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(54) **Capsule and system for preparing a crema-free coffee beverage**

(57) A capsule for preparing a crema-free coffee beverage comprises a substantially rigid capsule body with a circumferential wall and a base wall that border an inner space filed with a beverage ingredient. An open filling side of the capsule at an end of the circumferential wall opposite the base wall is covered with a lid of fluid tight material. The lid is provided with a preformed outlet opening suitable for draining the prepared beverage from the inner space when the capsule is used in a beverage preparation device. The outlet opening is fluid tightly closed by a removable cover element extending over at least part of the lid.

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Title: Capsule and system for preparing a crema-free coffee beverage

FIELD OF THE INVENTION

The invention relates to a capsule for preparing a crema-free coffee beverage comprising a substantially rigid capsule body having a circumferential wall extending around an inner space of the capsule which is at least partially filled with a beverage ingredient suitable for preparing the coffee beverage, and a base wall covering the inner space at a first end of the circumferential wall, the capsule comprising a lid covering the inner space at a second end of the circumferential wall opposite the base wall.

BACKGROUND OF THE INVENTION

Such capsules for preparing a coffee beverage are generally known from the prior art for use in a beverage preparation device wherein in a brewing chamber of the device pressurized hot water is injected in the capsule to extract the coffee beverage from the coffee beverage ingredient, usually roasted and ground coffee, contained within an inner space of the capsule.

In most of the known capsules the inner space of the capsule is hermetically or fluid-tightly closed from the environment prior to use in the beverage preparation device in order to maintain or prolong a freshness of the beverage ingredient during storage. The capsule hereto often comprises a substantially rigid capsule body having a circumferential wall extending around the inner space and a base wall covering the inner space at a first end of the circumferential wall. At a second end of the circumferential wall opposite the base wall the capsule body has an open filling side. A fluid tight lid is provided over the open filling side of the capsule body to cover the inner space. In use the capsule may be pierced, preferably at the base wall and/or the lid, to form an injection opening for injecting the hot water,

and/or to form an outlet opening which allows the prepared coffee beverage to escape the capsule.

Many of the known capsules are particularly for preparing an espresso beverage wherein the injection of pressurized hot water in the capsule leads to an extraction of substances from the coffee beverage ingredient and with foam forming on the beverage corresponding to an espresso beverage with a crema layer as obtained with known piston type espresso machine using high pressure brewing.

For a crema-free coffee beverage, for example a coffee beverage without foam, also referred to as brewed coffee, usually apparatuses are used in which the beverage is prepared by unpressurized filtration of a mixture of beverage ingredient and water.

There is however a need for capsules and systems with which a crema-free coffee beverage may be prepared in pressurized beverage preparation devices.

It is therefore an object of the invention to provide a capsule for preparing a crema-free coffee beverage.

It is a further object of the invention to provide a system comprising a beverage preparation device and a capsule for preparing a crema-free coffee beverage.

A particular object of the present invention is to provide such system and capsule for producing a crema-free coffee beverage which has improvements over systems and capsules of the prior art. The crema-free coffee beverage obtained by the capsule and the system is preferably in quality similar to or improved as compared to crema-free coffee beverages prepared in prior art unpressurized filtration type of preparation apparatuses, particularly as perceived by the general public.

Another object of the invention is to provide a method of manufacturing a capsule suitable for preparing a crema free coffee beverage.

SUMMARY OF THE INVENTION

For that purpose, the invention provides a capsule as described herein. Also, the invention provides a system as described herein. Furthermore, the invention provides a method as described herein. Specific embodiments of the invention are described herein. The objects are achieved by the present invention, i.e. a capsule, and a system.

The capsule for preparing a crema-free coffee beverage according to the invention comprises a substantially rigid capsule body having a circumferential wall extending around an inner space of the capsule which is at least partially filled with a beverage ingredient suitable for preparing the coffee beverage, and a base wall covering the inner space at a first end of the circumferential wall, the capsule comprising a lid covering the inner space at a second end of the circumferential wall opposite the base wall, wherein a membrane is provided in the inner space of the capsule between the beverage ingredient and the lid, wherein the lid is provided with a preformed outlet opening suitable for draining the prepared beverage from the inner space when the capsule is used in a beverage preparation device, wherein the membrane extends at least over the surface of the outlet opening, which outlet opening is fluid tightly closed by a removable cover element extending over at least part of the lid. In prior art capsules the injection of water in the closed inner space leads to a build up of pressure until an outlet or outflow opening is created, e.g. by piercing the capsule body or lid or by a bursting open of part of the capsule body or lid under the build up pressure. The high brewing pressure prior to forming of an outflow opening results in more crema-forming compounds being extracted. In addition to the pressure build up, the sudden pressure drop after creation of an outflow opening contributes to the formation of foam in the prepared beverage. The preformed outlet opening in the lid of the capsule according to the invention allows in use of the capsule in a beverage preparation device continuous escape of the prepared coffee beverage from the capsule while

water is injected. Accordingly the pressure build up and pressure drop at the outlet side of the prior art capsules which contribute to formation of a crema-layer are prevented in the capsule according to the invention. The preformed outlet opening in the lid is closed by the cover element in order to keep a hermetic sealing of the inner space of the capsule for maintaining or prolonging a freshness of the beverage ingredient in the capsule during storage. Prior to use in the beverage preparation device the cover element may be easily removed to free the outlet opening, for instance by manually tearing the cover element from the capsule. The preformed outlet opening is further covered by the membrane inside the inner space, which membrane may act as a filter to prevent solid particles of the beverage ingredient, for instance coffee grinds, from escaping the inner space through the outlet opening.

In a preferred embodiment of the capsule according to the invention the cover element is attached to the lid. For instance the cover element may be attached to a section of the lid surrounding the preformed outflow opening. As such the cover element may be sized to just cover the outflow opening without having to extend over the larger open filling side. This provides a saving on material costs. Additionally the lid and cover element may be conveniently premanufactured as an assembly which assembly can be attached to the capsule body in a single step, for instance by attaching the lid provided with the cover element to the end of the side wall. Also, when the lid has not yet been attached to the capsule body wherein it extends over the open filling side, it is easier to handle for attachment of the cover element to the lid in a correct manner over the preformed outflow opening. For instance the lid prior to attachment to the capsule body may be supported on a side in use facing the inner space to allow a force being exerted on the opposite side of the lid for attachment of the cover element, e.g. by applying a pressure step.

