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(71) Applicant (for all designated States except US): **TUT-TOESPRESSO S.R.L.** [IT/IT]; Via per Caronno, 23/25, I-21040 Origgio (VA) (IT).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **DOGLIONI MAJER, Luca** [IT/IT]; Via Dei Cristoforis, 14/16, I-22010 Carate Urio (IT).

(74) Agent: **GISLON, Gabriele**; Marietti, Gislon e Trupiano S.r.l., Via Larga, 16, I-20122 Milan (IT).

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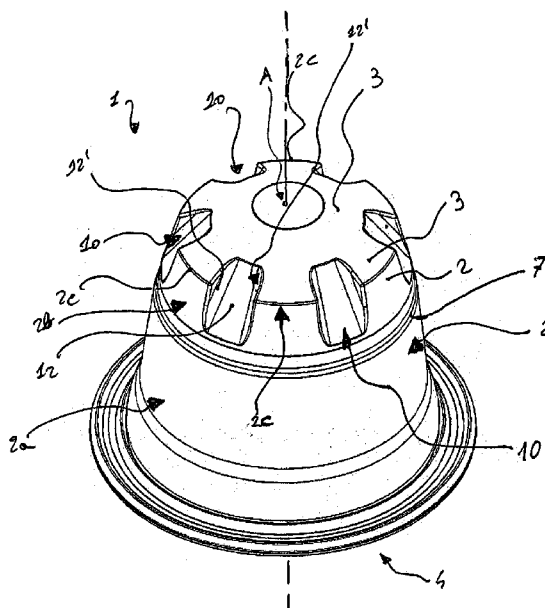


FIG. 1

(57) Abstract: A capsule for the preparation of a beverage that comprises a lateral wall, an inlet wall and a lower wall forming a hollow body where foodstuff is contained and having a substantially central axis, the inlet wall extending from a peripheral end of the lateral wall towards said central axis. The capsule further comprises at least one sunken portion extending on and connecting together the lateral wall and the inlet wall.

“Capsule for beverage preparation”

Technical field

The present invention relates to a capsule, or cartridge, for preparing beverage, such as coffee, from a dose of one or more products contained inside the capsule, by means of a beverage production device (brewing device). More particularly, the invention relates to a disposable capsule that, in use, is opened for the injection of brewing liquid by piercing means of the brewing device.

Background of the invention

These types of capsules have been known from the 1970's. Beverage capsules comprise a container portion that houses a dose of at least one extractable product, generally ground coffee, but also tea herbal extracts and similar products. The capsules also comprise a portion that interacts with a brewing device to prepare the required beverage. The typical brewing device comprises a boiler, an enclosing member, or receptacle, intended to cooperate with the capsule and a pump or similar means so that the brewing liquid or solvent, usually but not exclusively hot water under pressure, can be supplied to the capsule for the extraction of the beverage from the dose of product contained therein.

In a known beverage preparation process, a capsule is fed into the receptacle of the brewing device and is fed with the brewing solvent, such as hot water. The injected solvent passes through the capsule and thus creates by dissolving the soluble solids contained in the foodstuff or solubilising the powder contained in the capsule or otherwise diluting the liquid concentrate contained therein. In other words the injection of the solvent inside the capsule allows for the constitution of the beverage from the ingredient enclosed therein. The beverage thus constituted then exits the capsule to reach a beverage collector or outlet spout and then a cup or a container.

The injection of the brewing liquid may be obtained by providing a surface of the capsule where holes are provided for, usually these holes being placed on the water inlet surface of the capsule. This solution, though, allows for coffee powder to be spilled outside the capsule during handling or transport and in general a faster

oxidization of the foodstuff. For the above reasons it is preferred to utilise capsules in which the inlet means, that is at least one opening for the brewing liquid to penetrate into the capsules, is created on an inlet surface of the capsule, preferably its inlet wall. For this purpose the brewing device is provided, usually in its water inlet wall, with piercing means, usually in the form of one or more protruding parts, such as needles or blades, that are moved with respect to the capsule (or viceversa) for perforating its inlet surface and to protrude, at least in part, through the inlet surface. Openings, or holes, formed by the piercing means allow the passage of the brewing liquid inside the capsule.

Feeding of brewing hot water by piercing the inlet wall of the capsule is a method well known in the art and is disclosed in several prior art documents.

US2778739 discloses a package for beverage infusion having a body and an upper cover that is pierced by protruding elements of the brewing device. A similar concept is disclosed in US2968560 and US3607297.

Recently, some problems have been encountered by using capsule made of plastic polymers instead of capsule made of more rigid and thinner material, such as aluminium. Capsules made of plastics can be difficult to perforate so that full piercing of the capsule wall is not achieved, thereby no solvent e.g. hot water can be injected in the capsule, or only a partial perforation is achieved, thus providing an irregular and unsatisfactory distribution of the solvent inside the capsule and equally irregular quality of the beverage in the cup.

Therefore there is the need of obtaining a good perforation of capsules, especially of capsules made of materials harder than aluminium, such as standard thermoplastic materials, e.g. PE or PP polymers, or degradable plastics or so called bio-materials, e.g. PLA.

For facilitating the perforation by piercing means of the brewing device plastic capsules have been provided with reinforcing members, for example as disclosed in the international patent application WO2011/027259.

WO2011/027259 discloses a capsule having reinforcing means provided on its lateral wall in the form of a plurality of circular ribs, or an annular protruding member, and similar.

These solutions require, *ceteris paribus*, a higher mass of thermoplastic material during the production process, resulting in a heavier, less environmental-friendly capsule. Also, in any case, reinforcing members provided on the outer wall of the capsule may prove only partially effective for the reinforcement of the inlet wall in the areas where it has to be perforated.

