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(54) **CARDBOARD TRAY**

(57) The invention relates to a cardboard tray comprising:

- a bottom wall part;
- arranged along the circumference of the bottom wall part, a number of upstanding side wall parts alternated with the same number of upstanding corner wall parts;
- a circumferential flange composed out of abutting circumferential flange parts, each circumferential flange part being arranged, along a fold line, to the upper edge of one of the upstanding side wall parts;
- strengthening flange parts arranged, along a fold line, to the upper edge of each upstanding corner wall part,

wherein a strengthening flange part is adhered to both circumferential flange parts of the adjacent side wall parts;

wherein the circumferential flange has a sealing zone, which extends along the circumferential flange and which spans at least part of the width of said circumferential flange, and

wherein the strengthening flange parts at least partially overlap with the sealing zone, when viewed in a direction perpendicular to the sealing zone.

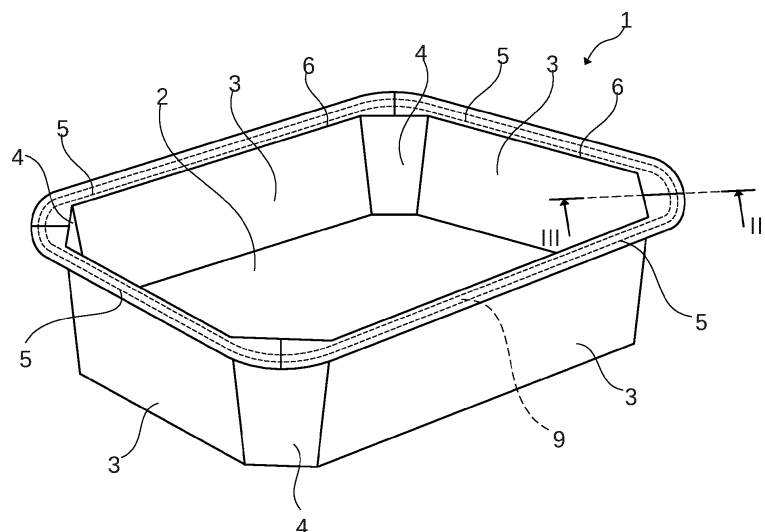


Fig. 1

Description

[0001] The invention relates to a cardboard tray comprising:

- a bottom wall part;
- arranged along the circumference of the bottom wall part, a number of upstanding side wall parts alternated with the same number of upstanding corner wall parts;
- a circumferential flange composed out of abutting circumferential flange parts, each circumferential flange part being arranged, along a fold line, to the upper edge of one of the upstanding side wall parts,

wherein the circumferential flange has a sealing zone, which extends along the circumferential flange and which spans at least part of the width of said circumferential flange.

[0002] Such a cardboard tray is known from DE 19654230 A1. This tray is folded from a cardboard sheet and kept in shape with glue flaps connecting adjacent wall parts. After providing such a cardboard tray, the tray is filled with for example fruit and vegetables and then a plastic film is sealed onto the circumferential flange. A disadvantage is that any tension in the plastic film, which typically occurs, when the plastic film cools down to room temperature, causes the circumferential flange to curl upwardly to relieve the tension. This deteriorates the aesthetic appearance and also prevents stacking of similar sealed cardboard trays.

[0003] WO 2018 178508 discloses another cardboard tray. This publication describes that there could occur a gap between abutting circumferential flange parts. In order to resolve this problem, a butt seam is provided between the abutting edges of the circumferential flange parts. A supporting flange is arranged to corner wall parts to ensure that the butt seam between said circumferential flange parts is not damaged when processing the cardboard tray. Although the supporting flange could be adhered to the circumferential flange parts, it is according to WO 2018 1785508 essential, that the supporting flange is dimensioned such that there is no overlap with the sealing zone, when viewed in a direction perpendicular to the sealing zone.

[0004] Also with the cardboard tray of WO 2018 1785508 the plastic film will cause the part of the circumferential flange with the sealing zone to curl upwardly.

[0005] EP 3768118 proposes a cardboard tray with double folded circumferential flange parts, which are adhered to the outside of the upstanding side wall parts. This ensures that the flange parts are less likely to curl upwardly, when a plastic film is sealed onto the circumferential flange.

[0006] However, due to the complexity of the double folded flange parts, special machines are required to fold such a cardboard tray from a blank.

[0007] Furthermore, such a rectangular shaped card-

board tray could not be used in the typical top seal devices and tools used for plastic trays, as such plastic trays typically have rounded edges.

[0008] It is an object of the invention to reduce or even remove the above mentioned disadvantages.

[0009] This object is achieved according to the invention with a cardboard tray according to the preamble, which is characterized by strengthening flange parts arranged, along a fold line, to the upper edge of each upstanding corner wall part, wherein a strengthening flange part is adhered to both circumferential flange parts of the adjacent side wall parts;

wherein the strengthening flange parts at least partially overlap with the sealing zone, when viewed in a direction perpendicular to the sealing zone.

