



- (51) International Patent Classification:
B65D 85/804 (2006.01)
- (21) International Application Number:
PCT/IB2014/000852
- (22) International Filing Date:
16 May 2014 (16.05.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
1308927.1 17 May 2013 (17.05.2013) GB
- (71) Applicant: **KRAFT FOODS R&D, INC** [US/US]; Three Parkway North, Deerfield, IL 60015 (US).
- (72) Inventors: **HALLIDAY, Andrew**; Mondelez UK R&D Limited, Ruscote Avenue, Banbury, Oxon OX16 2QU (GB). **SHABUDIN, Esak**; Mondelez UK R&D Limited, Ruscote Avenue, Banbury, Oxon OX16 2QU (GB). **JELLEY, Simon**; 4 Farringford Close, Cambridge, Cambridgeshire CB4 3LU (GB). **BANISTER, Stuart**; 59 Allan Avenue, Peterborough, Cambridgeshire PE2 8TN (GB).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

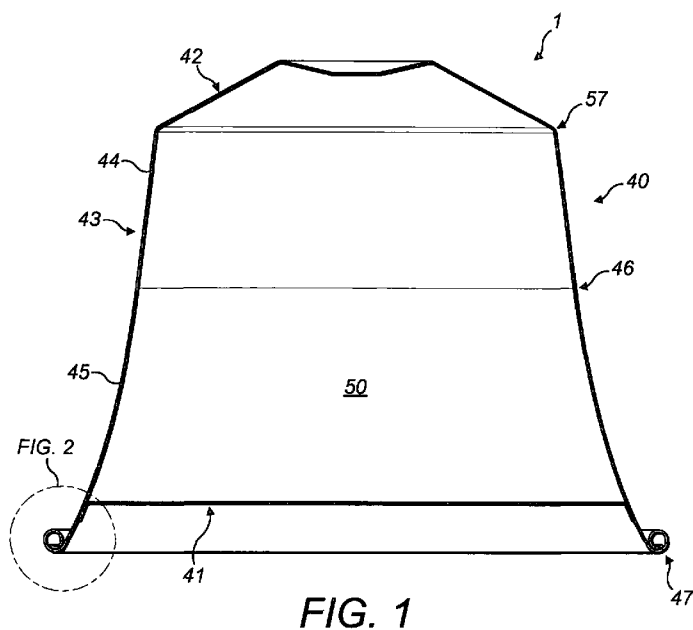
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: A BEVERAGE PREPARATION SYSTEM, A CAPSULE AND A METHOD FOR FORMING A BEVERAGE



(57) Abstract: A beverage producing system is provided comprising a capsule containing beverage ingredients and a beverage preparation machine. The capsule comprises a cup-shaped body and a lid; the cup-shaped body having a base and a side wall and the lid being sealed to the cup-shaped body. The side wall is dimensioned to be contacted by an enclosing member of the beverage preparation machine on closure of the enclosing member to buckle the side wall to form a valley zone bridging the enclosing member. The side wall is adapted such that said valley zone forms at least one sealing interface between the enclosing member and the side wall. A capsule and a method are also disclosed.

WO 2014/184651 A1

- 1 -

A Beverage Preparation System, a Capsule and a Method for
forming a Beverage

The present disclosure relates to a beverage
5 preparation system, a capsule and a method for forming a
beverage. The beverage preparation system is of the type
comprising a beverage preparation machine wherein the
capsule is designed for insertion into the beverage
preparation machine to permit a pressurised liquid to be
10 flowed through the capsule in order to produce a beverage
from interaction with beverage ingredients contained within
the capsule.

Background

15 Beverage preparation systems which comprise a beverage
preparation machine and a capsule containing beverage
ingredients are known in the art. One such system is taught
in EP 1700548, which discloses a capsule comprising a cup-
like base body and a closing foil member. The capsule is
20 designed for insertion in a beverage production device in
which a liquid under pressure enters the capsule in order to
interact with ingredients in the capsule to form a beverage
which is output for consumption. The capsule of EP 1700548
is provided with a dedicated sealing member to prevent a by-
25 pass flow of water around the exterior of the capsule in
use. The sealing member is in the form of a hollow sealing
member on the outer surface of the capsule, for example in
the form of a step which is contacted on closure of an
enclosing member of the beverage preparation machine.

30 The present disclosure provides an alternative capsule
which may be used as part of such a beverage preparation

- 2 -

system. The capsule may be economical to produce and provide effective sealing in use.

Summary of the Disclosure

5 In a first aspect the present disclosure provides a beverage producing system comprising:

 a capsule containing beverage ingredients; and

 a beverage preparation machine;

 the capsule comprising a cup-shaped body and a lid; the

10 cup-shaped body having a base and a side wall and the lid being sealed to the cup-shaped body;

 the capsule being designed for insertion into the beverage preparation machine to permit a pressurised liquid to be flowed through the capsule in order to produce a

15 beverage from interaction with the beverage ingredients;

 the beverage preparation machine having an enclosing member adapted to be selectively movable between an open position to permit insertion of the capsule into the beverage preparation machine and a closed position in which

20 the enclosing member sealingly engages the capsule;

 wherein the side wall is dimensioned to be contacted by the enclosing member on movement of the enclosing member into the closed position to buckle the side wall to form a valley zone bridging the enclosing member;

25 wherein the side wall is adapted such that said valley zone forms at least one sealing interface between the enclosing member and the side wall.

 In a second aspect, the present disclosure provides a

30 capsule for preparing a beverage comprising a cup-shaped body and a lid; the cup-shaped body having a base and a side wall and the lid being sealed to the cup-shaped body;

- 3 -

the capsule being designed for insertion into a beverage preparation machine to permit a pressurised liquid to be flowed through the capsule in order to produce a beverage from interaction with the beverage ingredients;

5 the beverage preparation machine being of the type having an enclosing member adapted to be selectively movable between an open position to permit insertion of the capsule into the beverage preparation machine and a closed position in which the enclosing member sealingly engages the capsule;

10 wherein the side wall is dimensioned to be contacted by the enclosing member on movement of the enclosing member into the closed position to buckle the side wall to form a valley zone bridging the enclosing member;

wherein the side wall is adapted such that said valley zone forms at least one sealing interface between the enclosing member and the side wall.

In a third aspect the present disclosure provides a method for preparing a beverage comprising the steps of:

- 20
- providing a capsule as described above;
 - providing a beverage preparation machine having an enclosing member;
 - moving the enclosing member into an open position;
 - inserting the capsule into the beverage preparation
- 25 machine;
- closing the enclosing member so as to sealingly engage the enclosing member with the capsule;
 - flowing a pressurised liquid through the capsule to produce a beverage from interaction with the beverage
- 30 ingredients; and
- outputting the beverage for consumption;

- 4 -

wherein on closure of the enclosing member the side wall of the capsule is contacted by the enclosing member to thereby buckle the side wall to produce a valley zone bridging the enclosing member;

5 wherein said valley zone forms at least one sealing interface between the enclosing member and the side wall.

Advantageously, in the above aspects, buckling of the side wall allows for a relatively large-scale deformation of the side wall to take place to allow formation of the valley zone bridging the enclosing member. This deformation may include folding of the material of the side wall and/or elastic and/or plastic straining of the material of the side wall.

15

The above aspects may further comprise one or more of the following features:

The valley zone may form a sealing interface with a leading edge of the enclosing member.

20

The side wall may be adapted such that during closure of the enclosing member the side wall is plastically drawn over the leading edge of the enclosing member.

Advantageously this may allow the side wall to be conformed to the shape of any grooves (or similar) provided in the leading edge.

25

The valley zone may be adapted to be nipped against a capsule holder of the beverage preparation machine part.

The side wall may be adapted to undergo plastic deformation during said buckling.

30

The side wall may be adapted such that, following buckling of the side wall, the side wall defines a ridge zone located outside the enclosing member. As above,

- 5 -

buckling of the side wall allows for a relatively large-scale deformation of the side wall to take place to allow formation of the ridge zone. This deformation may include folding of the material of the side wall and/or elastic
5 and/or plastic straining of the material of the side wall.

