Abstract:

Title: CAPSULE COMPRISING AN EXTRACTABLE PRODUCT

(57) Abstract: Exchangeable capsule, comprising a circumferential wall, a bottom, a lid extending opposite to the bottom, and an inner space that is enclosed by the circumferential wall, the bottom, and the lid, an extractable product that is provided in the inner space, and a rim that at least partly projects towards the outside of the capsule, from a top edge of the circumferential wall, where- in the bottom comprises an entrance area for supplying fluid to the extractable product, the lid comprises an exit area for draining beverage, and the capsule comprises a reinforcement structure that extends at and/or near the rim for increasing rigidity of the rim.

(54) Title: CAPSULE COMPRISING AN EXTRACTABLE PRODUCT

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Title: Capsule comprising an extractable product

The invention relates to an exchangeable capsule, comprising a circumferential wall, a bottom, a lid extending opposite to the bottom, and an inner space that is enclosed by the circumferential wall, the bottom, and the lid, an extractable product that is provided in the inner space, and a rim that at least partly projects towards the outside of the capsule, from a top edge of the circumferential wall, wherein the bottom comprises an entrance area for supplying fluid to the extractable product, the lid comprises an exit area for draining beverage.

In the art hermetically sealed capsules comprising ground coffee, for placement in a coffee dispensing apparatus, are known. During coffee preparation the entrance area of such sealed capsule is pierced, so that entrance openings are provided for supplying fluid under pressure to the grounded coffee in the inner space of the capsule. This in turn causes the pressure in the inner space of the capsule to rise, such that an exit area of the capsule is pressed against lid piercing means that are present in the receptacle. When sufficient pressure is applied, the exit area will tear against the lid piercing means creating exit openings through which the coffee drink can drain from the capsule through an outlet present in the apparatus. In use, the outlet is in fluid communication with the exit area of the receptacle so that coffee drink may flow through the outlet.

The capsule may comprise a circumferential rim near the lid, the rim projecting from the outside of the capsule. When the capsule is brought in position in the receptacle, the rim may abut an edge of the receptacle, while the circumferential wall of the capsule extends within the receptacle. In use, the receptacle may be moved to mechanically press the exit area of the capsule, including the rim, against the outlet so that the rim is pressed between the receptacle and the outlet. By applying enough pressure, a space between the
receptacle and the rim, as well as a space between the rim and the outlet, may be sealed enough to prevent leakage there between. The receptacle may additionally comprise a seal ring to provide better sealing. Preferably, it is ensured that substantially all fluid and/or beverage flows from the fluid dispenser, through the capsule and through the outlet, without leakage.

It has been found however, that the capsule may deform in the receptacle. Deformation of the circumferential wall and/or the rim may occur because of the water pressure and heat inside of the capsule and/or because of the mechanical pressure that is applied by the receptacle to the rim. For example, it may happen that the rim is partly deformed so that it is folded within the receptacle, or between the receptacle and the outlet. This may cause leakage of supplied fluid, such as water, and/or extractable product, such as ground coffee.

Therefore, one of the objects of the invention is to at least diminish one of abovementioned problems with such capsule.

Therefore, according to a first aspect, a capsule is provided according to claim 1.

A capsule is provided that comprises one or more flanges extending away from the axis. In an embodiment such flanges may be oblique or radial flanges. These flanges may extend at and/or near the rim for increasing rigidity of the rim and/or part of the circumferential wall. The flanges may be arranged along the upper edge of the wall, preferable coupled to the rim, for rigidifying the rim and/or at least a part of the wall. In an embodiment, the flanges may be formed integrally with the rim. The flanges may also be formed along the inner circumferential wall. The flanges may be evenly distributed, one after another, along the rim of the capsule.

Such flanges may be regarded as reinforcement structures for strengthening the capsule, especially at and/or near the rim, so that it may be accurately positioned in the receptacle, with a relatively low risk of being deformed. In particular, radial flanges may be chosen as reinforcement
structures. Moreover, the capsule may be taken between the fingers at its rim, with a relatively low risk of bending the rim and/or part of the circumferential wall. While in an embodiment, in use, the flanges themselves may slightly deform, for example by the pressing action of the edges of the receptacle against the rim, deformation of the rim itself may be largely prevented because of the rigidifying effect of the flanges, at least up until actual pressurising of the rim against the outlet arrangement.

