



(11) **EP 4 296 184 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**27.12.2023 Bulletin 2023/52**

(51) International Patent Classification (IPC):  
**B65D 43/02<sup>(2006.01)</sup>**

(21) Application number: **23180489.9**

(52) Cooperative Patent Classification (CPC):  
**B65D 43/0212**; B65D 2543/00027;  
B65D 2543/00092; B65D 2543/00268;  
B65D 2543/00314

(22) Date of filing: **20.06.2023**

(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**

(71) Applicant: **Thrace Plastics Pack SA  
45500 Ioannina (GR)**

(72) Inventor: **MICHAILIDIS, Michail  
19023 Porto Rafti (GR)**

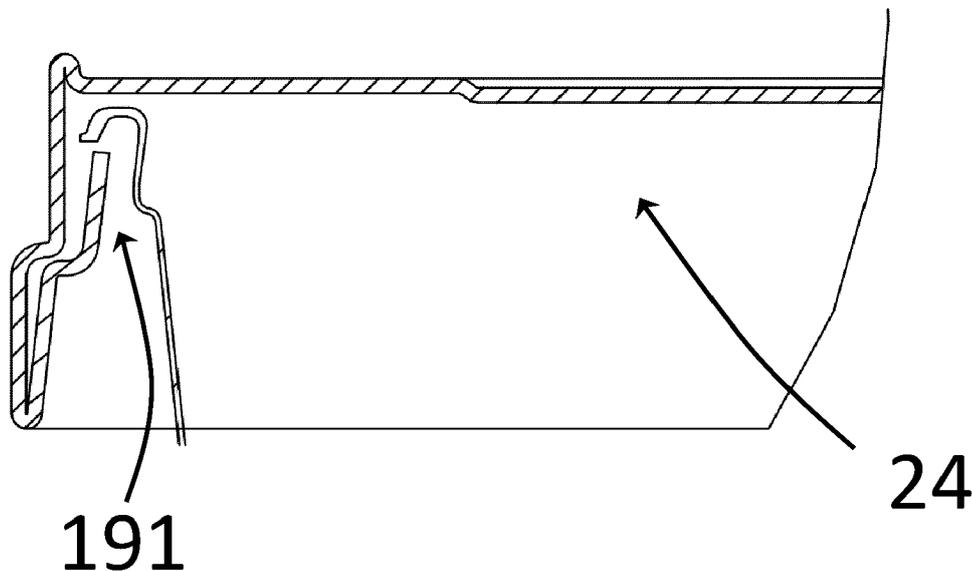
(74) Representative: **Samouilidis, Emmanouil  
Alkyonis 46  
175 62 Palaio Faliro (GR)**

(30) Priority: **24.06.2022 GR 20220100513**

(54) **VERSATILE PAPER LID FOR BEVERAGE CONTAINER**

(57) The versatile lid (10) is for a cup (20) or any other container. The lid (10) has a central wall (13) and a skirt (16) extending along its perimeter (18) and at an angle to the central wall (13). The skirt (16) has an outer wall (12) and a fold (19) that extends from the outer wall (12) towards the central wall (13). The outer wall (12) and the fold (19) converge at and are rotatable around an edge (17) of the skirt (16), so as to change the angle between

them. The lid (10) is formed from a single piece (33) of paperboard and does not contain any substance that would have had rendered the lid a single-use plastic product according to the EU Directive EU 2019/904. The configuration of the lid hinders unwished spillage of the liquid that is contained in the cup on one hand and is appropriate to co-operate with various shapes of cups on the other.



**Figure 10**

## Description

**[0001]** The invention concerns eco-friendly products used for beverages.

**[0002]** Such known products are usually made of paper mixed with plastic (polymers). There may be cups, containers, utensils mainly for liquids that are consumed while the lid is placed on the container. The terms cup, container or utensil are used for a container with an opening that may be closed by a lid.

**[0003]** EP0459017 describes a closing lid made of cardboard for cans or can-like containers, with a circumferential stabilizing ring reinforcing the edge of a circumferential flange of the lid. The stabilizing ring is fixed on the inside and/or the outside of the circumferential flange by gluing and/or welding.

**[0004]** EP3943409 describes a paper lid for a container. The lid comprises a central and flat lid panel and an outer fitting flange with two legs to interlock with an upper rim of the container. In one example the one leg has an inwardly folded end portion in abutment with an inner surface of the unfolded portion and connected to the same

**[0005]** EP3403944 describes a lid made from a paper or a cardboard material for closing a container. The lid comprises a top wall, which covers the opening of the container and a sidewall directed at an angle relative to the top wall. One end of the sidewall with a rolled edge can engage with the top end of the container.

**[0006]** The object of the invention is an eco-friendly lid for a cup. Another object of the invention is a cup with a lid for beverage consumption. Another object of the invention is a method of manufacture of a lid for a cup, container or utensil.

**[0007]** The invention is defined in the independent claims.

**[0008]** Dependent claims describe characteristics that offer further advantages to the invention.

**[0009]** According to the invention a lid of a cup has a central wall with a perimeter and a skirt extending along the perimeter. The skirt extends laterally and at an angle to the central wall and has an outer wall and a fold. The fold extends from the outer wall towards the central wall. The outer wall and the fold are rotatable around an edge provided on the skirt, where they converge, to change the angle between them. The lid is formed from a single piece of paperboard of recyclable material.

**[0010]** The geometry of the lid offers excellent properties and hinders unwished spillage of the liquid that is contained in the cup that is closed by the lid. The configuration of the lid does not require a particular geometry of the lip of the cup or container and is appropriate to cooperate with various cups. At least towards the edge, the fold is flat, i.e. it is not rolled as it is in some known lids. The design of the lid makes it easy to store multiple lids in a relatively small space.

**[0011]** The geometry of a lid according to the invention is effective, even if the paperboard does not contain any

substance that would have had rendered the lid a *single-use plastic product* according to the EU Directive EU 2019/904 on the reduction of the impact of certain plastic products on the environment that came into force on 3 July 2021 and the related Commission guidelines on *single-use plastic products*: 2021/C 216/01.

