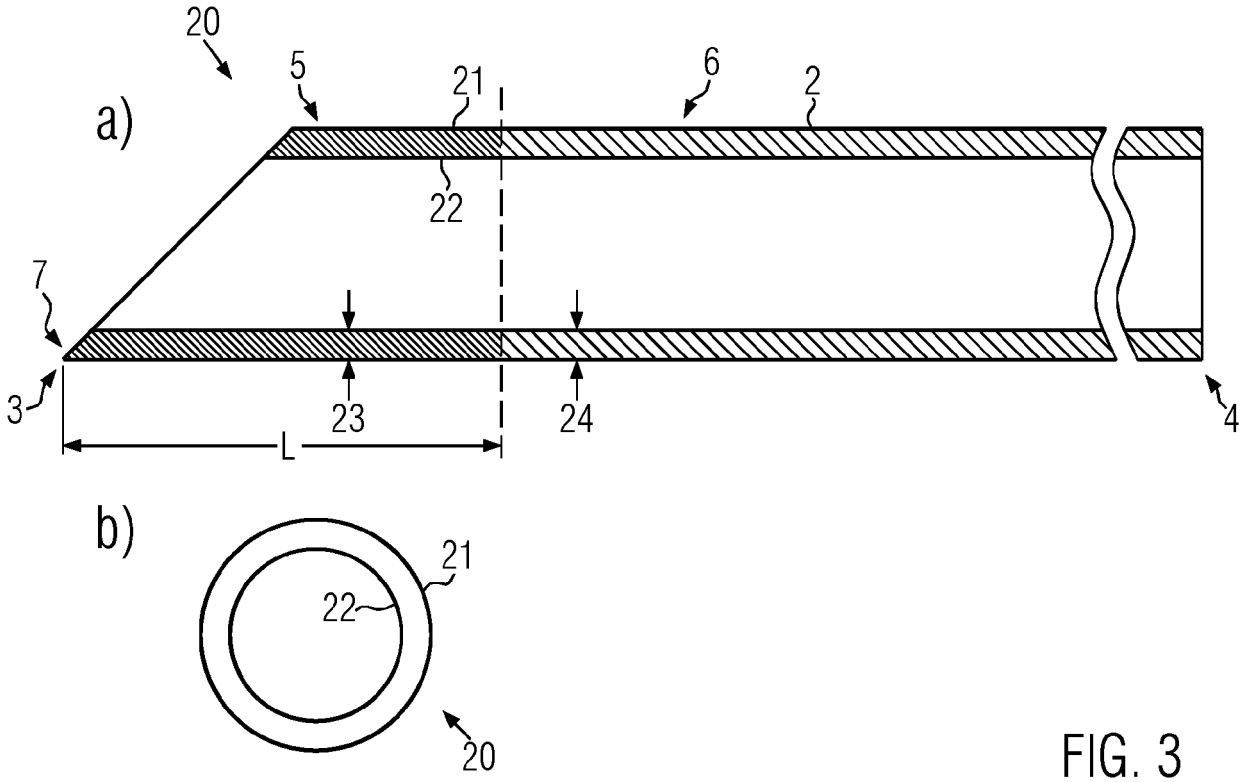
20
5
21
6
2
a)
22
7
3
23
24
L
4
b)
21
22
20