The presence of the flanges may accommodate relatively accurate sealing. In an embodiment, the edge of the receptacle may be partly resilient to seal fluid tightly against the rim and the flanges. In a further embodiment, the flanges may deform because of the pressing action of the receptacle, in such a manner that sealing may be obtained. In yet another embodiment, the rim comprises a sealing element. The sealing element may comprise a ring or the like. The sealing element may be arranged so that relatively accurate sealing may be obtained between the receptacle, the rim and the outlet arrangement, preferably so that accurate sealing is not impeded by the flanges.

According to a second aspect, a system is provided according to claim 19.

The capsule may form part of a system for preparing a predetermined quantity of beverage. In this system, an apparatus is provided, comprising a receptacle for holding the exchangeable capsule, and a fluid dispensing device for supplying an amount of a fluid, such as water, under pressure to the exchangeable capsule. The fluid dispensing device may be in fluid connection with the bottom of the capsule for supplying fluid to the extractable product. The apparatus may further comprise an outlet arrangement which, in use, is in fluid communication with the lid for draining the prepared beverage from the capsule and supplying the beverage to a container such as a cup. The flanges of the capsule may ensure that the rim does not fold and/or deform in the receptacle, when the lid is brought in fluid communication with the outlet arrangement.
In yet another embodiment, the receptacle comprises bottom piercing means intended for piercing the entrance area of an alternative capsule, for creating at least one entrance opening in the lid of the alternative capsule for supplying the fluid to the extractable product through said at least one entrance opening. However, in use, the entrance area of the capsule according to an embodiment of the invention may be positioned at a distance from the bottom piercing means, such that it is not pierced by the bottom piercing means and stays intact, as opposed to the alternative capsule.

In again a further embodiment, the receptacle comprises lid piercing means intended for piercing the exit area of an alternative capsule when the exit area is sufficiently pressed against the lid piercing means under the influence of pressure of the fluid and/or beverage in the alternative capsule for creating at least one exit opening through which the beverage can drain from the alternative capsule. However, the lid piercing means and the exit area of the capsule according to an embodiment of the invention may be adapted to each other such that it, in use, is not pierced by the lid piercing means and stays intact.

Furthermore, according to a third aspect, a method is provided according to claim 24.

Further embodiments of the invention and advantages thereof may be set out in the claims and description, with reference to the drawings.

In the drawings:

Fig. Ia schematically shows a system comprising a capsule that is positioned in an apparatus, in cross-sectional front view;

Fig. Ib schematically shows the capsule and apparatus of Fig. Ia in cross-sectional front view after bottom piercing means have been moved towards the capsule;

Fig. Ic schematically shows the capsule and apparatus of Fig. Ia and Ib in cross-sectional front view after fluid has been added to the capsule;
Fig. 2a schematically shows another embodiment of a capsule in cross-sectional front view;

Fig. 2b schematically shows the capsule of Fig. 2a in cross-sectional top view;

Fig. 3 schematically shows yet another embodiment of a system in cross-sectional front view;

Fig. 4 schematically shows another embodiment of a capsule in cross-sectional front view;

Fig. 5a - 5c schematically show details of different embodiments of upper parts of a capsule in cross-sectional front view;

Fig. 6 schematically shows a detail of an embodiment of an upper part of a capsule in cross-sectional front view.

Fig. 7 presents an embodiment of a cross-section of a capsule provided with oblique flanges.

In this description, identical or corresponding areas have identical or corresponding reference numerals. The exemplary embodiments shown should not be construed to be limitative in any manner and serve merely as illustration.