**[0012]** Optionally, the paperboard is multi-ply, preferably with three plies. The plies of the paperboard include cellulose fibers and may also include other substances such as minerals, lignine, binding agent or any other substances, which do not render the lid *single-use plastic product*. The layered structure of the paper enhances the technically acceptable and stable forming process that reduces shape memory effects.

**[0013]** The paperboard may have constant thickness.

**[0014]** In some examples the fold may have a flap with a free end that may rotate about a hinge line other than the edge of the skirt, which is provided on the fold. The rotation of the flap further facilitates the locking of the lid to a cup and the use of the lid with cups having various shapes.

**[0015]** In some examples the outer wall has a lower portion that is disposed radially and axially from the central wall and is connected to the fold at the edge of the skirt. The outer wall may have an upper portion, a lower portion and a shoulder therebetween. The lower portion is disposed radially and axially from the central wall and is connected to the fold at the edge of the skirt. The upper portion extends and the shoulder is disposed at a distance axially from the central wall. The widening of the skirt away from the central wall further facilitates the relative rotation of the fold and the outer wall and the use of the lid with cups of different dimensions and configurations of the edge of their opening.

**[0016]** In case the cups or containers have a circular cross-section, the central wall is also circular. In these cases, the skirt has a circular cross-section and if the outer wall has an upper portion and a lower portion, the diameter the cross-section of the former is larger than the diameter of the cross-section of the latter.

**[0017]** The lid may be provided in the central wall with a hole for the flow of liquid or for placing a straw.

**[0018]** The outer wall has a tip that projects from the central wall and is opposite to the edge of the skirt. This configuration offers further stability and robustness to the lid. The height of the tip is minimal.

**[0019]** Some embodiments have creases scattered over the entire surface of the outer wall and the fold. The creases that are scattered on the surface of the fold may be more dense than the creases that are scattered on the surface of the outer wall. The creases, which enhance stability of the lid, are randomly scattered, extend radially etc..

**[0020]** For connecting the lid to a cup, the cup may feature a lip around an opening. In use the lid traps a lip of a cup or container between the skirt and the central wall. The configuration of a lid according to the invention renders the lid versatile, since it allows the closure of

cups with various shapes of lips, for example lips with circular, oval or other cross-section, channel type lips etc.

[0021] When the lid is attached to the cup, the lip is trapped and secured between the outer wall of the skirt and the flat fold.

[0022] The description of examples of the invention follows, with reference to **Figures 1 to 8**:

- **Figure 1** shows a lid applied to a cup
- **Figure 2** shows lids stacked on each other
- **Figure 3** shows one of the lids of **Figure 2**
- **Figure 4** shows the cross-section of a lid of **Figure 2**
- **Figure 5** shows, in cross-section, a lid and a cup
- **Figure 6** shows, in cross-section, the attachment between a lid and a cup
- **Figure 7** shows, in cross-section, the attachment between of the lid with another cup
- **Figure 8** shows the exploded view of the wall of a circular lid with the creases formed on the skirt during production
- **Figure 9** shows in cross-section, another example of attachment between a lid and a cup
- **Figure 10** shows a further example of an attachment between of a lid and a cup
- **Figure 11** shows as an example only, a lid with its dimensions

[0023] **Figure 1** shows a lid (10) formed from a sheet (33) of paperboard, placed on a cup (20).

[0024] The cup (20) - see also **Figure 5** - has a base (26) and a lateral side jacket (24). At the free edge (27) of the side jacket (24), a lip (22) protrudes towards the outer space of the cup (20) defining an opening of the cup (20). The protruding lip (22) may have any form of cross-section, e.g. circular, oval, triangular, trapezoidal, channel-like or other. In some examples the lip (22) is formed by rolling the edge of the opening.

[0025] **Figure 3** shows the lid (10) with a central wall (13) and a skirt (16) at an angle with respect to the central wall (13). In this condition, the angle may be equal or about equal to 90 deg. The skirt (16) extends along the entire perimeter (18) of the central wall (13).

[0026] The central wall (13) has an annular portion and a central portion that lie parallel to each other with a slight offset.

[0027] The skirt (16) starts from the perimeter (18) of the central wall (13). As shown in **Figures 4 and 6**, the skirt (16) folds and forms an outer wall (12) and an inner flat wall, i.e. the fold (19), rather than rolled, which is observed in known lids. The fold (19) folds to the interior of the space defined by the skirt (16), extends to the central wall (13) and ends at a short distance from it. In the area where the sheet (33) is folded, there is a pivoting edge (17), around which the outer wall (12) and the fold (19) rotate around each other.

[0028] As shown in **Figure 4** the outer wall (12) has two end portions (121), (123) and a midportion, i.e. shoulder (122). The one of the two end portions (121), (123)

is designated as upper portion (121) and projects from the central wall (13). The other of the two end portions (121), (123) is designated as lower portion (123) and is connected directly with the fold (19). The shoulder (122) is in between and connects the two end portions (121), (123). In some embodiments the shoulder (122) is at a distance from the central wall. In general, the lower portion (123) extends radially outwards from the upper portion (121), i.e. the projection of the upper portion (121) on a plane that is parallel to the central wall (13) lies within the projection of the lower portion (123) on the same plane, with the projection of the shoulder (122) lying in-between.

[0029] The fold (19) has three portions disposed in a series: a pivoting portion (193), a connector (192) and a flap (191), whereby the pivoting portion (193) is connected to the lower portion (123), the flap (191) has a free edge and the connector (192) is between the pivoting portion (193) and the flap (191). The connector (192) may be a hinge line between the pivoting portion (193) and the flap (191).

[0030] When the outer wall (12) abuts the fold (19) an inner face of the lower portion (123) is in contact with an inner face of the pivoting portion (193), an inner face of the shoulder (122) is in contact with an inner face of the connector (192) and an inner face of the upper portion (121) is in contact with an inner face of the flap (191). However, in use the pivoting portion (193) and the lower portion (123) may rotate along the pivoting edge (17) and the pivoting portion (193) and the flap (191) may rotate relative to each other along the hinge line.