The ridge zone may be adapted to be forced inwardly against an outer face of the enclosing member to form a sealing interface with the outer face of the enclosing member.

10 Advantageously, a sealing interface may be provided with both the leading edge and the outer face of the enclosing member. In addition, the formation of the valley zone may also cause an outward pressure to be exerted by the side wall on the inner face of the enclosing member to form
15 a further sealing interface.

Prior to insertion, the side wall may have a flared shape.

Prior to insertion, at least a portion of the side wall may be concavely curved.

20 Prior to insertion, the side wall may extend away from the lid at an angle from 45 to 80 degrees.

The capsule may comprise a rim formed at an end of the cup-shaped body remote from the base.

25 The rim may be formed integrally with the cup-shaped body.

The rim may be formed by a rolled-over portion of the side wall.

Prior to insertion, the capsule may be flangeless except for the optional provision of a rim.

30 Prior to insertion, the side wall may extend from the base to the rim to define a curved surface without any abrupt angular changes in geometry.

- 6 -

Prior to insertion, the side wall may comprise a pre-selected zone which has been configured or treated to promote a reliable deformation of the side wall. The pre-selected zone may be a circumferential line or band of the side wall. The pre-selected zone may be configured or treated by altering the rigidity, strength, ductility or other suitable material characteristic of the side wall within (or adjacent to) the pre-selected zone to promote reliable deformation of the side wall during closure of the enclosing member. The rigidity, strength, ductility or other suitable material characteristic of the side wall may be altered by one or more of work hardening, localised thickening, creasing, scoring or thinning of the material of the side wall.

Prior to insertion, the side wall may comprise a frustoconical section proximate the base and a flared section distal the base.

The flared section may extend for a distance of 40 to 80% of a longitudinal height of the capsule or for a distance of 50 to 70% of the longitudinal height of the capsule or for a distance of approximately 60% of the longitudinal height of the capsule.

The lid may be sealed to the side wall at a location radially inside a point of contact, in use, of a leading edge of the enclosing member on the side wall. The lid may be sealed to an inner surface of the side wall. The lid may be sealed at a location on the side wall above the point of contact of the leading edge of the enclosing member. The lid may be positioned a distance of from 2.5 to 3.0 mm from the distal end of the side wall. The distance may be selected to be substantially twice the height of the rim, where present. In one example, the rim may have a height of 1.35 mm and the

- 7 -

lid may be located 2.7 mm above the distal end of the side wall. These features singularly or in combination may help to ensure that the enclosing member does not bear down on the capsule so as to trap beverage ingredients in between
5 the leading edge and the capsule holder which may have a detrimental effect on the fluid-tightness of the seal.

The side wall may comprise a distal portion that extends beyond the location where the lid is sealed to the side wall.

10 The distal portion of the side wall may form a roll-over edge of the capsule.

A leading edge of the enclosing member may comprise a plurality of grooves or indentations, and the side wall may be adapted such that the plastic deformation of the side
15 wall conforms the side wall to the grooves or indentations to provide an effective seal.

The cup-shaped body may be formed from aluminium, an aluminium alloy or a laminate comprising at least one layer formed from aluminium or an aluminium alloy. A lacquer layer
20 may be applied to one or both faces of the cup-shaped body. Alternatively, another, suitably ductile material could be utilised in place of the aluminium or aluminium alloy.

The aluminium alloy may, for example, be of grade 3005, 3105, 8011 or 8079. Preferably, the aluminium alloy will
25 have an 'O' temper rating.

The laminate, where used, may comprise a ductile structural layer formed from a material such as aluminium or an aluminium alloy together with a resilient layer formed from a polymer. The laminate may comprise only a single
30 layer of aluminium or aluminium alloy together with a single layer of polymer together with an optional lacquer layer applied to the aluminium or aluminium alloy.

- 8 -

The polymer layer may, for example, comprise a material selected from the group of: polyvinyl chloride (PVC), polypropylene (PP), low density polyethylene (LDPE), medium density polyethylene (MDPE), high density polyethylene (HDPE), fluorinated ethylene propylene (FEP), polytetrafluoroethylene (PTFE), polyethylene terephthalate (PET), polyamide (PA), ethylene propylene diene monomer (EPDM), polychloroprene or isobutylene.

The lid may be formed from aluminium, an aluminium alloy or a laminate comprising at least one layer formed from aluminium or an aluminium alloy. Alternatively, another, suitably ductile material could be utilised.

The cup-shaped body may be formed from a single integral piece of material. The single piece of material may be cold formed to form the shape of the cup-shaped body, including any flared section. A deep-drawing technique may be used to cold form the cup-shaped body. Where the material of the cup-shaped body comprises a laminate with a polymer layer, a warm-drawing technique may be used where the material is subjected to an increased temperature to promote easier deformation of the polymer material but without detrimental effects on the material characteristics of the aluminium layer.

The cup-shaped body and rim may be integral.

The cup-shaped body may have a thickness in the range of 80 to 500 microns. In some aspects the thickness may be in the range of 90 to 300 microns. Where the cup-shaped body is formed solely from aluminium or an aluminium alloy (optionally with one or more lacquer layers) a thickness in the range of 80 to 120 microns may be preferred. Where the cup-shaped body is formed from a laminate material comprising a polymer layer a thickness in the range 100 to

- 9 -

500 microns is preferred. The thickness of the material may be varied throughout the cup-shaped body.

The rim may have an outer diameter of approximately 37 mm.

5 Prior to insertion, the capsule may have a height of from 25 to 31 mm. In some aspects the height may be from 29 to 30 mm. Deformation of the capsule during use will tend to reduce the longitudinal height.

The capsule may form a single-use, disposable element.

10 The capsule may contain a beverage ingredient or mixture of beverage ingredients. As a non-limiting example, the beverage ingredient may comprise roasted ground coffee.

Brief Description of the Drawings

15

Examples of the present disclosure will now be described in more detail, for exemplary purposes only, with reference to the accompanying drawings, in which:

20 Figure 1 is a cross-sectional view of a first embodiment of capsule according to the present disclosure;
Figure 2 is an enlarged view of a detail of Figure 1;
Figure 3 is a schematic illustration of the capsule of Figure 1 together with an enclosing member of a beverage
25 preparation machine;

Figure 4 is an enlarged view of a detail of Figure 3;

Figure 5 is a schematic illustration of the arrangement of Figure 3 with the enclosing member in a closed position;

Figure 6 is an enlarged view of a detail of Figure 5;

30 Figure 7 is a perspective view of a further embodiment of capsule according to the present disclosure;

- 10 -

Figure 8 shows a schematic cross-section through a part of the capsule of Figure 7 after insertion into a beverage preparation machine;

Figure 9 is a perspective view of a further embodiment of capsule according to the present disclosure; and

Figure 10 shows a schematic cross-section through a part of the capsule of Figure 9 after insertion into a beverage preparation machine.

10 Detailed Description

Figure 3 shows schematically a part of a beverage preparation system according to the present disclosure. The beverage preparation system comprises a beverage preparation machine and a capsule 1.

Figures 1 and 2 show a first embodiment of capsule 1 according to the present disclosure for use with the beverage preparation machine. The capsule 1 will be described in more detail below but may have the general form of a cup-shaped body 40 having a base 42 at one end and a side wall 43 extending from the base 42 towards an opposed end which is closed-off by a lid 41.

As shown in Figure 3, the beverage preparation machine comprises an enclosing member 2 and a capsule holder 20. The enclosing member 2 is selectively movable relative to a capsule holder 20 between an open position, to permit insertion of the capsule 1 into the beverage preparation machine, and a closed position, in which the enclosing member sealingly engages the capsule 1 against the capsule holder 20 in a manner that will be described below.

The enclosing member 2 may be moved between the open and closed positions by means of a conventional mechanism

- 11 -

well known in the art. For example, the means may involve a mechanical mechanism activated by a manually-movable lever or an automatic or semi-automatic mechanism where movement is driven by a motor. The enclosing member 2 may be moved
5 while the capsule holder 20 remains stationary. Alternatively, the enclosing member 2 may remain stationary and the capsule holder 20 be moved. In a further alternative arrangement, both the enclosing member 2 and the capsule holder 20 may move during the opening and closing
10 operations.