EP2287090 discloses a capsule having an inlet wall provided with a section thinner than the rest of the wall, in the position where the piercing elements of the brewing apparatus will impinge, so as to facilitate the penetration of blades of the water injection device. Such thinning of the walls allows, though, for the deformation of the walls. For this reason reinforcement ribs are provided, too, extending both on the inlet wall and on the side wall of the capsule, thus avoiding undesired deformation of the capsule when piercing means of the brewing device exert a perforation force on the inlet wall of the capsule. However, reinforcing members that are disposed on the inlet wall of the capsule need to be dimensioned, positioned and oriented in an accurate manner so as to not be impinged by the piercing means of the capsule. In fact, should these ribs be contacted by the piercing blades of the brewing device, they would prove very hard if not impossible to perforate due to the additional material that determines an increase of the thickness of the inlet wall of the capsule in correspondence of the ribs.

It is an aim of the present invention to solve the above problems and to provide a capsule that can be pierced in a simple and effective manner, and to limit the number of reinforcing members on the upper inlet wall of the capsule.

Another aim of the present invention is to provide adequate reinforcement to the area where the inlet means need to penetrate the capsule wall, yet minimising the increase of capsule material needed to achieve such objective.

Another aim of the present invention is to provide a capsule that can be produced in a simple manner without the need of providing a portion of reduced thickness on the inlet wall of the capsule depending on the position of the piercing means of the brewing device.

Summary of the invention

These and other aims are achieved by means of the capsule of the present invention, that is a capsule for the preparation of a beverage from a dose of a product, according to claim 1.

The present capsule may be manufactured in plastics, bio-plastics, so-called "green"-plastics (that is plastics derived from renewable sources). Such capsule comprises a lateral wall, an inlet wall and a lower wall forming a hollow body where foodstuff is contained and having a substantially central axis, the inlet wall extending from a peripheral end of the lateral wall towards said central axis. The capsule is characterized in comprising at least one sunken portion extending on and connecting together said lateral wall and said inlet wall. More in detail, the sunken portion is provided in correspondence of the peripheral end of the lateral wall from which the inlet wall extends, thus the sunken portion extends on both the lateral wall and the inlet wall of the capsule.

Each sunken portion comprises a surface, preferably "oblique", forming an additional wall that is angled with respect to both lateral and inlet walls and that is connecting said walls.

In other words, sunken portions of the capsule form a modification of both lateral and inlet wall of the capsule providing a correspondent protrusion inside the capsule.

It has to be understood that, sunken portion comprises at least one surface connecting the lateral wall to the inlet wall of the capsule so as to provide a kind of "corrugation" with continuity in the surface of the capsule. According to different possible embodiments, the sunken portion can be formed by one continuous surface or by two or more surfaces, that can be oriented symmetrically or asymmetrically towards one to another in different manner to obtain the desired form of the sunken portion.

In designing, the sunken portion can be seen as the "removal" of a portion of volume of the capsule from the junction between inlet and lateral walls; thus, the walls are modified and they "sink" below their original level to rise again to the original level and shape. Exemplary shapes of the removed volume are prisms or portions of prisms, preferably a prism selected from triangular, parallelepiped, cylinder and

hexagonal base prisms, or other prisms having a base formed by a regular or irregular polygon.

Advantageously the presence of one or more sunken portions in correspondence of the peripheral end of the lateral and the inlet walls, i.e. the connection line between the lateral wall and the inlet wall, allow to obtain a stiffening of this area, and in general of both the inlet surface (inlet wall) and lateral surfaces of the capsule, thus avoiding undesired deformation when, in use, a perforation force is exerted on the inlet wall of the capsule by piercing means of the brewing device.

Moreover, sunken portions according to the invention provide a stiffening of the capsule without use of reinforcing members formed as an addition of material on the inlet wall and/or on the lateral wall, thus improving the environmental friendliness of such capsule, compared to existing reinforcing means.

According to an aspect of the present invention, said one or more sunken portions are radially arranged with respect to the central axis of the capsule, and preferably the capsule comprises a plurality of sunken portions arranged with constant spacing along the said peripheral end of the lateral wall, thus providing a uniform stiffening of both the lateral wall and the inlet wall of the capsule. According to different possible embodiments, the zones of the capsule that are not provided with sunken portions and wherein the lateral wall is connected to the inlet wall in correspondence of the peripheral edge (2c see below) of the lateral wall represent the 40% - 80% of the total circumferential length of said peripheral edge. In other words, a length of the circumferential peripheral edge (2c) of the lateral wall from 40% to 80% of the total circumferential length can be provided without sunken portions.

Contrary to known capsules provided with ribs extending along the upper inlet wall and that could be difficult to pierce due to such addition of material if the ribs are impinged by piercing means of the brewing device, the sunken portions of the capsule according to the present invention are not configured so as to provide a thickness increase of the inlet wall and also of the lateral wall of the capsule.

Advantageously, according to a preferred embodiment, the thickness of the sunken portion is equal to the thickness of the inlet wall and/or of that of the lateral wall outside said sunken portion. It has to be noted that in the present disclosure the

expression "thickness of the sunken portion" is intended as the thickness of the capsule surface in correspondence of the sunken portion, and in particular as the thickness of the at least one surface of the sunken portion that connects the inlet wall and the lateral wall of the capsule providing continuity in the capsule surface in correspondence of the sunken portion.

In a preferred embodiment, the thickness of the inlet wall, of the sunken portions and of the upper (inlet) wall is the same.

Brief Description of the Drawings

Further advantages and features of the present invention will be more apparent from the description below, provided with reference to the accompanying drawings, purely by way of a non-limiting example, wherein:

- Figure 1 is perspective view of the capsule according to the present invention;
- Figure 2 is a radial sectional view from a plane passing trough the central axis of the capsule and cutting two sunken portions of the capsule according to the present invention;
- Figure 3 is a perspective view of the sectioned capsule shown in Figure 2;
- Figure 4 is an enlarged sectional view of the area between lateral and inlet portions;
- Figure 5 shows in a radial sectional view a different embodiment of the capsule according to the present invention;
- Figures 6 and 6a show two possible embodiments of the capsule according to the present invention.