[0031] The flap (191) has a length that is smaller than the length of the corresponding upper portion of the outer wall (121). The length of the outer wall, the fold and the corresponding portions are measured along a line that is normal to the central wall (13), which coincides with the direction of the axis of the cup (20) when the lid (10) is placed on the cup (20).

[0032] **Figure 8** shows the exploded view of the skirt (16), where the width of the outer wall (12) and the fold (19) is denoted by the letter «α». The width of the skirt (16), i.e. the outer wall (12) and the fold (19) is defined as its dimension that is vertical to the perimeter (18) of the central wall (13). In the case of circular lids, the width is measured along the radius of the circle. The width of the fold (19) may be less than the width of the outer wall (12).

[0033] When the lid (10) is placed at the cup opening (20), the lip (22) of the cup (20) is located between the outer wall (12) of the lid (10) and the fold (19), securing in this way the lid (10) on the cup (20). When the fold (19) has a flap (191), it is the flap (191) that comes in contact with the lip (22) of the cup (20) - see **Figure 7**. **Figure 9** and **Figure 10** show the use of the lid (10) with cups (20) having lips (22) of different shapes. The cup (20) of **Figure 9** has a lip (10) with oval cross-section and that of **Figure 10** has a lip (22) with a channel shaped cross-section, that received the tip of the fold (19), in **Figure**

10 the tip of the flap (191).

[0034] To secure the lid (10) on the cup (20), the user presses the lid (10) onto the cup (20). By pressing the lid (10) onto the cup (20), the fold (19) is first pressed by the lip (22) and when the lip (22) of the cup (20) contacts the flap (191), the fold (19) is hinged away from the outer wall (12), trapping the lip (22) between the fold (19), and the central wall (16). In this position the lid (10) is secured on the cup (20), closes effectively the opening of the cup (20) and prohibits undesired spill of the liquid to be consumed.

[0035] The material used for the production of the lids is a recyclable paperboard. The paperboard may be multi-ply and in some embodiments has three distinct layers of paper. The paperboard does not include any substance, either plastic or other, which would have rendered the products including said paperboard *single-use plastic product according to the EU Directive EU 2019/904 on the reduction of the impact of certain plastic products on the environment that came into force on 3 July 2021 and the related Commission guidelines on single-use plastic products: 2021/C 216/01.*

[0036] The plies of the paperboard include cellulose fibers, for example fibers having a length of a few mm, such as 1 mm to 2 mm, and may also include other substances such as minerals, lignine, binding agent or any other substances, which do not render the lid *single-use plastic product.*

[0037] During production of a lid (10) a piece (33) of paperboard is pressed into a mould to create the skirt (16) and the fold (19). During the formation, creases (15) are created on the outer wall (12) and on the fold (19) of the skirt (16). These creases (15) are formed by breaking fibers of the paperboard so as to increase its deformability. **Figure 8** shows the exploded view of the wall of a circular lid, where the creases can be seen scattered over the entire surface of the outer wall (12) and the fold (19). In some examples the creases (15) on the fold (19) and more dense than the creases (15) on the outer wall (12).

[0038] **Figure 2** shows lids (10) stacked one on top of each other. The formation of the skirt (16) with the fold (19) facilitates stacking, as the lid (10) that fits inside another, pushes the fold (19) of the other lid to the outer wall (12).

[0039] **Figure 6** shows a lid (10) with the fold (19) forming an angle with respect to the outer wall (12). The Figure shows the lid (10) applied to the cup (20), with the lip (22) of the cup (20) trapped between the outer wall (12) and the fold (19) of the skirt (16). **Figure 7** shows a lid (10) with the fold (19) with a flap (191) that is in contact with the lip (22). As it can be easily seen, the lids are not permanently attached to the cups.

[0040] The single-use paper lid may have different shapes and diameters. A non-limiting example of a circular lid with internal diameter of 90 mm is shown in **Figure 11**. The dimensions and tolerances in **Figure 11** are given only as an example, since the single-use paper lid

may have different shapes and internal diameters, including but not limited to 90 mm & 95 mm. The features of the paper lids are such that may close under an oval-, flat- or snap-rim of paper or plastic cups on one hand and deliver secure closure at the cup rim, preventing spill-over of the cup content, on the other.