The enclosing member 2 and the capsule holder 20 in the closed position together define a receptacle 3 for holding the capsule 1 during a dispensing operation.

The beverage preparation machine may further comprise
15 other conventional elements which are not illustrated in the accompanying drawings and are well known in the art of beverage preparation machines. For example, the beverage preparation machine may comprise either a facility for storing an aqueous medium, such as an internal reservoir, or
20 a facility for connection to an external supply of aqueous medium, such as mains water. The aqueous medium will typically be water. A pump or equivalent may be provided for supplying the aqueous medium in a pressurised state to the capsule 1. The aqueous medium will typically be supplied at
25 a pressure of up to 9 to 14 bar. A heater may be provided for heating the aqueous medium to a desired temperature. The heater may heat the aqueous medium in the reservoir (where present) or may heat the aqueous medium on-demand as it passes through a conduit or over a thermoblock to the
30 receptacle 3. The beverage preparation machine may comprise base piercing means for piercing the base 42 of the capsule 1 to permit the aqueous medium to enter the capsule 1 and

- 12 -

interact with the beverage ingredients therein. Alternatively, the capsule 1 may be provided with one or more pre-formed openings to allow entry of the aqueous medium from the receptacle 3 into the capsule 1.

5 The enclosing member 2 may be of the type described in EP 1700548 comprising an annular element 22 having a leading edge 23 in the form of an annular rim, an inner face 25 facing the receptacle 3 and an outer face 24 facing an exterior. The leading edge 23 may be provided with a
10 plurality of grooves as taught in EP 1700548. An upper end (not shown) of the enclosing member 2 may be coupled to a supply of the aqueous medium and may provide a mounting for one or more perforation elements intended to pierce the base
15 42 of the capsule 1 in use.

15 The capsule holder 20 may be of the type described in EP 1700548 comprising relief elements 21 which are designed to tear and perforate the lid 41 of the capsule 1. The tearing of the lid 41 may occur due to internal
20 pressurisation of the capsule 1 caused by inflowing aqueous medium. The relief elements 21 may have any protruding shape able to cause a partial tearing of the foil member, e.g. pyramids, needles, bumps, cylinders, or elongated ribs.

 As shown in Figure 1, the capsule 1 of the first embodiment comprises the cup-shaped body 40 and the lid 41
25 together enclose a beverage ingredient chamber 50 which may be filled with a beverage ingredient or mixture of beverage ingredients. As a non-limiting example, the beverage ingredient may comprise roasted ground coffee.

 In the illustrated example, the cup-shaped body 40 is
30 made from aluminium or an aluminium alloy. However, other materials may be utilised. The cup-shaped body 40 includes the base 42 and the side wall 43. There may be, as

- 13 -

illustrated, a geometric discontinuity at the junction between the base 42 and the side wall 43, for example, in the form of a shoulder 57. Alternatively, the base 42 and the side wall 43 may have a smooth geometric transition.

5 The cup-shaped body 40 may have a thickness in the range of 80 to 500 microns. The thickness of the material may be varied throughout the cup-shaped body 40. In the illustrated example the thickness is 120 microns.

10 The side wall 43 may have a flared shape, wherein the diameter of the capsule at the lid end is greater than at the base 42. The flared shape may be achieved, for example, by configuring the side wall 43 to have at least a portion that is concavely curved when viewed from the exterior of the capsule 1.

15 The whole axial length of the side wall 43 may be flared, for example concavely curved. Alternatively, only a flared section 45 distal the base 42 may be flared. For example, the flared section 45 may extend for a distance of 40 to 80% of a longitudinal height of the capsule,
20 preferably 50 to 70% of the longitudinal height of the capsule. In one example, the flared section 45 extends for a distance of approximately 60% of the longitudinal height of the capsule.

25 In the example illustrated in Figure 1, the side wall 43 comprises a frustoconical section 44 proximate the base 42 and a flared section 45 distal the base 42.

30 The capsule 1 may be provided with a rim 47 formed at an end of the cup-shaped body 40 remote from the base 42. The rim 47 may be formed integrally with the cup-shaped body 40. In the illustrated example, the rim 47 is formed by a rolled-over portion 48 of the side wall 43.

- 14 -

Where a rim 47 is provided, the side wall 43 may extend from the base 42 to the rim 47 to define a curved surface without any abrupt angular changes in geometry. For example, any transition, e.g. at point 46 as shown in Figure 1, from a flared section 45 to a frustoconical section 44 (or
5 section of another shape, e.g. cylindrical) can be configured to be smooth.

According to the present disclosure, the capsule 1 may be flangeless except for the optional provision of a rim 47.
10 In other words, the side wall 43 may not include a flange, as taught for example in EP1700548 which extends substantially perpendicularly from the side wall 43.

The lid 41 may be formed from aluminium, an aluminium alloy or a laminate containing aluminium. The lid 41 may be
15 sealed to the side wall 43 at a location 58 radially inside and above a point of contact, in use, of the leading edge 23 of the enclosing member 2 on the side wall 43. For example, the lid 41 may be positioned a distance from the distal end of the side wall 43 which is twice the height of the rim 47.
20 In the illustrated example, the rim 47 may have a height of 1.35 mm. Consequently, the lid 41 may be located 2.7 mm above the distal end of the side wall 43 (which in this case equates to the lowermost edge of the rim 47). This helps to ensure that the enclosing member 2 does not bear down on the
25 capsule 1 so as to trap beverage ingredients in between the leading edge 23 and the capsule holder 20 which could have a detrimental effect on the fluid-tightness of the seal. To achieve this, the lid 41 may be sealed to the flared section 45 of the side wall 43 and not, as in the prior art, to a
30 flange that extends substantially perpendicularly to the side wall.

- 15 -

The side wall 43 may comprise a distal portion 59 that extends beyond the location 58 where the lid 41 is sealed to the side wall 43. The distal portion 59 may include the rolled-over portion 48 of the rim 47, where present.

5 In use of the beverage preparation system, the enclosing member 2 is first moved into the open position and the capsule 1 is inserted into a location in between the capsule holder 20 and the enclosing member 2. Depending on the design of the beverage preparation machine, the capsule
10 1 may be inserted by gravity or by manual placement or a combination thereof. In addition, the initial insertion may place the capsule 1 in proximity to the enclosing member 2 such that subsequent movement of the enclosing member 2 carries the capsule 1 therewith into engagement with the
15 capsule holder 20. Alternatively, initial insertion may place the capsule 1 in proximity to the capsule holder 20 such that the capsule 1 remains substantially stationary during closure of the enclosing member 2.

The enclosing member 2 is then closed so as to
20 sealingly engage the enclosing member 2 with the capsule 1. During this step the base 42 of the capsule 1 may be pierced by the perforation elements of the enclosing member 2.

Pressurised aqueous medium is then flowed into the capsule 1 to produce a beverage from interaction with the
25 beverage ingredients. During this step internal pressurisation of the beverage ingredient chamber 50 causes the lid 41 to be deformed outwardly against the relief elements 21 of the capsule holder 20 resulting in at least partial tearing of the lid 41 which opens up an exit path
30 from the capsule 1 for the beverage.

The beverage is then output for consumption.

- 16 -

As shown in Figures 4 and 5, during the step of closing the enclosing member 2 relative to the capsule holder 20 the side wall 43 of the capsule 1 is contacted by the enclosing member 2 to thereby buckle the side wall 43 to produce a valley zone 51 bridging the enclosing member 2. The valley zone 51 forms at least one sealing interface between the enclosing member 2 and the side wall 43.