In a particular embodiment of the capsule according to the invention between the cover element and the lid a layer of adhesive material is provided suitable for a removable adhesion of the cover element to the lid. Particularly a suitable adhesive material may be selected in dependence on the materials used for the cover element and lid, wherein an adhesion strength between the cover element and lid is sufficient to keep the lid and cover element attached under normal circumstances while being easily overcome when a user applies a manual removal force on the cover element. The adhesive material is in a further particular embodiment of the capsule according to the invention a heat-seal lacquer. The lacquer may be used to obtain a suitable attachment with desired adhesion strength between the cover element and lid by heat and pressure bonding. The lacquer may be applied by a lacquering step either to an attachment surface of the lid or, preferably, an attachment surface of the cover element.

In a further preferred embodiment of the capsule according to the invention an adhesion strength between the layer of adhesive material and cover element is weaker than an adhesion strength between the layer of adhesive material and the lid. As such when the cover element is removed, e.g. by tearing of the cover element, the cover element will under normal circumstances tear away at the interface between the adhesive layer and the cover element thus maintaining an integrity of the capsule lid at all times. A determined outflow rate of the prepared beverage from the capsule through the preformed outlet opening with particular dimensions is hereby not affected.

In a further particular embodiment of the capsule according to the invention the layer of adhesive material is provided on a surface part of the cover element extending over the lid with a part of the cover element extending over the outlet opening in the lid being substantially free of adhesive material. The contents of the inner space, i.e. the beverage

ingredient and extracted beverage, are herein not exposed to the adhesive material.

In a further preferred embodiment of the capsule according to the invention the lid with a circumferential edge portion thereof is attached to the capsule body. The lid may conveniently be glued, welded or otherwise attached to the capsule body, for example to the end of the side wall thereof.

The membrane provided between the beverage ingredient and the lid according to the invention particularly comprises a layer of non-woven material adapted to minimize formation of a crema layer. Particularly a weight, thickness and air permeability of the layer of non-woven material may be selected, preferably in dependence on each other, such to provide the layer with desired filtering capabilities for removing any crema forming components from the extracted liquid in the capsule. For instance the membrane may have a thickness of the layer in the range of 1.2-1.6 mm and/or the air permeability of the layer in the range of 100 – 700 mm/s measured at 200 Pa according to DIN and ISO 9237, and/or a weight of the layer in the range of 300-600 g/m2. A capsule according to the invention having such a membrane can be used for preparing a coffee beverage which does not or almost does not comprise crema. In particular a lungo or double lungo of brewed coffee can be prepared with such a capsule.

The membrane may be provided loosely, unattached, in the inner space, wherein the membrane may rest on the beverage ingredient provided in the capsule. Alternatively the membrane may be attached with a circumferential edge portion to the capsule body. However, in a preferred embodiment of the capsule according to the invention the membrane is attached to the lid. Accordingly the membrane may be conveniently preassembled with the lid, and possible also with the cover element, prior to the attachment of such assembly to the capsule body for closing the open filling side. In the preassembly of the membrane and lid a correct alignment

of the membrane with respect to the outlet hole may be easily achieved so that the entire outlet hole area may be covered with the membrane.

The membrane and lid in a particular embodiment of the capsule according to the invention may be attached by means of a layer of adhesive material, preferably a heat-seal lacquer. The heat-seal lacquer may be applied with a lacquering step to either the membrane or, preferably, the lid.

The cover element, lid and capsule body may be made of a wide variety of materials considered suitable by the skilled person and capable of being processed into a sheet, film or foil using techniques conventionally known in the art such as extrusion, co-extrusion, injection molding, blow molding, vacuum forming, etc. Suitable materials for the capsule body and/or lid and/or cover element include, without being limited thereto, plastic materials, in particular thermoplastic materials, for example a polyolefin polymer, for example polyethylene or polypropylene, PVC, polyesters for example polyethylene terephthalate (PET); metal foils such as aluminum, stainless steel, metal alloys etc. or sheets of a woven or a non-woven or otherwise processed fibrous material, like paper, polyester, etc.; or combinations thereof, e.g. multilayers. The material for the capsule can be a biodegradable polymer or another biodegradable material. The skilled person will be capable of selecting the appropriate material taking into account the envisaged use with food material and any other relevant circumstances during use of the capsule. The thickness of the sheet or foil may be chosen such that a form stable or substantially rigid capsule body is provided. The thickness of the sheet or foil may vary with the nature of the material.

In a further preferred embodiment of the capsule according to the invention the lid substantially consists of a sheet like layer of aluminum. The outlet opening may be provided in the lid by any appropriate means and method, such as punching or cutting one or more holes in the sheet with

desired dimensions. The outlet opening is preferably provided in a central portion of the lid.

The preformed outlet opening in the lid is preferably circular. The preformed outlet opening in the lid may have a diameter of between 6 - 20 mm as an outlet opening with such diameter provides a sufficient exit area in the lid for the brewed beverage to escape the capsule without forming a substantial crema layer. Preferably the diameter of the outlet opening is between 8 - 14 mm. An outlet opening with a diameter of 12 mm is most preferred.

In another preferred embodiment of the capsule according to the invention the lid comprises on a side facing the cover element a layer of protective lacquer. The protective lacquer further supports a strength of the lid, and particularly protects an integrity thereof when the cover element is removed.

The cover element in a further preferred embodiment of the capsule according to the invention comprises a laminate of at least an aluminum layer and a plastic layer, preferable PE. The aluminum layer may be on a side of the cover element facing away from the capsule to provide the cover element a same feel when touched and aesthetic finish as the lid and capsule body made of aluminum. The PE layer may be on an opposite side of the cover facing the lid, which allows for application of a heat-seal lacquer thereto with a bond strength between the lacquer and PE layer being lower than a bond strength of the lacquer to the aluminum lid when the cover element is attached to the lid.

