

(19)



(11)

EP 4 570 681 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
18.06.2025 Bulletin 2025/25

(51) International Patent Classification (IPC):
B65D 3/02 (2006.01) **B65D 3/12** (2006.01)
B65D 75/48 (2006.01) **B65D 75/58** (2006.01)
B65D 77/12 (2006.01) **B65D 75/00** (2006.01)

(21) Application number: **23215737.0**

(22) Date of filing: **12.12.2023**

(52) Cooperative Patent Classification (CPC):
B65D 75/008; B65D 75/48; B65D 75/5816;
B65D 77/12

(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 ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**

Designated Extension States:
BA

Designated Validation States:
KH MA MD TN

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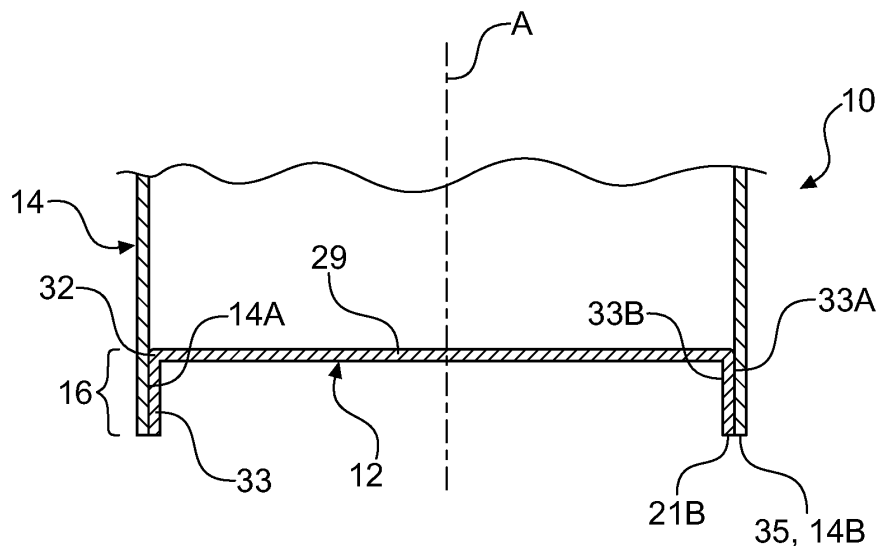
(54) **TUBE COMPRISING A BOTTOM MADE OF A LAMINATED MATERIAL**

(57) Tube (10) for storing and dispensing a single dose of a product, said tube comprising
- a flexible skirt (14), an upper end (18) of the skirt (14) being pinched flat and welded;
- a bottom (12) made exclusively of a plain piece of a laminated material (34) comprising one paper layer (36) comprising cellulose fibers, said bottom (12) extending radially in a lower end section (16) of the skirt (14) to close tightly the tube, in which the bottom (12) comprises an

outer annular area (31) folded downwardly to form a peripheral wall (33) extending axially;

in which the bottom (12) is fitted axially in the lower end section (16) of the skirt (14);
in which the bottom (12) is attached to the skirt (14) by tightly securing an inner face (14A) of the skirt (14) to an outer face (33A) of the peripheral wall (33) only.

FIG. 2



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Description

[0001] The invention relates to a tube for storing and dispensing a single dose of a product, said tube comprising a flexible skirt formed by a tubular sheet extending along a main axis.

[0002] Nowadays, the worldwide plastic production represents one of the biggest packaging waste sources. The consumption and the recycling of these plastic products is a major concern for national and regional organizations. The non-recycled plastic materials are currently disposed of by a variety of processes from landfill disposal to energy recovery through thermal and chemical treatments.

[0003] In the case of cosmetic packaging industry, laminated materials comprising several plastic layers are widely used as they represent advantages in terms of product protection and mechanical properties.

[0004] Some alternatives to plastics are studied in many technical fields. In the field of cosmetics packaging, it has already been envisaged to replace some plastic layers with a paper layer. As the paper is easily recyclable, the presence of a paper layer improves the recyclability of the laminated material. The thicker the paper layer, the higher the proportion of paper in the laminate and the more recyclable the laminate.

[0005] However, for many applications, single dose tubes are made in a plastic material.

[0006] The present invention attempts to reduce the quantity of plastic material in the tube. The object of the invention is also to provide a single dose tube which can also stand upright.

[0007] The invention relates to a tube for storing and dispensing a single dose of a product, said tube comprising:

- a flexible skirt formed by a tubular sheet extending along a main axis, an upper end of the skirt being pinched flat and welded;
- a bottom made exclusively of a plain piece of a laminated material comprising at least one paper layer comprising cellulose fibers, said bottom extending radially in a lower end section of the skirt to close tightly the tube,

in which the bottom comprises an outer annular area folded downwardly to form a peripheral wall extending axially;

in which the bottom is fitted axially in the lower end section of the skirt;

in which the bottom is attached to the skirt by tightly securing an inner face of the skirt to an outer face of the peripheral wall only.