The point of contact between the leading edge 23 of the annular element 22 and the capsule 1 is on the flared section 45 of the side wall 43. Importantly, the point of contact is at a point on the side wall 43 which is axially spaced from the capsule holder 20 such that there is room for the side wall 43 to deform downwards towards the capsule holder 20 enough to allow for formation of the valley zone 51 before the side wall 43 is nipped against the capsule holder 20. The buckling and induced movement of the side wall 43 causes the side wall 43 to undergo plastic deformation. In particular, as the side wall 43 is deformed downwards, the side wall 43 may be plastically drawn over the leading edge 23 of the enclosing member 2 which encourages the material of the side wall 43 to be closely conformed to the grooves of the leading edge 23. Thus, the valley zone 51 may form a sealing interface with the leading edge 23 of the enclosing member 2.

The formation of the valley zone 51 may also form a ridge zone 52 which is located outside the enclosing member 2 when it reaches the closed position. As shown most clearly in Figure 6, the ridge zone 52 may comprise an annular feature having an inner wall 54 adjacent the outer face 24 of the annular element 22 and an outer wall 55 facing away from the enclosing member 2. An apex 53 of the ridge zone 52 points back towards the base 42 of the capsule 1.

- 17 -

Compression of the material of the ridge zone 52 during deformation may cause the apex 53 and/or the inner wall 54 of the ridge zone 52 to be forced inwardly against the outer face 24 to form a sealing interface with the enclosing member 2.

Further, the formation of the valley zone 51 may also cause an outward pressure to be exerted by the side wall 43 on the inner face 25 of the enclosing member 2 to form a further sealing interface.

Where the capsule 1 comprises a side wall 43 formed from a laminate material as discussed above having a polymer layer, closure of the enclosing member 2 may compress at least the polymer layer of the laminate material when forming any of the sealing interfaces mentioned above. The compression of the polymer layer may aid the conforming of the side wall 43 to the shape of the leading edge 23. In particular the polymer layer may aid filling of any gaps arising due to the presence of grooves in the leading edge 23. Preferably, the polymer layer is directed outwardly to be directly contacted by the leading edge 23. In addition, during use the hot water passed through the receptacle 3 may act to slightly soften the material of the polymer layer. Such softening may lead to further deformation of the side wall 43 under the compressive loading of the enclosing member 2. This effect may help to reinforce the fluid seal between the enclosing member 2 and the capsule 1 by tending to seal up any gaps having hot water leaking there through.

The formation of the valley zone 51 will also typically cause a reduction in the longitudinal height of the capsule 1 relative to its height prior to insertion.

Figures 7 to 10 shows further variants of capsule 1 according to the present disclosure. Corresponding features

- 18 -

of the first embodiment and these variants are denoted by corresponding reference signs. Features of the first embodiment and these variants may be interchanged as desired.

5 Prior to insertion, the side wall 43 is provided with a pre-selected zone in order to promote reliable buckling and formation of the valley zone 51. The pre-selected zone may be a circumferential line or band of the side wall 43. The pre-selected zone may be configured or treated by altering
10 the rigidity, strength, ductility or other suitable material characteristic of the side wall 43 within (or adjacent to) the pre-selected zone to promote reliable deformation of the side wall during closure of the enclosing member 2. The rigidity, strength, ductility or other suitable material
15 characteristic of the side wall 43 may be altered by one or more of work hardening, localised thickening, creasing, scoring or thinning of the material of the side wall.

For example, as illustrated in Figure 7, a work hardened circumferential band 49 may be formed around the
20 side wall 43. The work hardening may be achieved by creasing and uncreasing the side wall material or by other suitable means.

Alternatives to a work hardened band include the side wall 43 being provided with a zone of increased thickness or
25 alternatively a thinned section of material 49' as shown in Figure 9; the side wall 43 being provided with a score line in the side wall 43; or a section of the side wall being subjected to thermal treatment, either before or after drawing.

30 During closure of the enclosing member 2 the work hardened band 49 is more resistant to bucking than adjacent zones of the side wall 43. Therefore, as shown in Figure 8,

- 19 -

the apex 67 of the ridge zone 63 will reliably be formed at an interface between the work hardened band 49 and the adjacent portion of the side wall 43. A similar mechanism takes place where a localised thickened portion of the side wall 43 is provided. Conversely, where the side wall 43 is weakened locally by, for example, the thinned section 49' or scoring, buckling is promoted at this point. Consequently, the apex 67 of the ridge zone will be reliably be formed by material within the thinned section 49'/at the score line as shown in Figure 10.

- 20 -

Claims:

1. A beverage producing system comprising:
a capsule containing beverage ingredients; and
5 a beverage preparation machine;
the capsule comprising a cup-shaped body and a lid; the cup-shaped body having a base and a side wall and the lid being sealed to the cup-shaped body;
the capsule being designed for insertion into the
10 beverage preparation machine to permit a pressurised liquid to be flowed through the capsule in order to produce a beverage from interaction with the beverage ingredients;
the beverage preparation machine having an enclosing member adapted to be selectively movable between an open
15 position to permit insertion of the capsule into the beverage preparation machine and a closed position in which the enclosing member sealingly engages the capsule;
wherein the side wall is dimensioned to be contacted by the enclosing member on movement of the enclosing member
20 into the closed position to buckle the side wall to form a valley zone bridging the enclosing member;
wherein the side wall is adapted such that said valley zone forms at least one sealing interface between the enclosing member and the side wall.
25
2. A beverage producing system as claimed in claim 1, wherein the valley zone forms a sealing interface with a leading edge of the enclosing member.
- 30 3. A beverage producing system as claimed in claim 1 or claim 2, wherein the side wall is adapted such that during

- 21 -

closure of the enclosing member the side wall is plastically drawn over the leading edge of the enclosing member.

4. A beverage producing system as claimed in any preceding claim, wherein the valley zone is adapted to be nipped against a capsule holder of the beverage preparation machine part.

5. A beverage producing system as claimed in any preceding claim wherein the side wall is adapted to undergo plastic deformation during said buckling.

6. A beverage producing system as claimed in any preceding claim, wherein the side wall is adapted such that, following buckling of the side wall, the side wall defines a ridge zone located outside the enclosing member.

7. A beverage producing system as claimed in claim 6, wherein the ridge zone is adapted to be forced inwardly against an outer face of the enclosing member to form a sealing interface with the outer face of the enclosing member.

8. A beverage producing system as claimed in any preceding claim, wherein prior to insertion, the side wall has a flared shape.

9. A beverage producing system as claimed in any preceding claim, wherein prior to insertion, at least a portion of the side wall is concavely curved.

- 22 -

10. A beverage producing system as claimed in any preceding claim, wherein the capsule comprises a rim formed at an end of the cup-shaped body remote from the base.
- 5 11. A beverage producing system as claimed in claim 10, wherein the rim is formed integrally with the cup-shaped body.
12. A beverage producing system as claimed in claim 10 or
10 claim 11, wherein the rim is formed by a rolled-over portion of the side wall.
13. A beverage producing system as claimed in any preceding claim, wherein prior to insertion, the capsule is flangeless
15 except for the optional provision of a rim.
14. A beverage producing system as claimed in any preceding claim, wherein prior to insertion, the side wall extends from the base to the rim to define a curved surface without
20 any abrupt angular changes in geometry.
15. A beverage producing system as claimed in any of claims 1 to 13, wherein prior to insertion, the side wall comprises a pre-selected zone which has been configured or treated to
25 promote a reliable deformation of the side wall.
16. A beverage producing system as claimed in any preceding claim, wherein prior to insertion, the side wall comprises a frustoconical section proximate the base and a flared
30 section distal the base.

- 23 -

17. A beverage producing system as claimed in claim 16, wherein the flared section extends for a distance of 40 to 80% of a longitudinal height of the capsule.
- 5 18. A beverage producing system as claimed in claim 16 or claim 17, wherein the flared section extends for a distance of 50 to 70% of the longitudinal height of the capsule.
- 10 19. A beverage producing system as claimed in any of claims 16 to 18, wherein the flared section extends for a distance of approximately 60% of the longitudinal height of the capsule.
- 15 20. A beverage producing system as claimed in any preceding claim, wherein the lid is sealed to the side wall at a location radially inside a point of contact, in use, of a leading edge of the enclosing member on the side wall.
- 20 21. A beverage producing system as claimed in claim 20, wherein the side wall comprises a distal portion that extends beyond the location where the lid is sealed to the side wall.
- 25 22. A beverage producing system as claimed in claim 21; wherein the distal portion of the side wall forms a roll-over edge of the capsule.
- 30 23. A beverage producing system as claimed in any preceding claim, wherein a leading edge of the enclosing member comprises a plurality of grooves or indentations, and the side wall is adapted such that the plastic deformation of

- 24 -

the side wall conforms the side wall to the grooves or indentations to provide an effective seal.