The cover element in another particularly preferred embodiment of the capsule according to the invention comprises a pull tab protruding from part of the cover element covering the outflow opening. At least a free end part of the pull tab opposite the end connected to the part of the cover element covering the outflow opening may be left unattached to the lid, so that a user may manually grasp the unattached part of the pull tab in order

to easily remove the cover element from the lid by tearing the cover element off. The pull tab may to this end have any suitable size, e.g. length and thickness, and form for supporting a quick and easy removal of the cover element. Desired properties for the pull tab in order to remove the cover element from the lid will generally be known to the skilled person. Preferably at least part of the pull tab is angled with respect to a surface of the lid facing the cover element in order to allow for a more easy gripping of the pull tab by a user.

Most preferred, the capsule body, the lid, and the cover element are each mainly made from aluminum.

In a further particular embodiment of the capsule according to the invention the beverage ingredient in the inner space comprises ground coffee in an amount of between 7-12 grams. Such a relatively large amount of ground coffee in the capsule allows for the preparation of a lungo or double lungo type of brewed coffee beverage without crema layer which has good organoleptic properties and sensory quality.

The system for preparing a crema-free coffee beverage according to the invention comprises an exchangeable capsule and a beverage preparation device with a fluid dispensing device for feeding an amount of a fluid, such as water, under pressure to the capsule, and with a brew chamber, the brew chamber having a first brew chamber part for holding the capsule and a second brew chamber part for closing the brew chamber, wherein the exchangeable capsule comprises a substantially rigid capsule body having a circumferential wall extending around an inner space of the capsule which is at least partially filled with a beverage ingredient suitable for preparing the coffee beverage, and a base wall covering the inner space at a first end of the circumferential wall, which base wall in use of the capsule in the beverage preparation device is pierced by at least one knife of the fluid dispensing device for feeding the amount of fluid, the exchangeable capsule comprising a lid covering the inner space at a second end of the

circumferential wall opposite the base wall, wherein the lid has a preformed outlet opening suitable for draining the prepared beverage from the inner space when the capsule is used in the beverage preparation device, wherein the second brew chamber part comprises an extraction plate for engaging the exchangeable capsule at the second end of the circumferential wall when the brew chamber holding the capsule is closed, the extraction plate comprising a tearing surface for facing the lid of the capsule, wherein the lid of the exchangeable capsule in use in the closed brew chamber is not affected by the tearing surface. As the lid of the capsule is not affected by the tearing surface of the extraction plate, e.g. no tears or holes are provided in the lid by the extraction plate, the preformed outlet opening in the lid of the capsule determines the rate of prepared coffee beverage escaping from the capsule in use. By providing an outlet opening dimensioned to this end, a beverage can thus be prepared with the system without pressure build up or sudden pressure drop occurring in the fluid flow. Formation of a crema-layer on the prepared beverage is hereby reduced. The preformed outlet opening in the lid is closed by a cover element in order to keep a hermetic sealing of the inner space of the capsule for maintaining or prolonging a freshness of the beverage ingredient in the capsule during storage. Prior to use in the beverage preparation device the cover element may be easily removed to free the outlet opening, for instance by manually tearing the cover element from the capsule.

In a preferred embodiment of the system according to the invention the beverage preparation device comprises a brew chamber in which additionally a capsule with closed lid can be used for preparing a further beverage. For instance the system may comprise a beverage preparation device with a brew chamber in which a capsule having a closed lid, without preformed outlet opening, may be used to prepare an espresso type of coffee beverage having a crema layer. The capsule with closed lid may be a known prior art capsule, such as a known espresso type capsule used in known

capsule beverage machines. The capsule with closed lid is preferably a capsule with a capsule body similar to the capsule according to the invention and with the lid without opening being attached to the capsule body. In the capsules with closed lid in use in the brew chamber the injection of water will increase the internal pressure. Due to the internal pressure the closed lid may bulge outwardly to contact the tearing surface of the extraction plate. The tearing surface of the extraction plate of the beverage preparation device may comprise or be formed by a plurality of relief elements in order to, in use, tear the bulging lid of such capsule to form an outflow opening through which the prepared coffee beverage may escape the capsule. As in the capsule according to the invention there is in use in the brew chamber no build up of pressure inside the inner space the lid with preformed opening does not, or at least not sufficiently, bulge for contacting the tearing surface. The extraction plate of the beverage preparation device and the lid of the capsules may thus be adapted to each other such that capsules with a closed lid tear on the extraction plate whereas capsules with a lid having the preformed outlet opening do not tear on the extraction plate. The system according to the invention thus allows for using both capsules with closed lid, for instance for the preparation of a coffee beverage with crema layer, such as an espresso coffee, and capsules with a lid with preformed opening, for preparing a coffee beverage without crema layer, such as a brewed coffee. The extraction plate can include relief elements of a first type and at least one relief element of a second type. The relief element of the second type may have a sharper edge than the relief elements of the first type.

The method of manufacturing a capsule suitable for preparing a crema free coffee beverage according to the invention comprises:

- providing a substantially rigid capsule body having a circumferential wall extending around an inner space to be at least partially filled with a beverage ingredient suitable for preparing the coffee beverage, and a base wall covering the inner space at a first end of the circumferential wall,

- filling the inner space with an amount of the beverage ingredient through an open filling side of the capsule body opposite the base wall, and
- closing the open filling side by attaching a lid to the capsule body extending over the open filling side,

wherein the lid prior to the attachment to the capsule body is provided with an outlet opening through which in use a prepared beverage may flow out of the capsule, which outlet opening is fluid tightly closed by providing a removable cover element extending over the outlet opening and at least part of the lid.

In a preferred embodiment of the method of manufacturing a capsule according to the invention the removable cover element is attached to the lid prior to attaching the lid to the capsule.

In a further preferred embodiment of the method of manufacturing a capsule according to the invention a membrane is provided in the inner space after filling of the inner space with the beverage ingredient.

In a particularly preferred embodiment of the method of manufacturing a capsule according to the invention the membrane is attached to the lid prior to attaching the lid to the capsule.

BRIEF DESCRIPTION OF THE DRAWING

These and other aspects of the present invention are hereinafter further elucidated by the appended drawing and corresponding embodiments, which form part of the present application. The drawing is not in any way meant to reflect a limitation of the scope of the invention, unless this is clearly and explicitly indicated. The exemplary embodiments are given by way of non-limitative illustration. It is noted that the figures are only schematic representations of embodiments of the invention that are given by way of non-limiting example.

