

(19)



(11)

EP 2 470 437 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
28.01.2015 Bulletin 2015/05

(51) Int Cl.:
B65D 47/06 ^(2006.01) **A47G 19/22** ^(2006.01)
B65D 43/02 ^(2006.01) **B65D 21/02** ^(2006.01)

(21) Application number: **10752134.6**

(86) International application number:
PCT/GB2010/051429

(22) Date of filing: **31.08.2010**

(87) International publication number:
WO 2011/024012 (03.03.2011 Gazette 2011/09)

(54) **A LID, CUP INCLUDING A LID, AND A METHOD FOR FORMING A LID**

DECKEL, BECHER MIT EINEM DECKEL UND VERFAHREN ZUR HERSTELLUNG EINES DECKELS
COUVERCLE, GOBELET COMPRENANT UN COUVERCLE, ET PROCÉDÉ POUR FORMER UN
COUVERCLE

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

(30) Priority: **28.08.2009 GB 0915052**
28.08.2009 GB 0915053
28.08.2009 GB 0915050

(43) Date of publication of application:
04.07.2012 Bulletin 2012/27

(73) Proprietors:
• **Solo Cup Europe Limited**
Huntingdon,
Cambridgeshire PE29 7BZ (GB)
• **Slurpcup Limited**
Cambridge, Cambridgeshire CB4 3NL (GB)

(72) Inventors:
• **BROWN, Alex**
Huntingdon Cambridgeshire PE18 7BZ (GB)
• **STONE, Kate**
Cambridge Cambridgeshire CB4 3NL (GB)

(74) Representative: **Sessford, Russell**
Forresters
Skygarden
Erika-Mann-Strasse 11
80636 München (DE)

(56) References cited:
US-A- 3 085 710 **US-A- 4 986 437**
US-A1- 2002 179 614 **US-B1- 6 419 112**
US-B1- 6 752 287

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 470 437 B1

DescriptionDescription of Invention

5 **[0001]** The present invention relates to a lid for a cup, a method of forming such a lid, and a cup including a lid.

[0002] Disposable cups for holding beverages are well known. These cups typically comprise a frustoconical tube of polyethylene coated paper with a polyethylene coated paper base at a narrow end of the tube. The tube and base define a cup-like receptacle and the polyethylene coating on an interior surface of the receptacle makes the walls of the receptacle substantially watertight which allows the cup-like receptacle to hold a liquid beverage - such as coffee, tea, fruit juice, or water. A circumferential edge of the tube at a wide end is usually turned into a tight roll to form a rim.

10 **[0003]** Other forms of disposable cups are also known, such as disposable plastic cups and insulated disposable cups.

[0004] Such cups are often provided with lids. These lids are intended to limit the amount of liquid beverage which is spilled from the cup during use and to reduce the rate of heat loss from a beverage in the cup.

15 **[0005]** A conventional lid typically comprises a vacuum-formed plastic (usually polystyrene) cap which defines a circumferential annular recess adapted to receive a rim at a wide end of a tube of a cup of the form described above - to secure the lid to the cup. An upper surface of the lid is separated from the annular recess by a perimeter wall (which defines a height of the lid).

[0006] A drinking aperture is provided in the upper surface through an entire depth of a wall of the lid at or towards an outer circumferential edge of the upper surface. A pressure equalisation aperture or vent may also be provided in the upper surface through an entire depth of a wall of the lid at a location which generally opposes the drinking aperture across a diameter of the upper surface.

20 **[0007]** The pressure equalisation aperture is configured to permit air to flow into a cup to which the lid is fitted as a liquid in the cup flows out of the cup through the drinking aperture of the lid during use.

[0008] A lip recess is provided in the upper surface of the lid, adjacent the drinking aperture, such that the upper lip of a user drinking from a cup to which the lid is fitted is at least partially received by the lip recess of the lid - to make the drinking process more comfortable for the user.

25 **[0009]** Another conventional lid for a disposable cup is described in US4,986,437. This lid is configured to allow a user to locate a drinking aperture without having to look at the lid. The lid differs from the above described conventional lid in that an upper surface of the lid is lower than the top of the perimeter wall (i.e. the upper surface is sunken into the lid such that perimeter wall stands proud of the upper surface). The perimeter wall and upper surface, therefore, form a reservoir.

30 **[0010]** The drinking aperture is provided through an inner part of the perimeter wall and the upper surface is positioned at an angle with respect to an annular recess such that the upper surface slopes down towards the drinking aperture when the lid is in a generally horizontal/normal orientation (with the perimeter wall extending generally upwards). Thus, the drinking aperture may act as a drain for the reservoir defined by the perimeter wall and upper surface.

35 **[0011]** A spout forms part of the perimeter wall adjacent the drinking aperture and extends beyond the remainder of the perimeter wall such that a user can locate the spout, and hence the drinking aperture, without looking at the lid.

[0012] These conventional lids suffer from numerous problems which include a tendency to allow a liquid held inside a cup to which such a lid is fitted to escape from the drinking or pressure equalisation apertures if the cup is moved from side-to-side (i.e. in a plane which is generally parallel to a plane of the lid) - for example, when walking or in a moving vehicle. This creates waves of liquid inside the cup which tend to splash through the drinking and pressure equalisation apertures.

40 **[0013]** Conventional lids require a user to suck the liquid beverage through the drinking aperture which is often an unfamiliar drinking process for users who are accustomed to drinking from an open-topped glass or mug. In addition, in order to suck a liquid beverage from a cup the user must form a seal around the drinking aperture with their lips. When the liquid beverage leaves the cup through the drinking aperture, the liquid will frequently make initial contact with sensitive parts of the user's mouth (such as their tongue or gums - rather than the user's lips). If the liquid is hot this can cause pain, discomfort or even injury to the user. This initial contact may be the first warning that the user has of the high temperature of the liquid beverage as the user's lips (which would normally provide an early warning of a potentially hot beverage when drinking from a mug - for example) do not come into initial contact with the liquid beverage - and are not sufficiently close to the liquid beverage to detect the temperature of the beverage. If a hot liquid beverage is received in a user's mouth then it is often difficult for the user to return this liquid to the cup (through the lid).

45 **[0014]** A user's perception of the taste of a beverage is often limited when using a conventional lid because the aroma of the beverage is substantially prevented from reaching the user's nose by the lid, the seal formed by the user's lips around the drinking aperture, and the flow of air into (rather than out of) the pressure equalisation aperture when the liquid beverage is being consumed.

50 **[0015]** A conventional lid requires the user to tilt their head backwards in order to drink the liquid beverage through the drinking aperture. This can be uncomfortable for the user and can cause an erratic or excessively fast flow of liquid

through the drinking aperture.

[0016] Users are often concerned about inadvertently spilling (or dribbling) small quantities of liquid beverage from the drinking aperture - particularly when finishing or during a sip of the beverage. These small quantities of liquid may - for example - run down the side of a conventional lid or into the recess intended to receive the user's upper lip (both of which are undesirable).

[0017] A user's perception of drinking from a disposable cup is also important. Many users dislike drinking from - for example - paper or plastic cups and prefer drinking from more traditional mugs and glasses. Conventional lids do not overcome this issue as the user is often even more conscious that they are drinking from a disposable cup when they are required to drink through a lid in an unfamiliar manner.

[0018] US6419112 discloses a spill resistant lid which has the preamble features of claim 1 and includes a sealing bead in pressure contact with the inside wall of a container to be closed when the lid is in sealing position with respect to the container to substantially seal the container. The lid includes a first cylindrical wall and a second cylindrical wall spaced apart to form a receiving channel for the top of a container to be sealed. A ridge extends into the channel from the first cylindrical wall to hold the lid in place. The sealing bead extends into the channel from the second cylindrical wall. A central lid portion closes the area inside the second cylindrical wall and applies sealing pressure to the bead. A third cylindrical wall in the central lid portion is joined to the second cylindrical wall by a web. The relative positions of the second cylindrical wall, the web, and the third cylindrical wall are deformed when the lid is in sealing position on the container and such deformation causes the bead to apply sealing pressure to the inside container wall. The central lid portion also includes a container bottom platform and container receiving groove or secondary container platform for receiving and holding the bottom of a container stacked on the lid. The container bottom platform comprises two shoulders adjacent a drinking aperture which are concave in the region of the drinking aperture.

[0019] A method having the preamble features of claim 10 can also be derived from said document.

[0020] Embodiments of the present invention, therefore, seek to ameliorate some of the problems associated with conventional lids.

[0021] Accordingly, aspects of the present invention are recited by the appended claims.

[0022] Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings in which:

Figure 1 shows a first view of a lid;

Figure 2 shows a second view of a lid;

Figure 3 shows a third view of a lid;

Figure 4 shows a fourth view of a lid;

Figure 5 shows a cross-sectional view of a lid;

Figure 6 shows a lid and cup in a normal orientation;

Figure 7 shows two stacked lids and cups;

Figure 8 shows a perspective view of a lid; and

Figure 9 shows a perspective view of a lid.

[0023] With reference to figures 1 to 5, an embodiment comprises a lid 1 for a cup.

[0024] In the depicted embodiment, the lid 1 has an outer circumferential edge 2 defining a generally circular perimeter of the lid 1. An annular flange 3 extends from the outer circumferential edge 2 of the lid 1 to the base of an annular rim receiving recess 4.