[0010] With the cardboard tray according to the invention, the corners are strengthened with the strengthening flange part being adhered to the circumferential flange parts. When a plastic film is now adhered to the sealing zone the circumferential flange will be less likely to curl up. The strengthening flange prevents the circumferential flange parts from folding up along the folding line as the folding line of the strengthening flange is at an angle with and offset from the folding lines of the circumferential flange parts. Furthermore, because the strengthening flange is adhered to the circumferential flange parts, this double layer part of the circumferential can better withstand any bends or folds. Furthermore, due to the double layer part a tension is created between the circumferential flange parts and the strengthening flange part, when said double layer part is pulled upwardly. This tension counteracts the curling of the double layer part.

[0011] Now with the corner parts of the cardboard tray being strengthened relative to the remaining circumferential flange, an additional tension could be applied to the plastic film sealed to the tray. This provides for a sleeker look and allows for stacking more filled cardboard trays on top of each other.

[0012] As a result a cardboard tray is provided according to the invention, which is suitable for fruit and vegetables, i.e. can be provided with aeration openings, and which can be manufactured both inline and offline. And due to the corner wall parts a rounded cardboard tray is provided which can be used with the same conventional top seal devices and tools, which are used for plastic trays.

[0013] In a preferred embodiment of the cardboard tray according to the invention the strengthening flange parts fully overlap the sealing zone in width direction of the circumferential flange.

[0014] By having the strengthening flange parts fully overlapping the sealing zone in width direction, it is ensured that the area at which the plastic foil can transfer tension to the circumferential flange is strengthened.

[0015] As the circumferential flange parts extend along the corner wall parts, the strengthening flange parts also overlap in circumferential direction for the full length of the strengthening flange parts.

[0016] In yet another preferred embodiment of the cardboard tray according to the invention adjacent upper edges of an upstanding side wall part and adjacent upstanding corner wall part are under an angle of larger than 0° and smaller than 90°, preferably larger than 35° and smaller than 55°, more preferably 45°.

[0017] The angle between the upper edges of the side wall parts and adjacent corner wall parts further contribute to the strength of the corners, where the strengthening flange part is adhered to the circumferential flange parts.

[0018] In still a further preferred embodiment of the cardboard tray according to the invention the combined angle of the abutting edges of two adjacent circumferential flange parts is smaller than the angle between the upper edges of the two upstanding side wall parts of said two adjacent circumferential flange parts.

[0019] Having the combined angle of the abutting edges smaller than the angle between the upper edges of the two upstanding side wall parts will cause the circumferential flange to slope downwards from the upper edges towards the outside of the tray. Such a downward sloping circumferential flange will provide further resistance to curling up of the circumferential flange, allowing for higher tension in the plastic foil sealed on top of the cardboard tray.

[0020] In a further embodiment of the cardboard tray according to the invention at least one longitudinal end of at least one of the circumferential flange parts extending along an adjacent upstanding corner wall part is provided with a glue flap, which is adhered to said upstanding corner wall part.

[0021] The glue flap being adhered to the upstanding corner wall provides an additional connection between the circumferential flange and the corner wall. In combination with the strengthening flange of the corner wall, also adhered to the circumferential flange, this provides an even further rigid construction for the corner of the cardboard tray.

[0022] In another embodiment of a cardboard tray according to the invention at least one of the upstanding side wall parts is provided with a glue flap, which is adhered to the adjacent upstanding corner wall part.

[0023] The advantage of each of the above mentioned embodiments is that only the upstanding corner wall part is to be provided with a glue layer and that by a simple folding device, the cardboard tray can be folded from an unfolded sheet into a structurally sturdy cardboard tray. As soon as the glue has set, the cardboard tray will maintain its shape.

[0024] In still a further embodiment, the cardboard tray according to the invention at least one of the circumferential flange parts comprise at least a first, a second and third elongate flange part section, which are connected parallel and along an elongate edge to each other,

wherein the first elongate flange part section is arranged to the corresponding upstanding side wall

part, the second elongate flange part section is double folded against the first elongate flange part section, and the third elongate flange part section is connected parallel and along an elongate edge to the second elongate flange part section, wherein the third elongate flange part section is adhered either on the inside or the outside of the corresponding upstanding side wall part.

[0025] With this embodiment, also the circumferential flange parts extending along the upstanding side wall parts are strengthened, so not only the corners of the tray but also the sides are strengthened. Such strengthened circumferential flange parts are described in WO 2019 179930.

[0026] Still another embodiment of the cardboard tray according to the invention further comprises a plastic film, which plastic film covers the cardboard tray and is sealed along the circumferential flange at the sealing zone.

[0027] In even a further embodiment of the cardboard tray according to the invention an amount of glue or adhesive is arranged between each strengthening flange part and both corresponding circumferential flange parts, wherein the amount of glue or adhesive extends between the abutting edges of the circumferential flange parts.