In Fig. 1a-Ic schematic drawings are shown of a system 1 for preparing a predetermined quantity of beverage suitable for consumption using an extractable product. The system 1 comprises an apparatus 3 and an exchangeable capsule 4. The apparatus 3 comprises a receptacle 5 for holding the capsule 4. The receptacle 5 may have shape complementary to the shape of the capsule 4. In Figs. 1a-Ic a gap is shown between the capsule 4 and the receptacle 5 for the purpose of illustration. It will be appreciated that, in use, the capsule 4 may lie in contact with the receptacle 5. The apparatus 3 further comprises a fluid dispensing device 6 for supplying an amount of a fluid, such as water, under pressure to the exchangeable capsule 4. The fluid dispensing device 6 may be arranged for supplying the fluid to the exchangeable capsule 4 under a pressure of approximately 4 - 20 bars, preferably 6 - 18 bars, more
preferably 8—15 bars, for example 9 bars. The temperature of the fluid may for example be between 0 and 100°C. For hot beverages such as coffee or tea, the temperature for example may be between 60 and 98°C, preferably approximately 90°C.

The capsule 4 comprises a circumferential wall 7, a bottom 8, a lid 9 that extends opposite to the bottom 8, and an inner space 10 that is enclosed by the circumferential wall 7, the bottom 8, and the lid 9. The circumferential wall 7 may preferably be fairly rigid, to prevent possible buckling of the wall 7 by internal and/or external pressures. An extractable product 11 is provided within the inner space 10. The extractable product 11 may comprise roasted and ground coffee. For example, the extractable product 11 in the capsule 4 may be compressed. In an embodiment, the extractable product 11 may itself support the walls 7, 8, 9 of the capsule 4.

A rim 12 may project from a top edge 13 of the circumferential wall 7, towards the outside of the capsule 4. The bottom 8 comprises an entrance area for supplying fluid to the extractable product 11. The extractable product 11 may for example comprise roasted and ground coffee beans. The lid 9 comprises an exit area for draining beverage such as for example coffee. The capsule 4 further comprises radial flanges 14 that extend near the top edge 13 of the circumferential wall 7 for increasing rigidity of the rim 12. As shown, the flanges 14 may be coupled to the rim 12 and to the top part of the outside of the circumferential wall 7. The flanges 14 may form an integral part of the rim 12 and/or the circumferential wall 7. For example, four, eight, twenty, or any number of radial flanges 14 may be formed along the rim 12, wherein the flanges 14 may be evenly distributed along the rim 12. It will be appreciated that the flanges 14 may be provided with any suitable angle with respect to the surface of the wall 4 of the capsule.

The capsule 4 may comprise ground coffee beans or another similarly extractable or soluble product 11. The inner space 10 may comprise an amount of extractable product 11 suitable for preparing a single portion of
beverage, such as coffee. Such portion of beverage may for example have a volume of between 30 and 200 millilitres. The extractable product 11 may have a weight of approximately between 2 and 16 gram, preferably between 3.5 and 12 gram, more preferably between 5 and 10 gram, for example approximately 7 gram. In a particularly advantageous embodiment the weight of the product, such as coffee, may be between 4.5 and 8 gram. The capsule 4 may be designed to fit such weights and/or a corresponding volume of extractable product 11. The capsule 4 may have a height H of approximately 30 millimetres, or at least between 10 and 40 millimetres (see Fig. 1a). The capsule 4 may at least partially have a substantially conical or frustoconical shape, wherein the cross-sectional diameter d2, d3 of the capsule 4 may for example vary between 5 and 80 millimetres. The capsule 4 may taper towards the bottom 8. For example, the cross-sectional diameter d2 of the capsule 4 near the lid 9, excluding the rim 12, may be approximately 30 millimetres, and the diameter d3 of the same capsule 4 near the bottom 8 may be approximately 24 millimetres. The conical shape may facilitate positioning in the receptacle 5. For example, the bottom 8 itself may taper over a relatively sharper angle than the circumferential wall 7 (not shown). The bottom 8 may for example be conical, frustoconical or rounded, for facilitating relatively easy positioning in the receptacle. In an embodiment, the bottom 8 may comprise a rounded edge between the bottom 8 and the circumferential wall 7.

