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(72) Inventors:  
• **Hoekstra, Aad**  
**7201 AE Zutphen (NL)**  
• **Knipe, Stephen**  
**Hayling Island**  
**PO11 0EP Hampshire (GB)**

(71) Applicant: **Huhtamäki Oyj**  
**02150 Espoo (FI)**

(74) Representative: **Wolff, Felix et al**  
**Kutzenberger Wolff & Partner**  
**Theodor-Heuss-Ring 23**  
**50668 Köln (DE)**

(54) **Paper-container with two sidewalls**

(57) The present invention relates to a container (1) with an inner sidewall (2), a bottom (4) and an outer sidewall (3) which is connected to the inner sidewall and comprises locally confined protuberances (5) to provide a gap

between the inner and the outer sidewall, wherein the protuberances are, at least partially, in contact with the inner sidewall.

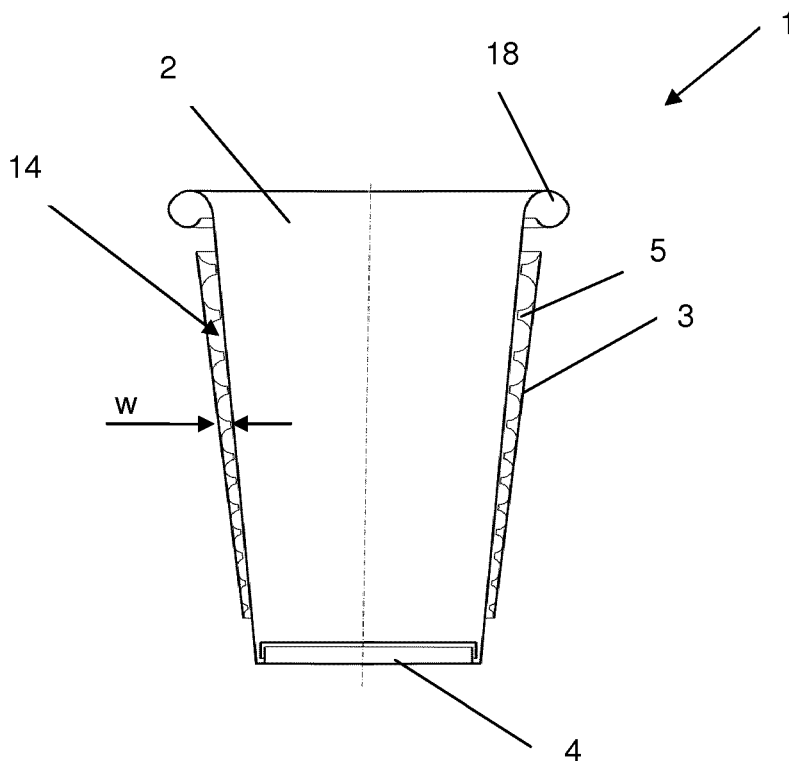


Fig. 1

## Description

**[0001]** The present invention relates to a container with an inner sidewall, a bottom and an outer sidewall which is connected to the inner sidewall and comprises locally confined protuberances to provide a gap between the inner and the outer sidewall, wherein the protuberances are, at least partially, in contact with the inner sidewall.

**[0002]** Such a container is for example known from WO 2008/045944. The protuberances are formed by punching a small needle like spike through the material of the outer sidewall and then forming the protuberance. During the punching no material shall be removed from the outer sidewall but rather is the material deformed or upset outwardly. However, when using this method, the paper material of the outer sidewall tends to tear and/or recycle paper cannot be used, because it tears much more easily than paper made from virgin pulp.

**[0003]** It was therefore the objective of the present invention to provide a container that does not comprise the deficiencies according to the state of the art.

**[0004]** This problem is solved with a container with an inner sidewall, a bottom and an outer sidewall which is connected to the inner sidewall and comprises locally confined protuberances to provide a gap between the inner and the outer sidewall, wherein the protuberances are, at least partially, in contact with the inner sidewall and wherein each protuberance comprises a hole, preferably a punched out section and a deformed section.

**[0005]** The disclosure made regarding this embodiment of the present invention also applies to the other embodiments of the present invention and vice versa.

**[0006]** According to another inventive or preferred embodiment of the present invention, the protuberances comprise each at least one means to facilitate the formation of the protuberance.

**[0007]** The disclosure made regarding this embodiment of the present invention also applies to the other embodiments of the present invention and vice versa.

**[0008]** According to yet another inventive or preferred embodiment of the present invention, the protuberances vary in their size.

**[0009]** The disclosure made regarding this embodiment of the present invention also applies to the other embodiments of the present invention and vice versa.