[0025] The outer circumferential edge 2 of the lid 1, the annular flange 3 and the annular rim receiving recess 4 all form part of a cup receiving section or cup attachment member 5 of the lid 1. As such, the outer circumferential edge 2 of the lid 1 defines a cup receiving aperture with a first diameter. The annular flange 3 is arranged such that it extends from the outer circumferential edge 2 and generally towards a central longitudinal axis of the lid 1. Thus, the annular flange 3 forms a guide member which defines an aperture with a decreasing diameter (the first diameter being the largest diameter of the guide member) as the annular flange 3 extends towards the annular rim receiving recess 4.

[0026] The annular rim receiving recess 4 extends from an edge of the annular flange 3 which opposes the outer circumferential edge 2 of the lid 1 across a depth of the annular flange 3. The annular rim receiving recess 4 is configured to receive and hold a rim of a cup.

[0027] Thus, a cup having a rim (which is usually a tight roll of the material which forms the walls of the cup) may be pressed against an inner surface of the annular flange 3 and guided (by the guide member) into the annular rim receiving recess 4 of the lid 1. Preferably, the diameter of the flange 3 at the circumferential edge thereof which meets the annular rim receiving recess 4 is less than a diameter of the rim of the cup to which it is intended to be fitted (but greater than an external diameter of a wall of the cup). The cup and/or lid may resiliently deform to allow the rim of the cup to enter the annular rim receiving recess 4. Thus, once the rim of the cup is located in the annular rim receiving recess 4, in a "snap-fit" manner, the lid 1 is generally held in place on the cup.

[0028] An outer perimeter wall 6 of the lid 1 extends from an upper edge of the annular rim receiving recess 4 away from the outer circumferential edge 2 of the lid 1. The outer perimeter wall 6 may extend such that an external diameter of the lid 1 decreases as the wall 6 extends away from the rim receiving recess 4.

[0029] The outer perimeter wall 6 extends away from the upper edge of the annular rim receiving recess 4 such that, when the lid 1 is fitted to a cup, - as described below - an inner surface of the perimeter wall 6 is substantially aligned with an inner surface of a wall of the cup.

[0030] The outer perimeter wall 6 has a height through a first section of the wall 6 which is less than a height of the outer perimeter wall 6 through a second section thereof. The height of the outer perimeter wall 6 through the first section is generally constant and the first section of the wall 6 forms an arc which preferably extends around approximately half the circumference of the lid 1. The second section of the outer perimeter wall 6, therefore, preferably forms an arc which extends around the remaining portion of the circumference of the lid 1 - also about half of the circumference of the lid 1. As the second section of the outer perimeter wall 6 extends away from the first section thereof the height of the outer perimeter wall 6 generally increases to a maximum height at a point around the circumference of the lid 1 which generally opposes a point (across a diameter of the lid 1) which is approximately central in the arc of the first section of the outer perimeter wall 6.

[0031] A curved rim surface 7 extends away from the edge of the outer perimeter wall 6 which opposes the annular rim receiving recess 4 across a height of the outer perimeter wall 6. The curved rim surface 7 defines a width of the rim of the lid 1. The curved rim surface 7 couples the inner 8 and outer 6 perimeter walls.

[0032] As will be appreciated, the curved rim surface 7 is substantially parallel to the annular rim receiving recess 4 around the first section of the outer perimeter wall 6 of the lid 1. Around the second section of the outer perimeter wall 6 of the lid 1, the curved rim surface 7 forms an incline to the highest point of the outer perimeter wall 6 above the annular rim receiving recess 4.

[0033] An inner perimeter wall 8 extends from an edge of the curved rim surface 7 (a rim) which is generally towards the central longitudinal axis of the lid 1 (relative to the rest of the curved rim surface 7) towards a base. Thus, the inner perimeter wall 8 may extend between a rim point to a base point, the base point being in the region of the drinking aperture 10.

[0034] The inner perimeter wall 8 extends substantially towards the cup receiving section 5 and is spaced apart from the outer perimeter wall 6. Preferably, an internal diameter of the lid 1 decreases as the inner perimeter wall 8 extends towards the cup receiving section 5. The inner perimeter wall 8 may form various different angles with respect to the outer perimeter wall 6 throughout a height of the inner perimeter wall 8. Thus, the internal diameter of the lid 1 may decrease more rapidly as the inner perimeter wall 8 approaches the cup receiving section 5 - in other words a distance between the inner 8 and outer 6 perimeter walls may increase as towards the cup receiving section 5.

[0035] As with the outer perimeter wall 6, the inner perimeter wall 8 has two sections which generally correspond with the two sections of the outer perimeter wall 6 such that a height of the inner perimeter wall 8 is greater through the second section thereof when compared to the first section thereof.

[0036] In an embodiment, not depicted, the outer 6 and inner 8 perimeter walls do not extend around the entire circumference of the lid 1. Instead, the outer 6 and inner 8 perimeter walls are only present adjacent the drinking aperture 10 - i.e. generally around the second section thereof. The height of the outer 6 and inner 8 perimeter walls decreases with circumferential distance away from the drinking aperture 10 such that the perimeter walls 6,8 are partial perimeter walls around only part of the circumference of the lid 1 and, together with the curved rim surface 7, form a spout adjacent the drinking aperture 10. In an embodiment, not depicted, the outer 6 and inner 8 perimeter walls extend around approximately half of the circumference of the lid 1. The profile of the spout which may be formed by the perimeter walls 6,8 and curved rim surface 7 is preferably arcuate or substantially arcuate in shape.

[0037] A main lid surface 9 extends across the lid 1 and is substantially coupled to an entire circumferential edge of the inner perimeter wall 8. The main lid surface 9 is, therefore, sunken with respect to the curved rim surface 7.

[0038] The main lid surface 9 is inclined with respect to the annular rim receiving recess 4 such that the main lid surface 9 extends away from the annular rim recess 4 towards the first section of the inner perimeter wall 8. Thus, the main lid surface 9 is configured to direct any liquid placed thereon (when the annular rim receiving recess 4 is in a generally horizontal/normal orientation and the perimeter walls 6,8 extend above the annular rim receiving recess 4) towards a central point around the arc of the second section of the inner perimeter wall 8. Indeed, in this orientation, a part of the main lid surface 9 which is most remote from the first section of the inner perimeter wall 8 (and therefore beneath the highest point around the inner 8 and outer 6 perimeter walls) is aligned with or generally below the annular rim receiving recess 4.

[0039] A part of the main lid surface 9 which is most remote from the first section of the inner perimeter wall 8 may, for example, be located between a plane defined by the annular rim receiving recess 4 and a plane defined the outer circumferential edge 2 of the lid 1.

[0040] A drinking aperture 10 is provided through an entire depth of the main lid surface 9 and is generally located towards the part of the main lid surface 9 which is most remote from the first section of the inner perimeter wall 8. The

drinking aperture 10 is preferably adjacent the inner perimeter wall 8 of the lid 1.

[0041] The drinking aperture 10 is preferably cut from the main lid surface 9. The drinking aperture 10 may be formed by a generally D-shaped cut. Preferably, the cut section of the main lid surface 9 is attached to the lid 1 and extends from the inner perimeter wall 8. Thus, the cut section of the main lid surface 9, in an embodiment, forms a guard member 21.

[0042] The drinking aperture 10 is preferably elongate in form with a width of about 3mm and a length of about 15mm. The drinking aperture 10 is generally oriented such that a longitudinal axis of the drinking aperture 10 is perpendicular to a radius of the lid 1.

[0043] The drinking aperture 10 is, in an embodiment, substantially located at a distance relative to the annular rim receiving recess 4 which is between a distance of one edge of the inner perimeter wall 8 and a distance of the opposing edge of the inner perimeter wall 8 (across a height of the perimeter wall 8) relative to the annular rim receiving recess 4. In other words, in an embodiment, the drinking aperture 10 is generally located within a region defined by the two opposing edges of the inner perimeter wall 6.

[0044] In an embodiment, the lid 1 has a first end and a second end which oppose each other across a height of the lid 1. The drinking aperture 10 is located, in an embodiment, between a base of the inner perimeter wall 8 and a second end of the lid 1. This position of the drinking aperture 10 helps to shield the drinking aperture 10 from the internal cavity 17 and, hence, any waves of liquid.

[0045] In an embodiment, not depicted, a further drinking aperture may be provided. The further drinking aperture may, for example, comprise a pair of intersecting (preferably bisecting) cuts through a surface of the lid 1. The two intersecting cuts are preferably located through the main lid surface 9 and may be generally at the centre thereof. However, in other embodiments, it is envisaged that the cuts may be through another surface of the lid 1. For example, the cuts may be through the outer 6 or inner 7 perimeter wall. The further drinking aperture may be configured to receive a drinking straw therethrough. The further drinking aperture may normally be closed or substantially closed until opened by a drinking device - such as a drinking straw. The further drinking aperture may be provided with a surrounding ridge or recess or may be located on a raised or sunken part of the lid 1 to provide a reinforcement for the further drinking aperture and to prevent unwanted tearing of the lid surface at the ends of the cuts (if present).

[0046] A liquid guide trough 11 is provided in the inner perimeter wall 8 of the lid 1 between the curved rim surface 7 and the main lid surface 9. A width of the base of the liquid guide trough 11 is generally equal to the length of the drinking aperture 10 and is generally aligned therewith such that liquid leaving the drinking aperture 10 will be directed along the liquid guide trough 11 when in use (as is discussed in more detail below).

[0047] The width of the liquid guide trough 11 generally decreases as the liquid guide trough 11 approaches the curved rim surface 7 of the lid 1. Thus, the liquid guide trough 11 is tapered.