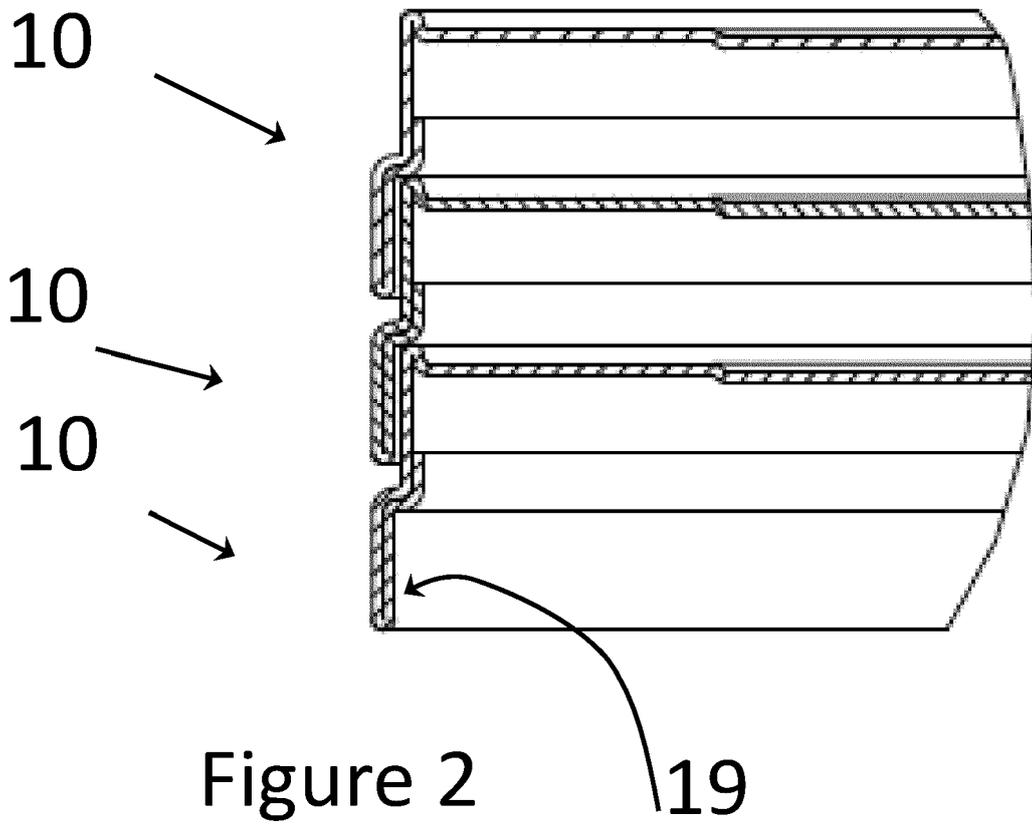
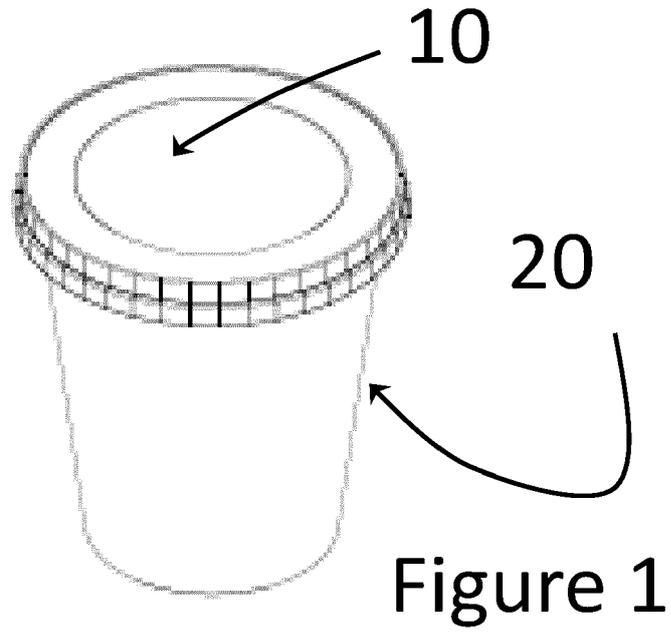
## Claims

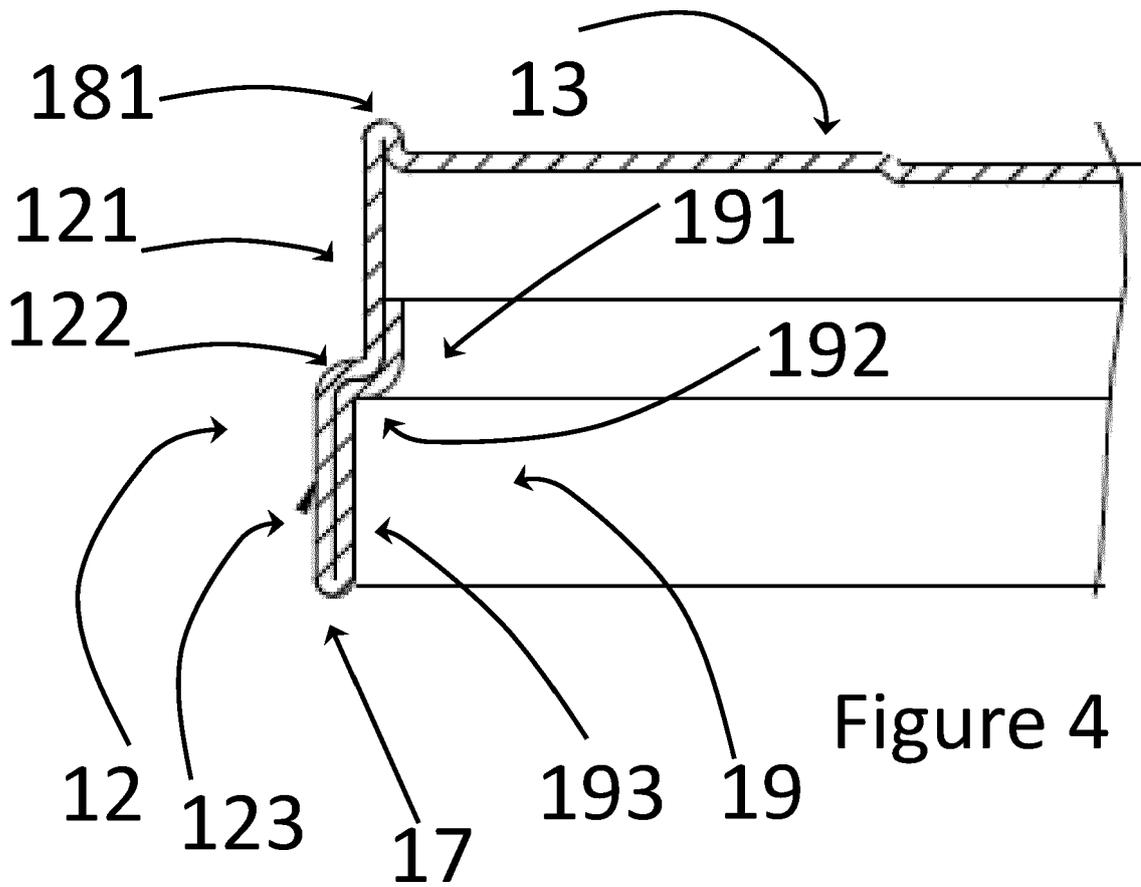
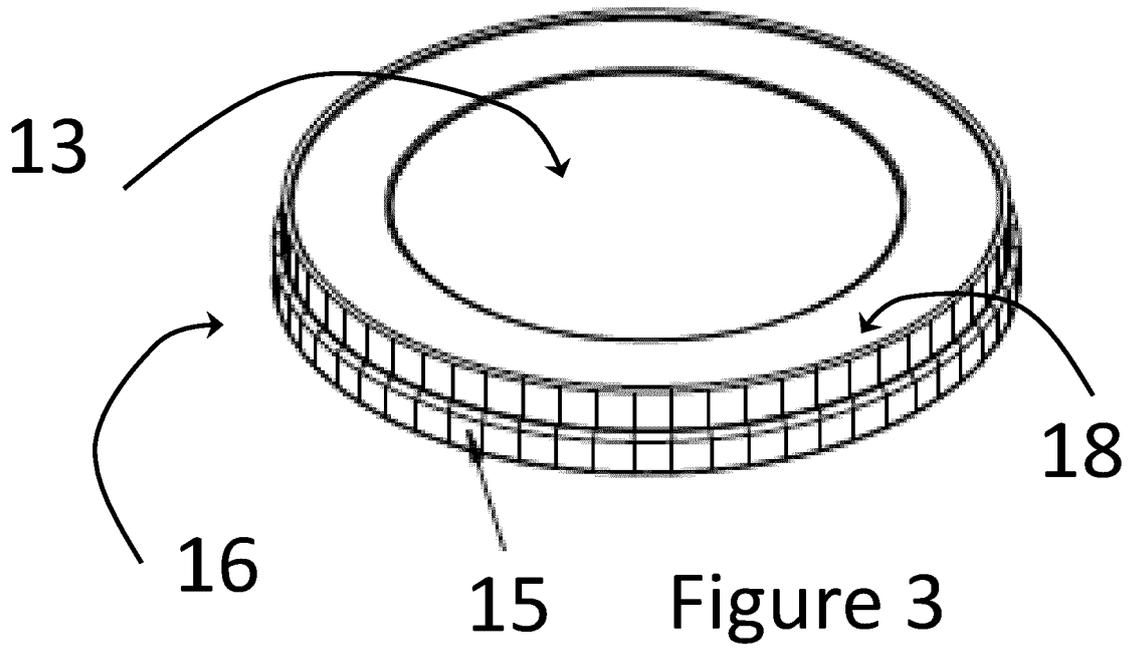
1. Lid (10) for a cup (20) or any other container with a central wall (13) with a perimeter (18) and a skirt (16) extending along the perimeter (18) and at an angle to the central wall (13), which skirt (16) has an outer wall (12) and a fold (19) that extends from the outer wall (12) towards the central wall (13), whereby the lid (10) is formed from a single piece (33) of paperboard of recyclable material, whereby the outer wall (12) and the fold (19) converge at an edge (17) of the skirt (16) and define an angle therebetween and whereby the outer wall (12) and the fold (19) are rotatable around the edge (17), so as to change the angle between them.
2. Lid (10) according to claim 1, whereby the fold (19) has a free end with a flap (193) that is configured to rotate along a hinge line, other than the edge (17) of the skirt (16).
3. Lid (10) according to one of claim 1 of claim 2, whereby the outer wall (12) has a lower portion (123) that is disposed radially and axially from the central wall and is connected to the fold (19) at the edge (17) of the skirt (16).
4. Lid (10) according to one of claims 1 to 3, whereby the outer wall (12) has an upper portion (121), a lower portion (123) and a shoulder (122) therebetween, whereby the lower portion (123) is disposed radially and axially from the central wall (13) and is connected to the fold (19) at the edge (17) of the skirt (16), the upper portion (121) extends at a distance axially from the central wall (13) and the shoulder (122) is disposed at a distance axially from the central wall (13).
5. Lid (10) according to one of the claims 1 to 3, whereby the central wall (13) is circular and the outer wall (12) has an upper portion (121) projecting from the central wall (13) and a lower portion (123) that is disposed radially and axially from the central wall and whereby the lower portion (123) has a diameter that is larger than the diameter of the upper portion (121).
6. Lid (10) according to one of claims 1 to 4, whereby the piece (33) of paperboard is multi-ply, preferably with three plies.

