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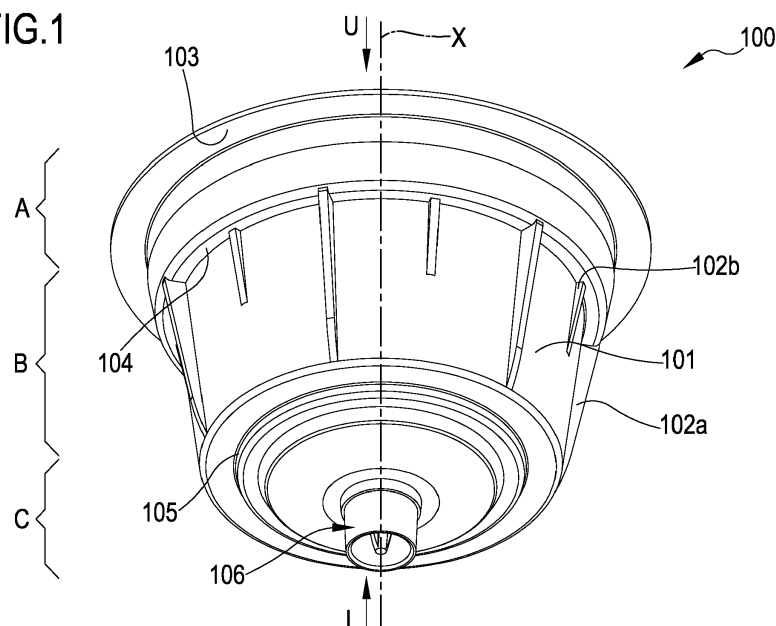
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(54) **CAPSULE FOR DELIVERING BEVERAGES**

(57) Capsule for distributing beverages (100) through the injection of pressurized fluid within the capsule, said capsule (100) being suitable for being introduced in a device for distributing of beverages and comprising a hollow and liquid impermeable body and at least one wall defining a lateral surface (102) and a bottom wall (103) joined to said wall defining said lateral surface (102), said capsule for distributing beverages (100) is characterized in that it comprises means of deviation and

distribution of flow (111, 112, 113, 114, 115, 115c, 119, 116c), through which said fluid transits from said hollow body towards an outlet opening (106) in a terminal portion of the said bottom wall (103) and wherein said means of deviation and distribution of flow (111, 112, 113, 114, 115, 115c, 119, 116c) integrated on said body and comprise means of passage interdiction (114) impeding a passage of said fluid along a substantially rectilinear path from said hollow body to said outlet opening (106).

FIG.1



Description

Field of the invention

[0001] The present invention concerns in general the capsule in plastic material, and in detail concerns a capsule for beverages preferably realized through injection moulding.

Background art

[0002] Capsules for distributing beverages are devices suitable for containing a dehydrated beverage in granules, powder or triturated leaves like typically coffee, the infusions, powder milk or similar are.

[0003] In the capsules of a known type the beverage is contained within the capsule that is realized in an impermeable body.

[0004] The capsule is introduced in a distributing device that by means of a needle or equivalent device perforates an upper protective sheet and injects a pressurized fluid, typically water, into the capsule, in such a way to have a double effect of hydration and heating of the dehydrated beverage, which so acting is distributed through an opening arranged on the bottom of the capsule itself in a glass or in a cup.

[0005] An example of capsule for distributing beverage it is known from EP 2444339. The capsules of a known type have the drawback of allowing a part of the granules or powder or triturated leaves pass through the outlet aperture.

[0006] This causes the beverage have an unpleasant aspect, especially if contained in containers like glasses or transparent or light color contrasted cups. Furthermore, the applicant has observed that with the passage of part of the granules or powder or triturated leaves through the outlet opening, often also an excessive beverage delivery speed takes place.

[0007] Therefore the beverage distribution speed depends directly on the speed with which the fluid injected in the body of the capsule reaches the lower opening of the capsule itself.

[0008] The applicant has observed, that locally, in correspondence of the lower aperture, that typically has modest size, the local increase of pressure and/or fluid transit speed into the granular beverage causes a bad mixing.

[0009] The applicant has furthermore noticed that the aforementioned drawbacks are particularly accentuated where the distributing device within which the capsule is introduced is capable of exerting on the same a significant pressure, that sometimes can exceed also 10 bars.

[0010] In detail for the coffee, whose features of creaminess is index of correct production and taste and perception on the palate, in case of excessive speed of delivery, the quality of the beverage which results is bad.

[0011] Nonetheless, an excessive local transit speed into the granular beverage can cause a non-optimal heating

of the beverage, on the contrary, an excessive heating of the other portions of the granular beverage into the capsule, with the consequent non-optimal transfer of the aroma in the fluid therein transiting.

[0012] The scope of the present invention is to describe a capsule for distributing beverages which allows to eliminate the aforementioned drawbacks.

Summary of the invention

[0013] According to the present invention is realized a capsule for distributing beverages through the injection of pressurized fluid within the capsule, said capsule being suitable for being introduced in a device for distributing beverages and comprising a hollow and liquid-impermeable body having at least one wall defining a lateral surface and a bottom wall joined to said wall defining said lateral surface, said capsule for distributing beverages is characterized in that it comprises means of deviation and distribution of flow, through which said fluid transits from said hollow body towards an outlet opening in a terminal portion of the said bottom wall and wherein said means of deviation and distribution of flow integrated on said body and comprise means of passage interdiction, impeding a passage of said fluid along a substantially rectilinear path from said hollow body to said outlet opening.

[0014] According to an aspect of the present invention, said means of passage interdiction of said fluid along a substantially rectilinear path comprise a wall arranged substantially in direction orthogonal respective to a longitudinal axis of the said capsule, said axis being oriented between the center of an upper opening of said hollow body and said outlet opening.