[0048] A pair of arcuate flow directors 12a and 12b extend away from the main lid surface 9 towards the curved rim surface 7. Each arcuate flow director 12a, 12b comprises an arcuate convex director surface 22 which extends away from a point around the inner perimeter wall 8 generally towards a central longitudinal axis of the cup 1 and returns to the inner perimeter wall 8 at a location which is adjacent the drinking aperture 10 and at the base of the liquid guide trough 11.

[0049] The arcuate surfaces 22 of the flow directors 12a, 12b have a height which is less than the height of the inner perimeter wall 8 and a respective support surface 23 of each of the pair of arcuate flow directors 12a, 12b extends from an edge of the respective arcuate surfaces 22 of the flow directors 12a, 12b towards the inner perimeter wall 8. Each support surface 22 generally has a common plane which is parallel with a plane defined by the annular rim receiving recess 4 of the lid 1. Thus, the pair of arcuate flow directors 12a, 12b comprise shoulders.

[0050] In an embodiment, see figure 8, each of the pair of arcuate flow directors 12a, 12b extends at a first end thereof away from the inner perimeter wall 8 at a location adjacent the drinking aperture 10. A second end of each arcuate flow director 12a, 12b joins an arcuate support member 25 which extends around at least part of the circumference of the inner perimeter wall 8 and links the inner perimeter wall 8 to the main lid surface 9. The arcuate support members 25 may each be a segment of an annulus. Each arcuate support member 25 has a support surface which is generally parallel to and aligned with a respective support surface 23 of each of the pair of arcuate flow directors 12a, 12b. The support surfaces of the arcuate support members 25 are, therefore, raised with respect to the main lid surface 9. The main lid surface 9 is inclined with respect to the support surfaces 23 of the arcuate flow directors 12a, 12b; therefore, at a location generally remote from the drinking aperture 10, the arcuate support members 25 merge into the main lid surface 9 and become a part thereof. Preferably, where the main lid surface 9 merges with the arcuate support members 25, an arcuate section of the main lid surface 9 - between the two arcuate support members 25 - is parallel to and aligned with the support surfaces of the arcuate support members 25. In an embodiment the arcuate support members 25 join each other.

[0051] Thus, a generally continuous support surface is provided within the confines of the perimeter walls 6, 8. The generally continuous support surface has a break adjacent the drinking aperture 10 - between the arcuate flow directors 12a, 12b - and is configured to support the base of a cup.

[0052] An inner inclined surface 13 extends between the main lid surface 9 and the inner perimeter wall 8 around the

first section of the wall 8. The inclined surface 13 includes an arcuate recess 14 which generally opposes the drinking aperture 10 across a diameter of the lid 1.

[0053] At a generally central location within the arcuate recess 14 is a pressure equalisation aperture or vent 15. The pressure equalisation aperture or vent 15 may be cut from the material forming the lid and may be formed by a D-shaped cut. The cut material may extend generally from inner perimeter wall 8.

[0054] The arcuate recess 14 includes a support surface 24 which defines a plane which is generally parallel with the common plane of the support surfaces 23 of the arcuate flow directors 12a, 12b and the arcuate support surfaces (if present).

[0055] In an embodiment (such as depicted in figure 8), the arcuate recess 14 is configured such that the support surface 24 thereof is generally part of the main lid surface 9.

[0056] The lid 1 is preferably formed from plastic which may be polystyrene, or polyethylene terephthalate, or high impact polystyrene. The lid 1 may be formed using thermoforming (such as vacuum forming and/or pressure forming). In an embodiment, the lid 1 is formed by an injection moulding technique.

[0057] In an embodiment, one or more buttons 26 are provided in the lid 1 - see figure 9. The or each button 26 is moveable between a first position and a second position. Typically, the or each button 26 comprises a dome of lid material which can be depressed. The dome may, for example, have a substantially circular or oval perimeter. Once, depressed the or each button 26 preferably remains in a depressed state unless some other external force is applied. The or each button 26 is accompanied by a label (perhaps in the form of raised or recessed lettering) - for example, "sugar", "milk", "diet", "BLK", "CHOC", "CAPP", "LATT" etc. Thus, a user can use the or each button 26 to indicate some characteristic of the contents of the cup to which the lid 1 is fitted by depressing appropriate button(s) 26 on the lid 1.

[0058] The or each button 26 may be located on the main lid surface 9. Preferably, the or each button 26 is provided in another surface of the lid 1. For example, the or each button 26 may be located in the outer 6 or inner 8 perimeter wall. In an embodiment, the or each button 26 is located in the inclined surface 13. In an embodiment, one or more recesses are formed in the inclined surface 13. Each recess is configured to be a button recess and extends towards the annular rim receiving recess 4 of the lid 1. A respective button 26 is located at the base of each recess. Each button 26 is, in an embodiment, generally parallel to and aligned with the main lid surface 9 or the annular rim receiving recess 4; in an embodiment, each button 26 is generally inclined with respect to a plane of the annular rim receiving recess 4; in an embodiment, each button 26 is generally in a plane which is further away from the annular rim receiving recess 4 than the main lid surface 9. The use of recesses to house the buttons 26 ensures greater reliability of the buttons 26 - in particular, the buttons 26 are more likely to remain depressed. In addition, the positioning of the buttons 26 in the inclined surface 13 helps to ensure that liquid on the main lid surface 9 can flow, substantially unimpeded, towards the drinking aperture 10 - liquid which is impeded by buttons 26 on the main lid surface 9 can cause staining of the surface 9. There is also a reduced risk of damage to the lid 1 caused by manual depression of a button 26 if it is located in the relatively stiff inclined surface 13 area rather than in the main lid surface 9 (which is more prone to potential damage). Moreover, the positioning of the or each button 26 out of the expected flow region for liquid on the lid 1 (across the main lid surface 9) reduces the risk of contamination of the liquid due to contaminants on the fingers of the user depressing the or each button 26.

[0059] Thus, as will be appreciated, the lid 1 may be fitted to a cup 16 - see figure 6 - in a conventional manner by use of the cup receiving section 5. The lid 1 provides a substantially continuous wall across an aperture defined by a rim of the cup 16. The drinking aperture 10 is provided through this wall, as is the pressure equalisation aperture 15. Therefore, a user can drink a liquid beverage held within a cup 16 to which the lid 1 is attached through the drinking aperture 10.

[0060] The main lid surface 9 and the inner perimeter wall 8 form a reservoir. When the lid 1 is oriented generally so that the annular rim receiving recess 4 is horizontal (and the perimeter walls 6, 8 extend above the annular rim receiving recess 4), then the lowest part of the reservoir is located beneath the highest part of the inner 8 and outer 6 perimeter walls generally at the location of the drinking aperture 10. Thus, when in this normal orientation (as will often be the case when the lid is in use), liquid within the reservoir will drain through the drinking aperture 10, which is then a drainage aperture according to the invention.

[0061] The pair of arcuate flow directors 12a, 12b direct the flow of low level liquid in the reservoir (i.e. liquid in reservoir which is generally lower than the height of the respective arcuate surfaces of the flow directors 12a, 12b above the main lid surface 9) towards the drinking aperture 10. This may have the effect of limiting the collection of liquid in the reservoir in the region of the edge between the second section of the inner perimeter wall 8 and the main lid surface 9. Liquid which collects in this region can, for example, drain poorly or slowly through the drinking aperture 10 and, if allowed to dry, can leave an unsightly stain on the lid 1 (which users can find unpleasant). As will be understood the pair of arcuate flow directors 12a, 12b are located within reservoir.

[0062] When in use the lid 1 is fitted to a cup 16 and, therefore, liquid which drains through the drinking or drainage aperture 10 from the reservoir will drain into the cup 16 - when in a normal orientation.

[0063] Liquid may be present in the reservoir due to a user drinking from the cup 16 as will be explained in more detail

below.

[0064] The relative sizes of the drinking aperture 10 and the pressure equalisation aperture 15 are such that when the lid 1 fitted to a cup 16 containing a liquid is inverted such the liquid covers the drinking aperture 10 and the pressure equalisation aperture 15, the surface tension of across the apertures 10,15 helps to prevent the liquid from passing through the lid 1 (along with the relative pressures of the contents of the cup and the ambient atmosphere).

[0065] The inner and outer perimeter walls 6,8 form an internal cavity 17 in the lid 1 around the perimeter of the lid 1. The internal cavity 17 is annular in form and is open to the interior of a cup 16 to which the lid 1 is fitted. When the cup 16 (containing a liquid and in a normal orientation is moved from side-to-side (generally parallel to the plane of the annular rim receiving recess 4), one or more waves of liquid inside the cup 16 are generated. As the or each wave of liquid reaches the wall of the cup 16, liquid is driven up the wall of the cup 16 towards the lid 1. If the travel of the liquid up the wall of the cup 16 is sufficient, then the liquid will enter the internal cavity 17 of the lid 1. The liquid may then flow back down into the cup 16, or may reach an interior surface 18 (which opposed the curved rim surface 7 across a depth of the material forming the lid 1) and be directed by the interior surface 18 back into the cup 16. Some liquid which reaches the interior surface 18 may be directed down an inner surface of the inner perimeter wall 8. Some liquid may also be splashed onto the inner surface of the inner perimeter wall 8 and this liquid may also run down the inner surface of the wall 8 into the cup 16.