[0028] The glue or adhesive is used to adhere the strengthening flange to the circumferential flange parts, but also to fill any gaps which occur between the abutting edges of the circumferential flange parts. This ensures that when a plastic film is laminated to the inside of the cardboard tray, no grooves are formed at the transition from one circumferential flange part to the other. A fully smooth sealing surface is then created allowing for airtight sealing of a plastic film covering the cardboard tray.

[0029] These and other features of the invention will be elucidated in conjunction with the accompanying drawings.

Figure 1 shows a perspective view of a first embodiment of a cardboard tray according to the invention. Figure 2 shows the unfolded sheet for the cardboard tray according to figure 1.

Figure 3 shows a cross-section along the line III-III in figure 1.

Figure 4 shows a bottom view of a corner of the cardboard tray of figure 1.

Figure 5 shows a part of an unfolded sheet for a second embodiment of a cardboard tray according to the invention.

Figure 6 shows a cross-section of a cardboard tray folded out of the unfolded sheet of figure 5.

Figure 7 shows a perspective view of part of a third embodiment of a cardboard tray according to the invention.

Figure 8 shows a cross-section of the cardboard tray of figure 7.

Figures 9A and 9B show a cross-sectional view of a detail of a corner of a cardboard tray according to

the invention.

[0030] Figure 1 shows a perspective view of a first embodiment of a cardboard tray 1 according to the invention. The cardboard tray 1 has an eight-sided bottom wall part 2 along the circumference upstanding side wall parts 3 alternated with upstanding corner wall parts 4 are arranged.

[0031] Abutting circumferential flange parts 5 are arranged along a fold line 6 to the upper edge of one of the upstanding side wall parts 3. Each of the circumferential flange parts 5 extend on each longitudinal end beyond the fold line 6 to border part of an adjacent corner wall part 4.

[0032] As shown in figure 2, strengthening flange parts 7 are arranged, along a fold line 8, to the upper edge of each upstanding corner wall part 4. The strengthening flange parts 7 are adhered to the bottom side of the extending flange parts 5 to keep the cardboard tray 1 in the folded position.

[0033] Figure 3 shows a cross section of the cardboard tray 1 according to the invention. Clearly shown is that the strengthening flange 7 is adhered to the bottom of the circumferential flange part 5. A sealing zone 9 is defined on the circumferential flange 5 to which a plastic sheet 10 is sealed. The strengthening flange 7 spans at least part of the width of said circumferential flange 9 such that the sealing zone 9 is at least partially and preferably, as shown, fully overlapped by the strengthening flange 7 (see figure 4).

[0034] Figure 5 shows a part of an unfolded sheet for a second embodiment of a cardboard tray 20 according to the invention. The cardboard tray 20 has a bottom wall part 21 with upstanding side wall parts 22 and corner wall parts 23. The side wall parts 22 have each a circumferential flange part 24, 25. The circumferential flange part 24, 25 extends in longitudinal direction with an end 25 over the strengthening flange part 26 arranged to the corner wall part 23. This is similar to the embodiment 1 shown in figure 1.

[0035] The bottom edge 27, 28 of the side wall parts 22 is formed partially by a cut line 27 and partially by a fold line 28. When the unfolded sheet as shown in figure 5 is folded to a cardboard tray 20 as shown in figure 6, the cut line 27 will form a foot element which will space the bottom wall part 21 from any underground on which the cardboard tray 20 is placed.

[0036] The combined angle α_1 and α_2 of the abutting edges of the two adjacent circumferential flange parts 24, 25 is smaller than the angle β between the upper edges of the two upstanding side wall parts 22 of said two adjacent circumferential flange parts 24, 25. When the cardboard tray 20 is folded into its shape, the circumferential flange parts 24, 25 need to slope down (see figure 6) in order for the longitudinal edges to abut and form a smooth circumferential flange. Because the circumferential flange slopes down, additional strength is provided to the cardboard tray 20.

[0037] Figure 7 shows a third embodiment of a cardboard tray 30 according to the invention. The cardboard tray 30 has a bottom wall part 31 with upstanding side wall parts 32 and corner wall parts 33. To the upper edge of the side wall parts 32, a first 34, a second 35 and third 36 elongate flange part section are connected parallel and along an elongate edge to each other. (see also figure 8) The first 34, a second 35 and third 36 elongate flange part section are double folded with the third elongate flange part section 36 adhered to the side wall part 32. This provides a strong flange along the side wall part 32. Such a double folded flange could also be provided for the other side wall parts of the tray.

[0038] The second elongate flange part section 35 extends in longitudinal direction along the upper edge of the corner wall part 33. This corner wall part 33 is provided with a strengthening flange (not shown) similar to the embodiments 1 and 20. To further strengthen the corner, the elongate flange part section 35 is provided at the end with glue flaps 37 which are adhered to the corner wall part 33.