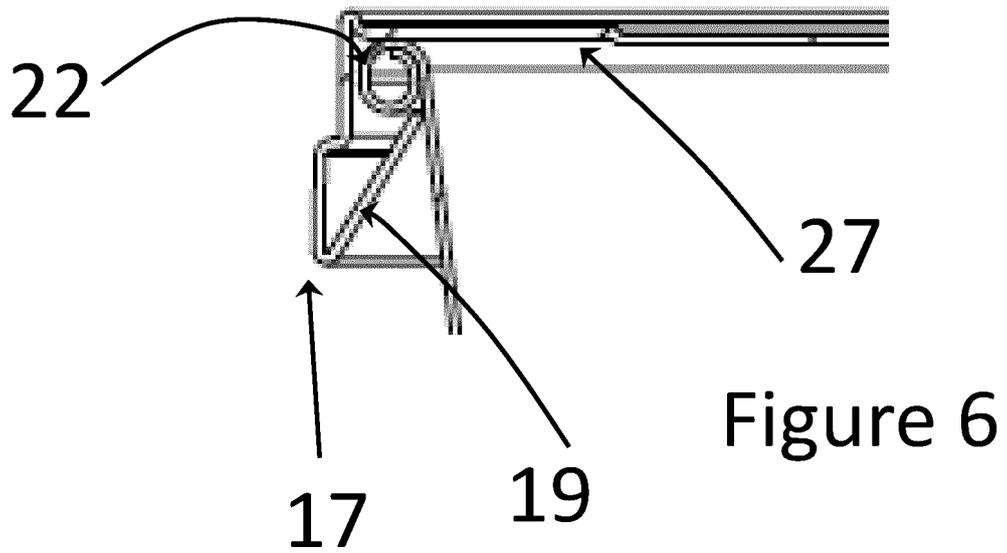
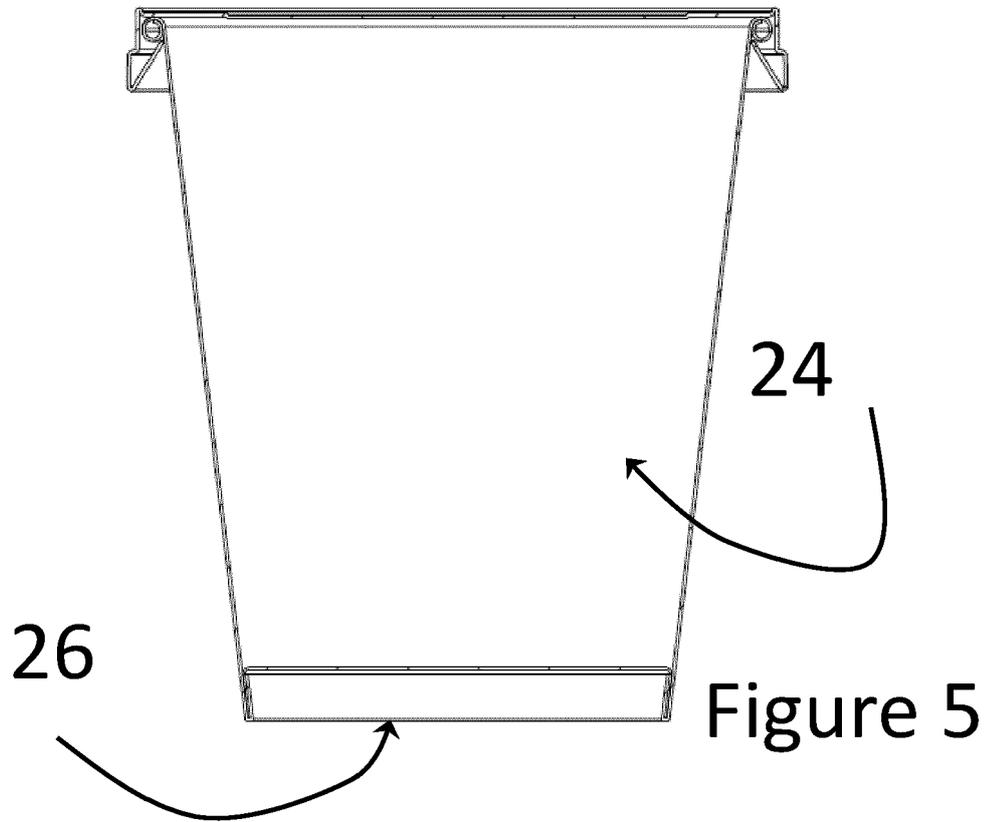
7. Lid (10) according to one of claims 1 to 6 whereby the outer wall (12) has a tip (181) that projects from the central wall (13) and is opposite to the edge (17) of the skirt (16). 5
8. Lid (10) according to one of claims 1 to 7, whereby the central wall (13) has a hole (14) formed for the flow of liquid or for placing a straw.
9. Lid (10) according to one of the claims 1 to 8, whereby there are creases (15) scattered over the surface of the outer wall (12) and the fold (19). 10
10. Lid (10) according to claim 9, whereby the creases (15) scattered on the surface of the fold (19) are more dense than the creases (15) that are scattered on the surface of the outer wall (12). 15
11. Lid (10) according to one of claims 1 to 10, whereby the lid does not contain any substance that would have had rendered the lid a single-use plastic product according to the EU Directive EU 2019/904. 20
12. Lid (10) according to one of claims 1 to 11, and a cup (20) with a lip (22) around an opening, with the lip (22) being trapped within the lid (10). 25
13. Lid (10) according to claims 12, whereby the lip (22) has a channel that receives the tip of the fold (19) of the lid (10). 30
14. Method of production of a lid (10) with a central wall (13), a skirt (16) with a fold (19) pivoting around an edge (17) of the skirt (16), which skirt (16) extends along a perimeter of the central wall (13) and at an angle with respect to the central wall (13), the lid (10) being produced from a single piece (33) of recyclable material, whereby production includes application of pressure on and drawing of the piece (33), characterized in that the piece is a piece of paperboard with three distinct plies. 35  
40
15. Method according to claim 14, whereby the lid is according to any one of claims 1 to 11. 45