[0008] According to some embodiment, the peripheral wall of the bottom is straight.

[0009] According to some embodiment, the lower end of the peripheral wall, formed by the outer edge of the

laminated material, and the lower end of the skirt, formed by the lower edge of the sheet, are coplanar.

[0010] According to some embodiment, the lower end section of the skirt is straight.

[0011] According to some embodiment, a stretch of the lower end section of the skirt extends under the lower end of the peripheral wall of the bottom and it is folded inwardly at 180° so that the lower edge of the sheet is arranged against the said lower end of the peripheral wall.

[0012] According to some embodiment, a stretch of the lower end section of the skirt extends under the lower end of the peripheral wall of the shoulder, said stretch being rolled inwardly and welded on itself to form a bead extending just under the lower edge of the peripheral wall.

[0013] According to some embodiment, a stretch of the lower end section of the skirt extends under the lower end of the peripheral wall of the bottom and it is folded inwardly at an angle strictly less than 180°, the fold of the skirt being at the same level as the lower end of the peripheral wall of the bottom.

[0014] According to some embodiment, the stretch is folded inwardly at an angle greater or equal to 90°.

[0015] According to some embodiment, the tube is neckless.

[0016] According to some embodiment, the peripheral wall of the bottom is tightly secured to the lower end section of the skirt by ultrasonic welding.

[0017] According to some embodiment, the sheet forming the skirt is made of laminated material comprising at least one paper layer comprising cellulose fibers.

[0018] According to some embodiment, the bottom and the skirt are made of the same laminated material.

[0019] According to some embodiment, the cellulose fibers represent at least 70% in mass of the tube, preferably more than 80%.

[0020] According to some embodiment, the laminated material comprises at least an internal polymeric layer.

[0021] The invention will be better understood thanks to the following description which is only indicative and which is not intended to limit said invention, accompanied with the following figures:

- figure 1 is a perspective view of a tube produced in accordance with a first embodiment of the invention;
- figure 2 is an axial sectional view of figure 1 which show the bottom of the tube and a lower section of the skirt;
- figure 3 is a perspective view showing a piece of laminate intended to form the bottom of the tube of figure 2 after folding of its outer annular area;
- figure 4 is an axial sectional view similar to the view of figure 2 which shows the bottom of a tube and a lower section of the skirt produced in accordance with a second embodiment;
- figure 5 is an axial sectional view similar to the view of figure 2 which shows the bottom of a tube and a lower section of the skirt produced in accordance with a

third embodiment;

- figure 6 is an axial sectional view similar to the view of figure 2 which shows the bottom of a tube and an upper section of the skirt produced in accordance with a fourth embodiment;
- figure 7 is a cross sectional view of the laminated paper forming the bottom of the tube according to any of the previous embodiments.

[0022] In the context of the invention, the axial orientation is defined in the direction of the main axis "A" of the tube directed from bottom. A radial orientation extends from the main axis "A" in every direction orthogonally from said main axis "A". An element facing or close to the axis "A" in a radial will be qualified as an "inner" element, whereas an element facing the opposite direction or far from the axis "A" will be qualified as an "outer" element.

[0023] The term "container" is used herein to refer to an item which may contain a product. Such products are usually liquids, gels or pastes. Preferred containers include tubes and pouches.

[0024] The term "single dose" tube is used herein to refer to a tube which cannot be closed once it has been opened.

[0025] The term "flexible laminate" as used herein describes a laminate or a container made thereof which can bend or be bent easily and which does not break (unless it is bent too much). Herein in connection with the containers the term flexible indicates that if the container is subjected to a force, for example, by being filled with a liquid, or by applying pressure with a finger or a hand, it will change its form without breaking. A flexible container can also be considered to be a "squeezable" container.

[0026] The term "polymer" refers to a large molecule, or macromolecule, composed of many repeated subunits.

[0027] The term "PE" refers to polyethylene.

[0028] The term "paper layer" refers to a layer comprising cellulose fibers. This term includes bleached, unbleached, colored and barrier coated paper. It is preferably a bleached paper which is easier and quicker to recycle.

[0029] Figures 1 show a tube 10 extending along a main axis "A". The tube 10 comprises a skirt 14 and a bottom 12.

[0030] The tube 10 is intended to contain a product such as liquids, gels or pastes. Advantageously, the tube 10 is intended to contain a cosmetic product.

[0031] The skirt 14 is made by a cylinder of a sheet of extruded or laminated material. A lower section 16 of the skirt 14 is tightly secured to the bottom 12. An upper end 18 of the skirt 14 is tightly closed to enclose the content of the tube 10. For instance, the upper end 18 of the skirt 14 is pinched flat and welded.