24. A capsule for preparing a beverage comprising a cup-
5 shaped body and a lid; the cup-shaped body having a base and
a side wall and the lid being sealed to the cup-shaped body;
the capsule being designed for insertion into a
beverage preparation machine to permit a pressurised liquid
to be flowed through the capsule in order to produce a
10 beverage from interaction with the beverage ingredients;
the beverage preparation machine being of the type
having an enclosing member adapted to be selectively movable
between an open position to permit insertion of the capsule
into the beverage preparation machine and a closed position
15 in which the enclosing member sealingly engages the capsule;
wherein the side wall is dimensioned to be contacted by
the enclosing member on movement of the enclosing member
into the closed position to buckle the side wall to form a
valley zone bridging the enclosing member;
20 wherein the side wall is adapted such that said valley
zone forms at least one sealing interface between the
enclosing member and the side wall.

25. A capsule as claimed in claim 24 wherein the side wall
25 is adapted to undergo plastic deformation during said
buckling.

26. A capsule as claimed in claim 24 or claim 25, wherein
the side wall has a flared shape.

30

- 25 -

27. A capsule as claimed in any of claims 24 to 26, wherein at least a portion of the side wall is concavely curved.

28. A capsule as claimed in any of claims 24 to 27, wherein
5 the capsule comprises a rim formed at an end of the cup-shaped body remote from the base.

29. A capsule as claimed in claim 28, wherein the rim is formed integrally with the cup-shaped body.

10

30. A capsule as claimed in claim 28 or claim 29, wherein the rim is formed by a rolled-over portion of the side wall.

31. A capsule as claimed in any of claims 24 to 30, wherein
15 the side wall extends from the base to the rim to define a curved surface without any abrupt angular changes in geometry.

32. A capsule as claimed in any of claims 24 to 30, wherein
20 the side wall comprises a pre-selected zone which has been configured or treated to promote a reliable deformation of the side wall.

33. A capsule as claimed in any of claims 24 to 32, wherein
25 the capsule is flangeless except for the optional provision of a rim.

34. A capsule as claimed in any of claims 24 to 33, wherein
30 the side wall comprises a frustoconical section proximate the base and a flared section distal the base.

- 26 -

35. A capsule as claimed in claim 34, wherein the flared section extends for a distance of 40 to 80% of a longitudinal height of the capsule.

5 36. A capsule as claimed in claim 34 or claim 35, wherein the flared section extends for a distance of 50 to 70% of the longitudinal height of the capsule.

10 37. A capsule as claimed in any of claims 34 to 36, wherein the flared section extends for a distance of approximately 60% of the longitudinal height of the capsule.

15 38. A capsule as claimed in any of claims 24 to 36, wherein the lid is sealed to the side wall at a location radially inside a point of contact, in use, of a leading edge of the enclosing member on the side wall.

20 39. A capsule as claimed in claim 38, wherein the side wall comprises a distal portion that extends beyond the location where the lid is sealed to the side wall.

25 40. A capsule as claimed in claim 39, wherein the distal portion of the side wall forms a roll-over edge of the capsule.

30 41. A capsule as claimed in any of claims 24 to 40, wherein the cup-shaped body is formed from aluminium, an aluminium alloy or a laminate comprising at least one layer formed from aluminium or an aluminium alloy.

42. A capsule as claimed in any of claims 24 to 41, wherein the lid is formed from aluminium, an aluminium alloy or a

- 27 -

laminated comprising at least one layer formed from aluminium or an aluminium alloy.

43. A capsule as claimed in any of claims 24 to 42, wherein
5 the cup-shaped body has a thickness in the range of 80 to 500 microns.

44. A method for preparing a beverage comprising the steps of:

10 - providing a capsule as claimed in any of claims 24 to 43;

- providing a beverage preparation machine having an enclosing member;

- moving the enclosing member into an open position;

15 - inserting the capsule into the beverage preparation machine;

- closing the enclosing member so as to sealingly engage the enclosing member with the capsule;

20 - flowing a pressurised liquid through the capsule to produce a beverage from interaction with the beverage ingredients; and

- outputting the beverage for consumption;

25 wherein on closure of the enclosing member the side wall of the capsule is contacted by the enclosing member to thereby buckle the side wall to produce a valley zone bridging the enclosing member;

wherein said valley zone forms at least one sealing interface between the enclosing member and the side wall.

30 45. The method of claim 44 wherein the side wall undergoes plastic deformation during said buckling.

- 28 -

46. The method of claim 44 or claim 45, wherein the valley zone forms a sealing interface with a leading edge of the enclosing member.

5 47. The method of claim 46, wherein the side wall is plastically drawn over the leading edge of the enclosing member.

48. The method of claim 46 or claim 47, wherein the valley zone is nipped against a capsule holder of the beverage preparation machine part.

10

49. The method of any of claims 44 to 48, wherein buckling of the side wall forms a ridge zone located outside the enclosing member.

15

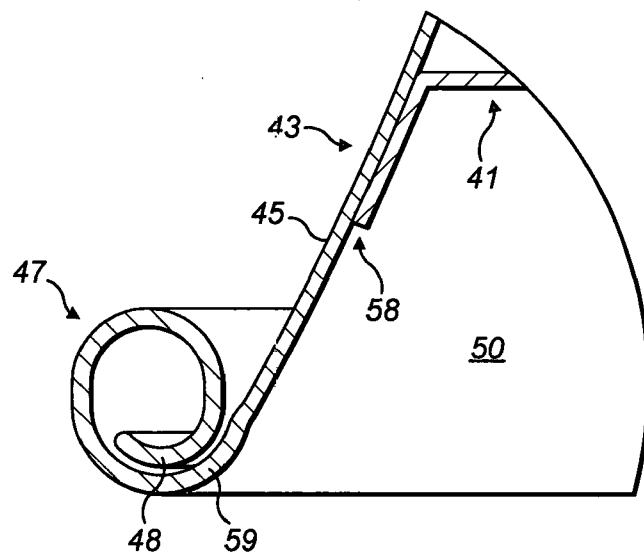
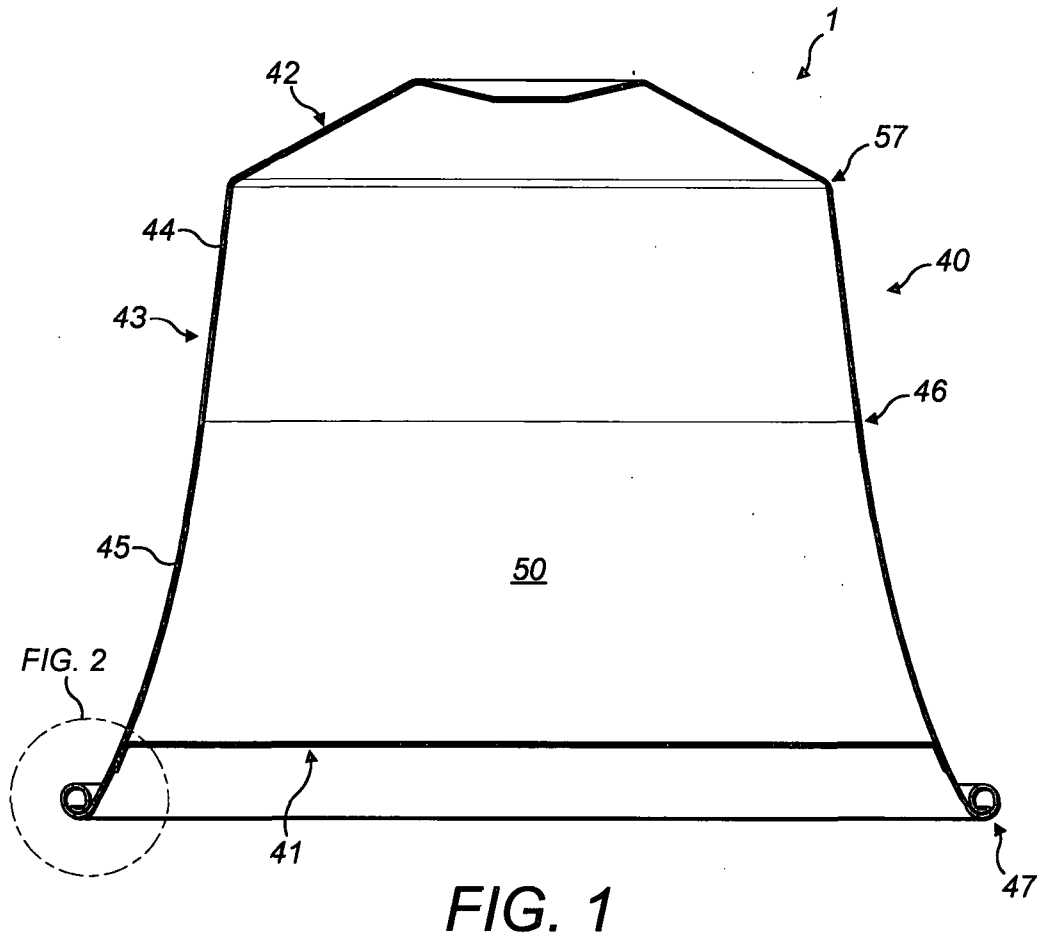
50. The method of claim 49, wherein the ridge zone is forced inwardly against an outer face of the enclosing member to form a sealing interface with the outer face of the enclosing member.