50

55







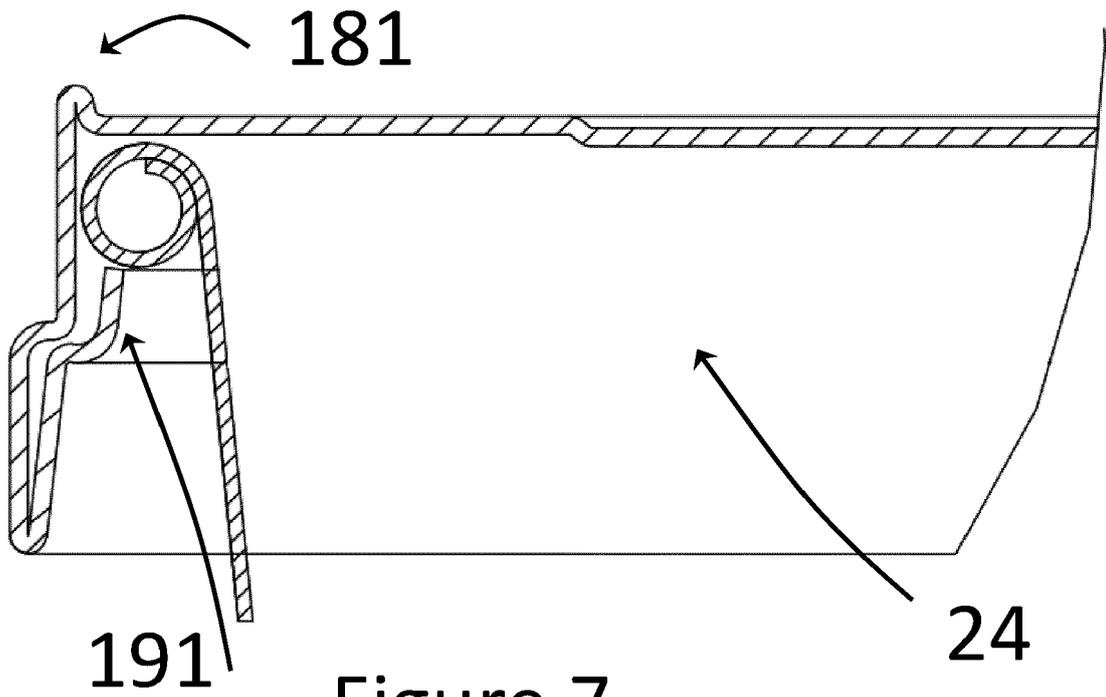


Figure 7

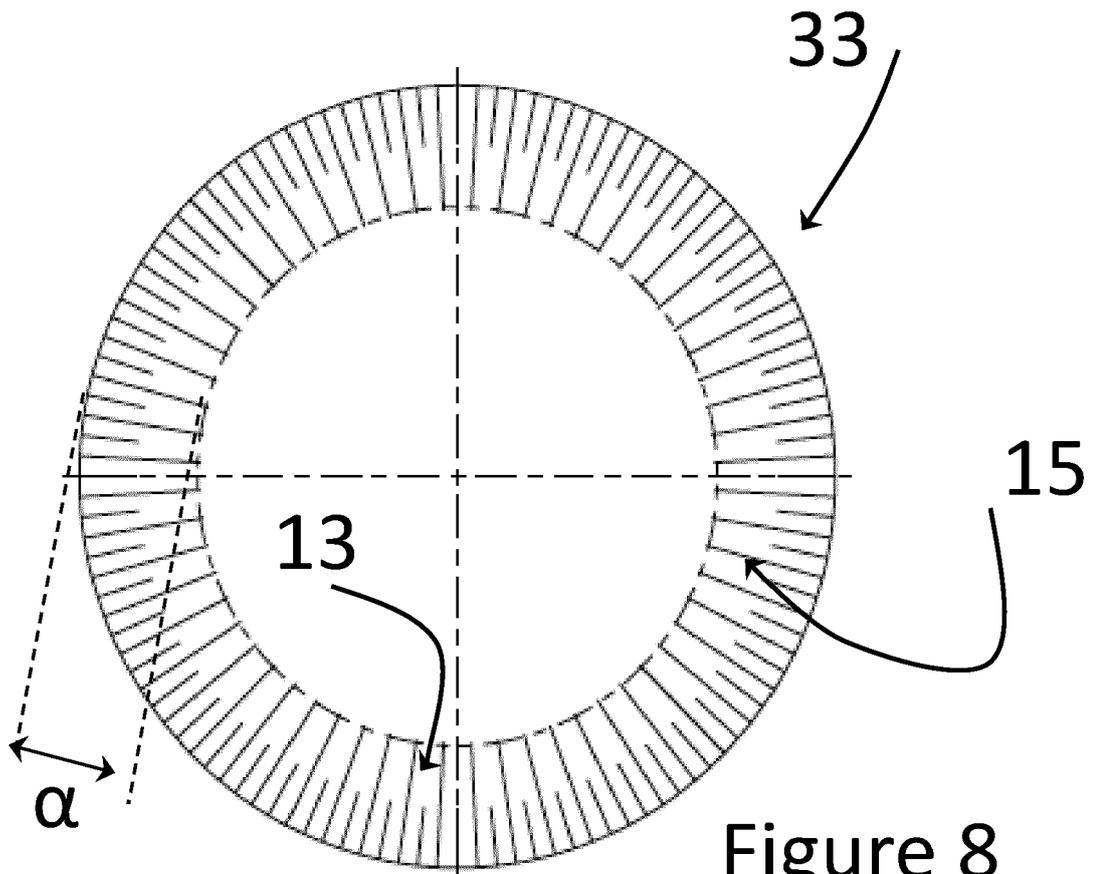


Figure 8

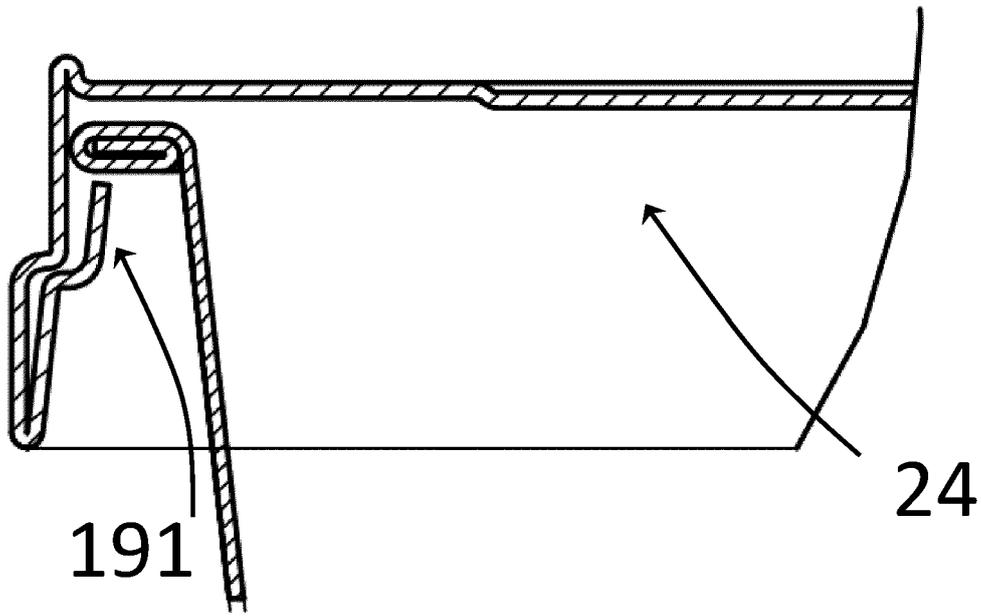


Figure 9

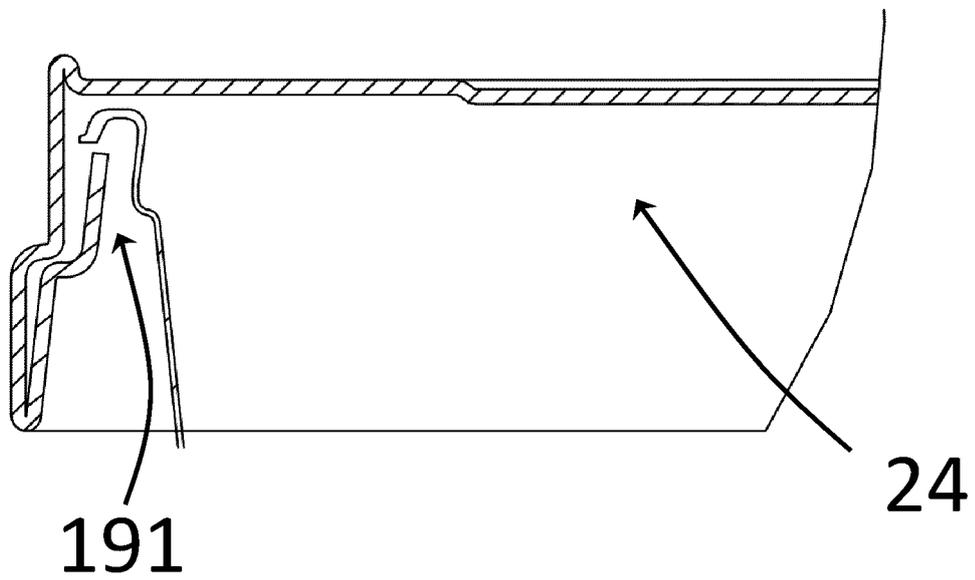


Figure 10

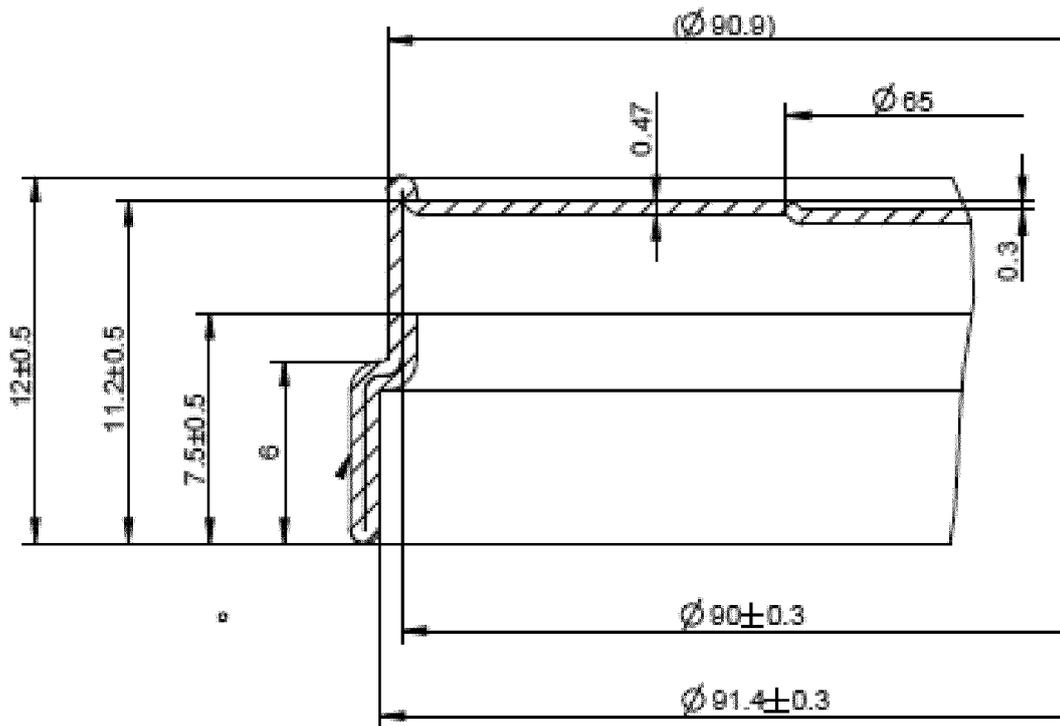


Figure 11



EUROPEAN SEARCH REPORT

Application Number

EP 23 18 0489

5

10

15

20

25

30

35

40

45

50

55

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	US 2017/203888 A1 (HOOKER KENNETH SINCLAIR [GB] ET AL) 20 July 2017 (2017-07-20)	1, 6	INV. B65D43/02
Y	* the whole document *	3-5, 7-9, 12-15	
Y	EP 0 639 509 A1 (RISSEN GMBH MASCHF [DE]) 22 February 1995 (1995-02-22) * the whole document *	3-5, 12, 13	
Y	WO 2021/037980 A1 (SEDA INT PACKAGING GROUP SPA [IT]) 4 March 2021 (2021-03-04) * the whole document *	7, 8	
Y	US 2 074 325 A (HERMAN CAREW) 23 March 1937 (1937-03-23) * the whole document *	9	
Y	US 2 832 522 A (SCHLANGER DANIEL J) 29 April 1958 (1958-04-29) * the whole document *	14, 15	TECHNICAL FIELDS SEARCHED (IPC) B65D
A	US 2 383 760 A (CESARE BARBIERI) 28 August 1945 (1945-08-28) * the whole document *	1-13	
The present search report has been drawn up for all claims			