[0032] The tube 10 is neckless. This means that it does not comprise any element able to receive a cap.

[0033] The tube 10 here has no preformed dispensing orifice. To dispense the content of the tube, a user has to

cut or tear a part of the tube, for instance a corner of the upper end 18 of the skirt 14. As an example, the welded upper end 18 might comprise a notch 19 forming a starting point for tearing the corner of the upper end 18.

[0034] As a variant, the skirt or the bottom may comprise a preformed dispensing orifice closed by a peelable or tearable membrane.

[0035] As represented on figure 3, the bottom 12 is made exclusively of a plain piece of a laminated material 34. The piece is formed by a flat piece of laminated material 34 which presents an external edge 21A. The piece is for instance cut in a larger sheet of laminated material 34.

[0036] The outer edge 21A presents a closed outline, such as a circular or oval outline.

[0037] The bottom 12 comprises a central section 29 which extends radially with respect to the main axis "A" in the lower end section 16 of the tube skirt 14. The central section 29 here presents a flat shape extending in a radial plane.

[0038] The bottom 12 comprises an outer annular area 31 folded downwardly to form a peripheral wall 33 extending axially from the periphery of the central section 29. Therefore, the outer edge 21A of the bottom 12 forms a lower end 21B of the peripheral wall 33. The bottom 12 thus presents a fold 32 between the central part 29 and the peripheral wall 33.

[0039] The peripheral wall 33 of the bottom 12 is here straight, so that the outer edge 21A, forms the lower end 21B of the peripheral wall 33 and faces downwards.

[0040] For instance, the bottom 12 is conformed from the annular piece by a stamping process.

[0041] The bottom 12 thus shaped is fitted axially in the lower end section 16 of the skirt 14. Thus, the lower end section 16 of the base extends downwards from the fold 32 of the bottom 12. An outer face 33A of the peripheral wall 33 is in contact with an inner face of the sheet forming the skirt 14. Said outer face 33A is tightly secured to an inner face 14A of the skirt 14. The bottom 12 is attached to the skirt 14 by securing the inner face 14A of the skirt 14 only to the outer face 33A of the peripheral wall 33. More particularly, the skirt 14 is not in contact with an inner face 33B of the peripheral wall 33.

[0042] The outer face 33A of the peripheral wall 33 of the bottom 12 is tightly secured to the inner face 14A of the skirt 14 by welding. For instance, the outer face 33A of the peripheral wall 33 is secured to the skirt 14 by ultrasonic welding.

[0043] According to a first embodiment of the invention as shown in figure 2, the lower end section 26 of the skirt 14 is straight so that the lower edge 35 of the sheet forming the skirt 14 faces downwards. In this case, the lower end 14B of the skirt 14 is formed by the lower edge 35 of the sheet. The lower end 21B of the peripheral wall 33 and the lower end 14B of the skirt 14, formed by a lower edge 35 of the sheet, are coplanar.

[0044] According to a second embodiment of the invention as shown in figure 4, a stretch 37 of the lower end

section 16 of the skirt 14 extends under the lower end 21B of the peripheral wall 33 of the bottom 12. The stretch 37 of the lower end section 26 is folded back on itself inwardly at 180° so that the lower edge 35 of the sheet faces upwards. Thus, the skirt 14 presents a fold 39. Preferably, the lower edge 35 of the sheet is arranged axially against the lower edge 21B of the peripheral wall 33. The lower end 14B of the skirt 14 is formed by the fold 39 which is arranged under the lower edge 35 of the sheet.

[0045] According to a third embodiment of the invention shown in figure 5, a stretch 37 of the lower end section 16 of the skirt 14 extends under the lower edge 21B of the peripheral wall 33. The stretch 37 is folded inwardly at an angle α strictly less than 180°. The fold 39 of the lower end section 16 of the skirt 14 is axially at the same level as the lower edge 21B of the peripheral wall 33. Preferably, the stretch 37 is folded inwardly at an angle α greater or equal to 90° so that the lower end 14B of the skirt 14 is formed by the fold 39. In the example shown at the figure 5, the stretch 37 is folded at an angle α of 90°.

[0046] According to a fourth embodiment of the invention shown in figure 6, a stretch 37 of the lower end section 16 of the skirt 14 extends under the lower edge 21B of the peripheral wall 33. The stretch 37 is rolled inwardly to form a bead 41. The stretch 37 is welded on itself to maintain the bead 41. The bead 41 extends just under the lower edge 21B of the peripheral wall 33 so that the bead 41 protects said lower edge 21B.

[0047] In every embodiment, the bottom 12 is made exclusively of a laminated material 34 comprising at least one paper layer 36 comprising cellulose fibers. This paper layer 36 forms a structural layer of the laminated material 34 which confers mechanical strength and proper rigidity to the bottom 12.