[0066] As mentioned above, an inner surface of the outer perimeter wall 6 is generally aligned with an inner wall of a cup 16 to which the lid 1 is fitted. This helps to provide a substantially smooth surface for the flow of a liquid wave - the substantially smooth surface being formed, in part, by the inner surface of the outer perimeter wall 6 and in part by an adjacent inner surface of the cup 16. The alignment is achieved, in an embodiment, by radially offsetting the attachment member 5 from the outer perimeter wall 6 - preferably around the entire circumference of the lid 1. Thus, the outer perimeter wall 6 has a diameter which is smaller than the maximum diameter of the attachment member 5. The radial offset is sized dependent on, for example, the dimensions of the rim of the cup to which the lid 1 is intended to be fitted and to which the attachment member 5 is configured to be fitted. In an embodiment, the radial offset is substantially equal to a depth of a part of the rim of the cup.

[0067] In an embodiment, this smooth surface does not substantially hinder the steady flow of a liquid from the cup 16 through the drinking aperture 10.

[0068] The drinking aperture 10 and the pressure equalisation aperture 15 are both spaced apart from the internal cavity 17. For example, the drinking aperture 10 is located through the main lid surface 9 rather than through the inner perimeter wall 8 and is relatively low with respect to the rest of the lid 1 (when the cup 16 and lid 1 are in a normal orientation). The internal cavity 17 is formed between the outer perimeter wall 6 and the drinking aperture 10. The internal cavity 17 may also be formed between the outer perimeter wall 6 and the pressure equalisation aperture 15 in a similar manner. Thus, liquid within the internal cavity 17 is unlikely to flow through the drinking aperture 10 (or the pressure equalisation aperture 15) as a result of the above described waves of liquid.

[0069] The guard member 21 assists in helping to prevent splashes of liquid from moving through the drinking aperture 10 by shielding the drinking aperture from at least part of the internal cavity 17. The cut section of the pressure equalisation aperture or vent 15 may also, in a similar manner, form a guard member in respect of the pressure equalisation aperture or vent 15.

[0070] Thus, the internal cavity 17 comprises a wave catching cavity which substantially hinders the passage of waves of liquid within a cup 16 to which the lid 1 is fitted through the apertures 10,15. In other words, the internal cavity 17 substantially contains one or waves of liquid within the cup 16.

[0071] As will be appreciated, in an embodiment, the internal cavity 17 may not be an annular cavity as shown in the depicted embodiment. Instead, the internal cavity 17 may only be provided adjacent the drinking aperture 10 and/or adjacent the pressure equalisation aperture 15. The internal cavity 17 may, therefore, comprise two separate internal cavities which may be arcuate or linear in form.

[0072] The internal cavity 17 preferably tapers towards the interior surface 18. Thus, an annular opening of the internal cavity 17 is wider than the internal cavity 17 adjacent the interior surface 18. This tapering of the internal cavity 17 provides a relatively large cross-section at the opening thereof which aids in the capturing of waves of liquid while not resulting in a curved rim surface 7 which is too wide to permit comfortable drinking.

[0073] The volume defined by the internal cavity 17 is such that a wave of a typical size can be sufficiently accommodated to inhibit, substantially, a build-up of liquid adjacent the lid 1 which would (partly or completely) cover the drinking aperture 10.

[0074] The curved rim surface 7 has a width which extends from the outer perimeter wall 6 to the inner perimeter wall 6. The width is selected to be similar to the width of a mug or cup so as to provide a user with a familiar rim from which to drink.

[0075] When a user wishes to drink from a cup 16 to which the lid 1 is fitted, the user will raise the curved rim surface 7 towards their mouth. The user will tilt the cup 16 from a normal orientation in which a longitudinal axis of the cup 16 is generally vertical with the lid 1 at the top of the cup 16 (and the annular rim receiving recess 4 is generally horizontal)

towards a drinking orientation in which the longitudinal axis 4 of the cup 16 approaches a horizontal orientation.

[0076] The lid 1 is usually in a position such that the drinking aperture 10 is generally towards a pivot point about which the cup 16 is tilted and the pressure equalisation aperture 15 is generally away from the pivot point. Indeed, the lid 1 is typically in a position such that the drinking aperture 10 is aligned with the lowest part of the lid 1 through a radius of the lid 1.

[0077] The user's lower lip will typically rest against the outer perimeter wall 4 in much the same manner as a user's lower lip would rest against the outer surface of a mug when drinking therefrom. The user will usually have their mouth partially open - in anticipation of the liquid which they are intending to drink. The user's upper lip is, therefore, positioned above the inner perimeter wall 6. The user's mouth is generally aligned with the liquid guide trough 11 and the drinking aperture 10.

[0078] As the cup 16 is tilted towards the drinking orientation, the liquid inside the cup 16 will cover the drinking aperture 10. Liquid will pass out of the drinking aperture 10 and through the liquid guide trough 11 - which guides the flow of liquid towards the user's mouth and towards curved rim surface 7.

[0079] As will be appreciated, the upper lip of the user is positioned close to the liquid which flows through the liquid guide trough 11. The user can, therefore, typically sense whether or not the liquid is hot through their upper lip. Indeed, the user's upper lip may be the first part of the user to contact the liquid. This allows the user to make a determination as to whether or not the liquid is too hot to be consumed - as would be the case when drinking from a mug (for example).

[0080] In addition, as the liquid flows through the liquid guide trough 11, the liquid is exposed to the air adjacent the user's nose. The aroma of the liquid may, therefore, be smelt by the user. This may improve the perceived taste of the liquid.

[0081] The curved rim surface 7 of the lid 1 is spaced above the main lid surface 9 by a distance which is sufficient such that the nose of a user may extend into the reservoir defined by the inner perimeter wall 6 and the main lid surface 9.

[0082] Moreover, it will be understood that as the user drinks from the cup 16 through the lid 1, the cup 16 and lid 1 will generally be tilted about a pivot point which is defined by the position of the user's lip on the outer perimeter wall 6 of the lid 1. The height of the outer perimeter wall 6 and the distance between the curved rim surface 7 and main lid surface 9 are such that the pivot point will typically be on the outer perimeter wall 6 between the drinking aperture 10 and the curved rim surface 7. Preferably, the pivot point is typically closer to the curved rim surface 7 than the drinking aperture 10.

[0083] The location of the pivot point and the space provided for the user's nose means that the user need not (usually) tilt their head backwards in order to drink from the cup 16 through the lid 1. This may provide a more familiar drinking experience for the user.

[0084] The distances which the first and second sections of the inner 8 and outer 6 perimeter walls extend above the main lid surface 9 are, therefore, selected to provide enough space to accommodate much of a user's nose (when the user is drinking from a cup 16 to which the lid 1 is fitted). In addition, the relative heights of the first and second sections of the inner 8 and outer 6 perimeter walls must be selected to reduce the likelihood of the first section of the walls 6,8 - and/or the associated part of the curved rim surface 7 - abutting against the bridge of a user's nose, or the part of the user's forehead near their eyes - in the region of the nasion or glabella of the user - (when drinking from a cup 16 to which the lid 1 has been fitted).

[0085] When the user has taken a sip of liquid from the cup 16 through the lid 1, the user may return the cup 16 towards the normal orientation. The liquid which is in the liquid guide trough 11 but has not been drunk by the user will flow towards the main lid surface 9. This liquid may pass through the drinking aperture 10 back into the cup 16. Some liquid may not immediately pass through the aperture 10 but may gather in the reservoir. As the cup 16 is returned towards its normal orientation, the liquid will flow along the main lid surface 9 towards and then through the drinking aperture 10 into the cup 16. Thus, substantially little or no liquid may remain on the main lid surface 9.

[0086] The inner perimeter wall 8 and the arcuate recess 14 generally form a cup stacking section configured to receive a base 19 of a cup 16 - see figure 7.

[0087] In an embodiment, the generally continuous support surface (see above) which is provided within the confines of the perimeter walls 6,8 at least partially forms the cup stacking section.

[0088] The cup stacking section, therefore, has a diameter which substantially equal to or marginally greater than a diameter of the base 19 of the cup 16. Support surfaces 23,24 of the cup stacking section are, in an embodiment, provided by the respective support surfaces 23,24 of the pair of arcuate flow directors 12a,12b and the arcuate recess 14. All of these support surfaces 23,24 (and potentially the generally continuous support surface) generally define a plane which is substantially parallel to the annular rim receiving recess 4.

[0089] The base 19 of a cup 16 may be received by the cup stacking section of the lid 1 such that the cup 16 does not does not substantially move with respect to the longitudinal axis of the cup 16 (although rotation of the cup 16 substantially around the longitudinal axis may be permitted). Movement of the cup 16 is restricted by the inner perimeter wall 8 adjacent the arcuate flow directors 12a,12b and a wall of the arcuate recess 14.

[0090] Therefore, a lid 1 may be fitted to a first cup 16 and a second cup 20 stacked on the cup stacking section of the lid 1. If the first cup 16 and lid 1 are oriented such that the annular rim receiving recess 4 is substantially horizontal, then the support surfaces of the cup stacking section of the lid 1 will also be substantially horizontal. As will be appreciated

a further lid of this type (not shown) can be fitted to the second cup 20 and a third cup (not shown) stacked on the further lid and so on.

[0091] In an embodiment, the longitudinal axis of the first 16 and second 20 cups (and preferably any further cups too) stacked in this manner will be parallel and aligned with each other - thus maintaining the centre of mass of the stack of cups 16,20 substantially in line with the longitudinal axes.

[0092] The diameter of the cup stacking section of the lid 1 is preferably such that the cup stacking section of the lid 1 is configured to received the base 19 of a cup 16 of the same type and size as the cup 16 to which the lid 1 is fitted. In an embodiment, the diameter of the cup stacking section of the lid 1 is preferably such that the cup stacking section of the lid 1 is configured to receive the base 19 of a cup 16 of a different type and/or size as the cup 16 to which the lid 1 is fitted.