The apparatus 3 may be arranged for bringing the fluid dispensing device 6 in fluid connection with the bottom 8 of the capsule 4 for supplying fluid to the extractable product 11. To this end, the apparatus 3 may be arranged to achieve a relatively accurate seal between the capsule 4 and the receptacle 5. The apparatus 3 may further comprise an outlet arrangement which, in use, is in fluid communication with the lid 9 for draining the prepared beverage from the capsule 4 and supplying the beverage to a container such as a cup.
As shown in Fig. Ia-Ic, the system 1 may comprise bottom piercing means 16 intended for piercing the capsule 4. Here, the bottom piercing means 16 may comprise a knife or needle or the like. Fig. Ia shows the bottom piercing means 16 in a retracted position. The bottom piercing means 16 may comprise a bore 17 through which fluid can be supplied to the extractable product 11 that is contained in the inner space 10, the bore 17 being part of the fluid dispensing device 6. Alternatively, the bore 17 may extend separately from the bottom piercing means 16, such that it, in use, supplies fluid to the capsule 4 through holes in the capsule 4, which holes may be made by said bottom piercing means 16.

The system 1 may further comprise lid piercing means 18. The lid piercing means 18 may comprise protrusions against which the lid 9 may tear.

The system 1 shown in Figs. Ia-Ic may operate as follows. The capsule 4 is placed in the receptacle 5, so that the rim 12 and/or flanges 14 may abut the edge 19 of the receptacle 5. As shown in Fig. Ib, after the capsule 4 is positioned, the bottom piercing means 16 may be activated to pierce the bottom 8 of the capsule 4 for creating entrance openings 20. Hence, the fluid dispensing device 6 is arranged in fluid connection with the bottom 8 of the capsule 4 for supplying fluid to the extractable product 11. The fluid, which may be water under pressure, is supplied to the extractable product 11 from the bore 17 through these entrance openings 20. The water will wet the extractable product 11 and extract the desired substances to form the desired beverage.

While the water is supplied under pressure to the inner space 10, the pressure inside the capsule 4 may rise. The rise in pressure may cause the lid 9 to deform and be pressed against the lid piercing means 18, creating exit openings 21 in the lid 9 (see Fig. Ic). Hence, the outlet arrangement 15 may be in fluid communication with the lid 9. The prepared beverage may then drain from the capsule 4 through the exit openings 21 and through the outlet arrangement 15, for example into a container such as a cup.
The outlet arrangement 15 may comprise an abutment part 22, for abutment with the rim 12 and/or radial flanges 14 of the capsule 4. During pressing of the edge 19 of the receptacle 5 against the rim 12, the rim 12 may be pressed against the abutment part 22. The outlet arrangement 15 may further comprise one or multiple outlet openings 23. The outlet openings 23 may guide the beverage to a cup or other container that may be put in position under the outlet arrangement 15.

Before pressure is applied to the rim 12 by the edge 19 of the receptacle 5, the flanges 14 may abut the edge 19 of the receptacle 5. When the receptacle is activated, pressure may be applied to the rim 12 while it is pressed between the edge 19 of the receptacle 5 and the abutment part 22 of the outlet arrangement 15. During such pressing action, the flanges 14 may deform. Such deformation may prevent leakage of fluid and/or beverage along the radial flanges 14. Even when provided with radial flanges 14, the rim 12 may have a sealing function. In another embodiment, deformation of the flanges 14 may be prevented by providing the edge 19 of the receptacle 5 with a shape that is complementary to the rim 12 with flanges 14. The flanges 14 may fit in the edge 19 of the receptacle 5. In yet another embodiment, the edge 19 of the receptacle 5 may be resilient and/or flexible so that the spaces between the flanges 14 may be sufficiently sealed because of temporary deformation of the edge 19 of the receptacle 5.

In a further embodiment, the capsule 4 may be provided with flexible sealing material and/or with a separate seal ring 24, preferably along the rim 12 and/or along the radial flanges 14 (see Fig. 2a and 2b). The seal ring 24 may be provided along, under and/or above the rim 12 and/or may form part of the rim 12. The seal ring 24 may fill up the space between the radial flanges 14, so that leakage between the flanges 14 may be prevented.

In again another embodiment (see Fig. 2a and 2b), the flanges 14 may be arranged along the inner circumferential wall 7. The flanges 14 may be arranged to have a rigidifying function, so that deformation of the rim 12
and/or upper circumferential wall part 13, during pressing of the receptacle 5 against the outlet arrangement 15, may be prevented. Preferably, the flanges 14 extend at least near the top edge 13 of the circumferential wall 7, so that they may increase the rigidity of the rim 12.