[0015] According to a further aspect of the present invention, said means of deviation and distribution of flow comprise a plurality of flow directing walls, having a first and a second direction of development and wherein at least one first of said directions of development is parallel to a direction defined by a longitudinal axis of the said capsule, said axis being oriented between the center of an upper opening of said hollow body and said outlet opening.

[0016] In detail, said plurality of flow directing walls develops in a direction which is radial respective to said longitudinal axis.

[0017] In detail, said plurality of flow directing walls comprises at least one first series of walls of a first greater radial extension and a second series of walls of a second lower radial extension, wherein each wall of the said second series is interposed between two walls of the said first series.

[0018] According to a further aspect of the present invention, said plurality of flow directing walls is joined to a first step connecting said wall defining a lateral surface to said bottom wall.

[0019] According to a further aspect of the present invention, at least part of the said plurality of walls has a profile inclined downwards.

[0020] According to a further aspect of the present invention, said means of passage interdiction comprise a plurality of longitudinal slits extending in a direction parallel respective to a longitudinal axis of the said capsule, said axis being oriented between the center of an upper opening of said hollow body and said outlet opening.

[0021] According to a further aspect of the present invention, said means of deviation and distribution of flow comprise at least one first crown of flow directing column-like elements.

[0022] In detail, said means of deviation and distribution of flow comprise furthermore a second crown of flow directing column-like elements.

[0023] In detail, said flow directing column-like elements of the said second crown are arranged along the same radial directrix of the flow directing column-like elements of the said first crown.

[0024] According to an aspect of the present invention, said outlet opening comprises a central flow-braking element.

[0025] In detail, said plurality of flow directing walls is configured for orienting the flow towards said first crown of column-like elements.

[0026] According to a further aspect of the present invention, at least part of said flow directing walls is oriented along the same radial directrix that passes for a column at least of the said first crown of column-like elements.

[0027] In particular, said first and/or said second crown of column-like elements comprises a plurality of vertically extending columns, defining between each other a plurality of recesses of a depth lower than the overall height defined on said first and/or second crown respective to the bottom wall.

Description of the figures

[0028] The invention will be herein described referring to the annexed figures wherein:

- figure 1 shows a first perspective downwards view of a capsule for beverages object of the present invention;
- figure 2 and figure 3 respectively illustrate a view from the bottom (along the direction L of the figure 1 and respectively from the top along the direction U of figure 1);
- figure 4 shows a perspective cutaway view of the capsule for beverages object of the present invention, in an its preferred and non-limiting embodiment;
- figure 5 shows a perspective cutaway view of the capsule for beverages object of the present invention, in an its preferred and non-limiting embodiment, along another direction of observation;
- figure 6 shows a detailed view of the circled portion of figure 5;
- figure 7 shows a plan view of the capsule object of the present invention where there are a first and a

second line of section A-A and B-B; and

- figure 8 and figure 9 respectively show the capsule for beverages object of the present invention along a first and a second line of section A-A and B-B represented in figure 7.

Detailed description of the invention

[0029] Referring to figure 1, with the reference number 100 is shown in its complex a capsule for beverages. In detail the capsule 100 object of the present invention is suitable for containing a beverage in powder that is housed inside a cavity of its body. The capsule with said beverage is sealed at least in correspondence of an its upper opening.

[0030] The capsule 100 object of the present invention is suitable for being introduced within a device for delivering beverages that comprises means of injection of a fluid within said capsule, through a through hole of the sealing on the upper opening.

[0031] As a result of said hole and of the injection of fluid, that preferably but in a non-limiting extent is pressurized water, the powder beverage therein contained is partially dissolved and its content is subsequently delivered through a bottom opening within a container out of the device for delivering beverages.

[0032] As represented in the annexed figures, the capsule 100 object of the present invention comprises a hollow and liquid impermeable body, preferably but in a non-limiting extent realized in plastic, which comprises a wall defining a lateral surface 102 and a bottom wall 103 joined to said wall defining the lateral surface. In a preferred and non-limiting embodiment, said capsule 100 comprises a body a circular section, with diameter greater in correspondence of an its first upper end where there is an upper opening and that as long as it develops towards the direction opposite results of a progressively reducing diameter; in correspondence of the bottom wall 103 there is an outlet opening 106 that allows the exit of the beverage.

[0033] Therefore the body of the capsule 100 object of the present invention defines a longitudinal axis X, that in detail is centered in the center of the outlet opening 106 and passes, as well, in the center of the upper opening.

[0034] In detail, as it is shown in figure 1, the bottom wall is not orthogonal respective to the longitudinal axis but is slightly convex outwards, and it also tapers in correspondence of the outlet opening 106.

[0035] As it is shown in figure 1 therefore the body of the capsule 100 object of the present invention can divide in a first upper subsection A of a greater diameter, provided with a perimetral lip for positioning a sealing means of the upper opening, a second intermediate subsection B of a diameter reducing towards the third subsection C, and said third subsection C that comprises the bottom wall 103 and the outlet opening 106.

[0036] The capsule 100 object of the present invention

comprises means of deviation and distribution of flow 111, 112, 113, 114, 115, 115c, 119, 116c through the which the flow of the beverage transits through the body of the capsule for exiting from the outlet opening 106 through a non-rectilinear path.

[0037] For the purposes of the present invention for non-rectilinear path shall be intended a path wherein the fluid changes at least once the direction of flowing respective to an axial direction corresponding to the direction defined by the longitudinal axis X.

