

(19)



(11)

**EP 3 342 730 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:

**04.07.2018 Bulletin 2018/27**

(51) Int Cl.:

**B65D 85/804** <sup>(2006.01)</sup>

(21) Application number: **17150074.7**

(22) Date of filing: **02.01.2017**

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB  
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO  
PL PT RO RS SE SI SK SM TR**

Designated Extension States:

**BA ME**

Designated Validation States:

**MA MD**

(71) Applicant: **Tuttoespresso S.r.l.**

**20121 Milano (IT)**

(72) Inventor: **DOGLIONI MAJER, Luca**

**I-20121 Milano MI (IT)**

(74) Representative: **Gislon, Gabriele et al**

**Marietti, Gislon e Trupiano S.r.l.**

**Via Larga, 16**

**20122 Milano (IT)**

(54) **CAPSULE AND METHOD FOR BEVERAGES**

(57) A capsule has an outlet wall (4) that comprises projecting portions (5) integral with the outlet wall of the capsule; the connecting elements between outlet wall and projecting portion can be broken to open the capsule and the projecting portions are moved into corresponding housings (6) to dispense the beverage.

**EP 3 342 730 A1**

## Description

**[0001]** The present invention relates to a capsule and a method for beverages; in particular, the invention relates to a capsule for preparing and dispensing beverages, having outlets means suitable to control the outflow of the beverage from the capsule. In the following the wording capsule will be used, this wording encompasses similar definitions such as, e.g., cartridge and pod.

**[0002]** The use of capsules for beverages has become widespread in the field, not only for coffee, chocolate and similar beverages but also for the preparation of other beverages such as broth, as e.g. disclosed in WO2015193774. The advantage of packaging a base product (such as a ground or soluble product) in a capsule for beverage preparation is well known: the product is put into a capsule in its best condition, with the maximum of its flavor and aroma being trapped in the capsule or capsule container.

**[0003]** EP1604915 discloses a capsule having a conveyor that collects the beverage exiting the capsule and that delivers the beverage from a central outlet. This solution may reduce the cross-contamination in the beverage preparing machine. This capsule has a foil or membrane that defines the brewing chamber; the membrane is pierced when the membrane contacts a plurality of piercing elements within the capsule.

**[0004]** WO2008011913 shows a capsule utilizing a cap defining a delivery chamber which conveys the beverage exiting the capsule towards the user's receptacle (such as a mug, jug, cup or glass) and actually replaces the outlet means present in known drink dispensing apparatus. The capsule has a central output port for the outflow of the extracted beverage, the output port is closed by an elastic septum which opens under the pressure of the water. EP2628694, in the name of the Applicant, discloses a capsule provided with outlet means which are portions of the bottom wall defined by grooves and which comprise portions extending towards the outside of the cartridge. In other words, the bottom wall of the capsule has grooves that define portions of the bottom wall that act as an outlet when the wall is broken; additionally, the outlet portions of the bottom wall which are defined by the grooves are also extending externally to provide projecting, wedge-shaped, portions of the wall.

**[0005]** PCT/EP2016/057844, in the name of the present applicant and not published at the date of filing of the present application, discloses a self-opening capsule that includes a brewing chamber and a collector element, i.e. a conveyor cap, for the beverage exiting the brewing chamber. In PCT'844, embodiments of capsule have a brewing chamber including outlet openings in the bottom wall; the outlet openings may be obtained according to above discussed EP2628694 and include grooves defining a portion of the wall having projecting parts. The collector element, or conveyor cap, is mounted on the brewing chamber outside the outlet wall of the chamber and is movable from a position spaced from said outlet

wall to a position in which the conveyor cap is substantially adjacent to the wall and presses the projecting parts inside the brewing chamber to open the capsule and dispense a beverage.

**[0006]** A problem with known capsules to be used with different ingredients is concerning the outlet means for the flow of the beverage from the brewing chamber. The outlet means should be able to provide different flow rates in view of the nature of the ingredient in the capsule and at the same time they should provide the best possible sealing of the capsule and a reliable way of opening the capsule.

**[0007]** A related problem, especially with those capsules containing a ground or leaf product, is that of improving the brewing conditions so as to obtain the best possible beverage. This is particularly important with coffee. Additionally, capsules containing different ingredients for different beverages, e.g. for coffee or broth or condensed infant milk or concentrated syrups, should be suitable to be used with a single machine for beverage preparation without generating cross contamination of the machine when changing from one type of beverage to another one.