In the drawing:

Figs. 1A and 1B show a perspective side view of a first embodiment of a capsule according to the invention in respectively a closed storage state with attached cover element and open use state with the cover element removed;

Fig. 2 shows a top view of an embodiment of the capsule according to the invention.

Fig. 3 shows a perspective side view of a second embodiment of the capsule according to the invention in a closed storage state with attached cover element.

Fig. 4 shows a schematic representation of a laminated assembly of a cover element, lid and membrane for use in a capsule according to the invention.

DETAILED DESCRIPTION

Figure 1A and 1B show a capsule according to the invention in a first embodiment. The capsule 1 comprises a capsule body 2. The body comprises a frusto-conical side wall extending around an inner space of the body. A base wall of the capsule body is connected to a first end of the side wall for closing off the inner space at the first end of the capsule body. A flange 3, also referred to as a rim, extends radially outwardly from a second end of the side wall. At the second end of the side wall the capsule body has an open filling side.

The capsule further includes a lid 4 that is attached to the flange 3 of the capsule body. The lid 4 is a relatively flexible sheet-like foil which is provided with a outflow opening 5 centrally located in the foil above the inner space. In the inner space a coffee bed of roast and ground coffee is provided. The weight of the coffee bed is in the range of 7-12 grams. In the storage state shown in fig. 1A the capsule 1 is hermetically closed to maintain a freshness of the coffee bed. The outlet opening 5 is fluid tightly closed by a cover element 6 which is attached to the lid 4. In a use state of

the capsule shown in fig. 1B the cover element 6 is removed to free the outlet opening 5. For instance the cover element 6 may be manually removed from the lid by pulling on a pull tab 7 of the cover element 6. The base wall of the capsule body is further designed to be pierced open by piercing means of a beverage preparation device for supplying water under pressure into the capsule. A membrane 8 is provided in the inner space of the capsule between the coffee bed and the lid 4 below the preformed outflow opening 5. The capsule body 2, the lid 4, and the cover element 6 are each mainly made from aluminum. The lid 4, cover element 6 and membrane 8 prior to attachment to the capsule body 2 form a laminate with the cover element 6 attached to one side of the lid 4 extending over the preformed outlet opening, and the membrane 8 attached to the opposite side of the lid 4 extending over the preformed outlet opening.

Figure 2 shows a top view of an embodiment of the capsule according to the invention in which a positioning of the lid, cover element, outlet opening and membrane with respect to each other is indicated. The outlet opening is provided in a central portion of the lid and has a circular shape. A diameter of the outlet opening may be between 6 - 20 mm, is preferably between 8 -14 mm and in a most preferred embodiment as shown in figure 2 a diameter of 12 mm. Further shown in figure 2 is that the cover element comprises a pull tab extending from the part of the cover element covering the outlet opening. The pull tab comprises a fold line for folding a loose part of the pull tab, i.e. part of the pull tab which is not attached to the lid, over part of the cover element attached to the lid and extending over the outlet opening.

Figure 3 shows a capsule according to the invention in a second embodiment, which capsule differs from the capsule shown in figure 1 in that the cover element 6 comprises a longer pull tab 7 extending from the part of the cover element 6 covering the outlet opening 5 to the flange or rim 3 of the capsule body. A free end part of the pull tab 7 is loose, i.e. not

adhered to the lid, and angled with respect to a surface of the lid so that a user may manually grasp this part of the pull tab in order to easily remove the cover element 6 from the lid by tearing the cover element off.

A detailed view of the laminated assembly of cover element, lid and membrane for use in a capsule according to the invention is shown in figure 4. The lid may be made of aluminum. The layer of aluminum may be in a range between 20-50 um and may particularly be between 30 um - 40um thick. As shown in figure 3 the lid 4 mainly consists of a layer of aluminum with a thickness of 30um. On both sides of the aluminum layer a lacquer layer is applied. On a side of the aluminum layer facing the cover element the lacquer layer is a protective lacquer. On the opposite side of the aluminum layer the lacquer layer is a heat seal lacquer for attaching the lid to the membrane 8 of non-woven material by means of heat and pressure bonding.

The cover element 6 comprises a layer of aluminum with a thickness of between 40-60 um, and is preferably 47um thick as shown. On one side of the aluminum layer facing the lid a print is applied which may be at least in part be visible to the user to provide information indicating how to suitably remove the cover element from the lid, e.g. arrows indicating a pull direction. A transparent adhesive layer is provided on this print layer for adhering a layer of polyethylene (PE). The PE layer may be 20 - 40 mm thick, and is preferably 30 mm thick as shown. The PE layer is lacquered with a heat seal lacquer for attaching the cover element 6 to the lid 4. The heat seal lacquer provides a weaker bond strength to the PE layer than to the aluminum lid, so that when a removal force is applied on the cover element, the cover element will tear at the PE layer and heat seal lacquer interface indicated with X. On the other side of the aluminum layer a print primer and further print layer is applied to provide an aesthetic finish to the cover element. A protective lacquer is provided at the visible outer surface of the cover element 6 facing away from the lid.

The membrane 8 comprises a layer of mainly polyester fibers with a thickness of 1.35 mm.

Herein, the invention is described with reference to specific examples of embodiments of the invention. It will, however, be evident that various modifications and changes may be made therein, without departing from the essence of the invention. For the purpose of clarity and a concise description features are described herein as part of the same or separate embodiments, however, alternative embodiments having combinations of all or some of the features described in these separate embodiments are also envisaged.

In the examples, the capsule body and lid are made of aluminum foil, preferable polymer coated aluminum foil to allow easy welding of the lid to the body. It will be appreciated that the capsule body and/or lid can be made of a wide variety of materials considered suitable by the skilled person and capable of being processed into a sheet, film or foil using techniques conventionally known in the art such as extrusion, co-extrusion, injection molding, blow molding, vacuum forming, etc. Suitable materials for the capsule body and/or lid include, without being limited thereto, plastic materials, in particular thermoplastic materials, for example a polyolefin polymer, for example polyethylene or polypropylene, PVC, polyesters for example polyethylene terephthalate (PET); metal foils such as aluminum, stainless steel, metal alloys etc.; or sheets of a woven or a non-woven or otherwise processed fibrous material, like paper, polyester, etc.; or combinations thereof, e.g. multilayers. The material for the capsule can be a biodegradable polymer or another biodegradable material. The skilled person will be capable of selecting the appropriate material taking into account the envisaged use with food material and any other relevant circumstances during use of the capsule. The thickness of the sheet or foil may be chosen such that a form stable capsule is provided. The thickness of the sheet or foil may vary with the nature of the material.