[0038] The means of deviation and distribution of flow 111, 112, 113, 114, 115, 115c, 119, 116c through which the flow of the beverage passes through the body of the capsule for exiting from the outlet opening 106 through a non-rectilinear path are integrated in the body of the capsule 100. This means that they are not removable respective to this last.

[0039] The integration allows for realizing the body of the capsule 100 in a single piece for example by means of moulding, and this advantageously allows a money-saving realization of the body of the capsule 100.

[0040] In detail said means of deviation and distribution of flow 111, 112, 113, 114, 115, 115c, 119, 116c comprise means 114 of interdiction to the passage of the fluid injected along a substantially rectilinear path.

[0041] In other words, the means of interdiction 114 impede that the fluid injected from the device for delivering into the capsule 100 can travel a simple path substantially parallel to the longitudinal axis X for then exiting from the outlet opening 106.

[0042] Due to the pressure of injection of the fluid into the capsule 100, pressure that can also exceed 10 bar, in case of a substantially rectilinear path and as mentioned before, it could take place that the fluid with the beverage exits from the outlet opening 106 with an excessive speed.

[0043] In this way, there is the risk to obtain that the beverage is sprayed outside the container, or anyway that the speed of the fluid through the powder beverage does not allow the correct soaking of the fluid itself with the flavors of the beverage.

[0044] Nonetheless the excessive speed of exiting of the beverage from the container risk to make also part of the powder of the beverage itself exit from the outlet opening, with a detrimental effect on the quality of the product distributed.

[0045] Said means of interdiction, as it is visible from figure 3 and more in detail in the figure 4, 5 and 6, comprise a wall arranged substantially in direction orthogonal respective to the longitudinal axis X of the capsule 100.

[0046] The wall 114 is the upper part of a castle that is joined to the outlet opening 106, this last protruding outside the bottom wall 103 while in contrast the castle rest inside the cavity of the body of the capsule 100.

[0047] On the castle, that together with the wall form the means of interdiction 114, there is a plurality of longitudinal slits 118, that extend substantially parallel to the direction defined by said longitudinal axis X, which allows

the injected fluid to exit through the means of interdiction in the outlet opening 106.

[0048] The number of longitudinal slits 118, that in the embodiment represented in the annexed figures is equal to 8, shall not be intended in a limiting extent, since said number is variable in accordance to at least the size of the capsule and further in accordance to the amount of beverage, its granularity and pressure of distribution of the fluid.

[0049] Furthermore, said means of deviation and distribution of flow comprise also a plurality of flow directing walls 111, 112, 113 having a first and a second direction of development, wherein the first of said directions of development is parallel to a direction defined by the longitudinal axis X.

[0050] In a preferred and non-limiting embodiment, flow directing walls 111, 112, 113 develop in a direction which is radial to the longitudinal axis.

[0051] Preferably but in a non-limiting extent, at least part of the said plurality of flow directing walls 111, 112, 113 has a profile which is inclined downwards.

[0052] The effect of the flow directing walls is to allow to address the flow of fluid and beverage coming from the upper opening, towards the longitudinal slits 118 in a more controlled way, so that no vortex with axes parallel to the longitudinal axis X create.

[0053] As it is shown in the annexed figures, the flow directing walls comprise at least one first series of walls 111 of greater radial extension, a second series of walls 112 of radial extension intermediate and a third series of walls 113 of minimum radial extension.

[0054] Each wall of the second series is interposed between two walls of the first series. Each wall of the third series is interposed between two walls of the second series. All the walls, of the first series of walls 111, as well as of the second series of walls 112 and of the third series of walls 113 have at least an extremity in contact with an interconnection zone between the surface that defines the lateral wall of the capsule 100 and the bottom wall 103. In detail, in said interconnection zone there is a step 105 on which in use a filter cardboard that acts as lower sustaining element for the powder of the beverage is welded.

[0055] The fact of having radial extensions being different for the flow directing walls 111, 112, 113 advantageously allows for not to limit excessively the area which is available for the fluid in proximity of the longitudinal slits 118 and according to the applicant allows a more optimal distribution of flows, allowing the creation of micro vortexes in correspondence of the least radially extended walls, that allow an almost final mixing of the beverage, before the exiting of the same. The capsule for distributing beverages 100 object of the present invention finally comprises a plurality of column-like elements arranged on a couple of concentric crowns (115c, 116c). Alternatively, the crown of column-like elements can be also only one.

[0056] The crown of column-like elements is defined

on a center coinciding with the longitudinal axis X of the capsule 100.

[0057] The first and the second crown of column-like elements 115c, 116c extend starting from the bottom wall 103 and is conceived for creating at least one barrier that allows the granules to deposit on the bottom instead of being free to exit from the longitudinal slits 118.

[0058] The first and the second crown 115c, 116c comprise therefore each one a plurality of column-like elements that define recesses with a depth lower than the height of the respective crown; this means that the recesses so defined do not extend up to the base of the crown, but leave a portion of this last completely full, and this portion is exactly the one that acts as a barrier.

[0059] Preferably but in a non-limiting extent, to the end of optimizing the addressing of the flow towards the longitudinal slits 118, the flow directing walls are oriented along the same radial direction of at least one column of said plurality of crowns 115c, 116c of column-like elements.

[0060] This means that observing the profile of the flow directing wall this lies on a straight line that joins the top of the column, and therefore one of the highest points among the points of the crown.

[0061] In the embodiment shown in the annexed figures, the combination of the first and the second crown 115c, 116 of column-like elements advantageously allows to have an annular recess wherein at the moment of the distribution of the fluid and beverage creates a vortex that allows a second deposit of potential granules of beverage before they can reach the longitudinal slits 118 from which they would inevitably be expelled.

[0062] The column-like elements or teeth of the crown lie on a same radial line, and this is the one that departs orthogonally respective to the tangent to the circumference defined by the respective crown.