FIG. 3

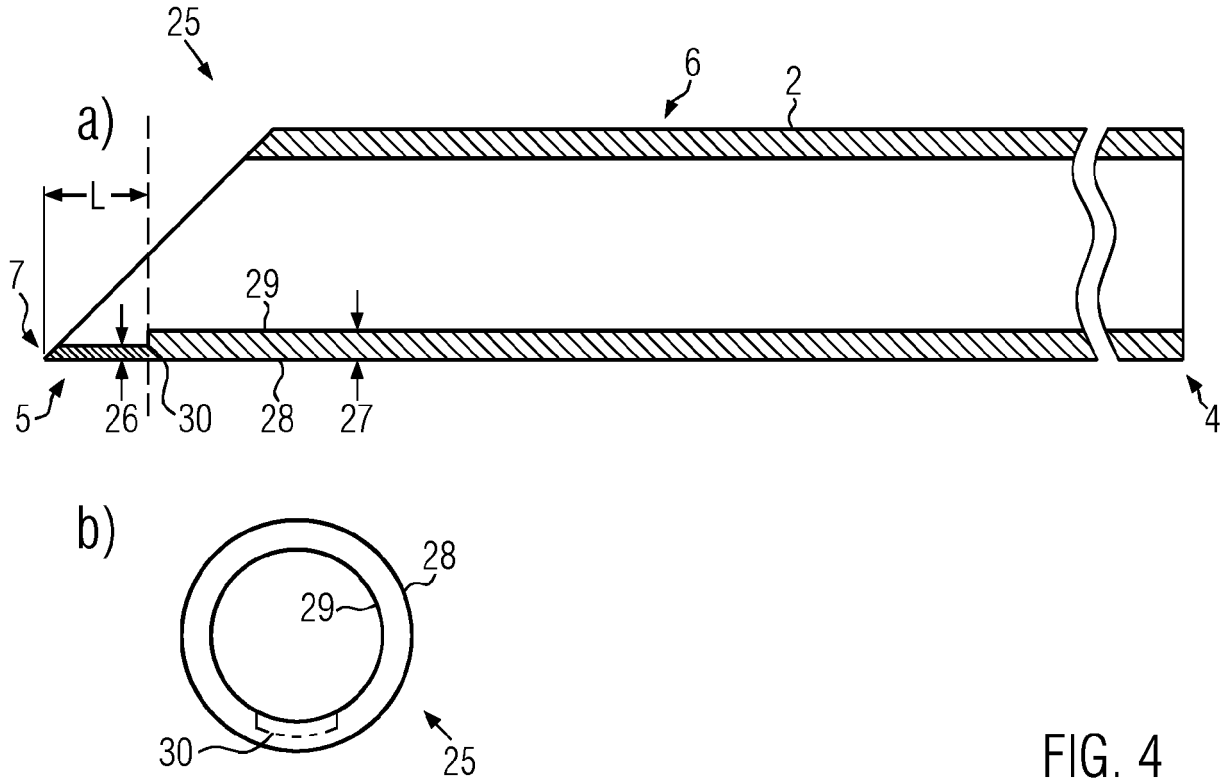
25
6
2
a)
L
7
29
5
26
30
28
27
4
b)
28
29
30
25