In this description, radial flanges 14 may be understood as indicating that the flanges 14 may be orientated in a direction from the inside of the capsule 4 towards the outside, or vice versa, as can be seen from the exemplary embodiment of Figs. 1a-Ic, 2a and 2b. In particular, the flanges 14 may comprise a ridge 25 that may extend in a direction from the inside of the capsule 4 towards the outside of the capsule 4, preferably approximately perpendicular to the rim 12. For example, the flanges 4 may extend in a direction that is approximately perpendicular to a rotational axis of the capsule 4 and perpendicular to the rim 12 of the capsule 4, the rotational axis running through the middle of the bottom 8 and the lid 9.

The flanges 14 may permit that the rim 12 may be relatively thin. For example, the rim 12 may have a thickness ti of approximately two millimetres or less (see Fig. 2a and 2b). In an embodiment, the rim 12 may have a thickness ti of approximately 1.5 millimetres or less. The thickness t2 of the flange 14 may be approximately two millimetres or less. In an embodiment, the flanges 14 may have a thickness t2 of approximately 1.5 millimetres or less. The rim 12 may for example protrude from the circumferential wall 7 over a distance dl of approximately between two and twenty millimetres, for example between three and five millimetres. The flanges 14 may have a height H2 of approximately one millimetre or more, for example approximately two, three, four, five, six, seven or eight millimetres or more (see Fig. 1c and 2a).

Another embodiment is shown in Fig. 3. Here, the system 1 may comprise bottom and lid piercing means 16, 18 as explained above. However, in a position when the receptacle 5 presses the rim 12 against the outlet arrangement 15, as shown in Fig. 3, the bottom 8 of the capsule 4 may be
positioned at a distance $d_4$ from the bottom piercing means 16, such that it is not pierced by the bottom piercing means 16 and stays intact. For example, the height $H$ of the capsule 4 may be approximately 25 millimetres or less, or approximately 20 millimetres or less, or approximately 15 millimetres or less.

The distance $d_4$ between the bottom 8 and the bottom piercing means 16 may depend on the length of the bottom piercing means 16. The bottom 8 may be provided with an entrance filter 26, comprising entrance openings 20 for the supply of fluid to the extractable product 11, from the fluid dispensing device 6. Hence, the fluid dispensing device 6 is arranged in fluid connection with the bottom 8 of the capsule 4 for supplying fluid to the extractable product 11, without tearing or cutting the bottom 8.

In another embodiment, the lid piercing means 18 and the exit area of the lid 9 of the capsule 4 are adapted to each other such that it, in use, is not pierced by the lid piercing means 18 and stays intact. The lid 8 may have sufficient strength to withstand tearing or breaking when it is pressed against the lid piercing means 18 by the pressure of the fluid and beverage inside the capsule 4. The lid 9 may also be arranged to be rigid so that it does not come into contact with the lid piercing means 18. In a further embodiment the lid 9 may comprise an exit filter 27 through which the beverage may drain from the capsule 4. The exit filter 27 may comprise pre-shaped exit openings 21. The exit openings 21 may prevent that too much pressure builds up in the inner space 10 of the capsule 4, so that it may be prevented that the lid 9 tears against of the lid piercing means 18. A pre-shaped exit filter 21 may facilitate a more controlled extraction process. In yet another embodiment, the lid 9 may be arranged at a distance from the rim 12, so that, in use, the lid 9 does not touch the lid piercing means 18 (see Fig. 4). The exit area of the lid 9 may be provided with exit openings 21.

In an embodiment, the rim 12 may be provided at the edge of the lid 9. As shown in Figs. Ia-Ic, 2 and 3, the lid 9 and the rim 12 may together form a top surface 27 of the capsule 4. The lid 9 and the rim 12 may be integrally
shaped. The exit filter 27 may be formed integrally with the lid 9, preferably within and next to the rim 12. In a different embodiment, the lid 9 may be arranged at a distance from the rim 12, as shown in Fig. 4. In this embodiment, the radial flanges 14 may rigidify the rim 12 and the upper part of the circumferential wall 7, wherein the upper part of the circumferential wall 7 that may be arranged between the lid 9 and the rim 12.