**[0008]** Therefore, there is the need for an improved capsule that can solve the above mentioned problems and that can be used for preparing dispensing beverages in an easy, reliable, cost-effective way.

**[0009]** It is an aim of the present invention to solve the above mentioned problems and provide an improved beverage dispensing capsule that can give excellent beverage from one or more ingredients. This aim is achieved by the present invention that provides a capsule for a beverage dispensing apparatus according to claim 1. The invention also provides a method of dispensing a beverage from a capsule, according to claim 11. Preferred embodiments are object of dependent claims.

**[0010]** A capsule according to the invention has an inlet wall through which a fluid can be fed into the capsule to prepare a beverage and an outlet wall including at least one beverage outlet means for dispensing the beverage from the capsule. The outlet wall has an outer side and an inner side which is facing the interior of the capsule body. The capsule acts as a brewing chamber in a way known per se in the art. The beverage outlet means comprise at least one projecting portion which usually is integral to, i.e. in one piece with, the outlet wall through a connecting element that is a breakable portion of the capsule; in general, the breakable portion of the capsule is a portion having reduced thickness with respect to the remaining part of the outlet wall.

**[0011]** In other words, the capsule has an outlet wall that comprises at least one projecting portion which is extending outwards of the capsule and which is integral with the outlet wall of the capsule; the connecting element(s) between outlet wall and projecting portion can be broken, or ruptured, to open the capsule and dispense the beverage. The projecting portion can thus be moved, i.e. pressed, into a corresponding housing in the outlet

wall.

**[0012]** The projecting portion has an outer face and an inner face, the inner face facing the interior of the capsule; in a closed condition of the capsule, at least a part of said inner face of the projecting portion is spaced by a distance from said inner side of said outlet wall to provide a housing in said wall. In an open condition, after the connecting elements, or element, have been broken, the projecting portions are movable into said housing to open said capsule and dispense a beverage. In order to brake the connecting elements and open the outlet means, and to thus open the capsule, pressure is applied to the projecting portion, usually pressure directed to the inside of the capsule.

**[0013]** The projecting portion comprises a first end having a first thickness and a second end having a second thickness, the first thickness being less than said second thickness, said first end providing a hinge for said projecting portion. In an embodiment, when the capsule is in a closed condition, said at least part of the inner face of the second end of the projecting portion is lying in a plane defined by the outer side of said outlet wall. In other words, in this embodiment, when the capsule is closed the inner face of the projecting portion is substantially coplanar with the outer face of the outlet wall, at least in the area where the projecting portion is located.

**[0014]** The inner surface may also be positioned inside or outside with respect of the outer face of the outlet wall of the capsule; in general, if the projecting portion is partially housed in the housing, the amount of portion housed in the housing, measured in a cross section of the outlet, is 25% or less, of the thickness of the projecting portion, preferably 15% or less, more preferably less than 10% of said thickness.

**[0015]** As mentioned, the capsule's projecting portions are integral to said outlet wall through a breakable element connecting the projecting portion with the outlet wall; in an embodiment, said connecting element is located internally to the capsule and it extends from the inner face of the projecting portions to said outlet wall along at least part of the periphery of said inner face. As above mentioned, the first end of the projecting portion preferably acts as a hinge for the projecting portion; in this embodiment the first end of the projecting portion does not comprise said breakable connection element, the projecting portion therefore remains attached to the outlet wall at said first end.

**[0016]** In an embodiment, the projecting portion has sides i.e. lateral walls, an inner wall or face and an outer wall or face; in this embodiment the connecting element extends along the periphery of the projecting portions from a side wall of said projecting portion to the outer side of the outlet wall. In a possible embodiment, the connecting element is located both inside and outside the outlet wall, to connect the inner face of the projecting portion to the outlet wall and a lateral wall of the projecting portion to the outer side of the outlet wall. The cross section of the connecting portion may have a curved shape

at one side.