**[0010]** The present invention relates to a container for beverages and/or food. The container comprises an inner sidewall and a bottom which confine the volume into which the beverage or food is placed. The inner sidewall may have a cylindrical or a conical shape. Around the outer circumference of the inner sidewall, an outer sidewall is provided. This outer sidewall comprises a multitude of locally confined protuberances which can be arranged along a line and/or in an area, preferably according to a recurrent pattern. Each protuberance is directed towards the outer circumference of the inner sidewall and at least some of the protuberances are in contact with the inner sidewall. Due to the protuberances, there is a gap

between the two sidewalls which provides insulation between the two sidewalls. Both sidewalls are preferably made from a paper board, more preferably from a paper board made from recycled paper. Other preferred materials are cardboard, particularly cardboard made from recycled material.

**[0011]** According to a first embodiment of the present invention, each protuberance comprises a hole, preferably a punched-out section, and a deformed section which extends at least partially around the hole. In the punched-out section material is removed from the outer sidewall and not only deformed in order to get the hole. However, the hole can also be produced by deforming and/or upsetting outwardly the material of the outer sidewall, for example by a needle or a spike. The hole has preferably a circular cross section, but may also have any other cross section like a triangle, a rectangle or polygon or any other shape. After or while the hole is inserted into the material of the outer sidewall, a section around the hole is plastically deformed to form the protuberance, i.e. the shape of the material around the hole is altered. The deformation takes, for example, place under the influence of heat, pressure and/or moisture. Due to the hole - e.g. preferably the material removed from the outer sidewall by punching out - larger protuberances, particularly protuberances with a larger depth and thus a larger gap between the two sidewalls, can be formed without tearing uncontrolledly the material of the outer sidewall. Alternatively or additionally, recycled material can be utilized for the outer sidewall. The protuberances formed are so rigid that they cannot be compressed by a squeezing hand.

**[0012]** Preferably, each protuberance comprises two sections, a section which is essentially conical and an adjacent section that extends perpendicular from the surface of the outer sidewall, more preferably from the conical section. The section that extends perpendicular preferably has a constant diameter and/or a constant wall-thickness. The cross section of both sections is preferably circular, but may be also polygonal. However, the cross section of the perpendicular section is preferably circular and more preferably constant over its entire length and more preferably provided with a constant wall-thickness.

**[0013]** According to another embodiment of the present invention, each protuberance comprises each at least one means to facilitate the formation of the protuberance. This means is for example an incision, which preferably extends from the circumference of the hole to alleviate tearing action during the formation of the protuberances.

**[0014]** According to yet another embodiment of the present invention, the protuberances may vary in their size. This variation in size, particularly in the depth allows the exact adjustment of the local width of the gap. The variation of the gap between the two sidewalls allows the adjustment of the locally needed degree of insulation. Preferably, the protuberances decrease in their size, par-

ticularly in their depth, i.e. in their extension perpendicular from the surface of the outer sidewall, from the upper rim towards the bottom. This results in a conicity of the outer circumference of the outer sidewall of the container, which improves the denesting of stacked containers.

[0015] Preferably, each protuberance comprises a section that extends perpendicular from the surface of the outer sidewall.

[0016] According to a preferred embodiment of the present invention, the outer sidewall comprises an area in which two opposite ends of the outer sidewall overlap. In this overlap, the two ends are connected by a material bond and/or a force- and/or form-fit. More preferably, protuberances are located in this area, which are even more preferably smaller than at least some of the protuberances outside this area. Due to the smaller protuberances, the diameter of the container is not increased in the overlap area.

[0017] The outer sidewall is preferably connected to the inner sidewall by an adhesive connection, for example by gluing and/or sealing the outer sidewall to the inner sidewall.

[0018] The protuberances can be used to prefix the outer sidewall to the inner sidewall and/or the two ends in the overlap region, before the adhesive material is hardened.

[0019] Another subject matter of the present invention is a method to produce a container according to the present invention, wherein holes are inserted, preferably stamped out of the flat outer sidewall and around each hole a protuberance is formed and subsequently the outer sidewall is bent around the inner sidewall and attached to the inner sidewall.

[0020] The disclosure made regarding this embodiment of the present invention also applies to the other embodiments of the present invention and vice versa.

[0021] Preferably, means to facilitate the forming of the protuberances are provided at the circumference of the hole. Such means are for example one or more incisions.

[0022] Preferably at least some of the protuberances are deformed during bending and/or attachment of the outer sidewall. Preferably, the depth of the protuberances are preferably elastically reduced. This induces a tension into the outer sidewall, which increases its stiffness.

[0023] The inventions are now explained according to Figures 1 - 10. These explanations do not limit the scope of protection of the present invention. The explanations apply to all embodiments of the present invention likewise.