[0039] The side wall parts 32 are furthermore provided with glue flaps 38 along the side edges, which glue flaps 38 are adhered to the corner wall part 33.

[0040] As will be clear from this embodiment as well as the previous embodiments, only the corner wall part needs to be provided on one side with an adhesive for the full cardboard tray to be folded into its shape.

[0041] Figure 9A and 9B show a detail of a corner of a cardboard tray 40 similar to any of the previous embodiments. The corner has a corner wall part 41 with a strengthening flange 42 adhered with a glue layer 45 to the bottom side of circumferential flange parts 43, 44.

[0042] If the circumferential flange parts 43, 44 would not fully abut, the glue could well up from the space between the flange parts 43, 44 to form a bulge 46.

[0043] When a plastic sheet 47 is laminated onto the circumferential flange parts 43, 44, the bulge 46 would be flattened (see figure 9B), such that a smooth sealing zone is formed and the seal of the plastic sheet 47 on the circumferential flange 43, 44 is airtight.

[0044] By designing the radius of the corners of the circumferential flange, the width of the circumferential flange and the width of the side wall parts and corner wall parts, a cardboard tray can be provided, which corresponds in dimensions to conventional plastic trays. This allows for a user to keep the existing top seal devices and tools, without any additional investments, and easily switch between plastic trays and cardboard trays and even handle both types through each other.

[0045] The strengthened corners of the cardboard tray according to the invention ensures that the elongate sides of the tray are sufficient strong that a cardboard tray, filled with for example fruit or vegetables, will hang into the tools of existing top seal devices, similar to a plastic tray. The elongate sides will not bend such that a filled cardboard tray falls from the top seal device.

Claims**1.** Cardboard tray comprising:

- a bottom wall part;
- arranged along the circumference of the bottom wall part, a number of upstanding side wall parts alternated with the same number of upstanding corner wall parts;
- a circumferential flange composed out of abutting circumferential flange parts, each circumferential flange part being arranged, along a fold line, to the upper edge of one of the upstanding side wall parts,

wherein the circumferential flange has a sealing zone, which extends along the circumferential flange and which spans at least part of the width of said circumferential flange;

characterized by

- strengthening flange parts arranged, along a fold line, to the upper edge of each upstanding corner wall part, wherein a strengthening flange part is adhered to both circumferential flange parts of the adjacent side wall parts;
- wherein the strengthening flange parts at least partially overlap with the sealing zone, when viewed in a direction perpendicular to the sealing zone.

2. Cardboard tray according to claim 1, wherein the strengthening flange parts fully overlap the sealing zone in width direction of the circumferential flange.**3.** Cardboard tray according to claim 1 or 2, wherein adjacent upper edges of an upstanding side wall part and adjacent upstanding corner wall part are under an angle of larger than 0° and smaller than 90°, preferably larger than 35° and smaller than 55°, more preferably 45°.**4.** Cardboard tray according to any of the preceding claims, wherein the combined angle of the abutting edges of two adjacent circumferential flange parts is smaller than the angle between the upper edges of the two upstanding side wall parts of said two adjacent circumferential flange parts.**5.** Cardboard tray according to any of the preceding claims, wherein at least one longitudinal end of at least one of the circumferential flange parts extending along an adjacent upstanding corner wall part is provided with a glue flap, which is adhered to said upstanding corner wall part.**6.** Cardboard tray according to any of the preceding

claims, wherein at least one of the upstanding side wall parts is provided with a glue flap, which is adhered to the adjacent upstanding corner wall part.

7. Cardboard tray according to any of the preceding claims, wherein at least one of the circumferential flange parts comprise at least a first, a second and third elongate flange part section, which are connected parallel and along an elongate edge to each other,

wherein the first elongate flange part section is arranged to the corresponding upstanding side wall part, the second elongate flange part section is double folded against the first elongate flange part section, and the third elongate flange part section is connected parallel and along an elongate edge to the second elongate flange part section,

wherein the third elongate flange part section is adhered either on the inside or the outside of the corresponding upstanding side wall part.

8. Cardboard tray according to any of the preceding claims further comprising a plastic film, which plastic film covers the cardboard tray and is sealed along the circumferential flange at the sealing zone.**9.** Cardboard tray according to any of the preceding claims, wherein an amount of glue or adhesive is arranged between each strengthening flange part and both corresponding circumferential flange parts, wherein the amount of glue or adhesive extends between the abutting edges of the circumferential flange parts.