In the examples, the capsules are pierced by the piercing means. It is also possible to provide the system with a capsule that is not pierced by the piercing means. Such capsule can e.g. include an entrance filter.

In the examples, the capsule has an outwardly extending flange-like rim to which the lid is attached. It will be appreciated that it is possible that the capsule does not include an outwardly extending rim.

Conclusies

1. Capsule voor het bereiden van een crema-vrije koffiedrank omvattende een in hoofdzaak stijf capsulelichaam met een omtrekswand welke zich uitstrekt rond een binnenruimte van de capsule welke ten minste gedeeltelijk gevuld is met een drankingrediënt geschikt voor het bereiden van de koffiedrank, en een basiswand welke de binnenruimte bedekt aan een eerste einde van de omtrekswand, waarbij de capsule een deksel omvat welke de binnenruimte bedekt aan een tweede einde van de omtrekswand tegenover de basiswand, waarbij een membraan is voorzien in de binnenruimte van de capsule tussen het drankingrediënt en het deksel, waarbij het deksel is voorzien van een voorgevormde uitlaatopening geschikt voor het afvoeren van de bereide drank uit de binnenruimte wanneer de capsule wordt gebruikt in een drankbereidingsinrichting, waarbij het membraan zich ten minste over het oppervlak van de uitlaatopening uitstrekt, welke uitlaatopening fluïdumdicht gesloten is door een verwijderbaar dekelement welke zich over ten minste een deel van het deksel uitstrekt.

2. Capsule volgens conclusie 1, waarbij het dekelement aan het deksel bevestigd is.

3. Capsule volgens conclusie 2, waarbij tussen het dekelement en het deksel een laag kleefmateriaal is voorzien geschikt voor een verwijderbare hechting van het dekelement aan het deksel.

4. Capsule volgens conclusie 3, waarbij de laag kleefmateriaal is voorzien op een deel van het dekelement dat zich uitstrekt over het deksel

met een gedeelte van het dekelement dat zich uitstrekt over de uitlaatopening in het deksel vrijwel vrij van kleefmateriaal.

5. Capsule volgens conclusie 3 of conclusie 4, waarbij een hechtingssterkte tussen de laag kleefmateriaal en het dekelement zwakker is dan een hechtingssterkte tussen de laag kleefmateriaal en het deksel.

6. Capsule volgens één der conclusies 3 tot en met 5, waarbij het kleefmateriaal een laag heatseal lak is.

7. Capsule volgens één der voorgaande conclusies, waarbij het deksel aan een omtreksrand aan het capsulelichaam bevestigd is.

8. Capsule volgens één der voorgaande conclusies, waarbij het membraan een laag van niet-geweven materiaal omvat welke is ingericht om vorming van een crema laag te voorkomen.

9. Capsule volgens conclusie 8, waarbij het membraan een dikte heeft in het bereik van 1.2-1.6 mm, een luchtdoorlatendheid in het bereik van 100 tot 700 mm/s bij 200 Pa, en een gewicht in het bereik van 300-600 g/m^2.

10. Capsule volgens één der conclusies 8 tot en met 9, waarbij het membraan aan het deksel bevestigd is.

11. Capsule volgens conclusie 10, waarbij het membraan en het deksel bevestigd zijn door middel van een laag kleefmateriaal, bij voorkeur een heatseal lak.

12. Capsule volgens één der voorgaande conclusies, waarbij het dekelement een velachtige aluminiumlaag omvat.

13. Capsule volgens conclusie 12, waarbij het dekelement een laminaat omvat van ten minste een aluminiumlaag en een kunststoflaag, in het bijzonder PE.

14. Capsule volgens één der voorgaande conclusies, waarbij het deksel in hoofdzaak een velachtige aluminiumlaag bevat.

15. Capsule volgens één der voorgaande conclusies, waarbij het deksel aan een zijde tegenover het dekelement een laag beschermende lak omvat.

16. Capsule volgens één der voorgaande conclusies, waarbij het dekelement een vrije treklip omvat welke uitsteekt van een deel van het dekelement dat de uitlaatopening bedekt.

17. Capsule volgens één der voorgaande conclusies, waarbij het capsulelichaam, het deksel, en het dekelement elk voornamelijk uit aluminium zijn vervaardigd.

18. Capsule volgens één der voorgaande conclusies, waarbij het drankingrediënt gemalen koffie omvat in een hoeveelheid van ten minste 7 gram.

19. Systeem voor het bereiden van een crema-vrije koffiedrank omvattende een uitwisselbare capsule en een drankbereidingsinrichting met een fluïdumafgifte-inrichting welke in staat is om een hoeveelheid fluïdum, zoals water, onder druk tussen 8-20 bar toe te voeren naar de capsule, en

met een brouwkamer, waarbij de brouwkamer een eerste brouwkamerdeel heeft voor het houden van de capsule en een tweede brouwkamerdeel heeft voor het sluiten van de brouwkamer, waarbij de uitwisselbare capsule een in hoofdzaak stijf capsulelichaam omvat met een omtrekswand welke zich rond een binnenruimte van de capsule uitstrekt welke ten minste gedeeltelijk gevuld is met een drankingrediënt geschikt voor het bereiden van de koffiedrank, en een basiswand welke de binnenruimte aan een eerste einde van de omtrekswand bedekt, welke basiswand bij gebruik van de capsule in de drankbereidingsinrichting wordt doorboord door ten minste één mes van de fluïdumafgifte-inrichting voor het toevoeren van de hoeveelheid fluïdum, waarbij de uitwisselbare capsule een deksel omvat die de binnenruimte bedekt aan een tweede einde van de omtrekswand tegenover de basiswand, waarbij het deksel een voorgevormde uitlaatopening heeft geschikt voor het afvoeren van de bereide drank uit de binnenruimte wanneer de capsule wordt gebruikt in de drankbereidingsinrichting, met een membraan voorzien in de capsule binnenruimte tussen de drankingrediënt en het deksel, waarbij het tweede brouwkamerdeel een extractieplaat omvat voor het aangrijpen van de uitwisselbare capsule aan het tweede einde van de omtrekswand wanneer de brouwkamer welke de capsule houdt wordt gesloten, waarbij de extractieplaat een scheuroppervlak omvat om gekeerd te zijn naar het deksel van de capsule, waarbij het deksel van de uitwisselbare capsule bij gebruik in de gesloten brouwkamer niet wordt beïnvloed door het scheuroppervlak.