**[0017]** As mentioned, a housing is provided in the outlet wall for the projecting portion; in an embodiment, the housing has a shape that is complementary to the shape of the projecting portion. The housing may have lateral walls, the bottom wall of the housing being formed by the inner wall of the projecting portion; preferably, no top or inner wall of the housing is provided also because the beverage has to flow through the housing when it is dispensed. The capsule is opened by applying a pressure onto the projecting portions, until the connecting element is broken and the projecting portions are pushed into the wall of the capsule and are housed in the housing. Thus, in an open condition of the capsule, the projecting portion is located in its relevant housing and provides a passage between the lateral walls of the housing and the lateral walls of the projecting portion, namely between walls of the housing and walls of the projecting portion. The result of opening the capsule by breaking the element which is connecting the projecting portion to the outlet wall and by pressing the projecting portion into its housing, is that when the beverage exits the capsule, the beverage flows through the passage between the walls of the housing and the walls of the projecting portion that has been pushed into the housing and is located therein.

**[0018]** Therefore, by controlling the distance between the walls of the housing and the walls of the projecting portion, a control of the flow rate and the brewing conditions in the capsule may be reached. In a possible and preferable embodiment, the walls (i.e. the lateral walls) of the housing are inclined with respect to the walls of said projecting portion, whereby in an open condition of the capsule, when the projecting portion is housed in said housing, an outlet having variable cross section is provided between said lateral walls of the housing and said projecting portion.

**[0019]** In another embodiment, the projecting portion is provided with at least a further hinge means located between said first end and said second end of the portion. The intermediate hinge means located between the two ends of the projecting portion may be obtained by having a cross section of the said portion with is thinner than adjacent section of the projecting portion. In some embodiments, there is only one hinge means, located close to the free end of said portion, i.e. the end that is provided with a breakable connection element and that upon opening of the capsule, becomes free and is pressed into the housing.

**[0020]** In an exemplary embodiment, when the capsule is in a closed condition, the projecting portion extends substantially completely outside from the outer surface of the outlet wall of the capsule; in an open condition of the capsule, i.e. once the connecting element between projecting portion and outlet walls has been broken, said projecting portion is substantially completely contained in said housing of the outlet wall of the capsule. The wording "substantially completely" is meant to be read according to its plain meaning, i.e. that a majority of the project-

ing portion, but not necessarily all of it, is contained within the housing.

**[0021]** Another object of the invention is a method of dispensing a beverage according to claim 11. The method comprises the steps of: providing a capsule having an outlet wall, a housing located in said outlet wall and a projecting portion of said outlet wall, wherein said projecting portion is integral with said outlet wall and extends outwardly from said outlet wall in correspondence to said housing; pressing said projecting portion inside the said housing, to provide at least one passage between housing and projecting portion; dispensing a beverage through said passage. The required pressure on the projecting portions may be exerted by any means known in the field. As an example, the said means may be the lower part of a seat that receives the capsule in a known brewing machine: when the capsule is received in its seat and the machine is closed to start the brewing step, closing pressure can also be used to break open the projecting portions the. In this case, the capsule of the invention is preferably provided with a conveyor cap as discussed in the description.

**[0022]** With the method of the invention the flow rate of the beverage dispensed from the capsule can be controlled by controlling, e.g. with a suitable design, the shape and/or dimensions of said passage between housing and projecting portion. Another possible way of controlling the flow rate of the beverage exiting the capsule is to control the amount of insertion of said projecting portion into its housing; the greater is the amount of projecting portion inserted into the housing, the greater may be the resistance to the beverage outlet flow. Such a control of the insertion of the projecting portion into the housing may be obtained when the capsule of the invention is used with a conveyor cap, as discussed in above mentioned PCT/EP2016/057844. In this embodiment the projecting portions of the capsule are pressed into the capsule when the conveyor cap is axially moved closer to the outlet wall of the capsule: at this time the capsule is mechanically opened. It is possible to regulate the minimum distance from the outlet wall of the capsule that is reachable by the abutment elements of the cap for the projecting portions, i.e. by the elements of the cap which exert a pressure on the projecting portions of the capsule.

**[0023]** A combination of the above disclosed two ways of flow control is also possible, e.g. with the use of shape and dimensions of projecting portion and of housing walls that are different at different points, such as those obtainable by using inclined walls. In such an embodiment, the passage between housing walls and projecting portion located in the housing will have different dimensions (and resistance) according to the degree of insertion (i.e. the position) of the projecting portion in the housing. Additionally, the walls of the housing and/or the side walls of the projecting portion may have recesses or ribs to increase or decrease the dimensions of the passage or to partition the passage into several passages.