**Figure. 1** shows the inventive container

**Figures. 2 and 3** show details of the protuberance

**Figures 4 - 6** show potential distribution-pattern of the protuberances

**Figure 7** shows a container with different

sized protuberances

**Figure 8** shows a container with a lower rim at the outer sidewall

**Figure 9** show the overlap region at the outer sidewall

**Figure 10** show the inventive method

[0024] Figure 1 shows the inventive container 1, here a paper cup, which comprises an inner sidewall 2. The sidewall 2, here shaped conically, is connected with a bottom 4, which confine a volume into which a beverage or food can filled. The container is open at its top, so that the beverage or the food can be inserted or removed from the container. At its upper end, opposite from the bottom 4, the inner sidewall preferably comprises a rolled rim 18. Around the outer circumference of the inner sidewall, an outer sidewall 3 is provided. This sidewall 3 comprises a multitude of protuberances 5, which extend from the inner surface of the outer sidewall towards the inner sidewall and thus define a gap 14 between the inner and the outer sidewall, which provides insulation, so that the fingers of a user are not harmed by a hot beverage/food in the container. As can be clearly seen, here the width w of the gap decreases from the end of the outer sidewall which is adjacent to the upper end of the container towards the end of the sidewall which is adjacent to the bottom of the container. This is achieved by protuberances 5 which decrease in their depth d towards the bottom, which will be explained in further detail according to Figure 2. Due the decreasing width of the gap 14, the slope of the outer surface of the outer sidewall is relative step which improves the denesting of two stacked containers. Furthermore, more insulation is provided in a region remote from the bottom 4, at which the container is normally gripped by a user.

[0025] **Figure 2** shows details of the protuberance 5. Each protuberance comprises, preferably at its center, a hole 6, where, in the present case, material of the sidewall has been removed, preferably by punching. Alternatively, the material can just be deformed and/or pushed outwards. The cross section of the hole 6 is preferably circular, but can have a different shape as well. Around the hole 6 a deformed section 7 of the material of the outer sidewall is provided. In this deformed section, the material of the outer sidewall is not planar anymore. Preferably, the deformed section comprises a conical section 7.1 and more preferably a section 7.2 which extends perpendicular from the surface of the outer sidewall. Due to the hole 6 in the center of the protuberance, the depth d of the protuberance perpendicular to the inner surface of the outer sidewall can be produced relatively large without uncontrolled tearing of the material of the outer sidewall during the forming of the protuberance. Due to the conical and the perpendicular part, the protuberances are very stiff. The diameter of the protuberance need not

be circular, but can have any other shape, for example polygonal. By varying the size of the hole, the depth *d* of the protuberance can be varied as well. By varying the diameter of the protuberance itself, the size of the area, which is kept at a distance from the inner sidewall can be varied as well.

**[0026]** Figure 3 shows another preferred embodiment of the protuberance. In the present case, means 8 to facilitate the forming of the protuberances, here incisions extend from the circumference of the hole, whose cross section is in the present case square, but may have any other shape. In the present case, the means 8 extend from each edge of the square. The means 8 alleviate the tearing of the material from which the outer sidewall is made.

**[0027]** Figure 4 shows two different pattern in which the protuberances can be arranged. In the Figure on the left hand side, the protuberances are arranged in at least one horizontal line, here in two lines 9 in the upper and lower end region of the outer sidewall 3. The line extends around the entire circumference of the container. In the Figure on the right hand side, the protuberances are arranged in an area 10, preferably in an area near the upper rim 18 of the container. The protuberances are arranged in lines which are parallel to each other and extend around the entire circumference of the container. The vertical distance between two lines is smaller in comparison to the example on the left hand side. Preferably, the protuberances are staggered.

**[0028]** Regarding Figures 5 and 6 the protuberances may have the cross section of a circle with a circular hole, as depicted in Figure 5. Other shapes are feasible as well such as a hexagon, a triangle, or any other regular or irregular polygon. The central hole is, however preferably circular.

**[0029]** Reference is now made to Figures 7 and 8. In order to fix the outer sidewall 3 to the inner sidewall 2, a circumferential connection at the top and/or at the bottom and a longitudinal connection along the side seam where the two ends of the outer sidewall overlap have to be made.

In Figure 7, an embodiment is shown wherein the depth *d* of the protuberances start relatively small in a region adjacent to the upper rim 18 to allow the outer sidewall to get in touch and connected with the outer circumference of the inner sidewall. Towards the bottom, the depth of the protuberances may increase to allow a better insulation, while in the vicinity of the bottom no protuberances are provided so that the lower edge of the outer sidewall can be connected, preferably glued or sealed, to the outer circumference of the inner sidewall. Near the bottom of the container preferably protuberances are provided because no insulation is needed.

In the embodiment according to Figure 8, the inner sidewall 2 comprises an indent 15 along at its upper rim near the opening of the container 1. This indent 15 offsets the outer sidewall 3 along its upper edge. Near the bottom 4 the offset of the outer sidewall is created by a deforma-

tion, here a curling of the lower rim 11 of the outer sidewall. Protuberances 5 are provided in the vicinity of the upper rim to stabilize the gap between the sidewalls 2, 3.

**[0030]** Figure 9 shows the overlap area 17, in which the opposite edges of the outer sidewall 3 are connected with a seam. In this area protuberances 5 are also provided. However, these protuberances are smaller than the protuberances outside from the overlap region. Thus, even though two layers of the outer sidewall are provided, the diameter of the container is not increased in this region. Furthermore, insulation is provided in the overlap region.