[0093] A diameter of the outer circumferential edge 2 is, in an embodiment, approximately 93mm. A maximum diameter of the annular rim receiving recess 4 may be approximately 88mm and a minimum diameter of the annular rim receiving recess 4 may be 89mm. A distance (or pitch) between the outer circumferential edge 2 and the annular rim receiving recess 4 may be 5mm and a distance between the annular flange 3 and the outer perimeter wall 6 may be 3mm. A distance between the outer circumferential edge 2 and the curved rim surface may vary between approximately 35mm and 20mm around the lid 1. A width of the curved rim surface 7 may be approximately 3mm and a width of the opening of the internal cavity 17 may be up to approximately 12mm. The internal cavity 17 may have a volume of approximately 23ml or may be in the range of about 20ml to about 30ml.

[0094] The lid 1 may be configured to be fitted to any of the following cups 16. In addition, the lid 1 may have a cup stacking section which is suitable to receive any of the following cups 16. The rim and base diameters of some of these cups have been provided by way of example.

Capacity ml (Oz)	Rim Diameter mm	Base Diameter mm
118 (4)	62.61	45.17
237 (8)	80	51.28
296 (10)	84.96	58.58
355 (12)	89.92	59.26
355 (12)	84.96	58.57
473 (16)	89.92	59.44
607 (20.5) or 665 (22.5)	89.92	61.17
200 (6.8)	69.6	
250 (8.5)	79.72	
300 (10.1)	88.9	
400 (13.5)	88.9	
500 (16.9)	88.9	
946 (32)	103.37	

[0095] The lid 1 may also be configured to be fitted to a 296ml (10Oz) cup with a rim diameter of 89.92mm, a 177ml (6Oz) cup, a 592ml (20Oz) cup, or a 710ml (24Oz) cup.

[0096] As will be appreciated, the internal cavity 17 need not be an annular cavity in order to perform the function discussed herein. In an embodiment, the internal cavity 17 comprises a pair of diametrically opposed internal cavities which are located adjacent the drinking aperture 10 and the pressure equalisation aperture or vent 15 (between the respective apertures 10,15 and an outer circumferential surface of the lid 1).

[0097] It will be understood, that the inner 8 and outer 6 perimeter walls along with the curved rim surface 7 may generally form a perimeter wall of the lid 1. The distance of the perimeter wall from the main lid surface 9 through the second section thereof is preferably greater than about 20mm. The distance of the perimeter wall from the main lid surface 9 through the first section thereof is preferably less than about 15mm.

[0098] In an embodiment, the main lid surface 9 and inner perimeter wall 8 form a reservoir, the drinking aperture is adjacent a second section of the inner perimeter wall 8, the second section of the inner perimeter wall 8 extends to a height above the main lid surface 9 which is greater than about 20mm; this height is, in embodiments, greater than about 25mm or greater than about 30mm. In an embodiment, this height is about 33mm and may be 33.32mm. In an embodiment,

this height is less than about 35mm or 40mm or 50mm.

[0099] A first section of the inner perimeter wall 8 which opposes the second section across a width of the lid extends, in an embodiment, to a height which is about 10mm or more from the height of the second section in a direction towards the main lid surface 9. In an embodiment, the first section of the inner perimeter wall 8 extends to a height which is about 15mm or more from the height of the second section in a direction towards the main lid surface 9. In an embodiment, the first section of the inner perimeter wall 8 extends to a height which is less than about 20mm or 16mm from the height of the second section in a direction towards the main lid surface 9. In an embodiment, the first section of the inner perimeter wall 8 extends to a height which is 15.32mm from the height of the second section in a direction towards the main lid surface 9.

[0100] In an embodiment, the first section of the inner perimeter wall 8 extends to a height from the main lid surface 9 which is about twice a height which the second section of the inner perimeter wall 8 extends from the main lid surface 9.

[0101] In an embodiment, the second section of the inner perimeter wall 8 extends to a height of about 18mm from the main lid surface 9.

[0102] As will be understood, the formation of a reservoir not only acts to help to collect any liquid which inadvertently leaves the drinking 10 or pressure equalisation 15 apertures, but also acts to at least partially accommodate a user's nose. Furthermore, if a reduced height section of the perimeter wall opposes the section of the perimeter wall adjacent the drinking aperture, then a user is less likely to abut against this section of the perimeter wall during use.

[0103] Embodiments comprise a lid 1 for a cup 16. The lid 1 may be a disposable lid 1. The lid 1 may be integrally formed with the cup 16. The lid 1 may be removably fitted to the cup 16.

[0104] As will be understood, a lid 1 for a cup 16 may be formed by forming each of the features of the lid 1.

[0105] The lid 1 and cups 16 discussed above are all assumed to have a substantially circular or oval cross-section. However, it will be appreciated that embodiments may include a lid 1 for a cup 16 which has a cross-section which is square, rectangular, triangular, or the like.

[0106] When used in this specification and claims, the terms "comprises" and "comprising" and variations thereof mean that the specified features, steps or integers are included. The terms are not to be interpreted to exclude the presence of other features, steps or components.

Claims

1. A lid (1) for a cup (16), comprising:

a main lid surface (9);

a perimeter wall (6,8) surrounding at least part of the main lid surface (9); and

a cup attachment portion (4) and a pair of shoulders (12a, 12b), wherein:

the cup attachment portion (4) is adapted to be fitted to a cup (16);

the main lid surface (9) is coupled to the cup attachment portion (4), the main lid surface (9) being inclined with respect to the cup attachment portion (4) for allowing the flow of liquid across the main lid surface (9), when the lid (1) is in a normal orientation, to a drainage aperture (10) defined through an entire depth of a wall of the lid (1);

the perimeter wall (6,8) surrounds at least part of the main lid surface (9); and

the shoulders (12a,12b) extend away from the perimeter wall (6,8) each with a respective support surface, the support surfaces (23) forming a plane which is substantially parallel to a plane of the cup attachment portion (4), such that, when the lid is generally in a normal orientation, the support surfaces (23) are operable to support at least part of a cup (16) thereon in substantially a normal orientation, wherein each shoulder (12a,12b) protrudes from the main lid surface (9) and has a flow director surface, **characterised in that:**

each shoulder (12a,12b) has a respective convex flow director surface (22) adjacent the drainage aperture (10) such that, when the lid (1) is in a normal orientation, liquid on the main lid surface (9) will flow across the main lid surface (9) to the drainage aperture (10) and is directed by the convex flow director surfaces (22) towards the drainage aperture (10).

2. A lid (1) according to claim 1, wherein the shoulders (12a,12b) are configured to support a cup (16) spaced apart from the main lid surface (9).

3. A lid (1) according to claim 1 or 2, further comprising a perimeter wall (6,8) configured to limit movement of a cup (16) supported on the or each support surface (23) with respect to a longitudinal axis of the lid (1).

4. A lid (1) according to claim 3, wherein the main lid surface (9) and the perimeter wall (6,8) form a reservoir, the drainage aperture (10) is adjacent a second section of the perimeter wall (6,8), the second section of the perimeter wall (6,8) extends to a height above the main lid surface (9) which is greater than about 20mm, and a first section of the perimeter wall (6,8) which opposes the second section across a width of the lid (1) extends to a height which is 10mm or more from the height of the second section in a direction towards the main lid surface (9).
5. A lid (1) according to claim 4, wherein the main lid surface (9) and the perimeter wall (6,8) defines a reservoir and each shoulder (12a,12b) is entirely contained within the confines of the perimeter wall (6,8) in the reservoir.
6. A lid (1) according to any of claims 3, 4 or 5, wherein the perimeter wall (6,8) further defines a wave catching cavity (17) located between an outer circumferential edge of the lid (1) and the drainage aperture (10).
7. A cup (16) and a lid (1) comprising a cup (16) to which a lid (1) is fitted, the lid (1) being a lid (1) according to any of claims 1 to 6.
8. A cup (16) and lid (1) according to claim 7, wherein the cup (16) and lid (1) are integrally formed.
9. A cup (16) and lid (1) according to claim 7 or 8, wherein the support surfaces (23) are configured to support a further cup (16) of the same form and size of the cup (16) to which the lid (1) is fitted.
10. A method of forming a lid (1) for a cup (16), the method comprising:

forming a main lid surface (9);
forming a perimeter wall (6,8) surrounding at least part of the main lid surface (9); and
forming a cup attachment portion (4) and a pair of shoulders (12a,12b), wherein:

forming the cup attachment portion (4) further comprises forming a cup attachment arrangement (4) adapted to be fitted to a cup (16);
forming the main lid surface (9) further comprises forming a main lid surface (9) coupled to the cup attachment portion (4), the main lid surface (9) being inclined with respect to the cup attachment portion (4) for allowing the flow of liquid across the main lid surface (9), when the lid (1) is in a normal orientation, to a drainage aperture (10) defined through an entire depth of a wall of the lid (1);
forming the perimeter wall (6,8) further comprises forming a perimeter wall (6,8) surrounding at least part of the main lid surface (9); and
forming the shoulders (12a,12b) further comprises forming shoulders (12a,12b) extending away from the perimeter wall (6,8) each with a respective support surface (23), the support surfaces (23) forming a plane which is substantially parallel to a plane of the cup attachment portion (4), such that, when the lid (1) is generally in a normal orientation, the support surfaces (23) are operable to support at least part of a cup (16) thereon in substantially in a normal orientation, wherein each shoulder (12a, 12b) protrudes from the main lid surface (9) and has a flow director surface, **characterised in that:**

each shoulder (12a,12b) has a respective convex flow director surface (22) adjacent the drainage aperture (10) such that, when the lid (1) is in a normal orientation, liquid on the main lid surface (9) will flow across the main lid surface (9) to the drainage aperture (10) and is directed by the convex flow director surfaces (22) towards the drainage aperture (10).