FIG. 4

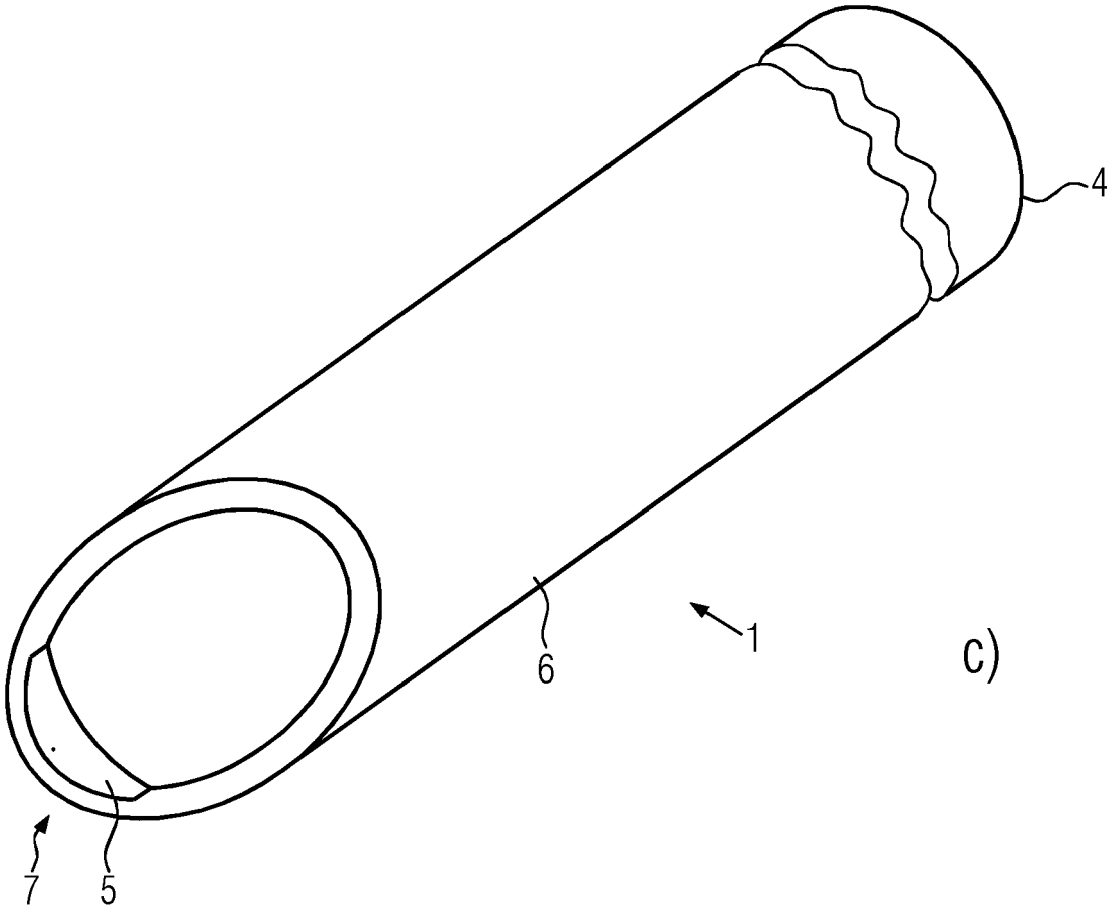

FIG. 4

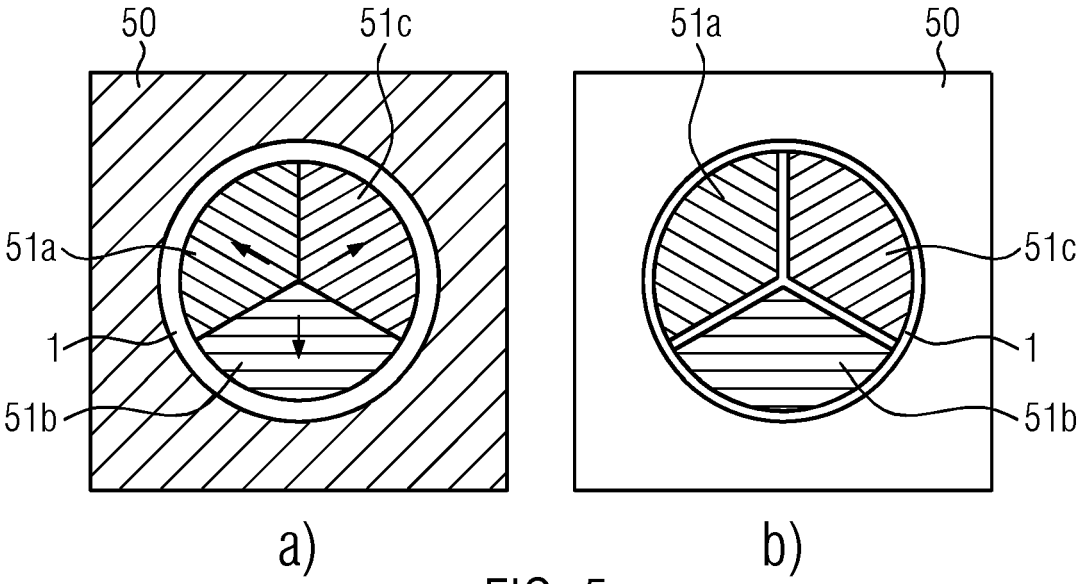

FIG. 5

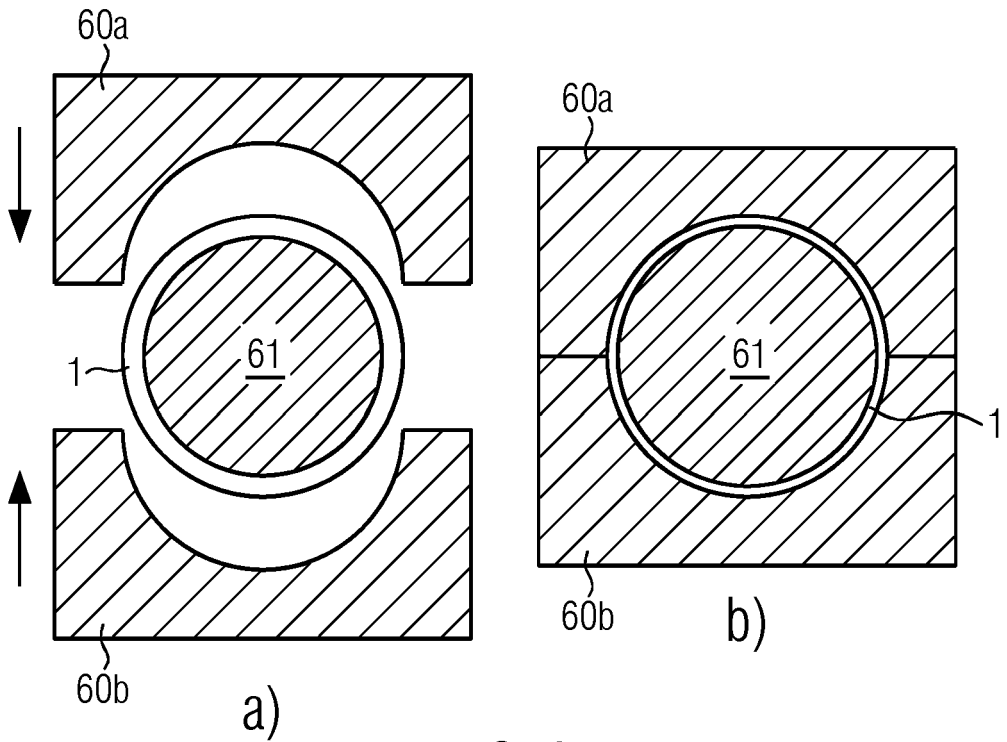

FIG. 6

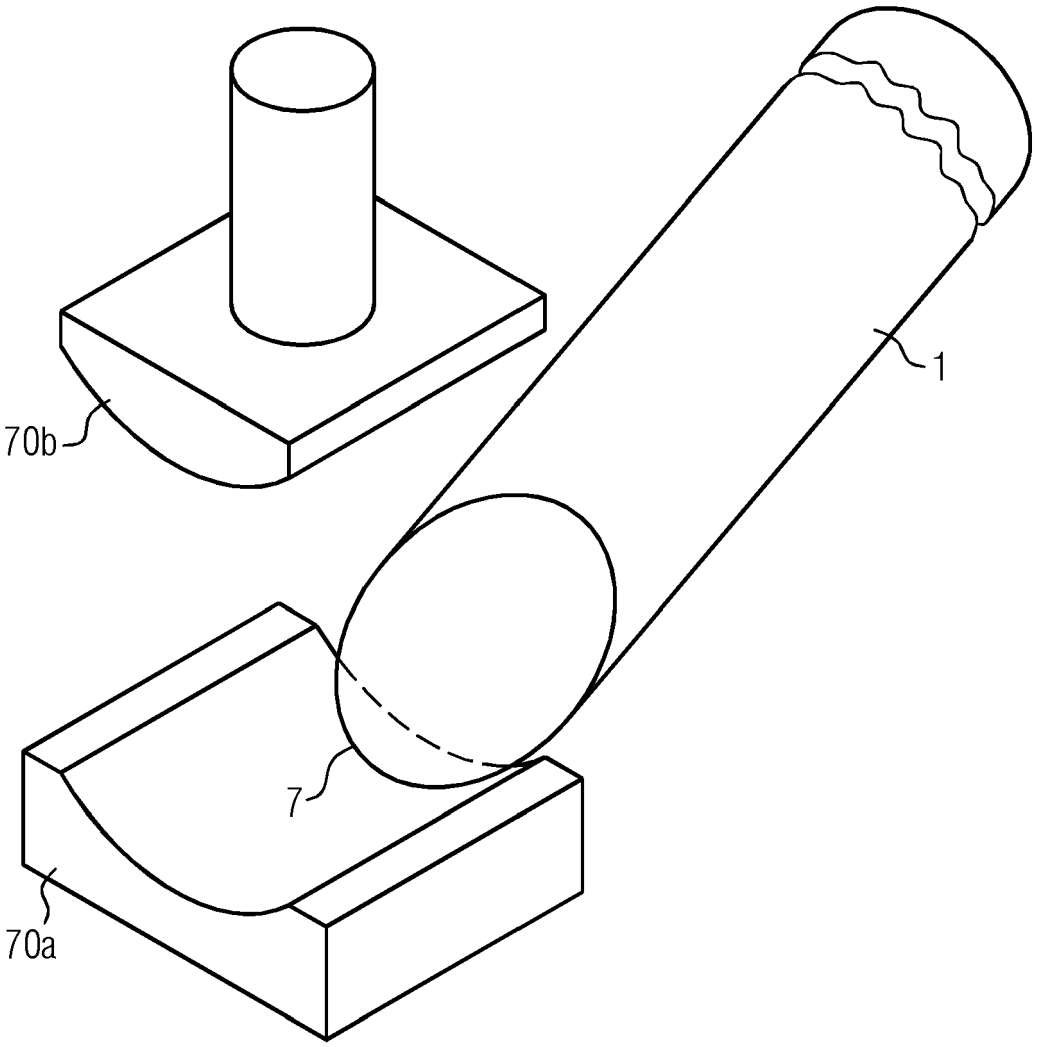

FIG. 7

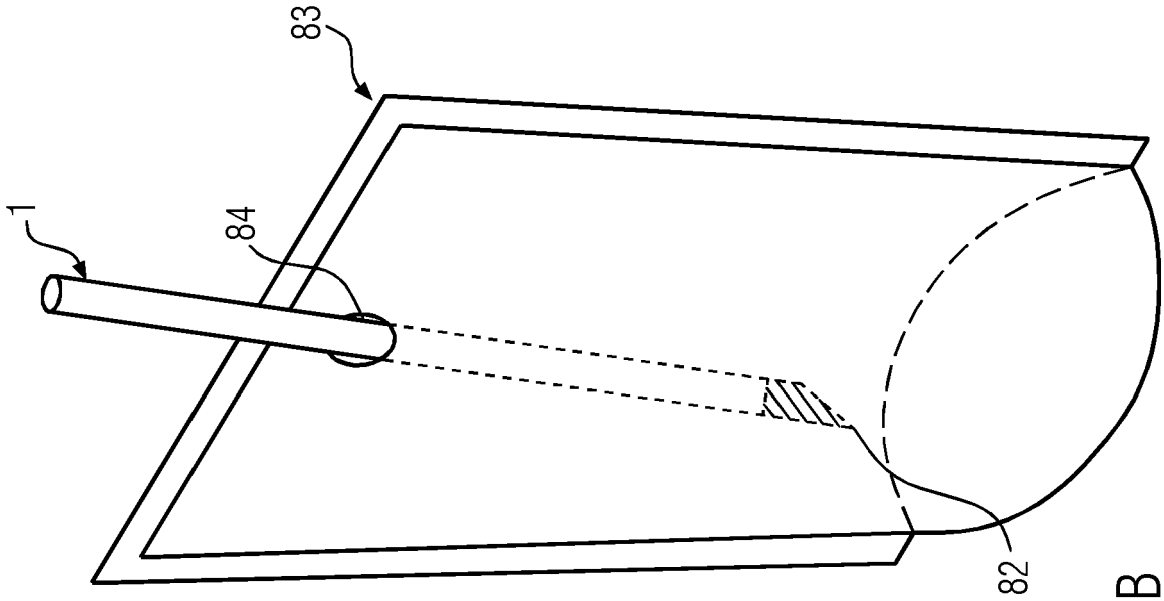

FIG. 8B

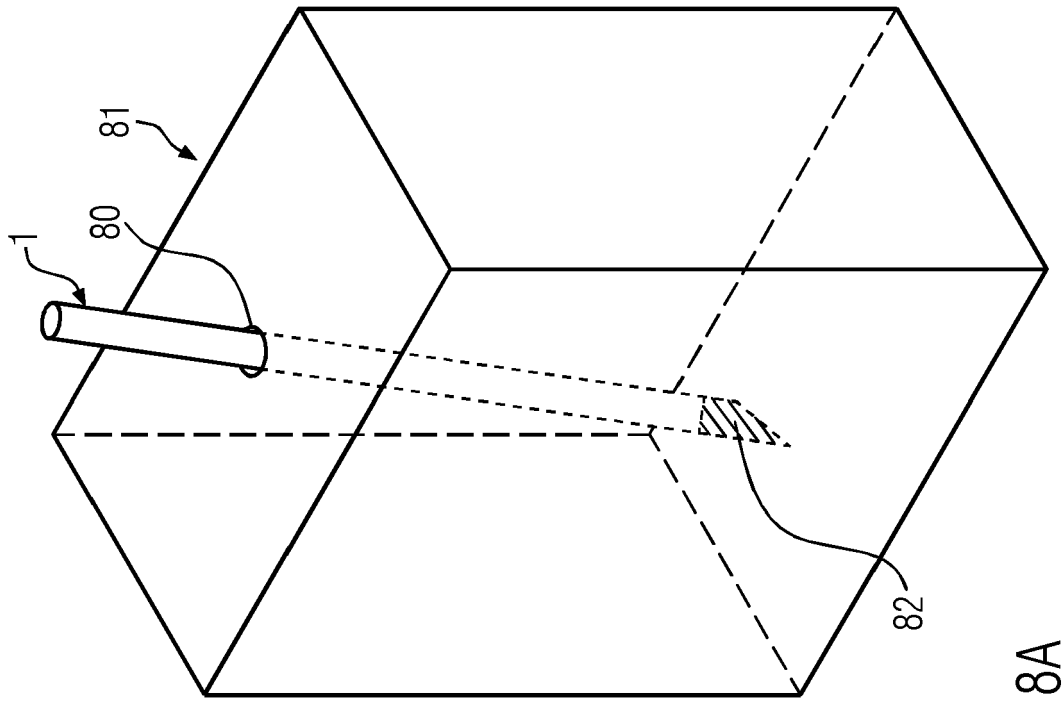

FIG. 8A

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 20 2723

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	CN 110 025 194 A (XUE YU) 19 July 2019 (2019-07-19) * the whole document *	1-7,9, 12,13 8,10,11	INV. A47G21/18