[0048] In all these embodiments, the tube 10 can stand upright on a flat surface, resting on the lower end 14B of the skirt 14.

[0049] As illustrated in figure 7, the laminated material 34 here comprises one paper layer 36.

[0050] The laminated material 34 can also comprise at least a polymeric layer 38. The polymeric layers 38 can comprise any polymer suitable for their use in the field of cosmetic packaging such as PE. Advantageously, the polymeric layers 38 all comprise PE. More advantageously, the polymeric layers 38 are made of PE, especially LDPE (low density polyethylene).

[0051] Advantageously, the laminated material 34 comprises at least one barrier layer 40. The barrier layer 40 can comprise any material suitable for their use in the field of cosmetic packaging. Advantageously, the barrier layer 40 comprise aluminum. As a variant, the barrier layer 40 comprise EVOH. The barrier layer 40 comprise aluminum and /or ethylene vinyl alcohol (EVOH). and /or ethylene vinyl alcohol (EVOH). As a variant, the barrier layer can be made of other oxygen and/or water barrier materials such as polyvinyl alcohol (PVOH), silicon di-

oxide (SiOx), aluminum oxide (AlOx), nano cellulose coating, etc.

[0052] Advantageously, the laminated material 34 may comprise adhesive layers (not showed) or tie layers, especially to establish contact between the barrier layer 40 and a neighboring layer. The adhesive layer can comprise any adhesive suitable for this use, such as EAA (Ethylene Acrylic Acid).

[0053] Advantageously, the cellulosic fibers represent at least 60% in mass of the laminated material 34. More advantageously, the cellulosic fibers represent at least 70%, preferably at least 80%, in mass of the laminated material 34. Such a ratio of paper in the laminated material 34 allows a good recyclability of said laminated material 34.

[0054] Preferably, the paper layer 36 has a thickness comprised between 100 and 400 μm .

[0055] Preferably, the total thickness of the laminated material 34 is comprised between 300 and 450 μm . This range of thickness allows good mechanical properties for a laminated material 34 comprising around 84% of cellulosic fibers in mass.

[0056] Advantageously, the total thickness of the paper layer 36 represent more than 50% of the total thickness of the laminated material 34. More advantageously, the total thickness of the paper layer 36 represent more than 70% of the total thickness of the laminated material 34. Such a ratio of paper 36 in the laminated material 34 allows a good recyclability of said laminated material 34 while keeping good mechanical properties.

[0057] In the example illustrated by figure 7, an external polymeric layer 38A is arranged above said paper layer 36. The external polymeric layer 38A is the first layer starting from the external surface of the laminated material 34.

[0058] An intermediate polymeric layer 38B is arranged under said paper layer 36. Under said intermediate polymeric layer 38B, an internal polymeric layer 38C is arranged under said intermediate polymeric layer 38B. A barrier layer 40 is sandwiched between the intermediate polymeric layer 38B and the internal polymeric layer 38C. The internal polymeric layer 38C is intended to be in direct contact with the product contained in the tube 10.

[0059] The shape integrity of the bottom 12 is maintained by the laminated material 34 comprising cellulosic fibers.

[0060] The sheet of the skirt 14 is also formed by a laminated material comprising cellulosic fibers.

[0061] Preferably, the sheet of the skirt 14 presents the same thickness as the laminated material 34 of the bottom 12.

[0062] Preferably, the sheet of the skirt 14 and the bottom 12 are formed by the same laminated material 34.

[0063] The cellulose fibers represent at least 70% in mass of the tube 10, preferably at least 75%. For instance, the cellulosic fibers represent between 70% and 84% in mass of the tube 10.

[0064] The invention allows to obtain a tube easy to

recycle and comprising a very huge ratio by mass of cellulosic fibers. Moreover, the quantity of plastic is minimized to further improve the recyclability of the tube.

Claims

1. Tube (10) for storing and dispensing a single dose of a product, said tube comprising

- a flexible skirt (14) formed by a tubular sheet extending along a main axis (A), an upper end (18) of the skirt (14) being pinched flat and welded;

- a bottom (12) made exclusively of a plain piece of a laminated material (34) comprising at least one paper layer (36) comprising cellulose fibers, said bottom (12) extending radially in a lower end section (16) of the skirt (14) to close tightly the tube,

in which the bottom (12) comprises an outer annular area (31) folded downwardly to form a peripheral wall (33) extending axially;

in which the bottom (12) is fitted axially in the lower end section (16) of the skirt (14);

in which the bottom (12) is attached to the skirt (14) by tightly securing an inner face (14A) of the skirt (14) to an outer face (33A) of the peripheral wall (33) only.