Patentansprüche

1. Deckel (1) für einen Becher (16), umfassend:

eine Hauptdeckeloberfläche (9);
eine Umfassungswand (6, 8), die zumindest einen Teil der Hauptdeckeloberfläche (9) umgibt;
und
einen Becherbefestigungsabschnitt (4) und ein Paar Schultern (12a, 12b), wobei:

der Becherbefestigungsabschnitt (4) angepasst ist, an einen Becher (16) angebracht zu werden; die Hauptdeckeloberfläche (9) an den Becherbefestigungsabschnitt (4) gekoppelt ist, wobei die Hauptdeckelober-

fläche (9) in Bezug auf den Becherbefestigungsabschnitt (4) geneigt ist, um die Strömung von Flüssigkeit über die Hauptdeckeloberfläche (9), wenn sich der Deckel (1) in einer normalen Orientierung befindet, zu einer Ablauföffnung (10) zu gestatten, die durch eine ganze Tiefe einer Wand des Deckels (1) definiert ist;

die Umfassungswand (6, 8) zumindest einen Teil der Hauptdeckeloberfläche (9) umgibt; und sich die Schultern (12a, 12b) weg von der Umfangswandung (6, 8) erstrecken jede mit einer jeweiligen Auflagefläche, wobei die Auflageflächen (23) eine Ebene bilden, die im Wesentlichen parallel zu einer Ebene des Becherbefestigungsabschnitts (4) ist, derartig, dass, wenn sich der Deckel generell in einer normalen Orientierung befindet, die Auflageflächen (23) betriebsfähig sind, zumindest einen Teil eines Bechers (16) darauf im Wesentlichen einer normalen Orientierung zu stützen, wobei jede Schulter (12a, 12b) aus dem Hauptdeckel (9) herausragt und eine Strömungsrichterfläche aufweist, **dadurch gekennzeichnet, dass:**

jede Schulter (12a, 12b) eine jeweilige konvexe Strömungsrichterfläche (22) angrenzend an die Ablauföffnung (10) derartig aufweist, dass, wenn sich der Deckel (1) in einer normalen Orientierung befindet, Flüssigkeit auf der Hauptdeckeloberfläche (9) über die Hauptdeckeloberfläche (9) zur Ablauföffnung (10) fließen wird und von den konvexen Strömungsrichterflächen (22) in Richtung der Ablauföffnung (10) gelenkt wird.

2. Deckel (1) nach Anspruch 1, wobei die Schultern (12a, 12b) konfiguriert sind, einen Becher (16) zu stützen, der von der Hauptdeckeloberfläche (9) beabstandet ist.

3. Deckel (1) nach Anspruch 1 oder 2, der ferner eine Umfassungswand (6, 8) umfasst, die konfiguriert ist, Bewegung eines Bechers (16), der auf der oder jeder Auflagefläche (23) abgestützt wird, in Bezug auf eine Längsachse des Deckels (1) zu begrenzen.

4. Deckel (1) nach Anspruch 3, wobei die Hauptdeckeloberfläche (9) und die Umfassungswand (6, 8) ein Reservoir bilden, die Ablauföffnung (10) einem zweiten Teil der Umfassungswand (6, 8) benachbart ist, sich der zweite Teil der Umfassungswand (6, 8) auf eine Höhe über der Hauptdeckeloberfläche (9) erstreckt, die größer als ca. 20 mm ist, und sich ein erster Teil der Umfassungswand (6, 8), die dem zweiten Teil über eine Breite des Deckels (1) gegenüberliegt, auf eine Höhe erstreckt, die 10 mm oder mehr ab der Höhe des zweiten Teils in einer Richtung zur Hauptdeckeloberfläche (9) ist.

5. Deckel (1) nach Anspruch 4, wobei die Hauptdeckeloberfläche (9) und die Umfassungswand (6, 8) ein Reservoir definiert und jede Schulter (12a, 12b) gänzlich innerhalb der Grenzen der Umfassungswand (6, 8) im Reservoir enthalten ist.

6. Deckel (1) nach einem beliebigen der Ansprüche 3, 4 oder 5, wobei die Umfassungswand (6, 8) ferner einen Wellenfanghohlraum (17) definiert, der sich zwischen einem äußeren umlaufenden Rand des Deckels (1) und der Ablauföffnung (10) befindet.

7. Becher (16) und ein Deckel (1), der einen Becher (16) umfasst, an den ein Deckel (1) angebracht wird, wobei der Deckel (1) ein Deckel (1) nach einem beliebigen der Ansprüche 1 bis 6 ist.

8. Becher (16) und Deckel (1) nach Anspruch 7, wobei der Becher (16) und der Deckel (1) integriert geformt sind.

9. Becher (16) und Deckel (1) nach Anspruch 7 oder 8, wobei die Auflageflächen (23) konfiguriert sind, einen weiteren Becher (16) der gleichen Form und Größe des Bechers (16) zu stützen, an den der Deckel (1) angebracht ist.

10. Verfahren zum Formen eines Deckels (1) für einen Becher (16), wobei das Verfahren umfasst:

Formen einer Hauptdeckeloberfläche (9);

Formen einer Umfassungswand (6, 8), die zumindest einen Teil der Hauptdeckeloberfläche (9) umgibt; und

Formen eines Becherbefestigungsabschnitts (4) und eines Paares von Schultern (12a, 12b),

wobei:

das Formen des Becherbefestigungsabschnitts (4) ferner das Formen einer Becherbefestigungsanordnung (4) umfasst, die angepasst ist, an einen Becher (16) angebracht zu werden;

das Formen der Hauptdeckeloberfläche (9) ferner das Formen einer Hauptdeckeloberfläche (9) gekoppelt an den Becherbefestigungsabschnitt (4) umfasst, wobei die Hauptdeckeloberfläche (9) in Bezug auf den Becherbefestigungsabschnitt (4) geneigt ist, um die Strömung von Flüssigkeit über die Hauptdeckeloberfläche (9), wenn

sich der Deckel (1) in einer normalen Orientierung befindet, zu einer Ablauföffnung (10) zu gestatten, die durch eine ganze Tiefe einer Wand des Deckels (1) definiert ist;
 das Formen der Umfassungswand (6, 8) ferner das Formen einer Umfassungswand wall (6, 8) umfasst, die zumindest einen Teil der Hauptdeckeloberfläche (9) umgibt; und
 das Formen der Schultern (12a, 12b), das ferner das Formen von Schultern (12a, 12b) umfasst, die sich von der Umfassungswand (6, 8) weg erstrecken, jede mit einer jeweiligen Auflagefläche (23), wobei die Auflageflächen (23) eine Ebene formen, die im Wesentlichen parallel zu einer Ebene des Becherbefestigungsabschnitts (4) ist, derartig, dass, wenn der Deckel (1) generell in einer normalen Orientierung ist, Auflageflächen (23) betriebsfähig sind, zumindest einen Teil eines Bechers (16) darauf im Wesentlichen in einer normalen Orientierung zu stützen, wobei jede Schulter (12a, 12b) aus der Hauptdeckeloberfläche (9) hervorsteht und eine Strömungsrichterfläche aufweist, **dadurch gekennzeichnet, dass:**

jede Schulter (12a, 12b) eine jeweilige konvexe Strömungsrichterfläche (22) aufweist, die an die Ablauföffnung (10) derartig angrenzt, dass, wenn sich der Deckel (1) in einer normalen Orientierung befindet, Flüssigkeit auf der Hauptdeckeloberfläche (9) über die Hauptdeckeloberfläche (9) zur Ablauföffnung (10) fließen wird und von den konvexen Strömungsrichterflächen (22) in Richtung der Ablauföffnung (10) gelenkt wird.

Revendications

1. Couvercle (1) pour un gobelet (16), comprenant :

une surface de couvercle principale (9) ;
 une paroi périphérique (6, 8) entourant au moins une partie de la surface de couvercle principale (9) ; et
 une partie de fixation de gobelet (4) et une paire d'épaulements (12a, 12b), dans lequel :

la partie de fixation de gobelet (4) est adaptée pour être fixée à un gobelet (16) ;
 la surface de couvercle principale (9) est reliée à la partie de fixation de gobelet (4), la surface de couvercle principale (9) étant inclinée par rapport à la partie de fixation de gobelet (4) pour permettre l'écoulement de liquide sur la surface de couvercle principale (9), lorsque le couvercle (1) est dans une orientation normale, vers une ouverture de drainage (10) définie à travers une épaisseur entière d'une paroi du couvercle (1) ;

la paroi périphérique (6, 8) entoure au moins une partie de la surface de couvercle principale (9) ; et
 les épaulements (12a, 12b) s'étendent chacun à l'opposé de la paroi périphérique (6, 8) avec une surface de support respective, les surfaces de support (23) formant un plan essentiellement parallèle à un plan de la partie de fixation de gobelet (4), de telle sorte que, lorsque le couvercle est généralement dans une orientation normale, les surfaces de support (23) puissent supporter au moins une partie d'un gobelet (16) placé dessus dans une orientation essentiellement normale, chaque épaulement (12a, 12b) dépassant par rapport au couvercle principal (9) et présentant une surface directrice d'écoulement, **caractérisés en ce que :**

chaque épaulement (12a, 12b) présente une surface directrice d'écoulement convexe respective (22) contiguë à l'ouverture de drainage (10) de telle sorte que, lorsque le couvercle (1) est dans une orientation normale, le liquide sur la surface de couvercle principale (9) s'écoulera sur la surface de couvercle principale (9) vers l'ouverture de drainage (10) et sera dirigé par les surfaces directrices d'écoulement convexes (22) vers l'ouverture de drainage (10).