Y	JP 2020 092746 A (JUJO PAPER CO LTD) 18 June 2020 (2020-06-18) * paragraph [0005]; figures 1,5 *	8,10,11	
X	CN 100 497 125 C (KANEBO LTD [JP]) 10 June 2009 (2009-06-10) * figures *	1-13	
X Y	KR 102 041 221 B1 (BAEK SEUNG BOK [KR]) 7 November 2019 (2019-11-07) * figures * & KR 102 041 221 B1 (BAEK SEUNG BOK [KR]) 7 November 2019 (2019-11-07)	1-7,9-13 8	
X	US 2019/290039 A1 (SORBARA ANGELO [IT]) 26 September 2019 (2019-09-26) * paragraph [0049]; claims 14,15; figures * -----	1,2,4,5, 8,10-13	TECHNICAL FIELDS SEARCHED (IPC) A47G
A	JP 2020 156938 A (JUJO PAPER CO LTD) 1 October 2020 (2020-10-01)	8	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	19 March 2021	Van Bastelaere, Tiny

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 20 2723

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-03-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 110025194 A	19-07-2019	CN 110025194 A	19-07-2019
		CN 110200466 A	06-09-2019
		WO 2020258248 A1	30-12-2020
JP 2020092746 A	18-06-2020	NONE	
CN 100497125 C	10-06-2009	CN 1835876 A	20-09-2006
		JP 4436325 B2	24-03-2010
		JP WO2005014430 A1	05-10-2006
		KR 20060035793 A	26-04-2006
		US 2007108259 A1	17-05-2007
		WO 2005014430 A1	17-02-2005
KR 102041221 B1	07-11-2019	NONE	
US 2019290039 A1	26-09-2019	BR 112019003488 A2	21-05-2019
		CN 109640748 A	16-04-2019
		EP 3311710 A1	25-04-2018
		JP 2019531151 A	31-10-2019
		RU 2019107943 A	23-11-2020
		US 2019290039 A1	26-09-2019
		WO 2018073096 A1	26-04-2018
JP 2020156938 A	01-10-2020	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82