[0063] In such a way it is possible to have an optimal fluid and beverage flow direction that is addressed between two flow directing walls and directed towards a recess between two columns having yet once changed direction starting from a direction substantially parallel to the direction defined by the axis X to a direction which is oblique respective to this last, and a second time wherein said direction of the flow and beverage following of introduction in the longitudinal slits 118, passes once more to a direction substantially parallel to the direction defined by the longitudinal axis X for being expelled through the outlet opening 106.

[0064] The applicant has observed that in particular with beverages like the coffee or tea, the presence of a double crown 115c, 116c of column-like elements in combination with flow directing walls 111, 112, 113 oriented on a radial straight line that joins with at least one column of the crowns 115c, 116c, allows a further and optimal mixing of the beverage, together with a reduction of the local speed of transit and local increase of pressure that allows to the beverage to be mixed with the fluid and to acquire the maximal aroma without leaving creaminess

where said creaminess become a particular feature thereof. This is most of all true for coffee.

[0065] The path defined by the flow of the fluid and beverage is schematically represented in figure 6 by the dashed line 200.

[0066] In the capsule for distributing beverages 100 object of the present invention is finally present a flow breaking element 119 within the cavity of the outlet opening 106, that is designed in such a way to avoid that into it creates a whirling flow that can lead to sprays outside the glass or cup or anyway contained within which said beverage is distributed after exiting from the capsule 100.

[0067] The capsule 100 has furthermore an intermediate step 104 arranged between the first subsection A and the second subsection B; on said intermediate step, that delimits an annular surface planarly orthogonal respective to the longitudinal axis X of the capsule 100, in use is arranged a second filter cardboard.

[0068] In the second subsection B, that therefore is the subsection delimited both upwards and downwards by filter cardboard, there is the introduction of the beverage in powder or granules.

[0069] It is finally clear that to the capsule object of the present invention can be applied modifications or variants obvious for a skilled person without for this departing from the scope of protection provided by the annexed claims.

Claims

1. Capsule for distributing beverages (100) through the injection of pressurized fluid within the capsule, said capsule (100) being suitable for being introduced in a device for distributing beverages and comprising a hollow and liquid impermeable body having at least one wall defining a lateral surface (102) and a bottom wall (103) joined to said wall defining said lateral surface (102),
said capsule for distributing beverages (100) is **characterized in that** it comprises means of deviation and distribution of flow (111, 112, 113, 114, 115, 115c, 119, 116c), through which said fluid transits from said hollow body towards an outlet opening (106) in a terminal portion of the said bottom wall (103) and wherein said means of deviation and distribution of flow (111, 112, 113, 114, 115, 115c, 119, 116c) integrated on said body and comprise passage interdiction means (114) preventing a passage of said fluid along a substantially rectilinear path from said hollow body to said outlet opening (106).
2. Capsule for distributing beverages (100) according to claim 1, **characterized in that** said means of passage interdiction (114) of said fluid along a substantially rectilinear path comprise a wall arranged substantially in direction orthogonal respective to a longitudinal axis of the said capsule (100), said axis

being oriented between the center of an upper opening of said hollow body and said outlet opening (106).

3. Capsule for distributing beverages (100) according to claim 1 or claim 2, **characterized in that** said means of deviation and distribution of flow (111, 112, 113, 114, 115, 115c, 119, 116c) comprise a plurality of flow directing walls (111, 112, 113), having a first and a second direction of development and wherein at least one first of the said directions of development is parallel to a direction defined by a longitudinal axis of the said capsule (100), said axis being oriented between the center of an upper opening of said hollow body and said outlet opening (106). 5
4. Capsule for distributing beverages (100) according to claim 3, **characterized in that** said plurality of flow directing walls (111, 112, 113) develops in direction which is radial respective to said longitudinal axis. 10
5. Capsule for distributing beverages (100) according to claim 3 or claim 4, **characterized in that** said plurality of flow directing walls (111, 112, 113) comprises at least one first series of walls (111) of a first greater radial extension and a second series of walls (112) of a second lesser radial extension, wherein each wall of the said second series is interposed between two walls of the said first series. 15
6. Capsule for distributing beverages (100) according to any of the preceding claims da 3 a 5, **characterized in that** said plurality of flow directing walls (111, 112, 113) is jointed to a first step (105) linking said wall defining a lateral surface (102) to said bottom wall (103). 20
7. Capsule for distributing beverages (100) according to any of the preceding claims from 3 to 6, **characterized in that** at least part of said plurality of walls has a profile inclined downwards. 25
8. Capsule for distributing beverages (100) according to any of the preceding claims, **characterized in that** said means of passage interdiction (114) comprise a plurality of longitudinal slits (118) extending in a direction parallel respective to a longitudinal axis of the said capsule (100), said axis being oriented between the center of an upper opening of said hollow body and said outlet opening (106). 30
9. Capsule for distributing beverages (100) according to any of the preceding claims from 1 to 8, **characterized in that** said means of deviation and distribution of flow (111, 112, 113, 114, 115, 115c, 119, 116c) comprise at least one first crown (115c) of flow directing column-like elements. 35
10. Capsule for distributing beverages (100) according 40

to claim 9, **characterized in that** said means of deviation and distribution of flow (111, 112, 113, 114, 115, 115c, 119, 116c) comprise furthermore a second crown (116c) of flow directing column-like elements.