**[0031]** Figure 10 shows a method how to produce the protuberances. A plane sidewall sheet is here provided to a punch which comprises penetration piston 12 and a female part 13 which punch a section, here a circle out of the sheet material so that a hole is created by removing material. Subsequently, the area 7 around the hole is deformed plastically around the hole. This can be done with the penetration piston or an additional tool. The person skilled in the art understands, that preferably all protuberances in one outer sidewall are produced simultaneously.

#### 25 List of reference signs:

##### [0032]

1	cup
2	inner sidewall
3	outer sidewall
4	bottom
5	protuberance
6	hole, preferably punched-out section
7	deformed section
7.1	conical section
7.2	section that extends perpendicular from the surface of the outer sidewall
8	means to facilitate the forming of the protuberances, incision
9	line of protuberances
10	area of protuberances
11	lower rim
12	penetration piston
13	female part
14	gap
15	circumferential indent
16	stacking shoulder
17	overlap area, side seam
18	upper rim
<i>d</i>	depth of the protuberance perpendicular to the surface of the outer sidewall
<i>w</i>	width of the gap

#### 55 Claims

1. Container (1) with an inner sidewall (2), a bottom (4)

and an outer sidewall (3) which is connected to the inner sidewall and comprises locally confined protuberances (5) to provide a gap (14) between the inner and the outer sidewall, wherein the protuberances (5) are, at least partially, in contact with the inner sidewall (2), **characterized in that** each protuberance comprises a hole (6), preferably a punched-out section (6), and a deformed section (7).

**in, that** at least some of the protuberances are deformed during bending and/or attachment of the outer sidewall (3).

2. Container (1) according to claim 1 of the preamble of claim 1, **characterized in that** the protuberances comprise each at least one means (8) to facilitate the formation of the protuberance (7). 10
3. Container (1) according to one of the preceding claims or the preamble of claim 1, **characterized in, that** the protuberances (5) vary in their size. 15
4. Container (1) according to claim 3, **characterized in, that** the protuberances (7) decrease in size, particularly in the extension (d) perpendicular from the surface of the outer sidewall (3), preferably from the upper rim (18) towards the bottom (4). 20
5. Container (1) according to one of the preceding claims, **characterized in, that** each protuberance (7) comprises a a conical section (7.1) and/or a section (7.2) that extends perpendicular from the surface of the outer sidewall (3). 25  
30
6. Container (1) according to one of the preceding claims, **characterized in, that** the outer sidewall comprises an area (17) in which two opposite ends of the outer sidewall overlap. 35
7. Container (1) according to claim 5, **characterized in, that** protuberances are located in the area (17), which are preferably smaller than at least some of the protuberances outside this area. 40
8. Container (1) according to one of the preceding claims, **characterized in that** it made from paper board, preferably made from recycled paper. 45
9. Method to produce a container according to one of the preceding claims, **characterized in, that** holes (6) are inserted, preferably stamped out of the flat outer sidewall (3) and around each hole a protuberance (5) is formed and subsequently the outer sidewall is bent around the inner sidewall and attached to the inner sidewall (2). 50
10. Method according to claim 9, **characterized in that** means (8) to facilitate the forming of the protuberances are provided at the circumference of the hole (6). 55
11. Method according to claims 9 or 10, **characterized**