**[0024]** The invention provides several advantages

over the prior art. The capsule is opened in an easy and reliable way, it is not expensive to produce and provides means to adjust the flow rate of the beverage dispensed from the capsule in view of the type of beverage required.

As an example, in a capsule for dispensing espresso coffee the resistance through the passage between housing and projecting portions will be greater than in a capsule for dispensing hot broth. The invention capsule is particularly suitable to be used with the conveyor cap of applicant's co-pending application PCT/EP2016/057844 and of the co-pending application claiming priority of PCT/EP2016/057844.

**[0025]** The invention will now be disclosed in greater details with reference to the non limiting drawings, in which:

- Figures 1 and 2 are respectively a top view and a lateral sectional view of a capsule of the invention;
- Figures 3 and 4 are a perspective view from the top and from the bottom of the capsule of figures 1 and 2;
- Fig. 5 is a lateral view of the capsule of fig 1;
- Fig. 6 is a longitudinal sectional view of a projecting portion and of its housing in the outlet wall;
- Fig. 7 is a transverse sectional view of the projecting portion of fig. 6;
- Fig. 8 is a view according to fig. 7, in which the capsule is in an open condition and the projecting portion is located in its housing;
- Fig. 9 is a sectional view of an embodiment similar to the one of fig.7;
- Fig. 10 is a perspective, partially sectional view of another embodiment of the invention, where the projecting portions are disposed in a helical arrangement;
- Fig. 11 and fig. 12 are a sectional and a perspective view of an exemplary conveyor cap to be used with the capsule of the invention; and
- Fig. 13 is a sectional view of an assembly of capsule and conveyor according to the invention.

**[0026]** With reference to figures 1 - 5, the capsule 1 of the invention has an inlet wall 2, through which water or a fluid is injected or fed to the capsule 1; the inlet wall shown in fig. 2 and in fig. 5 is a membrane, known per se in the art, that is suitable to be pierced by an injecting means for fluid or water. Other possible inlet walls, known per se in the art, may be used, such as the self-piercing inlet wall of EP1807318. Capsule 1 also has a lateral wall 3 and an outlet wall 4 where outlet means B are located for dispensing the beverage prepared in the capsule; the capsule acts as a brewing chamber. Outlet wall 4 has an inner side 8 and an outer side 7; in an embodiment, the inner side is provided with ribs 9 to increase the rigidity of the wall, ribs 9a connect the outlet wall to the lateral wall 3 also for increasing the rigidity of the capsule. Outlet means B of outlet wall 4, which are enlarged in figures 6 and 7, each comprise a portion 5 projecting outwards of outlet wall 4 and a housing 6. Housing 6 is preferably

obtained in the thickness of the outlet wall, so that an empty space is present in outlet wall 4 substantially at the position where the projecting portion 5 is located. Each projecting portion is associated to a corresponding housing 6; as visible in fig. 1, the shape and area of housing 6 are similar to the shape and area of projecting portion 5 associated to said housing.

**[0027]** The capsule has at least one projecting portion, preferably a plurality of projecting portions, e.g. three, as in the embodiment shown in the figures. Each projecting portion comprises a first end 13 and a second end 14; in the shown embodiment the two ends have different thicknesses; namely, thickness Th1 of the first end 13 is less than thickness Th2 of the second end, so that the first end 13 can act as a hinge for the projecting portion 5, when said portion 5 is compressed and moved into its associated housing. In a preferred embodiment the projecting portions 5 are arranged radially to the central axis of the capsule; preferably a radially arranged portion 5 has its second end located closer to the lateral wall 3 of the capsule than to the centre of the outlet wall 4. In other embodiments, the projecting portions may be arranged, across the surface of the outlet face of the capsule, circumferentially or in a helix shape and may have non symmetrical patterns, with respect to the central axis of the capsule. In other words, the arrangement of the projecting portions (which form the outlet means of the capsule) may include a change of position and/or of distance of a portion 5 from the adjacent portion 5, particularly when a conveyor cap is used with the capsule.