2. Couvercle (1) selon la revendication 1, dans lequel les épaulements (12a, 12b) sont configurés pour supporter un gobelet (16) espacé de la surface de couvercle principale (9).

3. Couvercle (1) selon la revendication 1 ou 2, comprenant en outre une paroi périphérique (6, 8) configurée pour limiter le mouvement d'un gobelet (16) supporté sur la ou sur chaque surface de support (23) par rapport à un axe longitudinal du couvercle (1).

4. Couvercle (1) selon la revendication 3, dans lequel la surface de couvercle principale (9) et la paroi périphérique (6, 8) forment un réservoir, l'ouverture de drainage (10) est contiguë à une deuxième section de la paroi périphérique (6, 8), la deuxième section de la paroi périphérique (6, 8) s'étend à une hauteur au-dessus de la surface de couvercle

principale (9) qui est supérieure à environ 20 mm, et une première section de la paroi périphérique (6, 8) opposée à la deuxième section sur une largeur du couvercle (1) s'étend à une hauteur d'au moins 10 mm par rapport à la hauteur de la deuxième section dans une direction vers la surface de couvercle principale (9).

- 5 5. Couvercle (1) selon la revendication 4, dans lequel la surface de couvercle principale (9) et la paroi périphérique (6, 8) définissent un réservoir, et chaque épaulement (12a, 12b) est entièrement contenu dans les limites de la paroi périphérique (6, 8) dans le réservoir.
- 10 6. Couvercle (1) selon l'une quelconque des revendications 3, 4 et 5, dans lequel la paroi périphérique (6, 8) définit en outre une cavité de capture d'onde (17) située entre un bord circonférentiel extérieur du couvercle (1) et l'ouverture de drainage (10).
- 15 7. Gobelet (16) et couvercle (1) comprenant un gobelet (16) auquel est fixé un couvercle (1), le couvercle (1) étant un couvercle (1) selon l'une quelconque des revendications 1 à 6.
- 20 8. Gobelet (16) et couvercle (1) selon la revendication 7, le gobelet (16) et le couvercle (1) étant formés d'une seule pièce.
9. Gobelet (16) et couvercle (1) selon la revendication 7 ou 8, dans lequel les surfaces de support (23) sont configurées pour supporter un autre gobelet (16) de même forme et de même taille que le gobelet (16) auquel est fixé le couvercle (1).
10. Procédé de formation d'un couvercle (1) pour un gobelet (16), le procédé consistant à :

former une surface de couvercle principale (9) ;
former une paroi périphérique (6, 8) entourant au moins une partie de la surface de couvercle principale (9) ; et
former une partie de fixation de gobelet (4) et une paire d'épaulements (12a, 12b), dans lequel :

la formation de la partie de fixation de gobelet (4) consiste également à former une configuration de fixation de gobelet (4) adaptée pour être fixée à un gobelet (16) ;

la formation de la surface de couvercle principale (9) consiste également à former une surface de couvercle principale (9) reliée à la partie de fixation de gobelet (4), la surface de couvercle principale (9) étant inclinée par rapport à la partie de fixation de gobelet (4) pour permettre l'écoulement de liquide sur la surface de couvercle principale (9), lorsque le couvercle (1) est dans une orientation normale, vers une ouverture de drainage (10) définie à travers une épaisseur entière d'une paroi du couvercle (1) ;

la formation de la paroi périphérique (6, 8) consiste en outre à former une paroi périphérique (6, 8) entourant au moins une partie de la surface de couvercle principale (9) ; et

la formation des épaulements (12a, 12b) consiste en outre à former des épaulements (12a, 12b) s'étendant chacun à l'opposé de la paroi périphérique (6, 6,8) avec une surface de support respective (23), les surfaces de support (23) formant un plan essentiellement parallèle à un plan de la partie de fixation de gobelet (4), de telle sorte que, lorsque le couvercle (1) est généralement dans une orientation normale, les surfaces de support (23) puissent supporter au moins une partie d'un gobelet (16) placé dessus dans une orientation essentiellement normale, chaque épaulement (12a, 12b) dépassant par rapport à la surface de couvercle principale (9) et présentant une surface directrice d'écoulement, **caractérisés en ce que** :

chaque épaulement (12a, 12b) présente une surface directrice d'écoulement convexe respective (22) contiguë à l'ouverture de drainage (10) de telle sorte que, lorsque le couvercle (1) est dans une orientation normale, le liquide sur la surface de couvercle principale (9) s'écoulera sur la surface de couvercle principale (9) vers l'ouverture de drainage (10) et sera dirigé par les surfaces directrices d'écoulement convexes (22) vers l'ouverture de drainage (10).