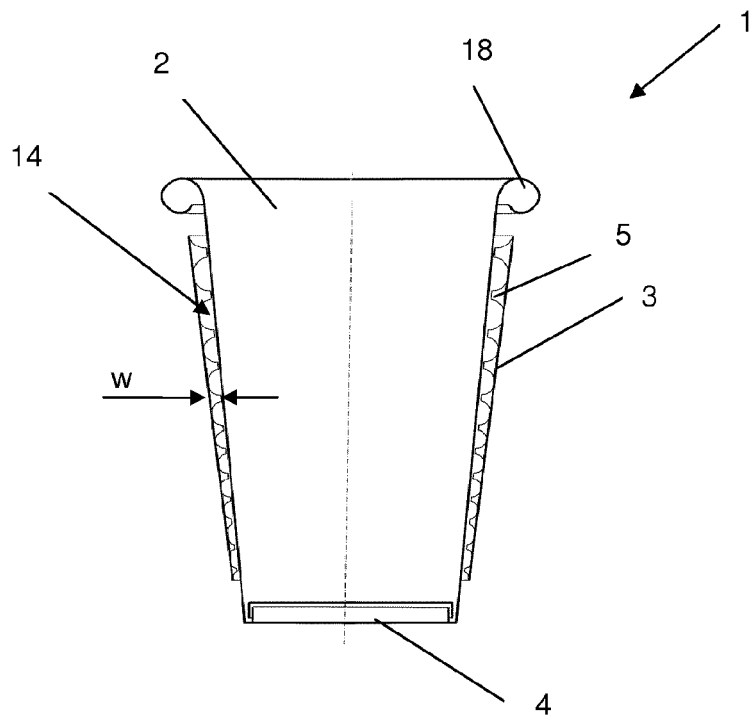


Fig. 1

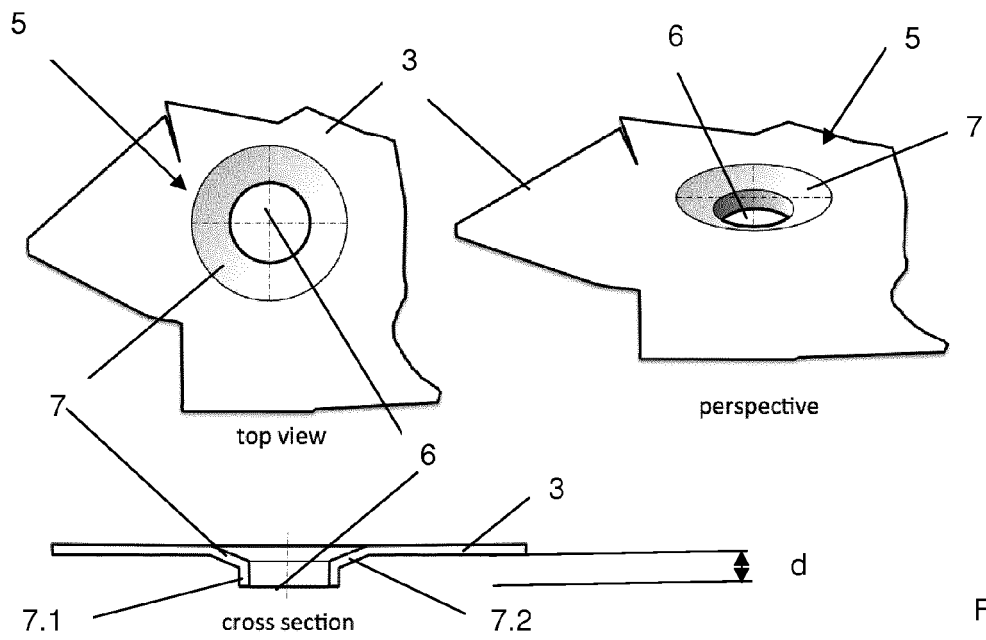


Fig. 2

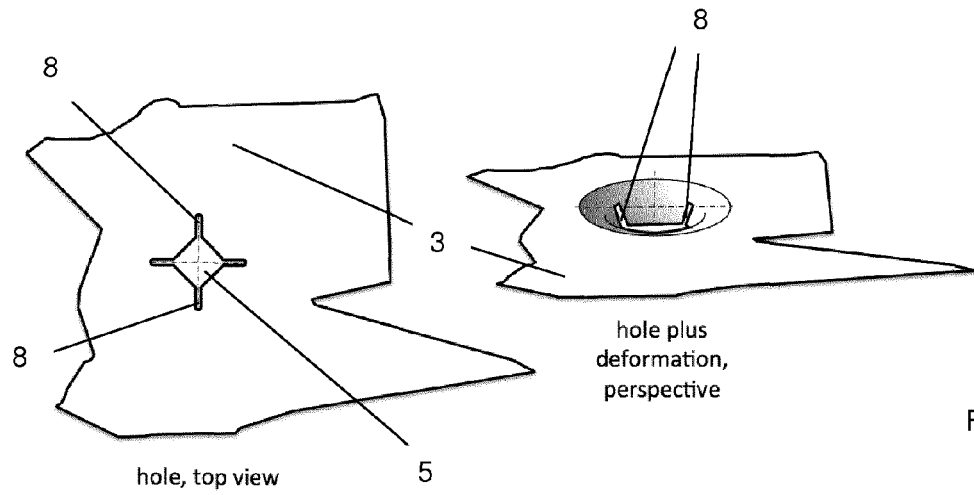


Fig. 3

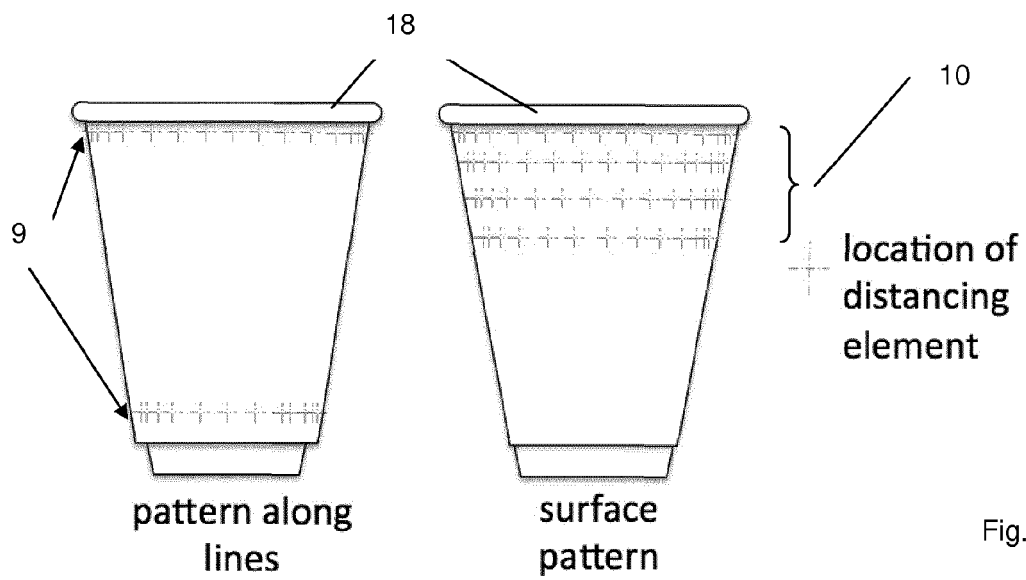