2. Tube (10) according to the previous claim, in which the peripheral wall (33) of the bottom (12) is straight.

3. Tube (10) according to any one of claims 1 or 2, in which the lower end (21B) of the peripheral wall (33), formed by the outer edge (21A) of the laminated material (34), and the lower end (14B) of the skirt (14), formed by the lower edge (35) of the sheet, are coplanar.

4. Tube (14) according to any one of the previous claims, in which the lower end section (16) of the skirt (14) is straight.

5. Tube (14) according to claim 3, in which a stretch (37) of the lower end section (16) of the skirt (14) extends under the lower end (21B) of the peripheral wall (33) of the bottom (12) and it is folded inwardly at 180° so that the lower edge (35) of the sheet is arranged against the said lower end (21B) of the peripheral wall (33).

6. Tube (14) according to claim 1 or 2, in which a stretch (37) of the lower end section (16) of the skirt (14) extends under the lower end (21B) of the peripheral wall (33) of the shoulder (20), said stretch (37) being rolled inwardly and welded on itself to form a bead (41) extending just under the lower edge (21B) of the

peripheral wall (33).

7. Tube (10) according to any one of claims 1 or 2, in which a stretch (37) of the lower end section (16) of the skirt (14) extends under the lower end (21B) of the peripheral wall (33) of the bottom (12) and it is folded inwardly at an angle (α) strictly less than 180° , the fold (39) of the skirt (14) being at the same level as the lower end (21B) of the peripheral wall (33) of the bottom (12).

8. Tube (10) according to the previous claim, in which the stretch (37) is folded inwardly at an angle (α) greater or equal to 90° .

9. Tube (10) according to any one of the previous claims, in which the tube is neckless.

10. Tube (10) according to any one of the previous claims, in which the peripheral wall of the bottom (12) is tightly secured to the lower end section (16) of the skirt (14) by ultrasonic welding.

11. Tube (10) according to any one of the previous claims, in which the sheet forming the skirt (14) is made of laminated material comprising at least one paper layer (36) comprising cellulose fibers.

12. Tube (10) according to the previous claim, in which the bottom (12) and the skirt (14) are made of the same laminated material (34).

13. Tube (10) according to any one of the previous claims, in which the cellulose fibers represent at least 70% in mass of the tube (10), preferably more than 80%.

14. Tube (10) according to any one of the previous claims, in which the laminated material (34) comprises at least an internal polymeric layer (38C).