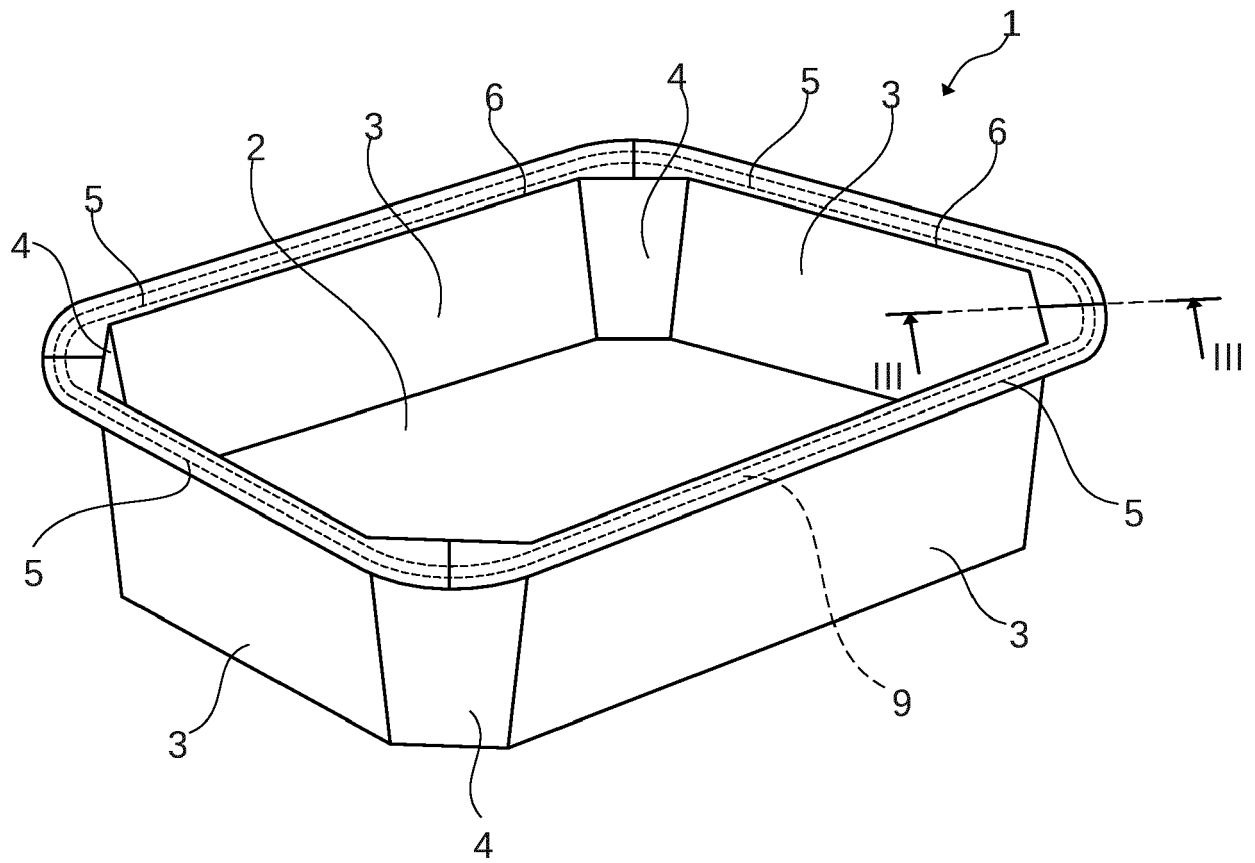


Fig. 1

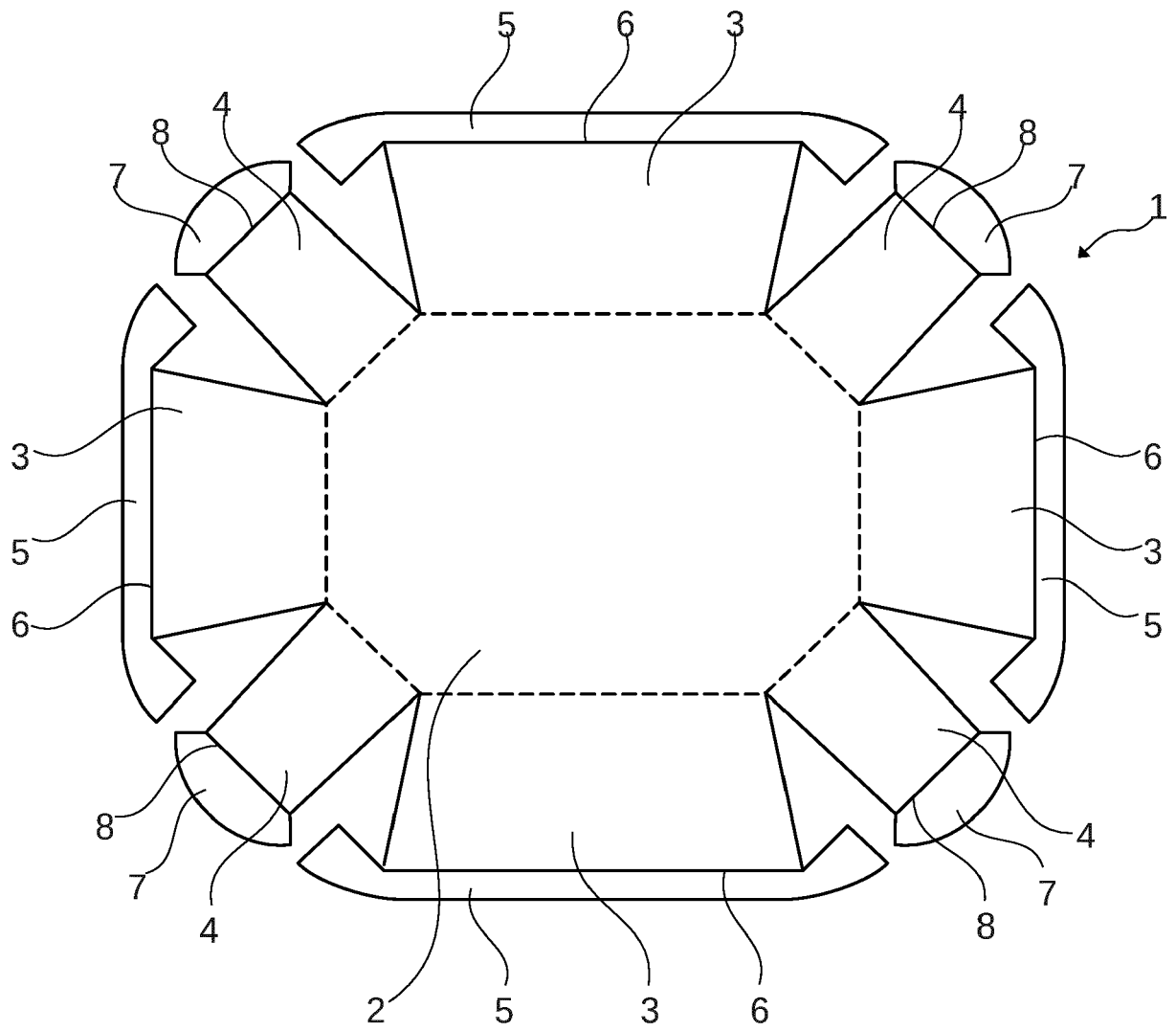


Fig. 2

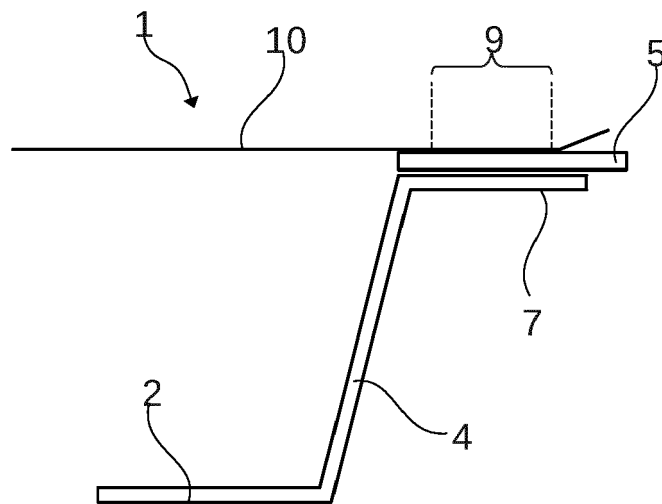


Fig. 3

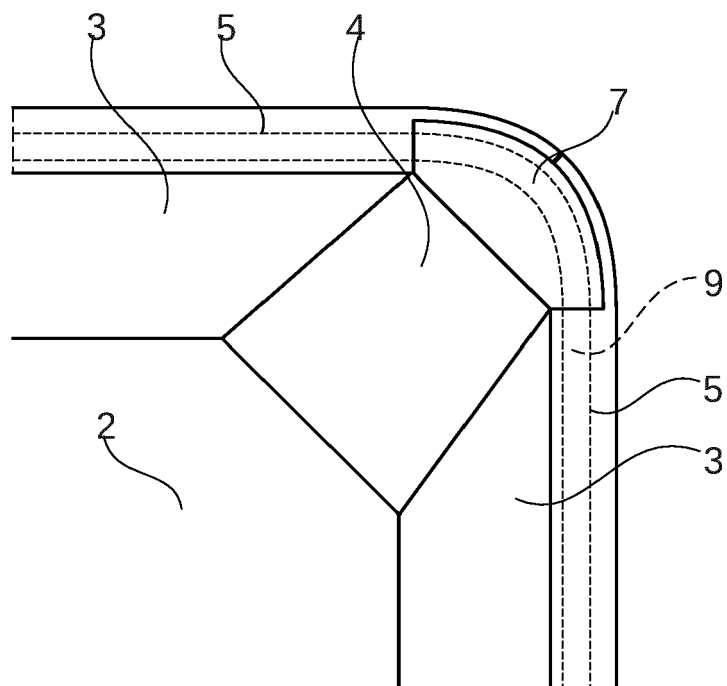


Fig. 4

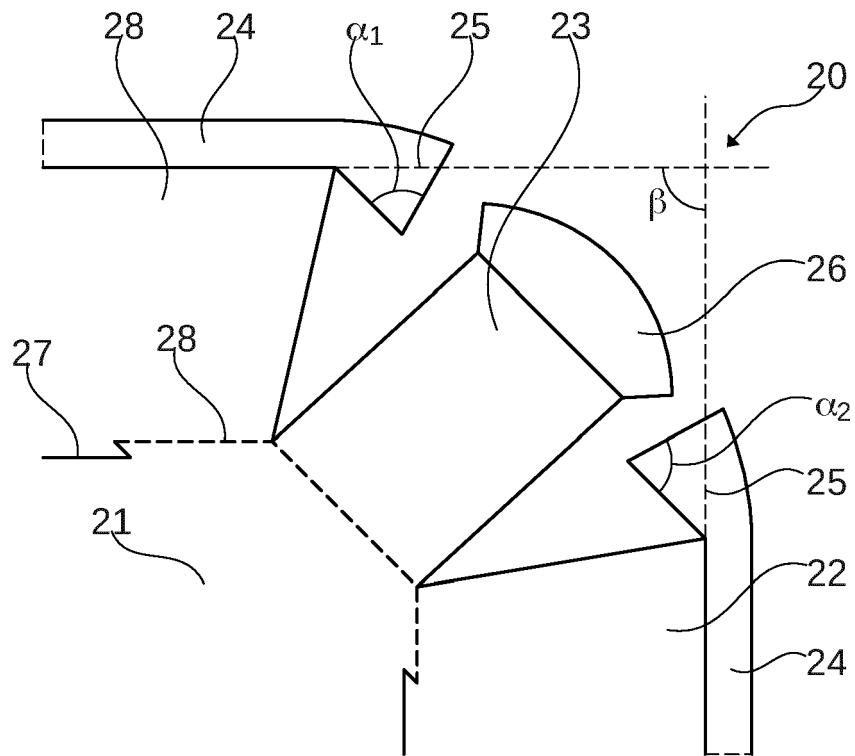


Fig. 5

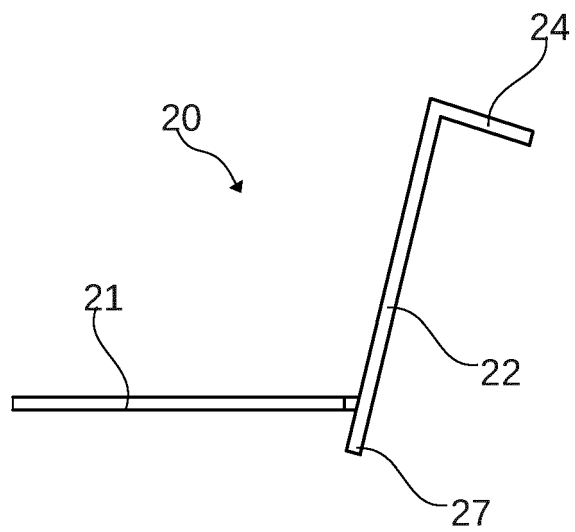


Fig. 6

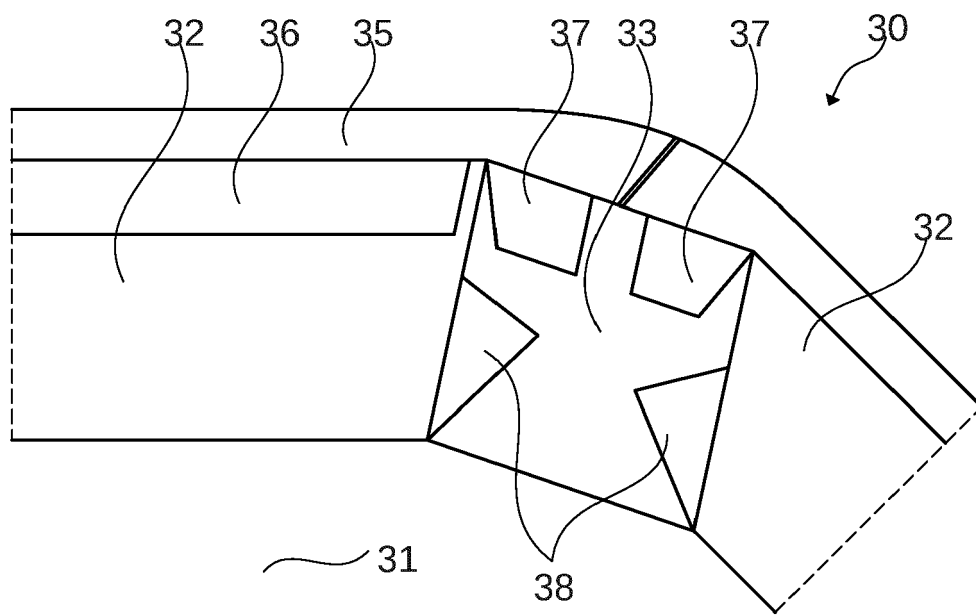


Fig. 7

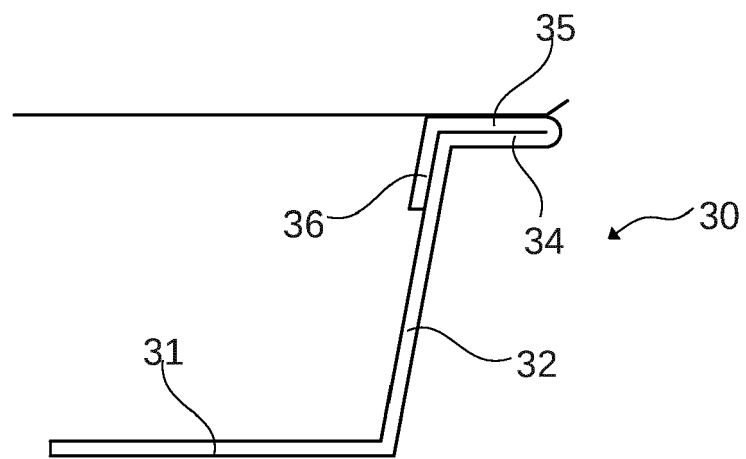