As shown in Fig. 4, the rim 12 may comprise a circumferential flange 28, which may extend from the rim 12. The circumferential flange 28 may rigidify the rim 12 in addition to the radial flanges 14 and/or the oblique flanges. The circumferential flange 28 may also facilitate appropriate sealing. For example, a substantially fluid tight sealing may be obtained between the rim 12 and the apparatus 2, wherein the circumferential flange 28 may prevent possible impeding of proper sealing by the radial flanges 14. The circumferential flange 28 may function as a sealing ring 24. In Fig. 5a, 5b and 5c, other embodiments of circumferential flanges 28 are shown, wherein the circumferential flange 28 may be formed by the rim 12 itself being curled or cornered towards the inside, in a direction towards the bottom 8. The radial flanges 14 may for example be arranged at the inner circumferential wall 7 (Fig. 5a) or within the rim 12 (Fig. 5b). In another embodiment, the rim 12 may be curled or curved in a direction away from the bottom 8 (not shown). As shown in Fig. 5c, the rim 12 may comprise multiple circumferential flanges 28. Each circumferential flange 28 may extend in the same direction, for example towards the bottom 8, as shown in Fig. 5c. The radial flanges 14 may extend between the circumferential flanges 28. In another embodiment, the circumferential flanges 28 may extend in different and/or opposite directions. For example, one circumferential flange 28 may extend in a direction away from the bottom 8, while another circumferential flange 28 extends in a direction towards the bottom 8.

As shown in Fig. 6, the rim 12 may comprise ridges 29. The ridges 29 may form pits, grooves, protrusions and/or folds in the rim 12. The ridges 29
in the rim 12 may rigidify the rim 12. The ridges 29 may for example cause the surface of the rim 12 to have a height difference dH of 0,5 millimetre or more, or 1 millimetre or more. The ridges 29 may be provided in addition to, or instead of, the radial flanges 14 and/or the concentric flanges 28.

In a further embodiment, the radial flanges 14 may be formed integrally with the rim 12, and/or with the circumferential wall 7, and/or with the whole capsule 4. The material of the capsule 4 may comprise cellulose, paper, cotton, and/or starch-based products. For example, the material of the capsule 4 may comprise biodegradable material. In another embodiment, the material of the capsule 4 may comprise plastics. The bottom 8 and the lid 9 may comprise an entrance and an exit filter 26, 27, respectively. The filters 26, 27 may comprise the same material as the circumferential wall 7 and/or the flanges 14. Also the seal ring 24 may comprise the same material as the rest of the capsule 4. For instance, the capsule 4 may be shaped in a mould, wherein the rim material 12 may have a different density than the material of the circumferential wall 7, to locally provide resilience and/or flexibility to the rim 12, and so that a proper sealing may be achieved. The capsule 4 may for example be shaped by injection moulding, vacuum-forming, thermoforming, compression moulding, or the like. In the above description, integrally shaped may be understood as comprising that the respective parts of the capsule 4 are formed approximately at the same time, in one form process. For example, the respective parts may be moulded in the same mould. In another embodiment, different parts may be heat-sealed, glued or welded to form the capsule 4.

At least one of the filters 26, 27 may comprise a porous fluid permeable sheet. At least one of the filters 26, 27 may comprise filtering paper and/or polyethylene (PE) fibres. Substantially the whole surface of the bottom 8 and/or lid 9, at least for the part extending inside the circumferential wall 7, may be fluid permeable. The filters 26, 27 may also be made to be permeable when waters supplied under a specific pressure, for example a pressure of at least 6 bars. For example, at lower pressures fluid will not flow through the
filter 26, 27. At least one of the filters 26, 27 may be flexible. The filter 26, 27 may comprise a polymeric foil.