Place of search <b>The Hague</b>		Date of completion of the search <b>30 October 2023</b>	Examiner <b>Pernice, Ciro</b>
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 23 18 0489

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.

30-10-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2017203888 A1	20-07-2017	EP 3145831 A1	29-03-2017
		ES 2716073 T3	10-06-2019
		GB 2526373 A	25-11-2015
		PT 3145831 T	28-02-2019
		TW 201600416 A	01-01-2016
		US 2017203888 A1	20-07-2017
		WO 2015177526 A1	26-11-2015
-----			
EP 0639509 A1	22-02-1995	DE 4327657 A1	23-02-1995
		EP 0639509 A1	22-02-1995
-----			
WO 2021037980 A1	04-03-2021	AR 119840 A1	12-01-2022
		AU 2020338701 A1	24-03-2022
		BR 112022003504 A2	24-05-2022
		CA 3148854 A1	04-03-2021
		DE 202019104776 U1	11-10-2019
		EP 4021818 A1	06-07-2022
		TW 202118704 A	16-05-2021
		US 2022306352 A1	29-09-2022
WO 2021037980 A1	04-03-2021		
-----			
US 2074325 A	23-03-1937	NONE	
-----			
US 2832522 A	29-04-1958	NONE	
-----			
US 2383760 A	28-08-1945	NONE	
-----			

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- EP 0459017 A [0003]
- EP 3943409 A [0004]
- EP 3403944 A [0005]