Detailed Description

Figures 1 - 6 show the capsule 1 according to an exemplary embodiment of the present invention, for the preparation of a beverage, such as coffee, tea, hot and cold drinks, or any other liquid foodstuff, from a pre-determined amount of an extractable or soluble or dilutable product, either liquid or solid, contained inside the capsule. Preferably the dose of product comprise a powder product, such as coffee powder, which is brewed by means of brewing liquid, preferably hot water under pressure, that is injected into the capsule for obtaining the desired beverage.

The capsule according to the invention is used into a beverage preparation device (i.e. a brewing device) provided with an enclosing element, or receptacle (not shown in the figures) intended to house at least part of the capsule during the beverage preparation process. The brewing device is further provided with means for piercing the capsule, preferably in correspondence of the inlet wall of the capsule (inlet wall) in order to feed the brewing liquid, preferably hot water under pressure, inside the capsule.

The capsule 1 according to the invention comprises a lateral wall 2, inlet wall 3 and a lower wall 4, said walls defining a hollow body 5 where the dose of product is located. The inlet wall 3 is the inlet surface of the capsule and is intended to be perforated by the piercing means of the brewing device (not shown) to obtain inlet openings allowing the passage of the brewing liquid into the capsule.

The lower wall 4 allows exit of the brewed beverage from the capsule into a container and, as will be disclosed in greater detail later, outlet means of the capsule, i.e. elements allowing the exit of the brewed beverage can be realized in different manner.

The capsule 1 has a substantially cup-shape, or frustoconical shape, with a central axis A (vertical axis), in other words, in the exemplary embodiment shown in the figures, the lateral wall 2 is not parallel to the central axis A and the hollow body 5 is closed by the lower wall 4 at one end and by the inlet wall 3 at the opposite end of the lateral wall with respect to the lower wall 4.

Moreover, as shown in the figures, the lateral wall 2 can be provided with different thickness along its extension between the inlet wall 3 and the lower wall 4. In the embodiment shown in the figures, lateral wall 2 is divided by lines 7 into a lower portion 2a and an upper portion 2b; the lower portion 2a of the lateral wall 2 is provided with a greater thickness with respect to the thickness of the upper portion 2b of the lateral wall 2. As visible in the shown embodiment, the thickness of the inlet wall is the same as that of the upper portion 2b of the lateral wall.

According to possible embodiments, the thickness of the lateral wall 2 and of the inlet wall 3 is comprised in the range 1.5mm – 0.15mm, and preferably in the range 1mm – 0.2mm. In the embodiment shown in the figures 1 – 6, the thickness t1 (see

figures 2 and 5) of the inlet wall 3 and of the upper portion 2b of the lateral wall 2 is 0.25mm. The thickness t2 of the lower portion 2a of the lateral wall 2 is 0.5mm.

Figure 5 shows a preferred embodiment of the capsule, equal to that disclosed in figure 1 – 4 except for the lower portion 2a of the lateral wall 2 that is provided with a constant thickness t2. Also in this embodiment the lower portion 2a of the lateral wall 2 is provided with a greater thickness with respect to the thickness of the upper portion 2b of the lateral wall 2.

In the embodiment shown in the figures 1 – 6, inlet wall 3 of the capsule extends from the peripheral end 2c of the lateral wall 2, towards central axis A of the capsule so that the capsule upper portion is closed by the inlet wall 3.

It has to be noted that the inlet wall 3 can be at least partially flat and/or convex and/or tapered, in other words, the inlet wall 3 can be shaped in different manner in order to facilitate both the insertion of the capsule into the receptacle of the brewing device and also the perforation of the inlet wall 3 by piercing means of the brewing device.

Also the inclination of the inlet wall 3 at the peripheral edge 2c of the lateral wall 2 can be varied according to different possible embodiments, and preferably the angle β (see figure 2 and 4) formed between the inlet wall 3 and the lateral wall 2 at the peripheral end 2c is equal or greater than 90°. In the embodiment shown in the figures, the capsule is provided with a substantially convex inlet wall 3, and the angle β formed between the lateral wall 2 and the inlet wall 3 is greater than 90°.

As mentioned, the thickness of the inlet wall, 3, is such as to allow an easy perforation by the device piercing members (e.g. blades); additionally, the same – reduced – thickness extends along the lateral wall until junction lines 7, where the lateral wall increases to provide greater rigidity to its lower portion.

To impart the required rigidity to the upper portion of the capsule and ensure the rigidity required for a reliable and sure piercing, the capsule according to the present invention is further provided with at least one, preferably a plurality of sunken portions 10 extending on and connecting together the inlet wall 3 and on the lateral wall 2; in other words, the capsule is provided with at least one sunken portion 10 forming a corrugation in correspondence of the peripheral end 2c of the lateral wall

2. It has to be noted that the at least one sunken portion 10 defines a modification of the shape of both the inlet wall 3 and of the lateral wall 2 in correspondence of the peripheral edge 2c of the lateral wall 2 from which the inlet wall 3 extends.

More in detail, the sunken portion 10 is provided in correspondence of the peripheral end 2c of the lateral wall 2 from which the inlet wall 3 extends, thus the sunken portion extends on both the lateral wall and the inlet wall of the capsule. Sunken portion 10 comprises at least one surface connecting the lateral wall to the inlet wall of the capsule forms in fact an additional wall that connects lateral and inlet walls 2, 3, and is angled with respect to both of them.

The thickness of inlet wall 3 lateral wall's upper portion 2b and sunken portions 10 is constant. As shown in the sectional view of figures 2 and 3, to each sunken portion 10 corresponds a protrusion 11 inside the hollow body 5 of the capsule, i.e. sunken portions 10 of the capsule form a modification of both lateral and inlet wall of the capsule providing a correspondent protrusion inside the capsule.