Before positioning the capsule 4 in the apparatus, i.e. during transport, storage and/or presentation, the capsule 4 may be packaged and/or wrapped in a foil, paper or other packaging. This may prevent the extractable product 11 to be exposed to too much air via the entrance and/or exit openings 20, 21. In another embodiment, the lid 9 and/or the bottom 8 may be sealed by a cover, for example a cover that is glued, welded or heat-sealed to the lid 9 and/or bottom 8. Before positioning the capsule 4 in the apparatus 2, the respective packaging, wrap, cover or the like may be taken from the capsule 4.

The extractable product 11 may comprise an extractable coffee or tea product, such as roasted and ground and/or cut coffee beans, dried and/or cut tea leaves. The extractable product 11 may also comprise chocolate extracts, milk powder, or any other suitable extractable product 11. The extractable product 11 could further comprise any mixture of the foregoing and/or any of the foregoing products put in layers on top of and/or between each other. Also chemical products for adding flavour to a fluid may be included in the extractable product 11. The extractable product 11 may be compressed to fit in the capsule 4. The fluid that is added to the extractable product 11 to obtain the beverage may for example comprise hot or cold water, or milk. The obtained beverage may comprise, amongst others, a coffee drink, tea drink, chocolate drink, or another beverage.

Fig. 7 presents an embodiment of a cross-section of a capsule provided with oblique flanges. In this embodiment the oblique flanges 14a may be arranged along the inner circumferential wall 7. The flanges 14a may be arranged to have a rigidifying function, so that deformation of the rim shown in Figure 2a and/or upper circumferential wall part 13, during pressing of the receptacle 5 against the outlet arrangement 15, may be prevented (all shown in Figure 2a). Preferably, the flanges 14a extend at least near the top edge of the circumferential wall 7, so that they may increase the rigidity of the rim.
It will be appreciated that further characteristics of the oblique flanges 14a may be the same as characteristics of the radial flanges discussed with reference to Figure 2a.

It shall be clear that the invention is not limited in any way to the embodiments that are represented in the description and the drawings. Many variations and combinations are possible within the framework of the invention as outlined by the claims. In particular, when the context allows the term 'radial flange' may be replaced by the term 'oblique flange'. Combinations of one or more aspects of the embodiments or combinations of different embodiments are possible within the framework of the invention. All comparable variations are understood to fall within the framework of the invention as outlined by the claims.
Claims

1. Exchangeable capsule, comprising
   a circumferential wall, a bottom, a lid extending opposite to the
   bottom, and an inner space that is enclosed by the circumferential wall, the
   bottom, and the lid,

5 an extractable product that is provided in the inner space, and
   a rim that at least partly projects towards the outside of the capsule,
   from a top edge of the circumferential wall, wherein
   the bottom comprises an entrance area for supplying fluid to the
   extractable product,

10 the lid comprises an exit area for draining beverage, and
   the capsule comprises a reinforcement structure that extends at
   and/or near the rim for increasing rigidity of the rim.

2. Capsule according to claim 1, wherein the reinforcing structure
   comprises radial or oblique flanges.

3. Capsule according to claim 2, wherein the radial or oblique flanges are
   coupled to the rim.

4. Capsule according to claim 3, wherein the radial or oblique flanges
   are formed integrally with the rim.

5. Capsule according to any of the preceding claims, wherein the radial
   or oblique flanges extend in a direction towards the outside of the capsule,
   approximately perpendicular to the rim.

6. Capsule according to any of the preceding claims, wherein the radial
   or oblique flanges are at least partially coupled to the circumferential wall.

7. Capsule according to any of the preceding claims, wherein the rim is
   provided with a seal ring.

8. Capsule according to any of the preceding claims, wherein the
   circumferential wall and the rim are integrally formed.
9. Capsule according to any of the preceding claims, wherein the lid and circumferential wall are integrally formed.

10. Capsule according to any of the preceding claims, wherein the bottom comprises an entrance filter for supplying fluid to the extractable product.

11. Capsule according to any of the preceding claims, wherein the lid comprises an exit filter through which the beverage can drain from the capsule.

12. Capsule according to any of the preceding claims, wherein the rim has a thickness of approximately two millimetres or less.

13. Capsule according to any of the preceding claims, wherein the rim is provided at the edge of the lid.

14. Capsule according to any of the preceding claims, wherein the rim comprises at least one circumferential flange that extends at an angle with the lid.