20. Werkwijze voor het vervaardigen van een capsule geschikt voor het bereiden van een crema-vrije koffiedrank, in het bijzonder een capsule volgens één van de conclusies 1-18, waarbij de werkwijze omvat:

- het verschaffen van een in hoofdzaak stijf capsulelichaam met een omtrekswand welke zich uitstrekt rond een binnenruimte om ten minste gedeeltelijk te worden gevuld met een drankingrediënt geschikt voor het bereiden van de koffiedrank, en een basiswand welke de binnenruimte aan een eerste einde van de omtrekswand bedekt,
- het vullen van de binnenruimte met een hoeveelheid van het drankingrediënt door een open vulzijde van het capsulelichaam tegenover de basiswand,
- het verschaffen van een membraan in de binnenruimte na het vullen van de binnenruimte met een drankingrediënt, en
- het sluiten van de open vulzijde door een deksel te bevestigen aan het capsulelichaam welke zich over de open vulzijde uitstrekt,
waarbij het deksel voorafgaand aan de bevestiging aan het capsulelichaam wordt voorzien van een uitlaatopening waardoor bij gebruik een bereid drank uit de capsule kan vloeien, welke uitlaatopening fluïdumdicht gesloten is door het verschaffen van een verwijderbaar dekelement welke zich over de uitlaatopening en ten minste een deel van het deksel uitstrekt.

21. Werkwijze volgens conclusie 20, waarbij het verwijderbare dekelement wordt bevestigd aan het deksel voorafgaand aan het bevestigen van het deksel aan de capsule.

22. Werkwijze volgens conclusie 20 of conclusie 21, waarbij het membraan wordt bevestigd aan het deksel voorafgaand aan het bevestigen van het deksel aan de capsule.