20

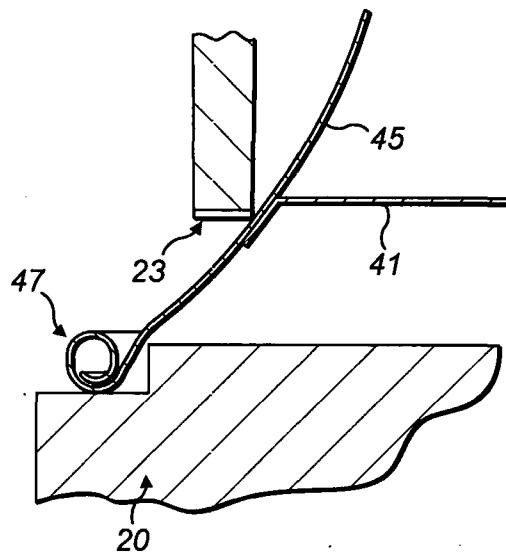
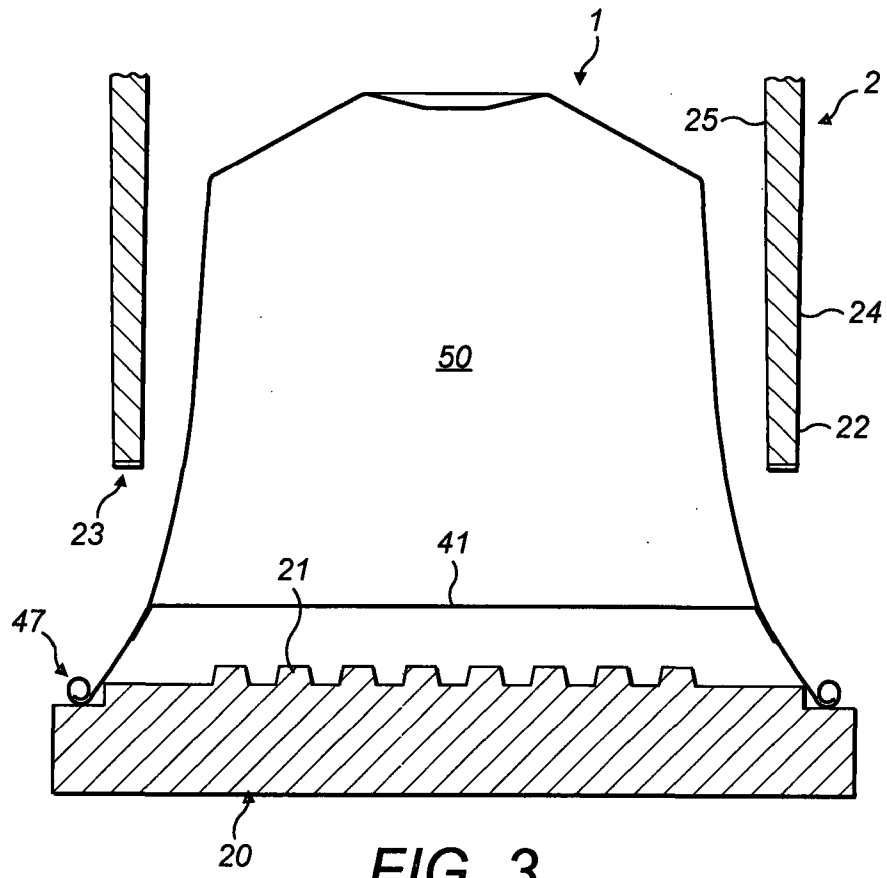
51. The method of any of claims 44 to 50, wherein a leading edge of the enclosing member comprises a plurality of grooves or indentations, and the side wall is plastically deformed to conform the side wall to the grooves or indentations to provide an effective seal.