FIG. 1

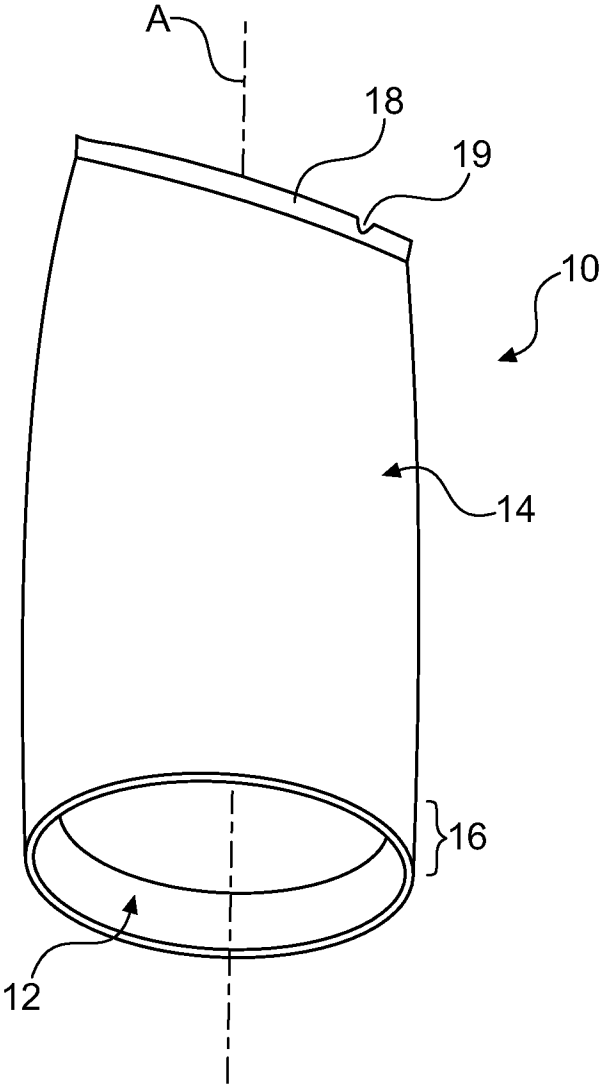


FIG. 2

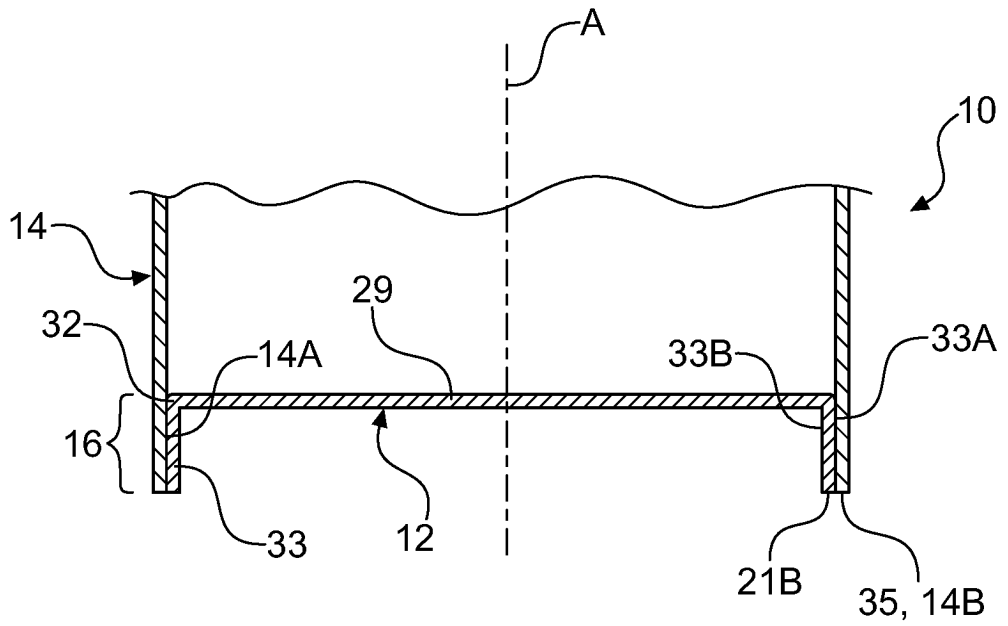


FIG. 3

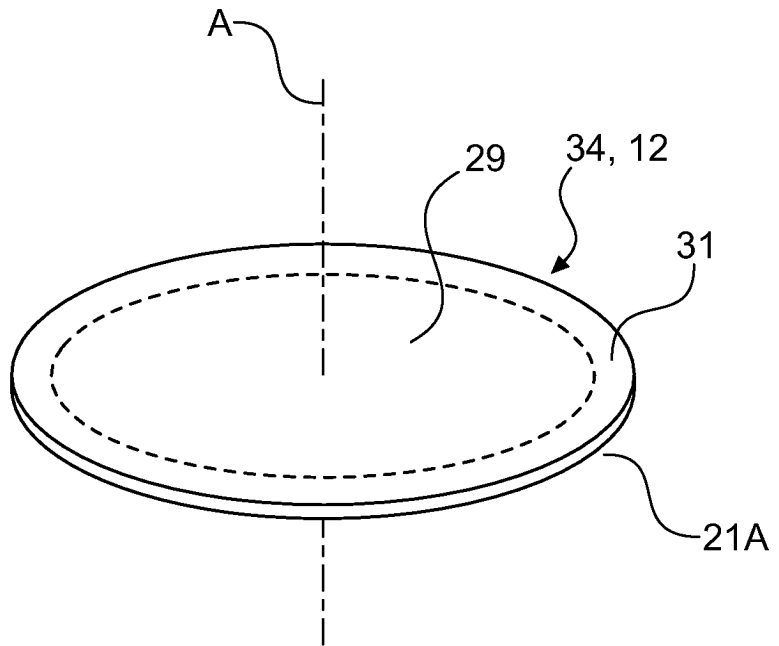


FIG. 4

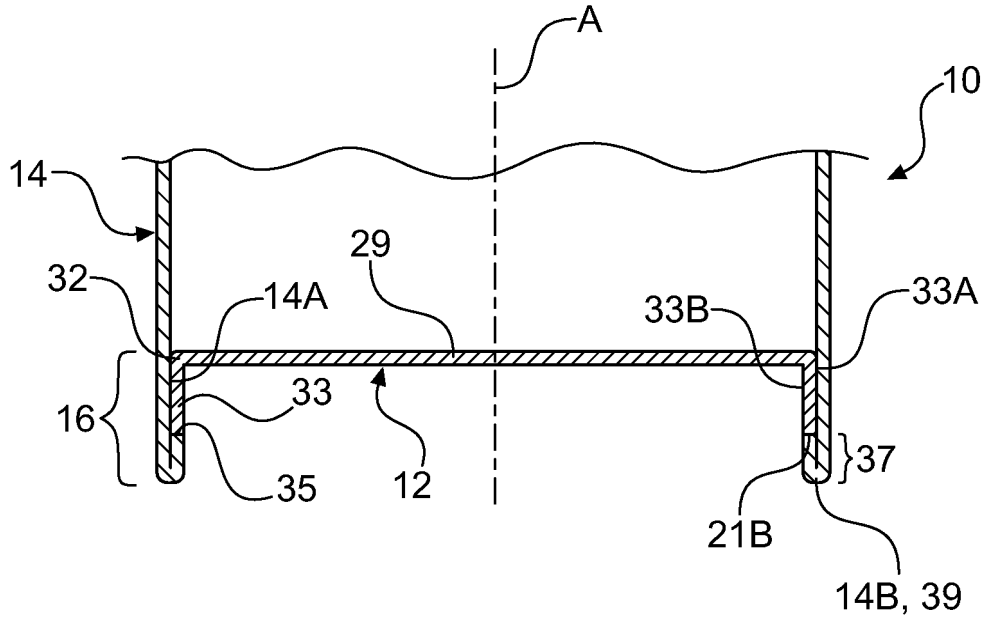


FIG. 5

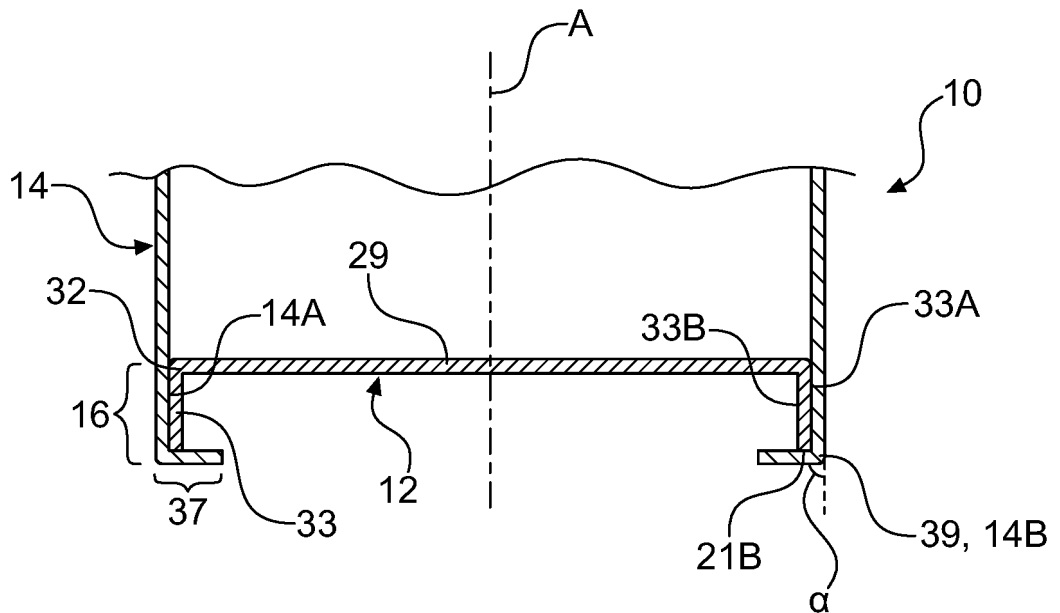


FIG. 6

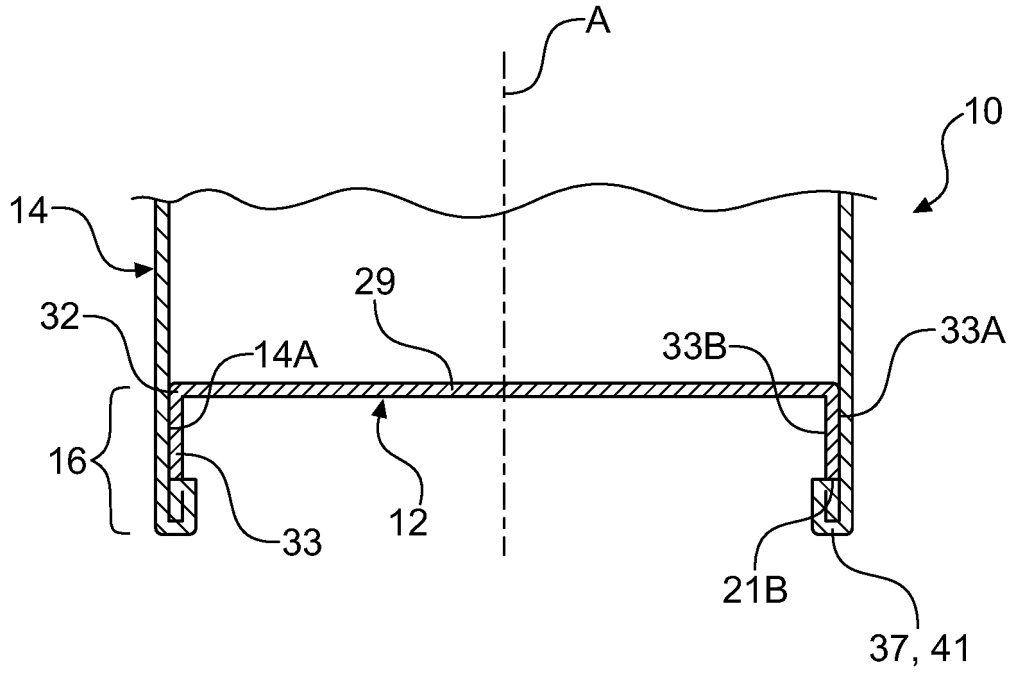
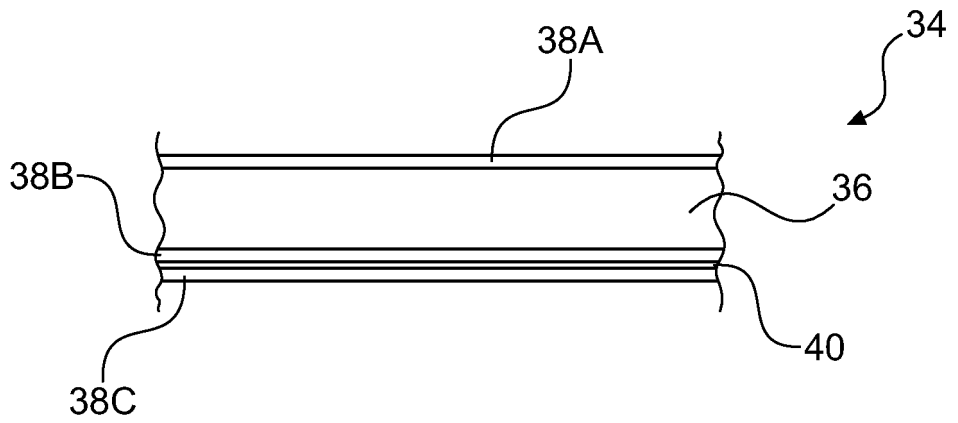


FIG. 7





EUROPEAN SEARCH REPORT

Application Number

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| 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 | WO 2004/005138 A1 (RECOT INC [US]; KNOERZER ANTHONY ROBERT [US] ET AL.) 15 January 2004 (2004-01-15) | 1-5, 9, 11-14 | INV. B65D3/02 B65D3/12 B65D75/48 B65D75/58 B65D77/12 B65D75/00 |
| Y | * page 6, lines 3-19; figures 1-4 * | 6-8, 10 | |
| Y | JP S58 52033 A (DAINIPPON PRINTING CO LTD) 28 March 1983 (1983-03-28) * figure 11 * | 6 | |