11. Capsule for distributing beverages (100) according to claim 10, wherein said flow directing column-like elements of the said second crown (116c) are arranged along the same radial directrix of the flow directing column-like elements of the said first crown (115c). 45
12. Capsule for distributing beverages (100) according to any of the preceding claims, wherein said outlet opening (106) comprises a central flow breaking element (119). 50
13. Capsule for distributing beverages (100) according to any of the claims 9-11 when depending from claims 3-5, **characterized in that** said plurality of flow directing walls (111, 112, 113) is configured for orienting the flow towards said first crown (115c) of column-like elements. 55
14. Capsule for distributing beverages according to any of the claims 9-13 when depending from any of the claims 3-5, wherein at least part of said flow directing walls (111, 112, 113) is oriented along the same radial directrix that passes for a column at least of the said first crown (115c) of column-like elements.
15. Capsule for distributing beverages according to any of the preceding claims 9-11, **characterized in that** said first and/or said second crown (115c, 116c) of column-like elements comprises a plurality of vertically extending columns, defining between each other a plurality of recesses of a depth lower than the overall height defined on said first and/or second crown (115c, 116c) respective to the bottom wall (103).

FIG.1

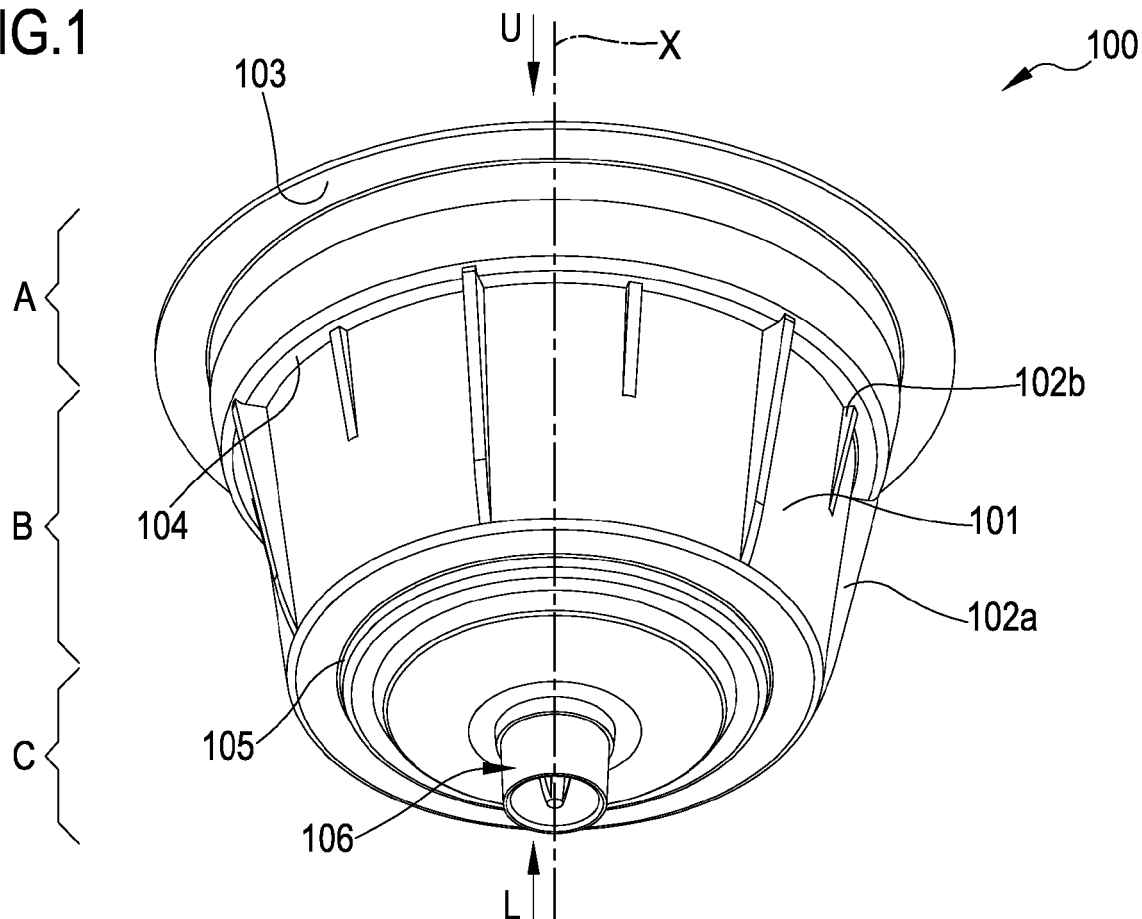


FIG.2

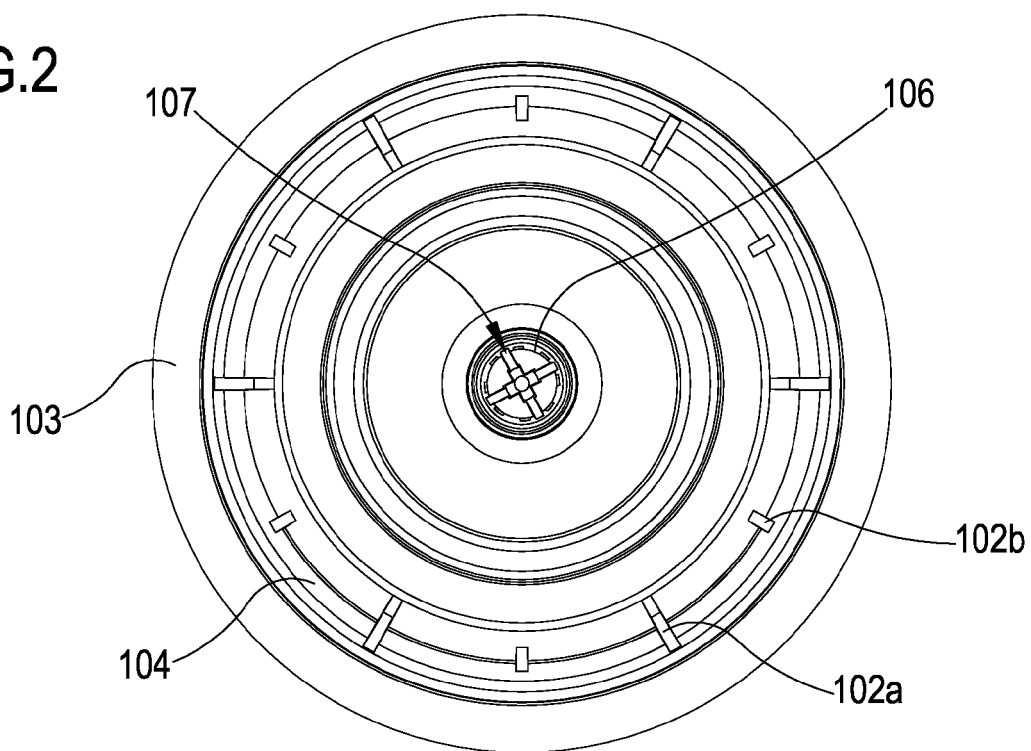


FIG.3

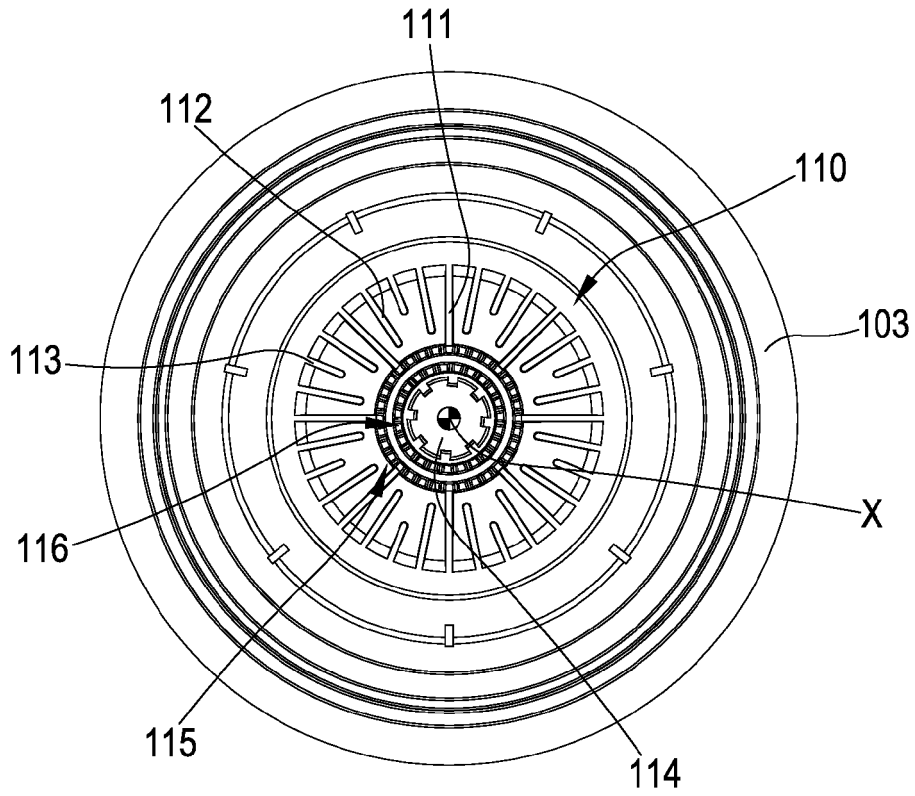


FIG.4

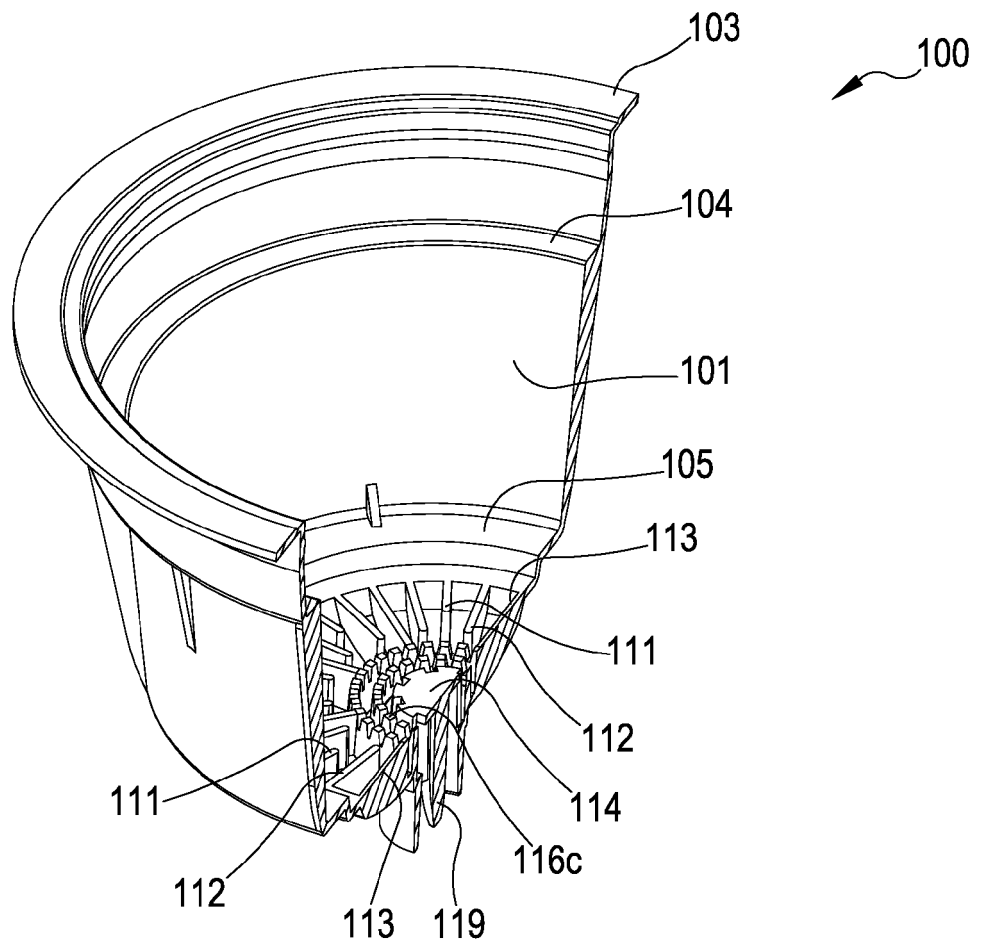


FIG.5