As already mentioned above, the sunken portion 10 can be seen as the "removal" of a portion of volume of the capsule from the junction (peripheral edge 2c) between inlet 3 and lateral 2 walls; thus, the walls are modified and they "sink" below their original level to rise again to the original level and shape. Exemplary shapes of the removed volume are prisms or portions of prisms, preferably a prism selected from triangular, parallelepiped, cylinder and hexagonal base prisms or prisms having a base formed by a regular or irregular polygon. So that the at least one surface 12 of the sunken portion 10 "belongs" to at least a portion of a prism used, in designing, to "remove" a volume of the capsule.

The sunken portion 10 thus comprises a surface 12 connecting the inlet wall 3 to the lateral wall 2 of the capsule. Surface 12 is thus forming an additional wall portion of the capsule. In other words, in correspondence of sunken portion 10, inlet wall 3 is connected to the lateral wall 2 by means of at least one surface 12 of the sunken portion 10.

According to different possible embodiments, each sunken portion 10 is formed by one continuous surface or two or more surfaces that can be oriented in different manner so as to form the sunken portion 10. It has to be understood that if the sunken

portion 10 is obtained by a “removal” of volume from a cylinder the sunken portion 10 comprises only one continuous surface 12 connecting the inlet and the lateral wall (see the embodiment shown in figure 6). In the case the sunken portion is obtained by a removal of volume from a prism with different shape such as parallelepiped or hexagonal prism, the sunken portion is formed with two or more surfaces 12 (see the embodiment shown in figure 6a).

In the embodiment shown in the figures 1 - 6, the sunken portion 10 comprises at least one inclined surface 12 with respect to the vertical, that connects the inlet wall 3 with the lateral wall. Preferably, the inclined surface 12 forms an acute angle α (visible in figures 2 and 4) with the vertical, i.e. with respect to direction parallel to the central axis A of the capsule, as shown in figures 2 and 4.

Preferably the acute angle α , as defined above, is comprised in the range $10^\circ - 65^\circ$.

More in detail, in the embodiment shown in attached figures 1 - 5, each sunken portion 10 is formed by an inclined surface 12 that is connected with two lateral surfaces 12'. The inclined surface 12, is substantially flat and is inclined with respect to the vertical, and the angle α formed between the inclined surface 12 and the vertical, i.e. a direction parallel to the central axis A, is an acute angle.

The lateral surfaces 12' of the sunken portion 10 are arranged on a plane passing through or parallel to the central axis A of the capsule.

According to an aspect of the present invention, the sunken portions 10 are radially arranged with respect to the central axis A of the capsule, and preferably the capsule comprises a plurality of sunken portions 10 arranged with constant spacing along the peripheral end 2c of the lateral wall 2, thus providing an uniform stiffening of both the lateral wall and the inlet wall of the capsule.

Preferably the sunken portions 10 are dimensioned so as to provide a constant “full-empty” alternation along the peripheral end 2c of the lateral wall from which the inlet wall 3 extends, i.e. a constant alternation of sunken portion 10 (empty) and portion of the lateral wall 2 and the inlet wall where no sunken portion are present (full).

Advantageously, according to a possible embodiment the thickness of the sunken portion 10 is equal to the thickness of the inlet wall 3 and/or of the lateral wall 2

outside said sunken portion, although other thicknesses can be adapted, accordingly to the specifications of the material used for the manufacturing of the capsule. As already mentioned above, in the present disclosure the expression “thickness of the sunken portion” is intended as the thickness of the capsule surface in correspondence of the sunken portion, and in particular as the thickness of the at least one surface 12 of the sunken portion 10 that connects the inlet wall and the lateral wall of the capsule.

In the embodiments shown in the figures, the thickness of the sunken portion 10 is equal to the thickness t_1 (see figures 2 and 5) of the inlet wall 3 and of the upper portion 2b of the lateral wall 2 and is 0.25mm. As already mentioned above, the thickness t_1 (and also the thickness of the sunken portion) may be comprised in the range 1.5mm – 0.15mm.

Advantageously the sunken portions 10 provided on the capsule surface on both the lateral wall 2 and the inlet wall 3 provide an effective reinforcement of the capsule thus avoiding undesired deformation thereof by piercing means of the brewing device, without the need of ribs produced by an addition of material, thus a thicker portion of the surface of the capsule, in correspondence of the inlet wall and/or of the lateral wall.

It also provides, in comparison to designs bearing the same mass of material, a more solid construction for the body of the capsule, which in turn proves advantageous during bulk storage or manipulation of the capsule by the filling machine or by the end-user.

According to other possible embodiments of the capsule according to the present invention, the thickness of the inlet wall and/or of said at least one sunken portion 10 is equal or reduced with respect to the thickness of the lateral wall 2.

In the embodiment shown in the figures 1 – 6, the thickness of the inlet wall 3 is equal to the thickness of the sunken portion 10, i.e. the thickness of the surfaces 12, 12', and is equal to the thickness of upper portion 2b of the lateral wall 2 below the peripheral end 2c. In fact, independently from the thickness of the lateral wall 2, that could be also variable along its extension between the inlet wall and the lower wall,

at least portion 2b of the lateral wall, between peripheral end 2c and junction lines 7, can have the same thickness of the inlet wall 3 and/or of the sunken portion 10.

In the exemplary embodiment shown in the figures, lower wall 4, i.e. the outlet wall, or the wall comprising the outlet from which the beverage exits the capsule, is a separate element which is connected to the lower portion of the capsule body 5, in order to close the capsule.

Any suitable constraint means of the lower wall 4 to the capsule body 5 can be used, and in other possible embodiments the lower wall 4 may be produced in one piece with the capsule. Moreover, the lower wall may be produced in different material with respect to the capsule material, for example, the lower wall 4 may be a porous or non porous membrane, for instance an aluminium foil or a paper filter, a non woven fabric or a cap in thermoplastic or similarly rigid or semirigid material provided with holes, as already known in other capsules for the production of beverage.