| Y | US 5 524 817 A (MEIER G P [US] ET AL) 11 June 1996 (1996-06-11) * figure 6 * | 7, 8 | |
| Y | WO 2012/162448 A1 (PRINTPACK ILLINOIS INC [US]; SEIDEL THOMAS P [US] ET AL.) 29 November 2012 (2012-11-29) * page 6, lines 21-26 * | 10 | |
| A | US 2006/286325 A1 (SWOBODA DEAN P [US] ET AL) 21 December 2006 (2006-12-21) * figures 1-31 * | 1-14 | |
| | | | TECHNICAL FIELDS SEARCHED (IPC) |
| | | | B65D |
| The present search report has been drawn up for all claims | | | |
| Place of search Munich | | Date of completion of the search 15 May 2024 | Examiner Jervelund, Niels |
| 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 | |

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 23 21 5737

5

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.

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| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|--|-------------------|-------------------------|-------------------|
| WO 2004005138 A1 | 15-01-2004 | AU 2003251776 A1 | 23-01-2004 |
| | | US 2004006950 A1 | 15-01-2004 |
| | | WO 2004005138 A1 | 15-01-2004 |
| ----- | | | |
| JP S5852033 A | 28-03-1983 | JP H03295 B2 | 07-01-1991 |
| | | JP S5852033 A | 28-03-1983 |
| ----- | | | |
| US 5524817 A | 11-06-1996 | NONE | |
| ----- | | | |
| WO 2012162448 A1 | 29-11-2012 | US 2012298663 A1 | 29-11-2012 |
| | | WO 2012162448 A1 | 29-11-2012 |
| ----- | | | |
| US 2006286325 A1 | 21-12-2006 | AT E458608 T1 | 15-03-2010 |
| | | CA 2611417 A1 | 28-12-2006 |
| | | CN 101198469 A | 11-06-2008 |
| | | EP 1901921 A1 | 26-03-2008 |
| | | HK 1120244 A1 | 27-03-2009 |
| | | US 2006286325 A1 | 21-12-2006 |
| | | WO 2006138642 A1 | 28-12-2006 |
| ----- | | | |

EPO FORM P0459

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