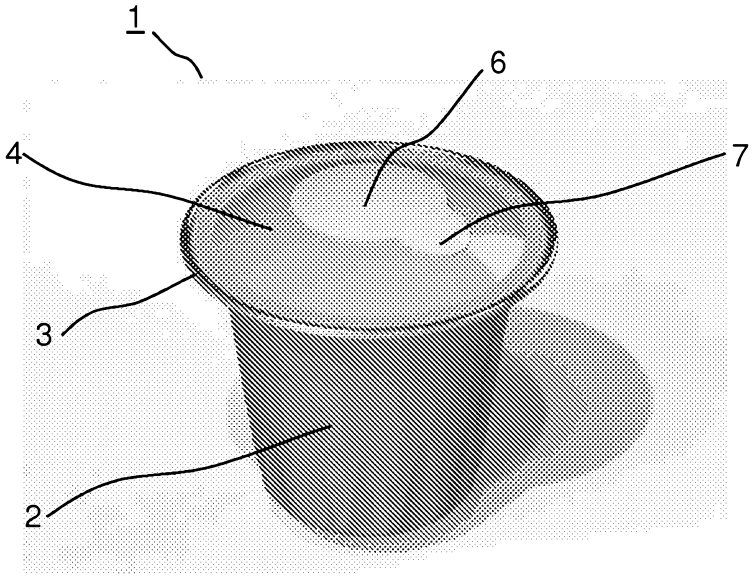

Fig. 1a

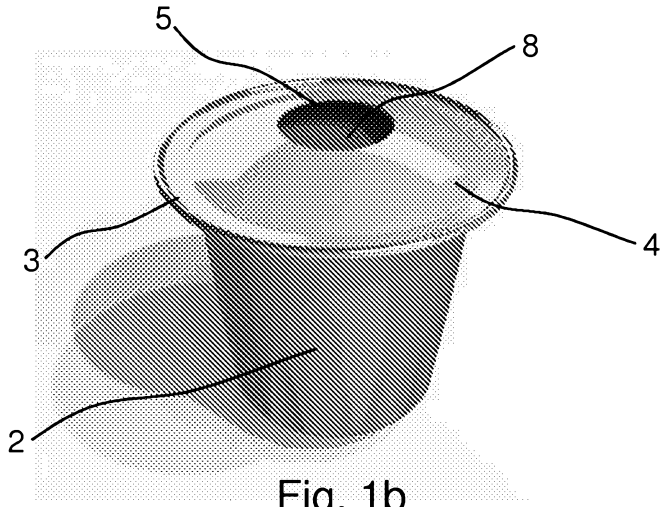

Fig. 1b

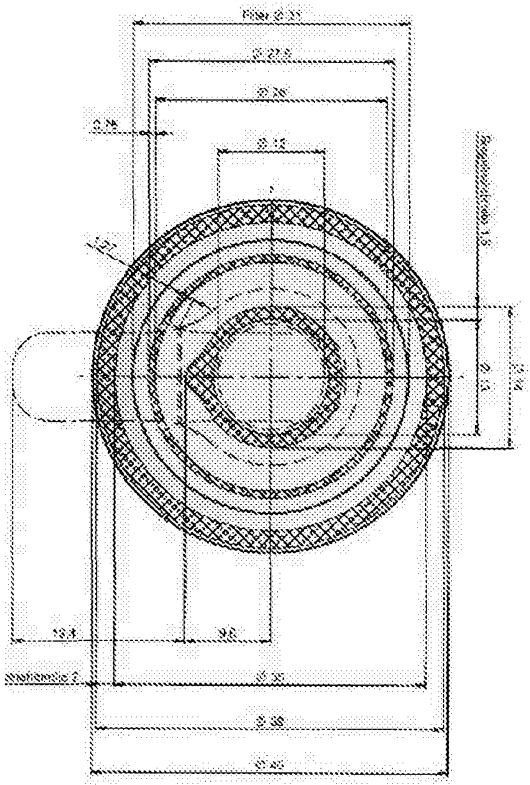

Fig. 2

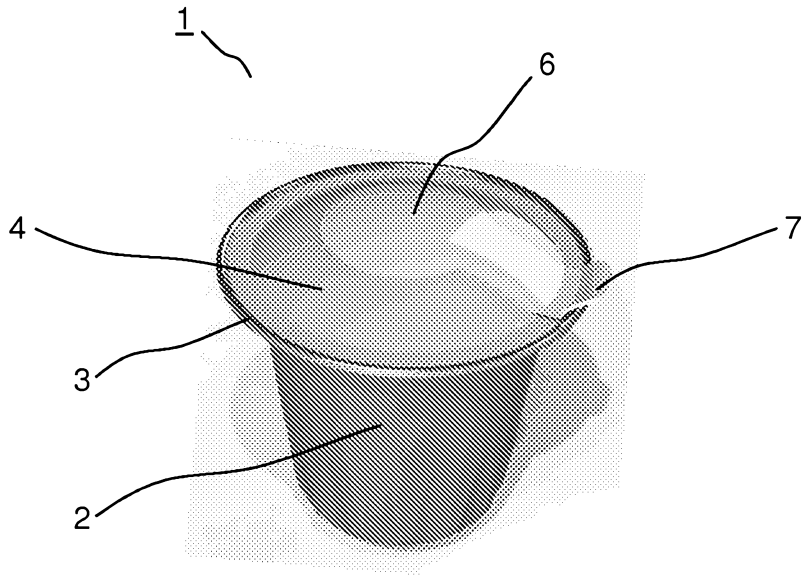

Fig. 3

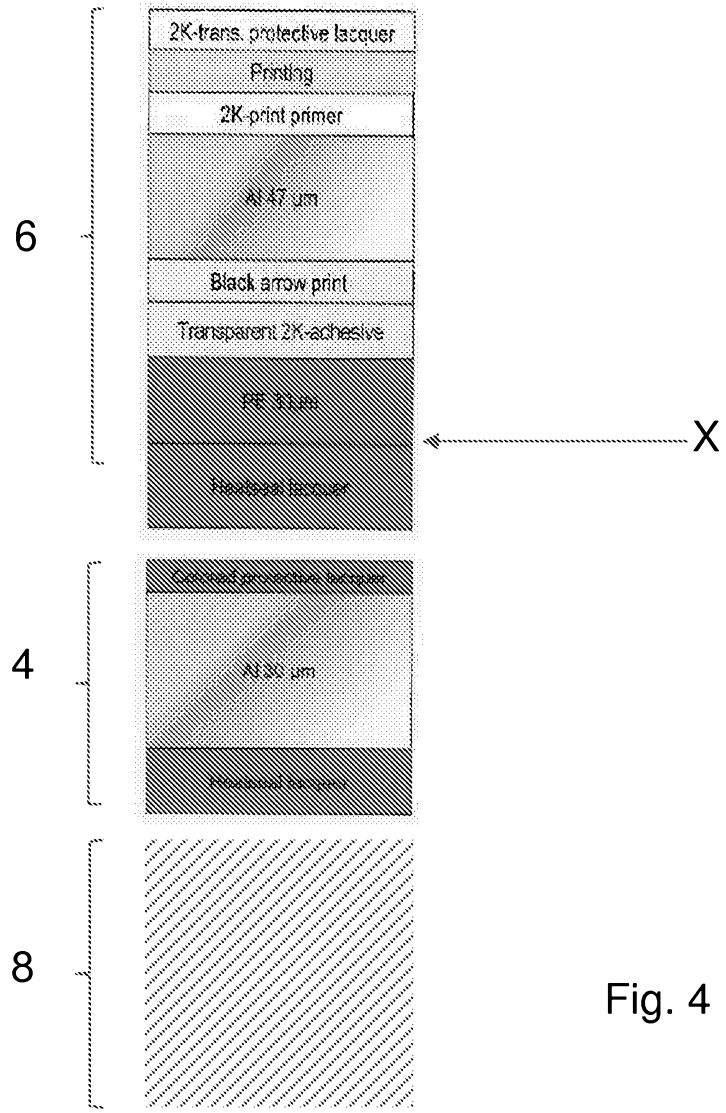
2K-trans. protective lacquer
Printing
2K-print primer
Al 47 µm
Black arrow print
Transparent 2K-adhesive
6
X
4
8

Fig. 4

Title: Capsule and system for preparing a crema-free coffee beverage

Abstract

A capsule for preparing a crema-free coffee beverage comprises a substantially rigid capsule body with a circumferential wall and a base wall that border an inner space filed with a beverage ingredient. An open filling side of the capsule at an end of the circumferential wall opposite the base wall is covered with a lid of fluid tight material. The lid is provided with a preformed outlet opening suitable for draining the prepared beverage from the inner space when the capsule is used in a beverage preparation device. The outlet opening is fluid tightly closed by a removable cover element extending over at least part of the lid.

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE
	P115706NL00
Nederlands aanvraag nr. **2019220**	Indieningsdatum **10-07-2017**
	Ingeroepen voorrangsdatum

Aanvrager (Naam)

Koninklijke Douwe Egberts B.V.

Datum van het verzoek voor een onderzoek van internationaal type	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr.
11-11-2017	**SN69963**

I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)

Volgens de internationale classificatie (IPC)

B65D85/804;A47J31/36

II. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimumdocumentatie

Classificatiesysteem	Classificatiesymbolen
IPC	**B65D;A47J**

Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

III.	☐	**GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES**	(opmerkingen op aanvullingsblad)
IV.	☐	**GEBREK AAN EENHEID VAN UITVINDING**	(opmerkingen op aanvullingsblad)

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2019220

A. CLASSIFICATIE VAN HET ONDERWERP
INV. B65D85/804
ADD. A47J31/36

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHTE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)
B65D A47J

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)
EPO-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	WO 03/073896 A1 (NEXSOL TECHNOLOGIES INC [KR]; KIM FIJEAU [KR]) 12 september 2003 (2003-09-12) * samenvatting; figuur 1 * * bladzijde 4, regel 24 - bladzijde 5, regel 17 * * bladzijde 12, regel 19 - bladzijde 12, regel 27 * * bladzijde 13, regel 16 - bladzijde 13, regel 25 * -----	1-22
X A	DE 10 2013 215274 A1 (K FEE SYSTEM GMBH [DE]) 21 augustus 2014 (2014-08-21) * alinea [0007] * * alinea [0005] * * alinea [0016] * * alinea [0017] * * alinea [0024] * -----	1-9, 12-21 10,11,22

-/--

[X] Verdere documenten worden vermeld in het vervolg van vak C.