Fig. 4

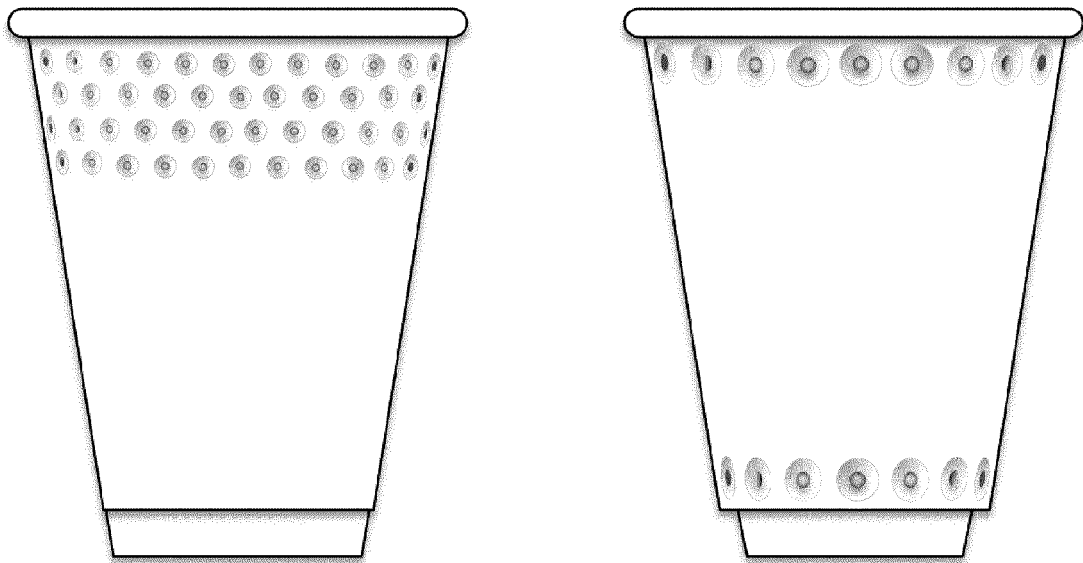


Fig. 5

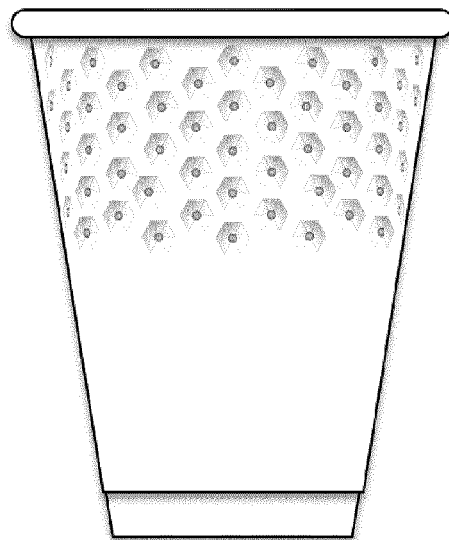


Fig. 6



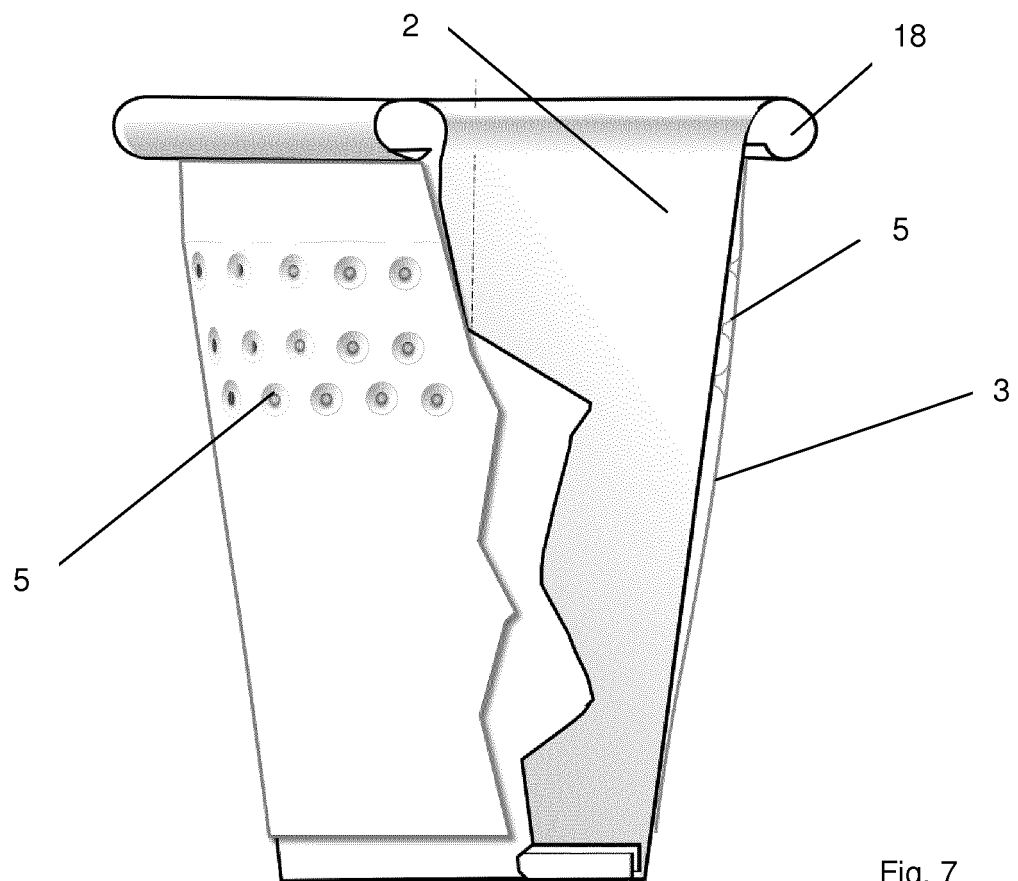


Fig. 7

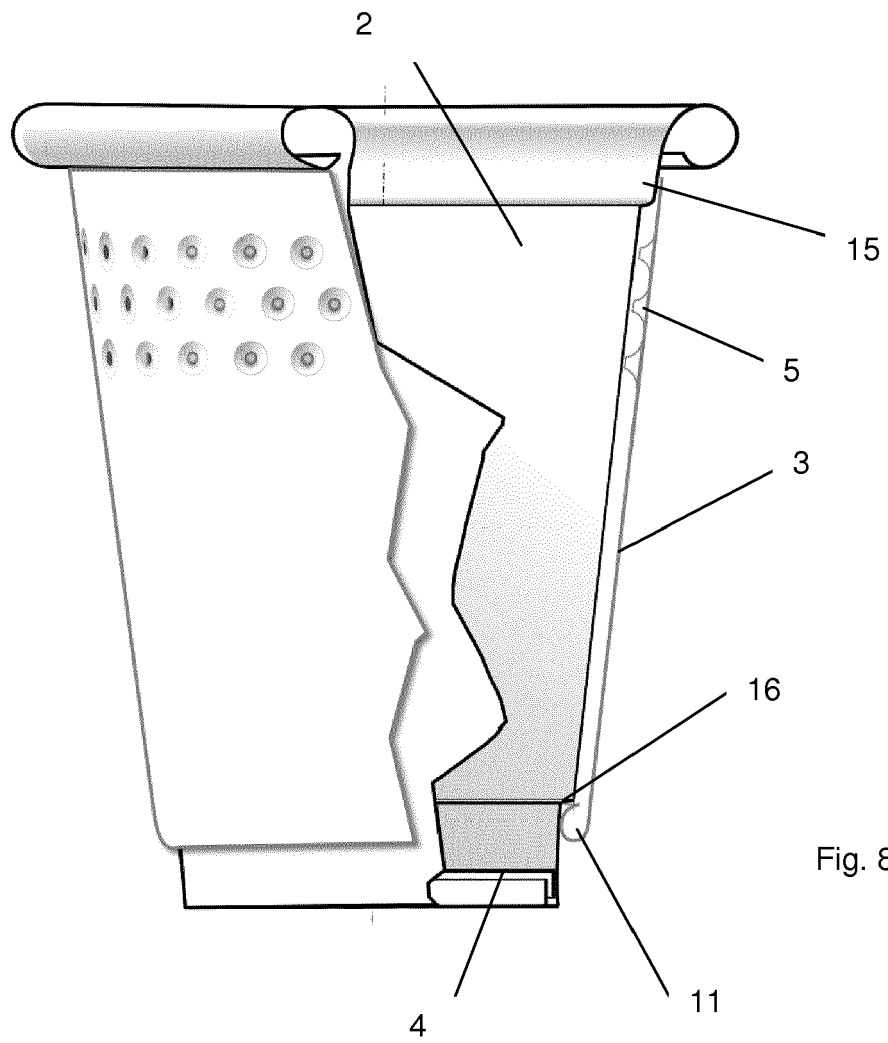