Fig. 8

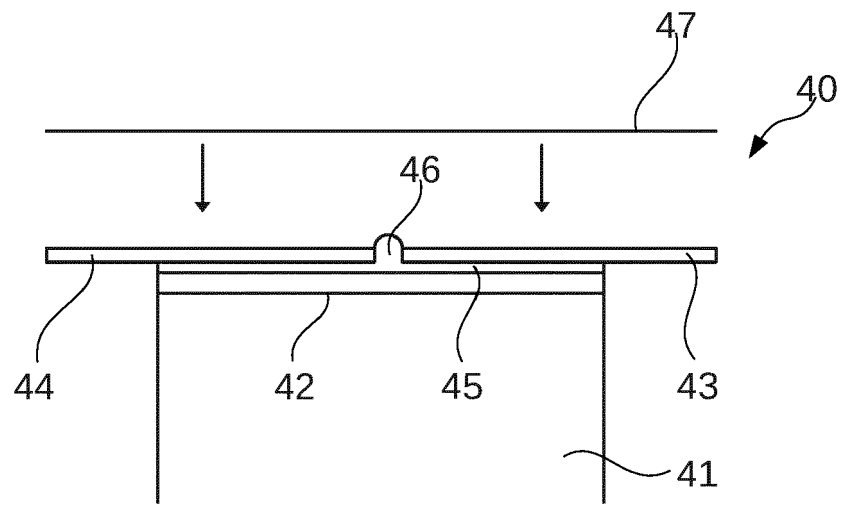


Fig. 9A

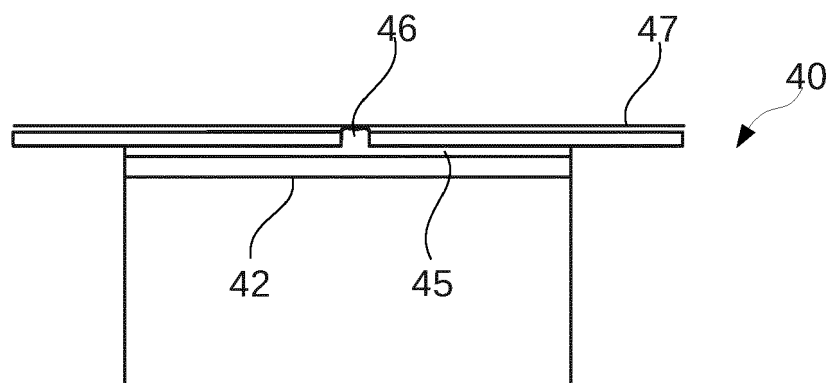


Fig. 9B



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Application Number

EP 22 17 6509

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EPO FORM 1503 03.82 (P04C01)

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X	WO 2022/107181 A2 (LIC PACKAGING S P A [IT]) 27 May 2022 (2022-05-27)	1-4, 6, 8, 9	INV. B65D5/20
Y	* page 11, paragraph 2 - page 13, paragraph 5; figures 1-12 *	7	B65D77/20
Y	EP 3 768 118 A1 (STACKPACK B V [NL]) 27 January 2021 (2021-01-27) * paragraphs [0042] - [0044]; figures 1-7 *	7	
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A	US 4 417 882 A (WALLIN KAY [SE]) 29 November 1983 (1983-11-29) * column 3, lines 1-15; figures 1-13 *	1-7	
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			B65D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 15 November 2022	Examiner Grondin, David
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 17 6509

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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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