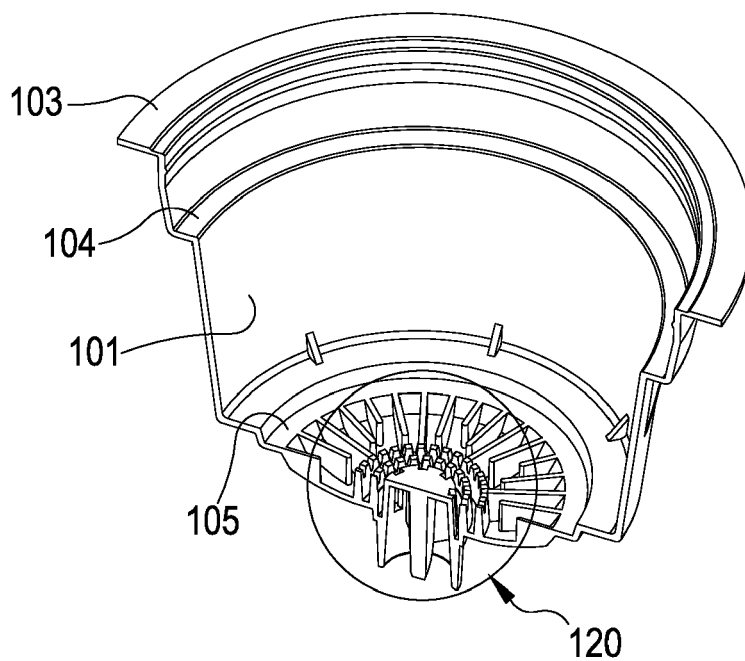


FIG.6

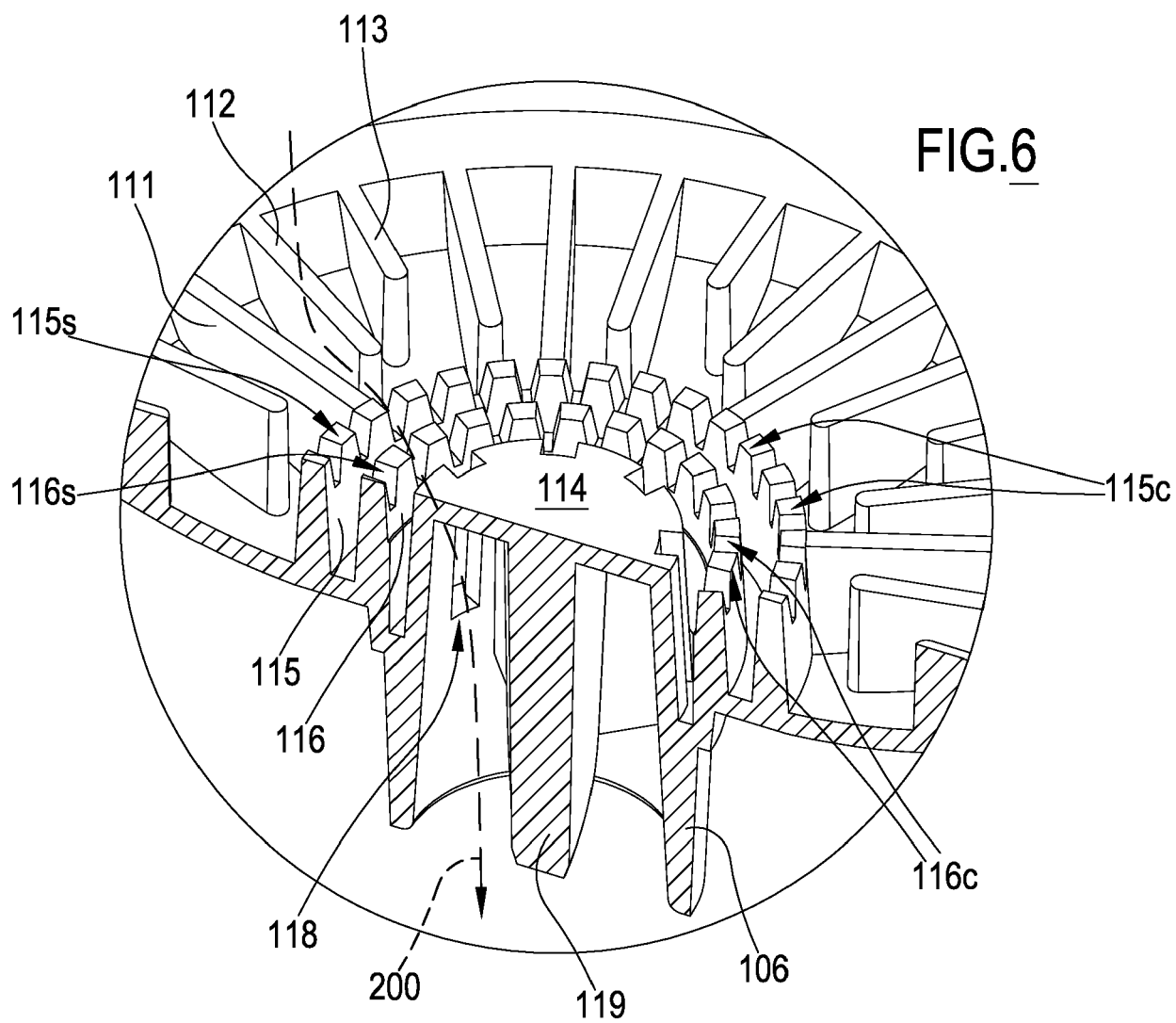


FIG.7

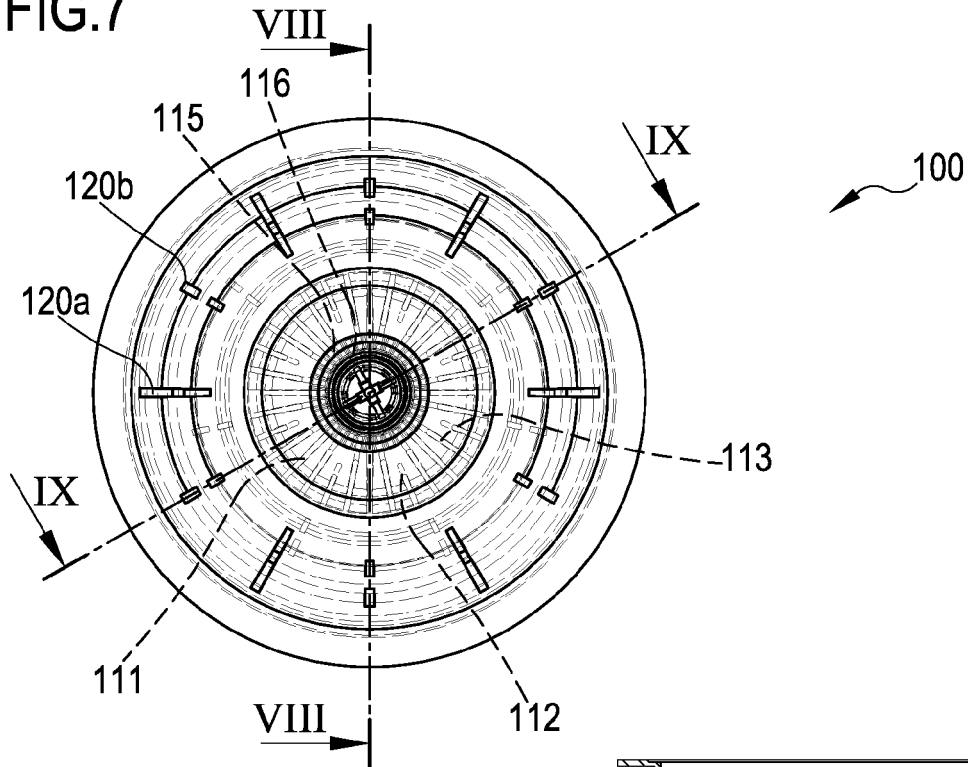


FIG.8

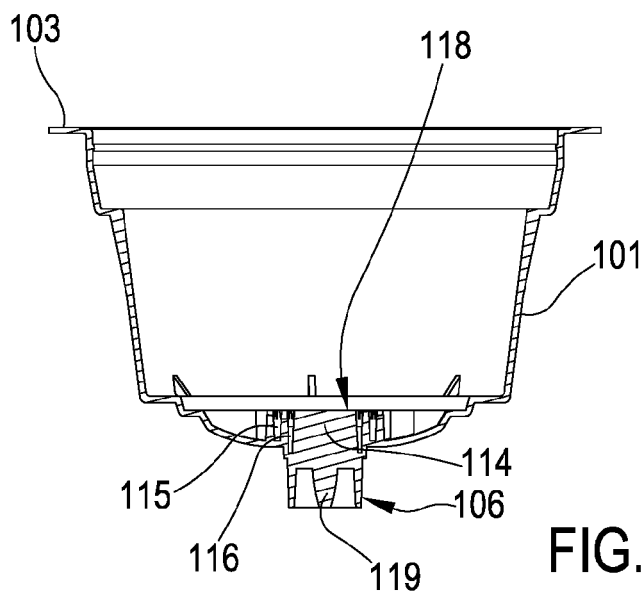
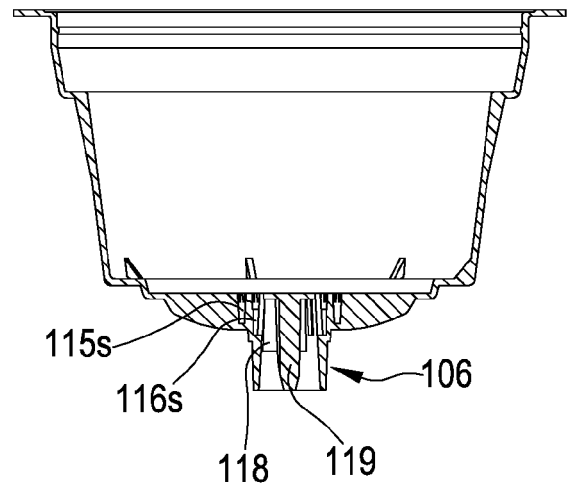


FIG.9



EUROPEAN SEARCH REPORT

 Application Number
 EP 17 16 3740

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 May 2017	Examiner Brochado Garganta, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 17 16 3740

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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