Fig. 8

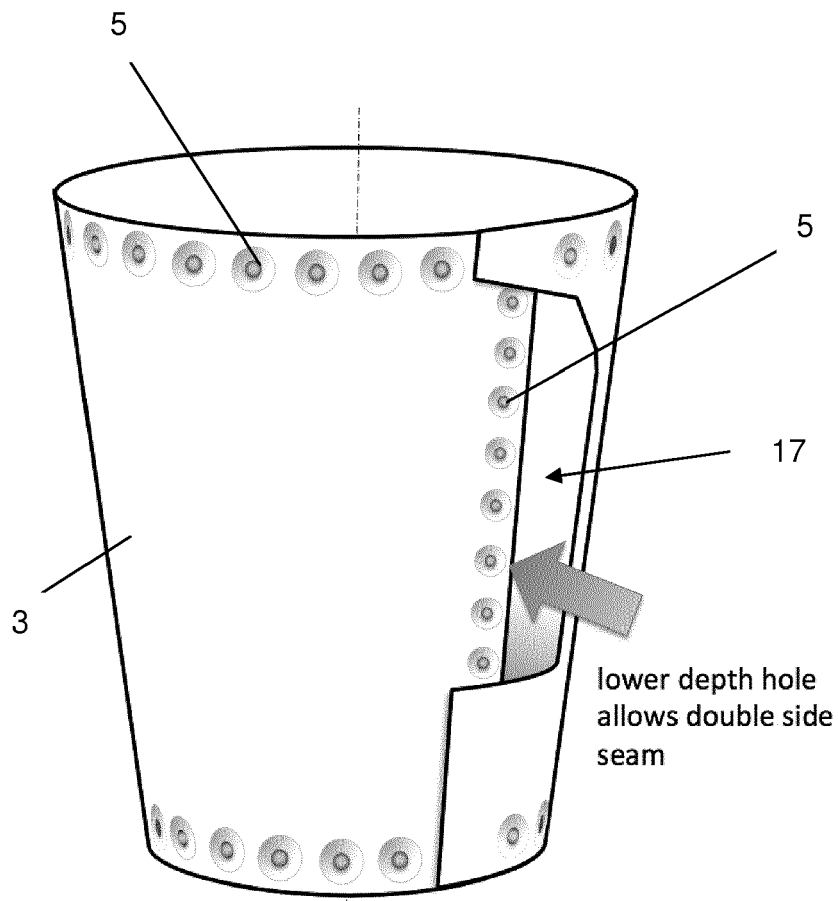


Fig. 9

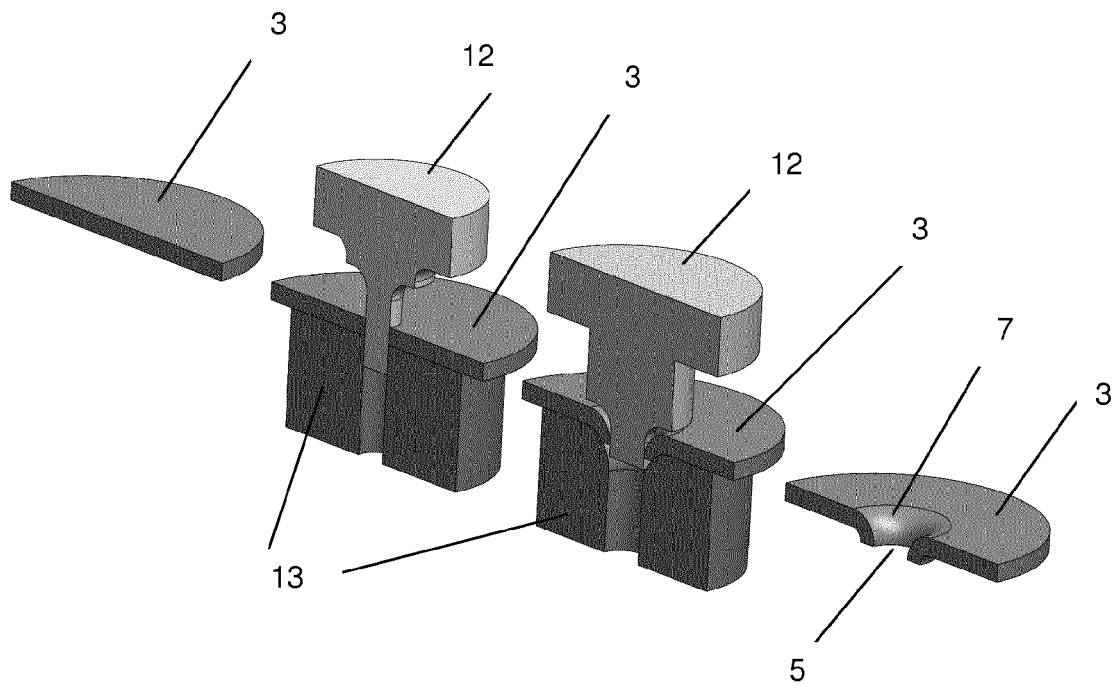


Fig. 10



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Application Number  
EP 13 18 6174

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 January 2014	Examiner Leijten, René
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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