25

1 / 5



2 / 5



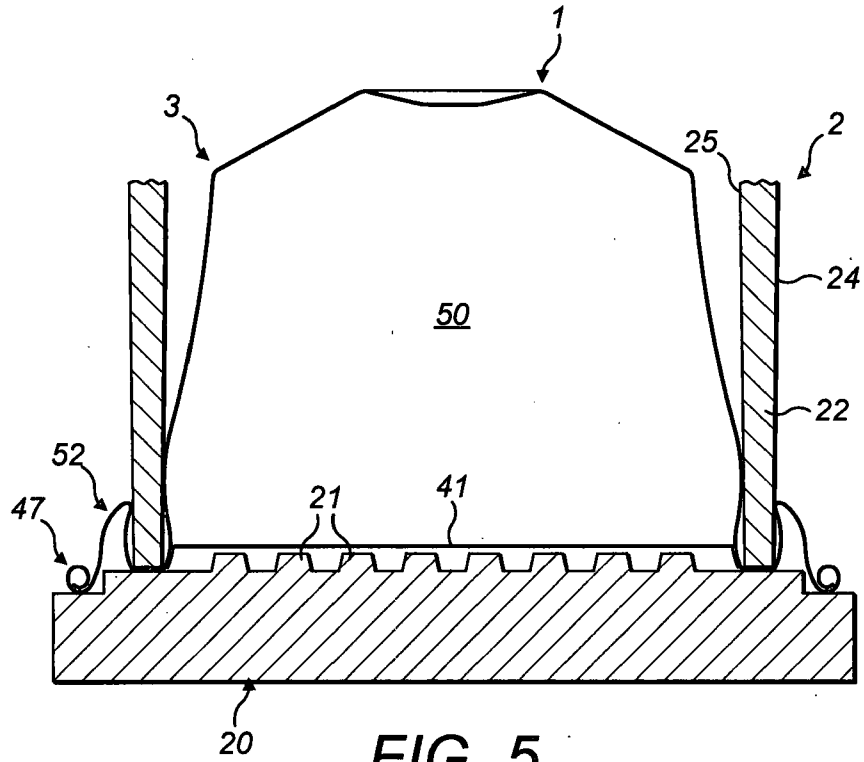


FIG. 5

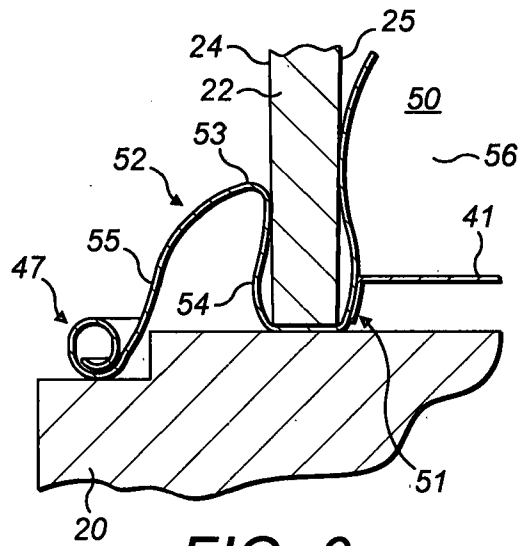


FIG. 6

4 / 5

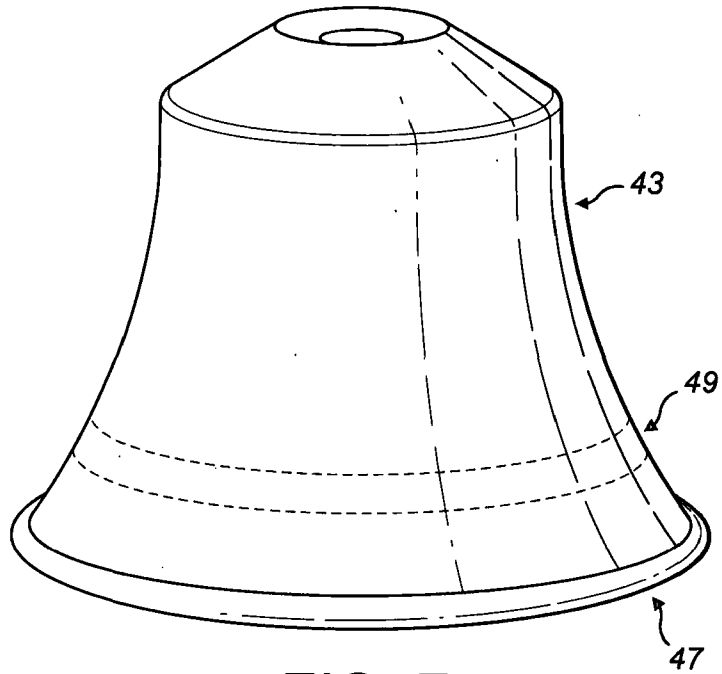


FIG. 7

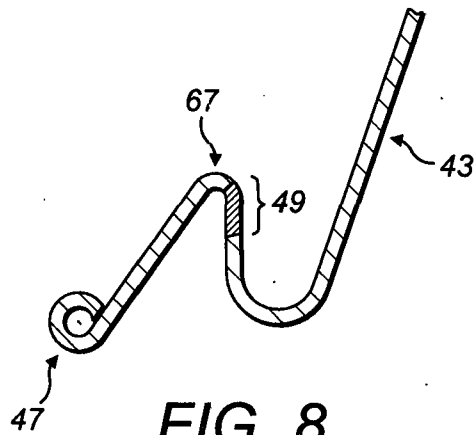


FIG. 8

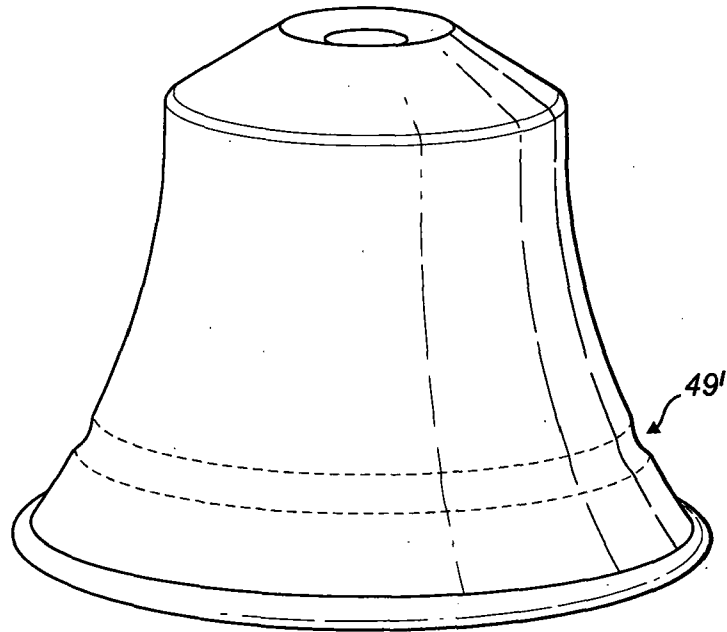


FIG. 9

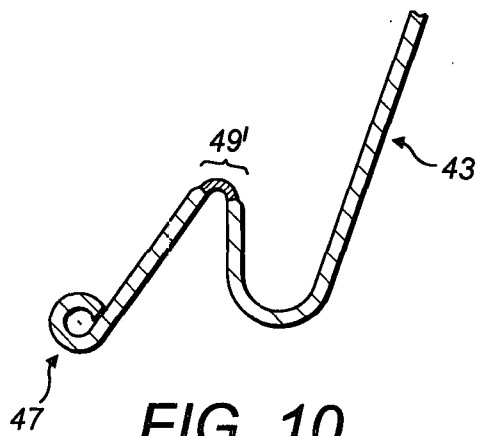


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2014/000852

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D85/804
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
B65D A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 654 966 A1 (NESTEC SA [CH]) 10 May 2006 (2006-05-10)	1,24,44
Y	abstract; figure 1	2-23, 25-43, 45-51
Y	----- WO 2010/076048 A1 (NESTEC SA [CH]; EICHLER PAUL [CH]; KOCH PETER [CH]; CAMPICHE FRANCISCO) 8 July 2010 (2010-07-08) the whole document	1-51
Y	----- EP 2 100 824 A1 (NESTEC SA [CH]) 16 September 2009 (2009-09-16) the whole document	1-51
	----- -/--	

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search 24 July 2014	Date of mailing of the international search report 28/08/2014
---	--

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Behammer, Frank
--	---

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2014/000852

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2006/045537 A1 (NESTEC SA [CH]; YOAKIM ALFRED [CH]; GAVILLET GILLES [CH]; DENISART JEA) 4 May 2006 (2006-05-04) the whole document	1-51
Y	WO 2012/118367 A1 (BISERKON HOLDINGS LTD [CY]; ZWEED SANDER GORDON [NL]) 7 September 2012 (2012-09-07) the whole document	1-51
Y	EP 2 489 609 A1 (E T I S R L [IT]) 22 August 2012 (2012-08-22) the whole document	1-51
Y	EP 2 284 100 A1 (NESTEC SA [CH]) 16 February 2011 (2011-02-16) the whole document	1-51
Y	WO 2011/010263 A1 (ETHICAL COFFEE COMPANY SA [CH]; MARILLER ALAIN [CH]) 27 January 2011 (2011-01-27) the whole document	1-51
Y	EP 2 151 313 A1 (NESTEC SA [CH]) 10 February 2010 (2010-02-10) the whole document	1-51
Y	EP 1 849 715 A1 (NESTEC SA [CH]) 31 October 2007 (2007-10-31) the whole document	1-51
Y	EP 1 369 069 A2 (SGL ITALIA SRL [IT]) 10 December 2003 (2003-12-10) the whole document	1-51