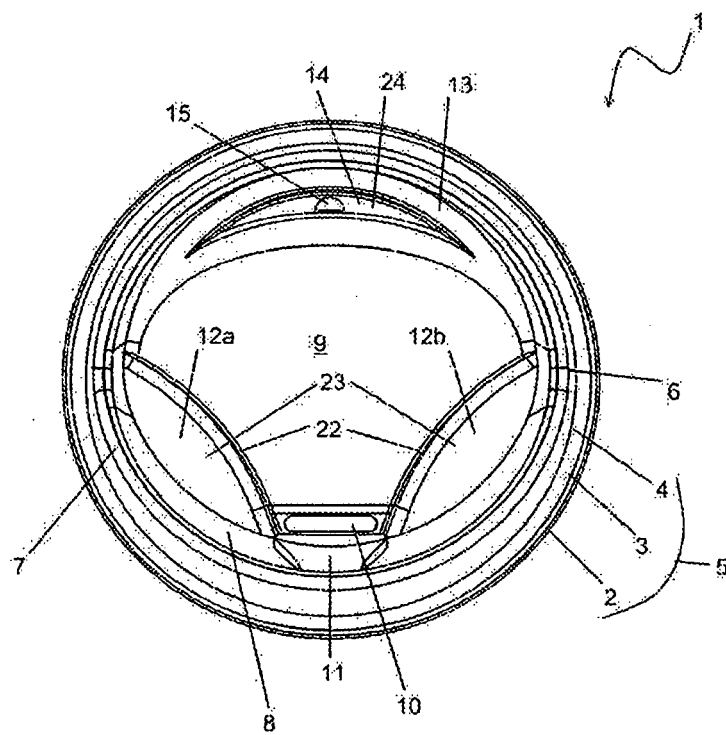


Figure 1

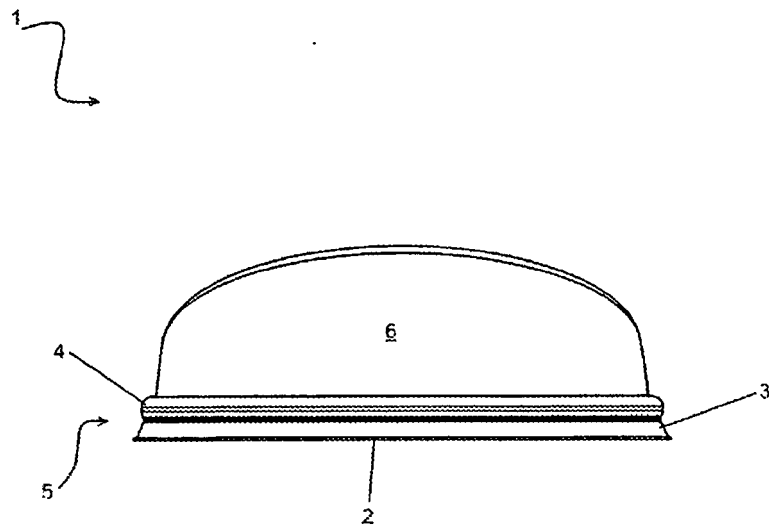


Figure 2

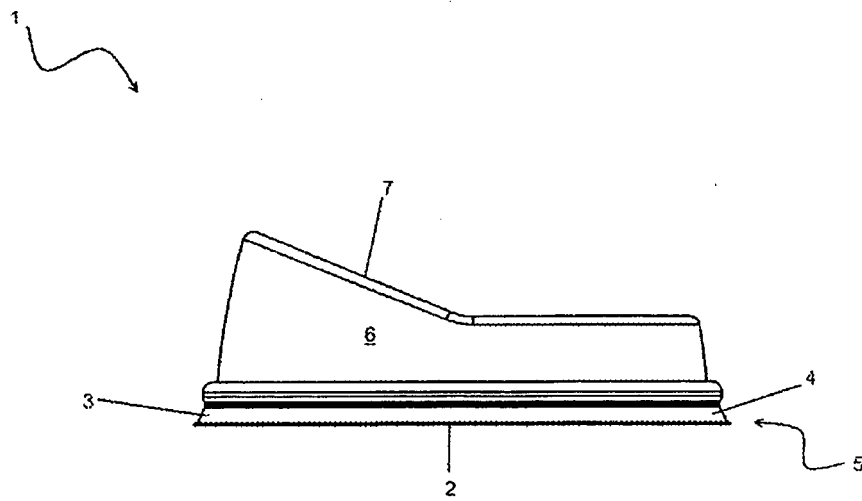


Figure 3

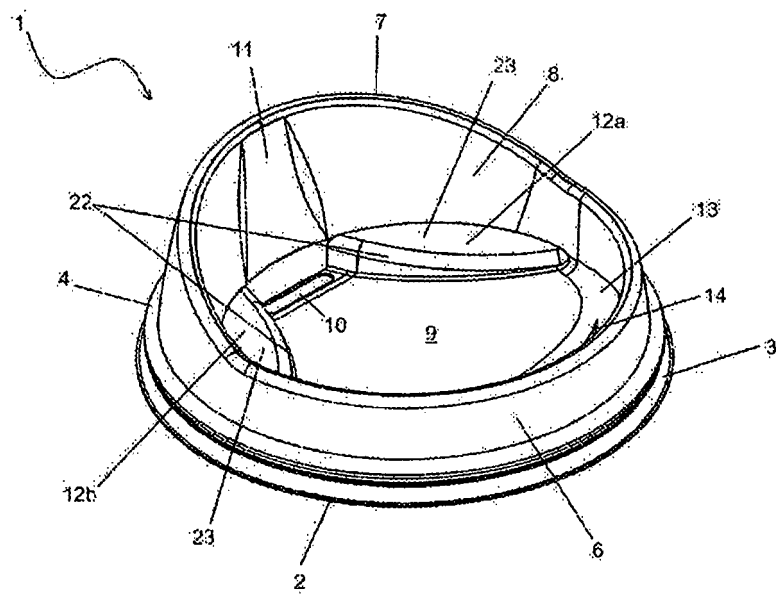


Figure 4

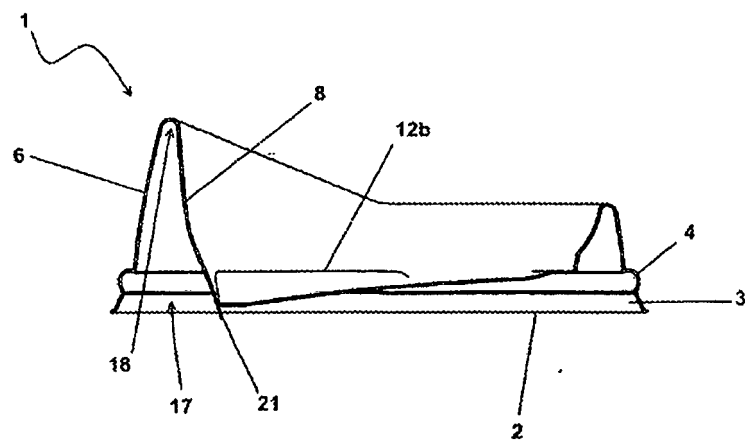


Figure 5

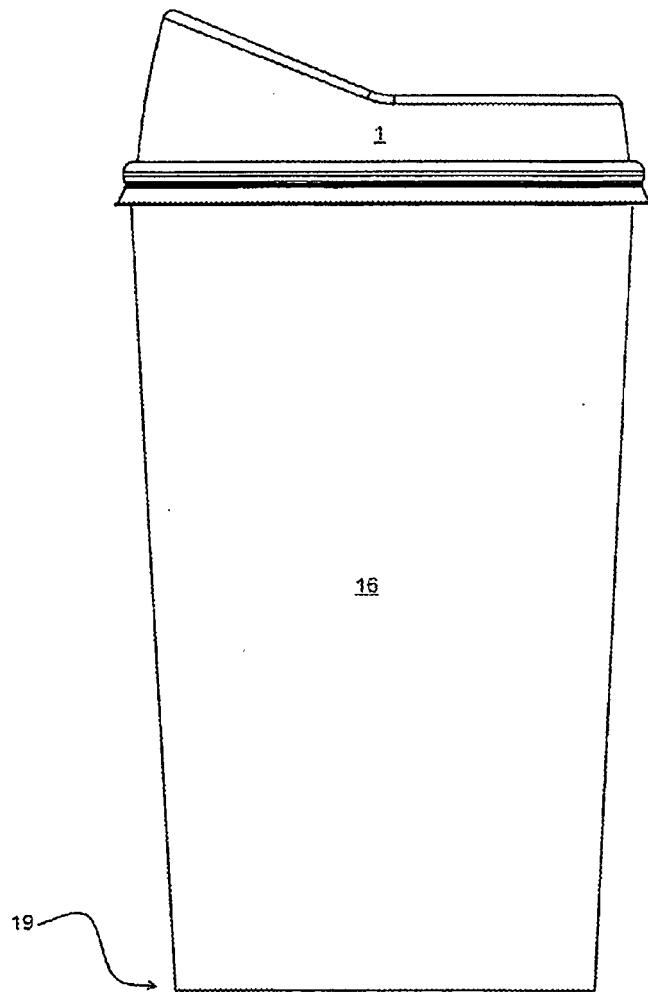


Figure 6

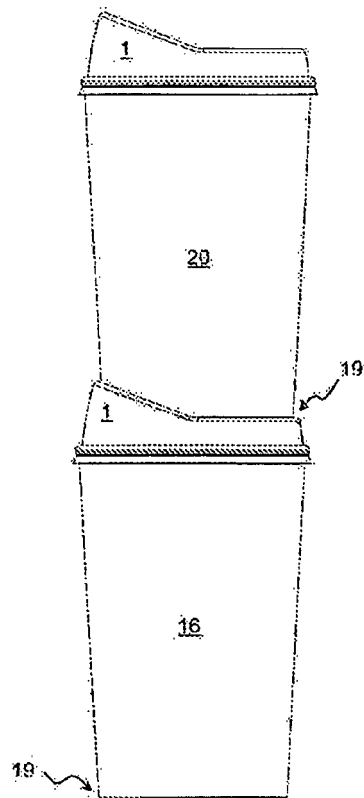


Figure 7

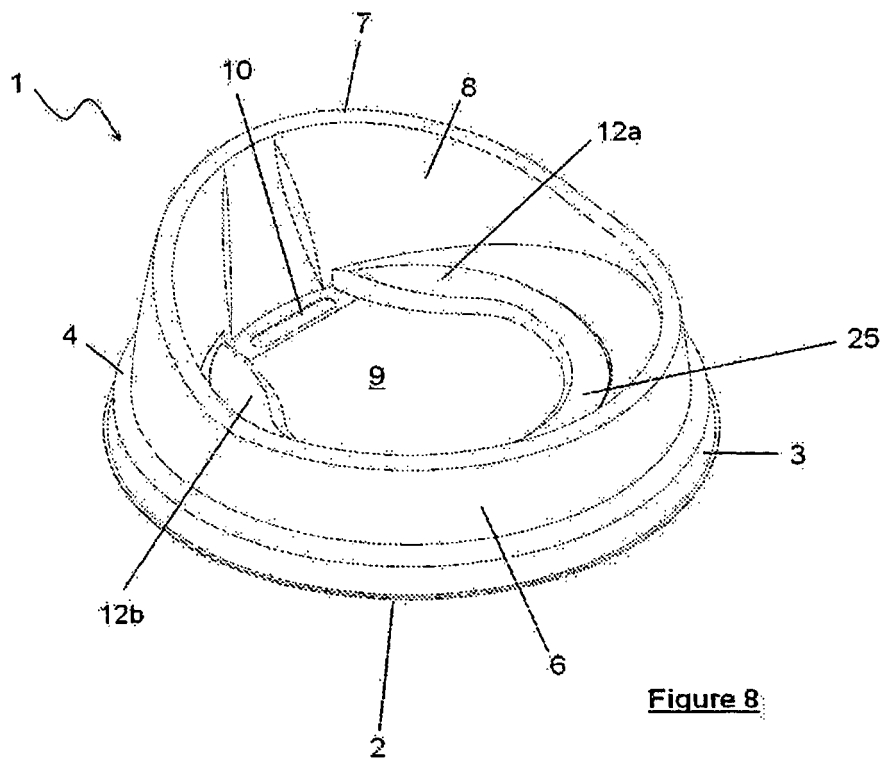


Figure 8

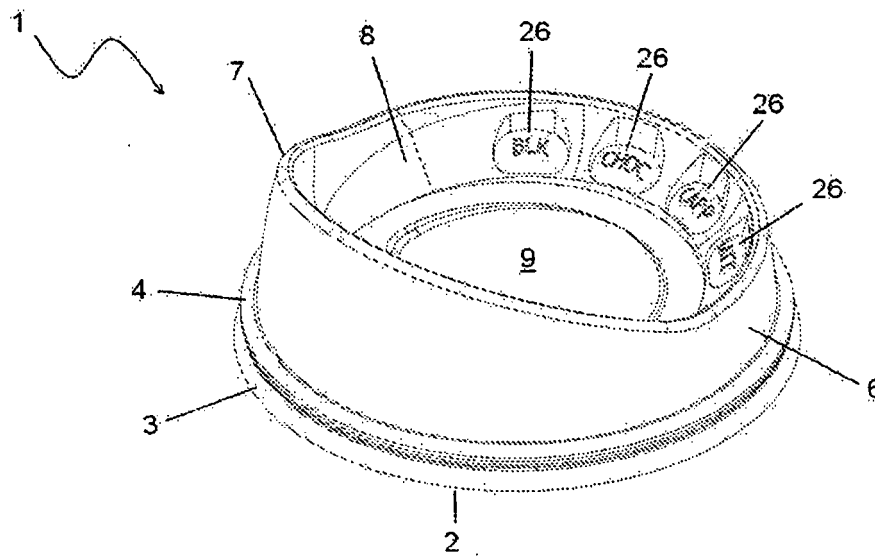


Figure 9

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

- US 4986437 A [0009]
- US 6419112 B [0018]