[X] Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

* Speciale categorieën van aangehaalde documenten

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvrage vermeld

"E" eerdere octrooi(aanvrage), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvrage, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"&" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid	Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type
21 maart 2018	

Naam en adres van de instantie	De bevoegde ambtenaar
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Schnitzhofer, Markus

1

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2019220

C.(Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	US 2012/070543 A1 (MAHLICH GOTTHARD [DE]) 22 maart 2012 (2012-03-22) * samenvatting; figuur 9 * * alinea [0016] * * alinea [0037] *	1-22
A	US 2014/161936 A1 (TROMBETTA LIBERATORE A [CA] ET AL) 12 juni 2014 (2014-06-12) * samenvatting; figuren 7,8 *	1-22

Formulier PCT/ISA/201 (vervolg tweede blad) (januari 2004)

ONDERZOEKSRAPPORT BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar de stand van de techniek
NL 2019220

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
WO 03073896 A1	12-09-2003	AU 2003215924 A1	16-09-2003
		KR 20020028977 A	17-04-2002
		WO 03073896 A1	12-09-2003
DE 102013215274 A1	21-08-2014	AU 2014220733 A1	17-09-2015
		CA 2901819 A1	28-08-2014
		CN 104995107 A	21-10-2015
		DE 102013215274 A1	21-08-2014
		DO P2015000190 A	15-09-2015
		EP 2958832 A1	30-12-2015
		JP 2016511030 A	14-04-2016
		KR 20160003638 A	11-01-2016
		NZ 711458 A	28-10-2016
		PH 12015501810 A1	07-12-2015
		RU 2015139724 A	27-03-2017
		TN 2015000350 A1	03-01-2017
		US 2016058234 A1	03-03-2016
		WO 2014128205 A1	28-08-2014
US 2012070543 A1	22-03-2012	US 2012070543 A1	22-03-2012
		US 2015086688 A1	26-03-2015
US 2014161936 A1	12-06-2014	AU 2013354828 A1	09-07-2015
		AU 2016204465 A1	21-07-2016
		CA 2888658 A1	12-06-2014
		CN 105073606 A	18-11-2015
		EP 2928792 A1	14-10-2015
		EP 3178758 A1	14-06-2017
		KR 20150093741 A	18-08-2015
		US 2014161936 A1	12-06-2014
		WO 2014085934 A1	12-06-2014

WRITTEN OPINION

File No.	Filing date *(day/month/year)*	Priority date *(day/month/year)*	Application No.
SN69963	10.07.2017		NL2019220

International Patent Classification (IPC)
INV. B65D85/804 ADD. A47J31/36

Applicant
Koninklijke Douwe Egberts B.V.

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

Examiner
Schnitzhofer, Markus

Application number

WRITTEN OPINION

NL2019220

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ on paper

   ☐ in electronic form

   c. time of filing/furnishing:

   ☐ contained in the application as filed.

   ☐ filed together with the application in electronic form.

   ☐ furnished subsequently for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes:	Claims	5-7, 9, 11-15, 17, 18
	No:	Claims	1-4, 8, 10, 16, 19-22
Inventive step	Yes:	Claims	
	No:	Claims	1-22
Industrial applicability	Yes:	Claims	1-22
	No:	Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Box No. VII Certain defects in the application

see separate sheet

1 **Re Item V**

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1 WO 03/073896 A1 (NEXSOL TECHNOLOGIES INC [KR]; KIM FIJEAU [KR]) 12 september 2003 (2003-09-12)

D2 DE 10 2013 215274 A1 (K FEE SYSTEM GMBH [DE]) 21 augustus 2014 (2014-08-21)

D3 US 2012/070543 A1 (MAHLICH GOTTHARD [DE]) 22 maart 2012 (2012-03-22)

D4 US 2014/161936 A1 (TROMBETTA LIBERATORE A [CA] ET AL) 12 juni 2014 (2014-06-12)

1.1 The present application does not meet the criteria of patentability, because the subject-matter of claim 1 is not new.

D1 discloses:

A capsule (10) for preparing a crema-free coffee beverage comprising a substantially rigid capsule body (20) having a circumferential wall extending around an inner space of the capsule which is at least partially filled with a beverage ingredient suitable for preparing the coffee beverage, and a base wall covering the inner space at a first end of the circumferential wall, the capsule comprising a lid (30) covering the inner space at a second end of the circumferential wall opposite the base wall, wherein a membrane (filter 71) is provided in the inner space of the capsule between the beverage ingredient and the lid, wherein the lid is provided with a preformed outlet opening (57) suitable for draining the prepared beverage from the inner space when the capsule is used in a beverage preparation device, wherein the membrane extends at least over the surface of the outlet opening, which outlet opening is fluid tightly closed by a removable cover element (59) extending over at least part of the lid.

1.2 D1 and D3 also disclose all features of the capsule of claim 1 of the present application.

1.3 A system as in independent claim 19 is not considered new, as it is disclosed in D2 (see figs 6a,b,7a,b).

1.4 A method as in claim 20 is not new, as such a method is also disclosed in D1-D3 (at least implicitly).

1.5 Dependent claims 2-4,8,10,16,21,22 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of novelty, as the additional features therein are also disclosed in D1, D2 or D3, see search report.

1.6 Dependent claims 5,6,7,9,11-15,17-18 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of inventive step, as they refer to constructional details known to the person skilled in the art.

2 **Re Item VII**

Certain defects in the application

2.1 The independent claims are not in the two-part form.

2.2 The features of the claims are not provided with reference signs placed in parentheses.

2.3 The relevant background art disclosed in D1-D4 is not mentioned in the description, nor are these documents identified therein.