15. Capsule according to any of the preceding claims, wherein the rim comprises ridges and/or grooves.

16. Capsule according to any of the preceding claims, wherein the rim comprises a sealing ring.

17. Capsule according to any of the preceding claims, wherein the capsule is substantially made of bio-degradable material.

18. Capsule according to any of the preceding claims, wherein the extractable product comprises an extractable coffee, tea or chocolate product.

19. System for preparing a predetermined quantity of beverage suitable for consumption using an extractable product, comprising:

   an exchangeable capsule, and
   an apparatus comprising a receptacle for holding the exchangeable capsule, and a fluid dispensing device for supplying an amount of a fluid, such as water, under pressure to the exchangeable capsule,
wherein the apparatus is arranged for bringing the fluid dispensing device in fluid connection with the bottom of the capsule for supplying fluid to the extractable product,

the apparatus comprises an outlet arrangement which, in use, is in fluid communication with the lid for draining the prepared beverage from the capsule and supplying the beverage to a container such as a cup,

the capsule comprises a circumferential rim that is supported by an edge of the receptacle for holding the capsule, and

the capsule further comprises a reinforcement structure for rigidifying the rim.

20. System according to claim 19, wherein the reinforcement structure comprises radial or oblique flanges.

21. System according to claim 19 or 20, wherein the receptacle comprises bottom piercing means intended for piercing the bottom of an alternative capsule for creating at least one entrance opening for supplying the fluid to the extractable product through said at least one entrance opening, and

wherein, in use, the bottom of the capsule of the system is positioned at a distance from the bottom piercing means, such that it is not pierced by the bottom piercing means and stays intact.

22. System according to claim 19, 20 or 21, wherein the receptacle comprises lid piercing means intended for piercing the exit area of an alternative capsule when the exit area is sufficiently pressed against the lid piercing means under the influence of pressure of the fluid and/or beverage in the capsule for creating at least one exit opening through which the beverage can drain from the alternative capsule, and

the lid piercing means and the exit area of the capsule of the system are adapted to each other such that it, in use, is not pierced by the lid piercing means and stays intact.
23. System according to any of claims 19—22, wherein the fluid dispensing device is arranged for supplying the fluid to the exchangeable capsule under a pressure of approximately 4-20 bars, preferably 6-18 bars, more preferably 9—15 bars.

24. Method of preparing a predetermined quantity of beverage suitable for consumption using an extractable product, wherein an exchangeable capsule is provided, comprising a circumferential wall, a bottom, a lid extending opposite to the bottom, an inner space an inner space that is enclosed by the circumferential wall, the bottom, and the lid, an extractable product that is provided in the inner space, and a rim that at least partly projects towards the outside of the capsule, from a top edge of the circumferential wall, wherein the capsule comprises a reinforcement structure that extend at and/or near the rim for increasing rigidity of the rim, an apparatus is provided, comprising a receptacle for holding the exchangeable capsule, a fluid dispensing device for supplying an amount of a fluid, such as water, under pressure to the exchangeable capsule, and an outlet arrangement, the capsule is positioned in the receptacle and at least a part of the receptacle is moved towards the outlet arrangement, the rim of the capsule is pressed against the outlet arrangement, fluid is supplied through the bottom, to the extractable product, and beverage is supplied through the lid, and the prepared beverage is drained from the capsule through the outlet arrangement and supplied to a container such as a cup.
INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2009/050833

A. CLASSIFICATION OF SUBJECT MATTER

INV. B65D85/804 A47J31/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D A47J

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>BE 1 015 694 A6 (HOORELBEKE ALAIN [BE]) 5 July 2005 (2005-07-05) figures 2a, 2b</td>
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<td>WO 2007/114685 A (MECCANO ASIA LTD; VERBEEK ROLAND WALDEMAR [NL]) 11 October 2007 (2007-10-11) figures 1, 6-8, 10</td>
<td>1-20, 23, 24</td>
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See patent family annex

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Date of the actual completion of the international search 8 February 2010

Date of mailing of the international search report 01/03/2010

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 Fritsch, Klaus
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