According to known embodiments outlet means may comprise one or more opening on the surface of the capsule, self-perforating elements that are broken under mechanical and/or pressure force acting on the capsule, or one or more holes that are produced by piercing means of the brewing device. Alternatively, inlet and outlet means are open passages.

In the embodiment shown in the figures 1 – 6 in the lower wall 4 are arranged outlet means 13, i.e. elements allowing the extraction of the brewed beverage from the capsule.

In the shown embodiment, the capsule is provided with outlet means in the form of one self-perforating element 13 located on lower wall 4.

The self-perforating element 13 is protruding from the lower surface of bottom wall 4, and is defined by grooves, or lines with reduced thickness, that are breakable under the action of the mechanical force exerted by the brewing device and/or the force exerted by the water fed into the capsule. This type of self-perforating elements is described in detail in application WO2007/063411, in the name of the present applicant, to which reference is made for further details. The shown embodiment has one, centrally located, element 13 forming a central outlet for the brewed in the form

of a circumference; other embodiments can have a plurality of smaller outlets located in different positions, e.g. peripherally or radially.

Another type of outlet means has a plurality of protrusions, but the reduced thickness periphery of the rib is replaced by a cut area of the wall, along three sides of the outlet, the hinge portion being still present; additionally, in this embodiment the outlets can protrude both outwardly and inwardly with respect to wall 4. It has to be noted that the above mentioned outlet elements can be opened under the action of the mechanical force, or by means of the brewing liquid pressure, or as a result of the combined action of the brewing liquid pressure with the mechanical force exerted by the brewing device, or by hydraulic force exerted by the pump.

Other types of outlet means can be provided, i.e. the extraction of the beverage from the capsule can be obtained, for example, by perforating the capsule by suitable perforating means of the brewing device; in another embodiment, the outlet means is a water-soluble membrane.

According to a possible embodiment the capsule is produced in food-grade materials, for example polypropylene or PLA (polylactic acid), that is also resistant both to high temperature and pressure of the brewing liquid injected in its inside during the beverage preparation process.

Moreover, as shown in the figures, the capsule 1 could be provided with a plurality of ribs 8 protruding from the internal surface of the inlet wall 3. The ribs 8 are preferably arranged in a radial manner from the central portion of the inlet wall 3, substantially from the central axis A.

Furthermore, as visible in the sectional views of figures 2 and 3, the capsule is provided with vertical lug 9 protruding from the internal surface of the lateral wall 2 and intended to impede the capsules from stacking during the production process.

In the shown exemplary embodiment, a sealing element 20 is provided on the flange-like rim 21 of the capsule, i.e. the portion of the capsule designed to be brought in contact with the receptacle, and in particular with the lower edge of the receptacle, i.e. the pressing portion of the receptacle, for providing the sealing engagement.

Preferably the sealing member is produced in one piece with the capsule and is shaped as an element protruding from the flange-like rim 21 of the capsule.

Claims

1. A capsule (1) for the preparation of a beverage from a brewing device, said capsule comprising a lateral wall (2), an inlet wall (3) and a lower wall (4) forming a hollow body (5) where a brewing product is contained and having a substantially central axis (A), said inlet wall (3) extending from a peripheral end (2c) of the lateral wall (4) towards said central axis (A), characterized in said capsule walls comprising at least one sunken portion (10) extending on and connecting together said lateral wall (2) and said inlet wall (3).
2. A capsule according to claim 1, wherein said at least one sunken portion (10) comprises a surface (12) forming an additional wall that is angled with respect to both lateral and inlet walls (2, 3) and that is connecting said walls (2,3).
3. A capsule according to claim 1 or 2, wherein said at least one sunken portion (10) corresponds to a protrusion (11) inside the hollow body (5) of the capsule.
4. A capsule according to any previous claim, characterized in that said sunken portion (10) has a shape that is a prism or a portion of a prism, preferably selected from a parallelepiped, a cylinder, a triangular, an hexagonal prism.
5. A capsule according to any claim 2 to 4, wherein said at least one surface (12) of said sunken portion (10) is inclined with respect to said central axis (A) of the capsule.
6. A capsule according to any previous claim, wherein said at least one sunken portion (10) is radially arranged with respect to the central axis (A) of the capsule.
7. A capsule according to any previous claim, characterized in comprising a plurality of sunken portions (10) arranged with constant spacing along the said peripheral end (2c) of the lateral wall (2), to provide a corrugation or undulation of a portion of the inlet and lateral walls.
8. A capsule according to any previous claim, wherein the angle (β) formed between said lateral wall (2) and said inlet wall (3) at said peripheral end (2c) of said lateral wall (2) is equal or greater than 90° .

9. A capsule according to any previous claim, wherein the inlet wall (3) is at least in part flat, and/or convex and/or tapered.
10. A capsule according to any previous claim, wherein the thickness in correspondence of said sunken portion (10) is equal to the thickness of the inlet wall (3) and/or of the lateral wall (2) outside said sunken portion (10).
11. A capsule according to any previous claim, wherein the thickness of the inlet wall and/or of said at least one sunken portion (10) is equal or reduced with respect to the thickness of the lateral wall (2).
12. A capsule according to any previous claim, wherein at least a portion of the lateral wall (2b) below said peripheral end (2c) has the same thickness of said inlet wall (3) and/or of the said at least one sunken portion (10).
13. A capsule according to any previous claim, wherein said lateral wall (2) has different thickness along its extension between the inlet wall (3) and the lower wall (4).