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2014/000852

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1654966	A1	10-05-2006	AP 2200 A 21-01-2011
			AR 055279 A1 15-08-2007
			AR 075946 A2 04-05-2011
			AT 347837 T 15-01-2007
			AT 369062 T 15-08-2007
			AT 399495 T 15-07-2008
			AT 419769 T 15-01-2009
			AU 2005298933 A1 04-05-2006
			AU 2005298954 A1 04-05-2006
			AU 2010201295 A1 22-04-2010
			BR PI0517030 A 30-09-2008
			BR PI0517296 A 07-10-2008
			CA 2581293 A1 04-05-2006
			CA 2584884 A1 04-05-2006
			CA 2728461 A1 04-05-2006
			CN 101043835 A 26-09-2007
			CN 101048094 A 03-10-2007
			CN 101803870 A 18-08-2010
			CN 102001496 A 06-04-2011
			CR 9071 A 01-12-2008
			CR 11312 A 21-04-2010
			CY 1106861 T1 26-09-2012
			CY 1107283 T1 21-11-2012
			DE 602004003713 T2 18-10-2007
			DE 602004008113 T2 15-05-2008
			DE 602004010435 T2 16-10-2008
			DK 1654966 T3 19-02-2007
			DK 1700548 T3 17-09-2007
			DK 1702543 T3 07-01-2008
			DK 1816935 T3 11-05-2009
			DK 1816936 T3 08-09-2008
			DK 2098144 T3 17-02-2014
			EC SP077350 A 26-04-2007
			EP 1654966 A1 10-05-2006
			EP 1700548 A1 13-09-2006
			EP 1702543 A2 20-09-2006
			EP 1816935 A2 15-08-2007
			EP 1816936 A1 15-08-2007
			EP 1929904 A1 11-06-2008
			EP 2098144 A1 09-09-2009
			EP 2210540 A1 28-07-2010
			ES 2277184 T3 01-07-2007
			ES 2292154 T3 01-03-2008
			ES 2297791 T3 01-05-2008
			ES 2309804 T3 16-12-2008
			ES 2317314 T3 16-04-2009
			ES 2442269 T3 10-02-2014
			HK 1091703 A1 30-05-2008
			HK 1112166 A1 20-02-2009
			HK 1112569 A1 27-11-2009
			IL 181703 A 31-10-2011
			IL 204517 A 29-03-2012
			IL 213077 A 28-06-2012
			JP 4861989 B2 25-01-2012
			JP 5057984 B2 24-10-2012
			JP 5261427 B2 14-08-2013
			JP 2008517639 A 29-05-2008
			JP 2008517838 A 29-05-2008

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2014/000852

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
		JP 2010155118 A	15-07-2010	
		KR 20070085287 A	27-08-2007	
		KR 20100049650 A	12-05-2010	
		MA 28939 B1	01-10-2007	
		ME P23908 A	10-06-2010	
		MY 139254 A	30-09-2009	
		NZ 553635 A	29-10-2010	
		NZ 584218 A	29-07-2011	
		PE 06242010 A1	10-09-2010	
		PE 06712006 A1	29-08-2006	
		PT 1654966 E	28-02-2007	
		PT 1700548 E	01-10-2007	
		PT 1702543 E	14-12-2007	
		PT 1816935 E	04-02-2009	
		PT 1816936 E	04-08-2008	
		PT 2098144 E	11-12-2013	
		RS 20070155 A	07-08-2008	
		RU 2350243 C1	27-03-2009	
		RU 2378967 C2	20-01-2010	
		SG 156663 A1	26-11-2009	
		SI 1654966 T1	30-04-2007	
		SI 1700548 T1	31-12-2007	
		SI 1816935 T1	30-04-2009	
		SI 1816936 T1	31-10-2008	
		SM AP200700017 A	23-05-2007	
		TW I306824 B	01-03-2009	
		UA 96123 C2	10-10-2011	
		US 2006110507 A1	25-05-2006	
		US 2007224319 A1	27-09-2007	
		US 2009280219 A1	12-11-2009	
		US 2012180670 A1	19-07-2012	
		WO 2006045515 A2	04-05-2006	
		WO 2006045536 A1	04-05-2006	
		ZA 200704261 A	25-09-2008	

WO 2010076048	A1	08-07-2010	AU 2009335236 A1	21-07-2011
			CA 2748748 A1	08-07-2010
			CN 102272017 A	07-12-2011
			EP 2384305 A1	09-11-2011
			RU 2011132885 A	10-02-2013
			US 2011315021 A1	29-12-2011
			US 2013180408 A1	18-07-2013
			WO 2010076048 A1	08-07-2010

EP 2100824	A1	16-09-2009	AT 508074 T	15-05-2011
			AU 2009224911 A1	17-09-2009
			CA 2716580 A1	17-09-2009
			CN 101970314 A	09-02-2011
			EP 2100824 A1	16-09-2009
			EP 2265517 A1	29-12-2010
			ES 2365642 T3	07-10-2011
			HK 1137401 A1	06-01-2012
			JP 5519540 B2	11-06-2014
			JP 2011517551 A	16-06-2011
			JP 2012514482 A	28-06-2012
			PT 2100824 E	27-07-2011
			RU 2010141757 A	20-04-2012
			US 2011020500 A1	27-01-2011

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2014/000852

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		WO 2009112291 A1	17-09-2009

WO 2006045537	A1 04-05-2006	AT 449739 T	15-12-2009
		AU 2005298955 A1	04-05-2006
		BR PI0518408 A2	18-11-2008
		CA 2583754 A1	04-05-2006
		CN 101048095 A	03-10-2007
		EP 1816934 A1	15-08-2007
		HK 1111324 A1	09-09-2011
		JP 4865720 B2	01-02-2012
		JP 2008517839 A	29-05-2008
		RU 2378968 C2	20-01-2010
		US 2007202237 A1	30-08-2007
		WO 2006045537 A1	04-05-2006

WO 2012118367	A1 07-09-2012	AU 2011361036 A1	26-09-2013
		CA 2828915 A1	07-09-2012
		EP 2681126 A1	08-01-2014
		US 2014170281 A1	19-06-2014
		WO 2012118367 A1	07-09-2012

EP 2489609	A1 22-08-2012	EP 2489609 A1	22-08-2012
		ES 2446385 T3	07-03-2014
		PT 2489609 E	17-02-2014

EP 2284100	A1 16-02-2011	AT 512099 T	15-06-2011
		CN 101992905 A	30-03-2011
		EP 2284100 A1	16-02-2011
		ES 2366821 T3	25-10-2011
		PT 2284100 E	25-08-2011
		US 2011186450 A1	04-08-2011

WO 2011010263	A1 27-01-2011	CN 102574636 A	11-07-2012
		EP 2456689 A1	30-05-2012
		ES 2418329 T3	13-08-2013
		JP 2013500051 A	07-01-2013
		PT 2456689 E	25-07-2013
		US 2012210878 A1	23-08-2012
		WO 2011010263 A1	27-01-2011

EP 2151313	A1 10-02-2010	AT 529248 T	15-11-2011
		AU 2009272891 A1	21-01-2010
		CA 2730053 A1	21-01-2010
		CN 102099177 A	15-06-2011
		EP 2151313 A1	10-02-2010
		EP 2318199 A1	11-05-2011
		ES 2377030 T3	21-03-2012
		HK 1138540 A1	27-07-2012
		JP 5426673 B2	26-02-2014
		JP 2011527920 A	10-11-2011
		KR 20110043586 A	27-04-2011
		PT 2151313 E	02-02-2012
		RU 2011105396 A	20-08-2012
		US 2011259204 A1	27-10-2011
		WO 2010006936 A1	21-01-2010

EP 1849715	A1 31-10-2007	AR 063194 A1	14-01-2009
		AT 435170 T	15-07-2009

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2014/000852

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		AU 2007242800 A1	01-11-2007
		BR PI0710903 A2	10-01-2012
		CA 2649443 A1	01-11-2007
		CN 101432207 A	13-05-2009
		EP 1849715 A1	31-10-2007
		ES 2326909 T3	21-10-2009
		HK 1130747 A1	19-08-2011
		JP 5017361 B2	05-09-2012
		JP 2009534143 A	24-09-2009
		PT 1849715 E	06-08-2009
		RU 2008146080 A	27-05-2010
		US 2009223373 A1	10-09-2009
		WO 2007122206 A1	01-11-2007
EP 1369069	A2	10-12-2003	
		AT 315351 T	15-02-2006
		BR 0301569 A	08-09-2004
		CN 1483375 A	24-03-2004
		DE 60303159 T2	13-07-2006
		EP 1369069 A2	10-12-2003
		ES 2254824 T3	16-06-2006
		IT T020020481 A1	09-12-2003
		PT 1369069 E	31-05-2006
		US 6792980 B1	21-09-2004