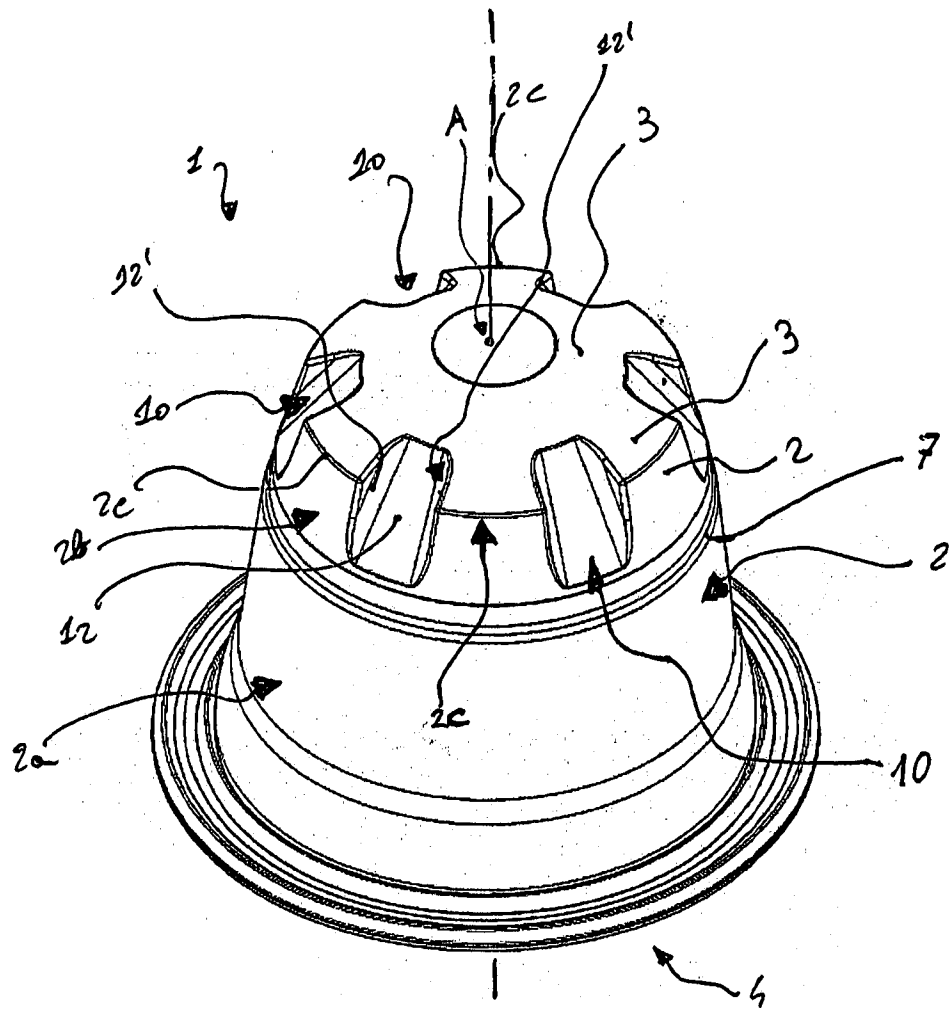


FIG. 1

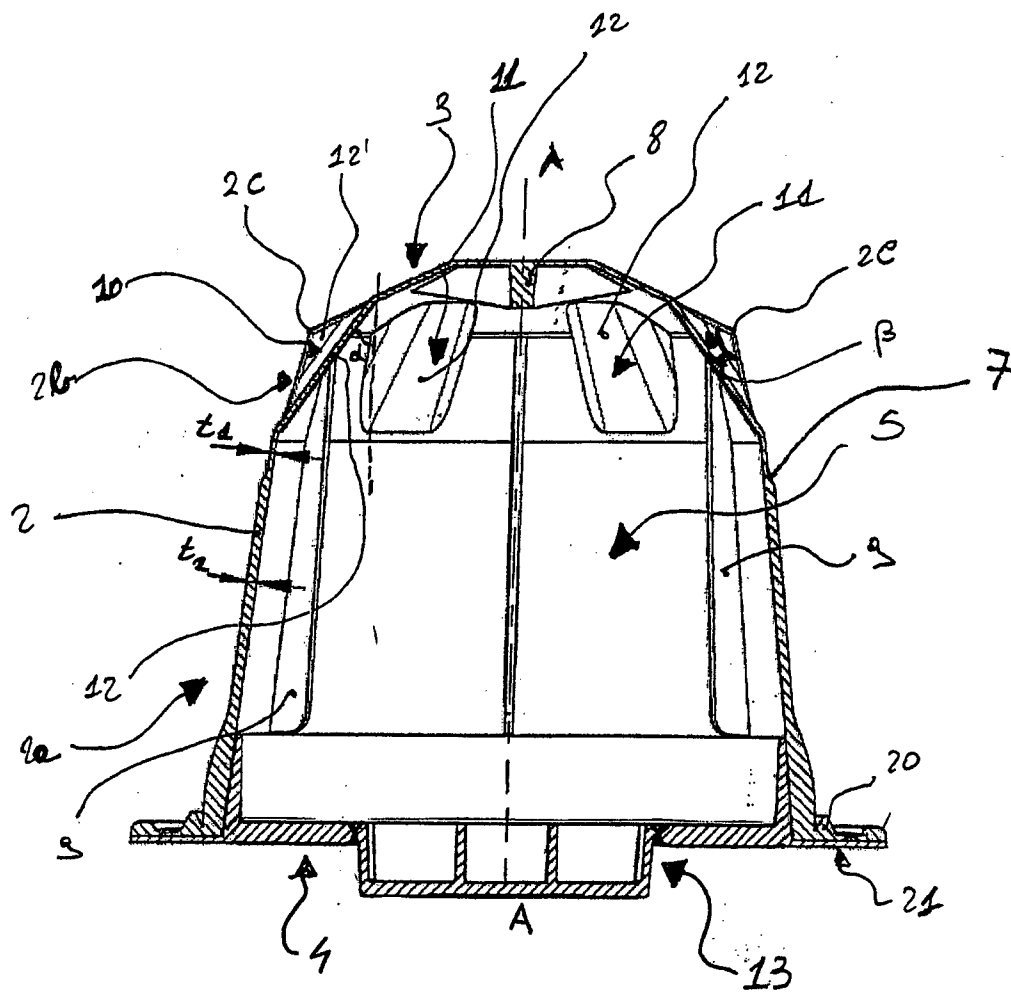


FIG. 2

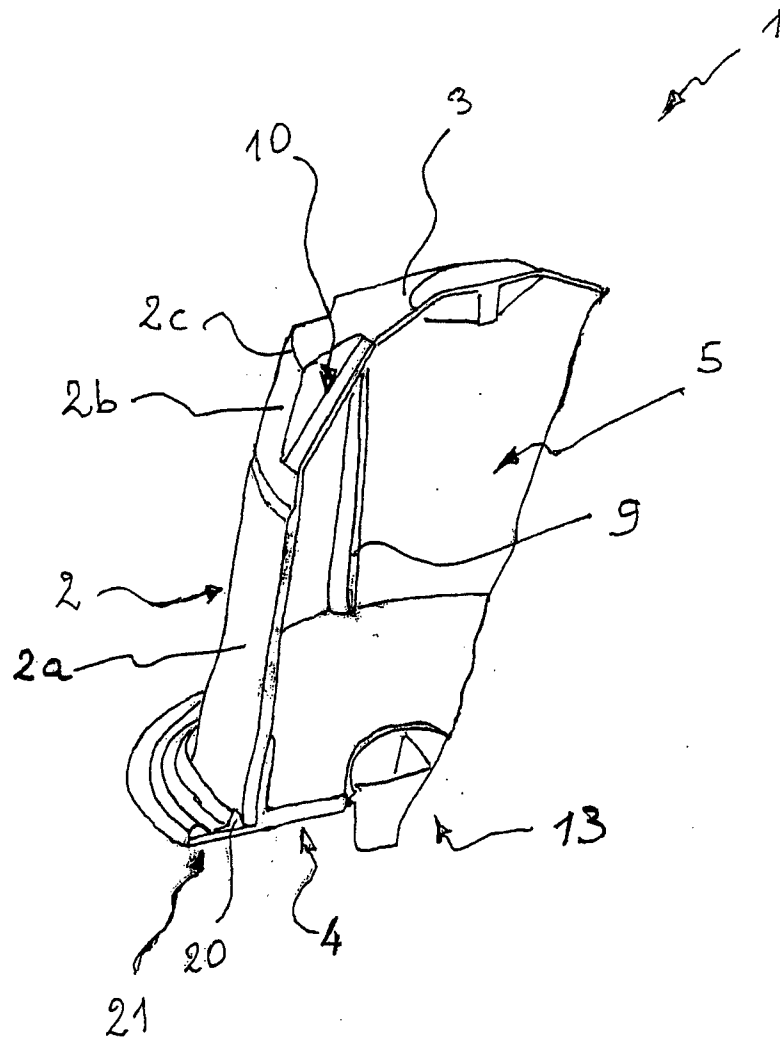


Fig. 3

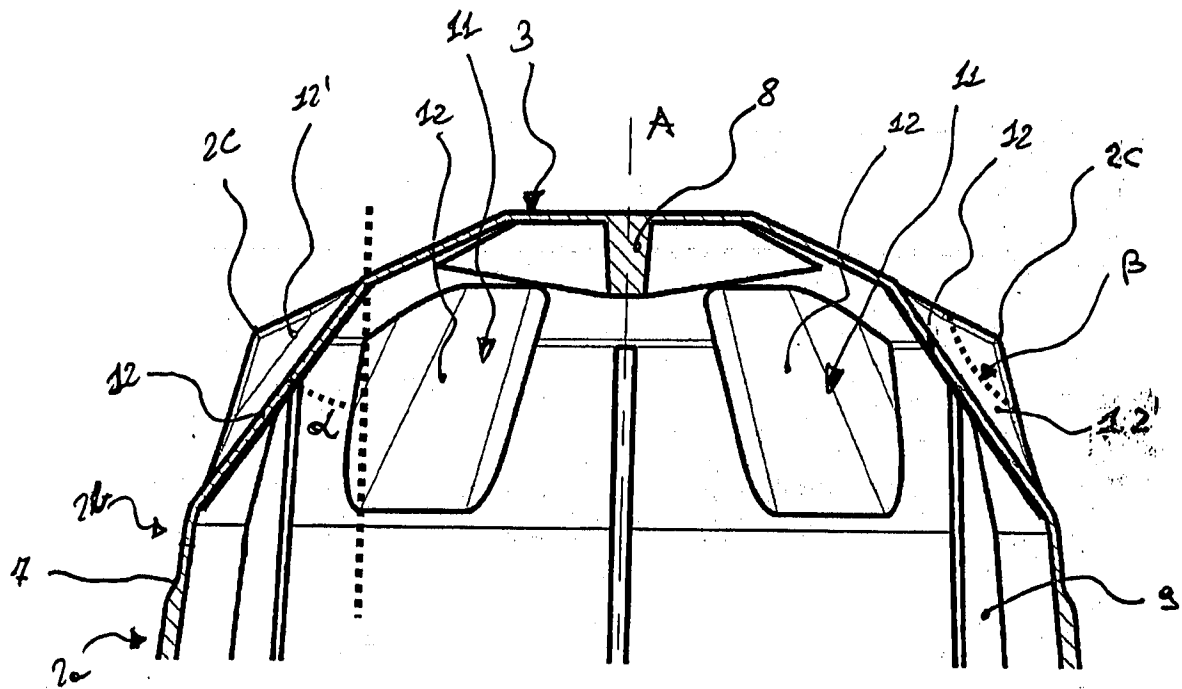


FIG. 4

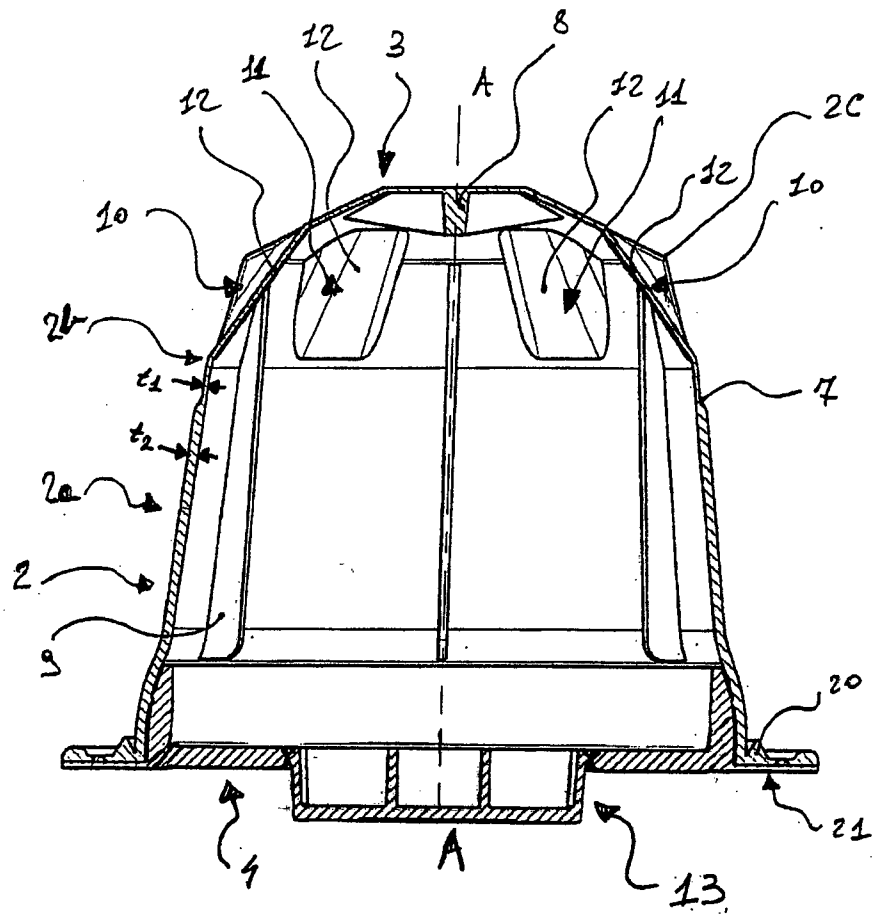


FIG. 5

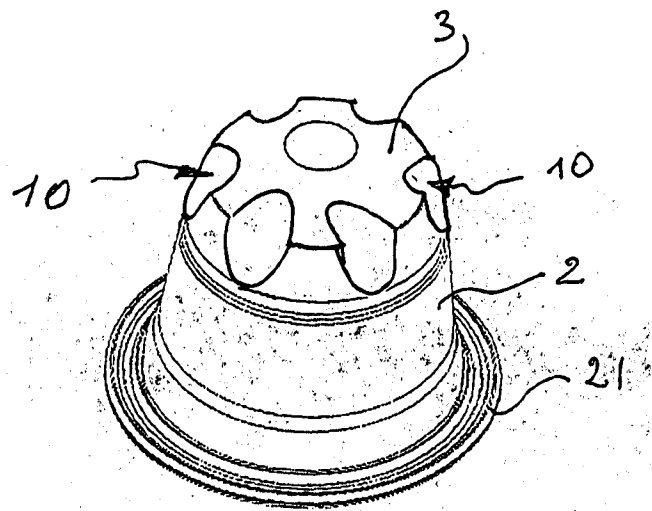


Fig. 6

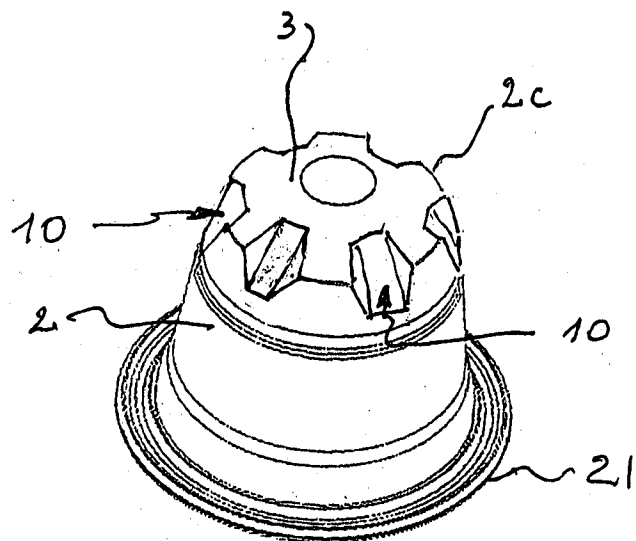


Fig. 6A

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2011/002773

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

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

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X	WO 2010/041179 A2 (ETHICAL COFFEE COMPANY SA [CH]; MARILLER ALAIN [CH]) 15 April 2010 (2010-04-15)	1-12
Y	pages 3-5; claim 2; figures 2,6,8	13
Y	----- WO 2010/128844 A1 (SARA LEE DE NV [NL]; KAMERBEEK RALF [NL]; KOELING HENDRIK CORNELIS [NL]) 11 November 2010 (2010-11-11) figures 8,9	13
A	----- WO 2011/047836 A1 (RAPPARINI GINO [IT]) 28 April 2011 (2011-04-28) page 8, lines 11-21; figures 6-11	1-13
A	----- EP 2 287 090 A1 (NESTEC SA [CH]) 23 February 2011 (2011-02-23) cited in the application figure 1	1-13



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

22 June 2012

Date of mailing of the international search report

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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

Jervelund, Niels

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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