**[0028]** Each projecting portion 5 has a corresponding housing obtained in the outlet wall 4 of the capsule. In the shown embodiment, the inner wall 12 of the projecting portion is spaced from the plane defined by inner side 8 of wall 4, to provide in the inner wall an empty space that forms a housing 6 for the projecting portion 5. In the shown embodiment, at least a part of the inner face 12 of the portion 5 is lying in a plane defined by the outer side 7 of outlet wall 4. In other words, at least at the cited second end 14 of portion 5, the inner face of the projecting portion is at the same distance from the inner side of outlet wall 4 as the outer side 7 of the outlet wall 4. In this embodiment, when the capsule is still closed the inner face of the projecting portion is substantially co-planar with the outer face of the outlet wall, at least in the area where the projecting portion is located.

**[0029]** The capsule's projecting portions 5 are integral to outlet wall 4 by means of breakable element 10, see figures 7 and 8, which is connecting the projecting portion with the outlet wall; in an embodiment, the connecting element is located along the periphery of the inner face 12 of the projecting portion. Element 10 may be located internally or externally to the capsule, in other words on either lateral side of the projecting portion, or it may be present on both sides of the contact point between projecting portion and outlet wall. Furthermore it may be present on the second end 14 of the projecting portion, in other words on the front side of the same, that is, in

the embodiment shown in fig.7, on the side in proximity of, or substantially parallel to, the lateral wall. In Fig. 7 the connecting element 10 is shown on the left side of the projecting portion 5 to be located inside the housing; element 10 extends along at least part of the periphery of inner face 12 of portion 5 from the inner face to a wall 18 of housing 6 of outlet wall 4. On the right side of portion 5 of fig.7 element 10 is shown extending on both sides of wall 4; element 10, in addition of extending from face 12 to wall 18, is also extending from wall 16 of portion 5 to outer side 7 of outlet wall 4.

**[0030]** In this embodiment the first end 13 of the projecting portion does not comprise breakable connection element 10 because end 13 acts as a hinge and the projecting portion therefore remains attached to outlet wall 4 at first end 13. It should be noticed that in most of the embodiments of the invention, connection element 10 has low thickness and dimensions, which may be in an exemplary range of 0.02 to 0.1 mm. Thickness and dimensions may be different according to the type of material used.

**[0031]** In the previously disclosed embodiment of the invention the width of the inner face 12 of portion 5 is substantially identical to the width of the housing 6 on the outer side of outlet wall 4. This will result in the above discussed location of connection element 10, inside or outside of the capsule. Other possible embodiments are shown in figures 9 and 10. In fig.9 the width of the inner face 12 of portion 5 is shorter than the width of the housing 6 at outer side 7 of wall 4. In this embodiment connection element 10a extends to provide the missing link between portion 5 and wall 4. Connecting element 10a extends along the periphery of face 12 of portion 5 from said face 12 to the outlet wall 4.

**[0032]** The embodiment of fig. 9 shows that face 12 of portion 5 is slightly spaced downwards (with reference to the figure) from the outer side 7 of outlet wall 4; while this arrangement is shown in the embodiment of fig. 9, a same or similar arrangement can be used also in the other embodiments previously discussed. The cross section of the connecting element may have a curved shape of the face of the connecting element 10 or 10a which is not attached to a side of the capsule; in general, the breakable connecting element may have different sections i.e. thicknesses and/or cross sections along the length of the line connecting portion 5 and wall 4. In other words, the connecting element 10 or 10a may extend in any direction depending on the position of face 11 of portion 5 with respect to side 7 of outlet wall 4, and also depending on the width of face 12. Thus, connecting portion 10 in fig. 7, where face 12 is co-planar with side 7 of wall 4, extends along walls 16 and side 7. In fig. 9, where the width of face 12 is shorter than the width of housing 6 and is located below side 7 of wall 4, the connecting element 10a extends diagonally. In other embodiments connecting element 10 or 10a may extend vertically or horizontally.

**[0033]** In general, if the projecting portion is partially

housed in the housing, i.e. the inner surface 12 is located inside housing 6, the amount of portion 5 housed in the housing, measured in a cross section of the outlet at second end 14 of portion 5, is 25% or less, of the thickness of the projecting portion, preferably 15% or less, more preferably less than 10% of said thickness.

**[0034]** As mentioned, a housing 6 is provided in the outlet wall 4 for the projecting portion 5; in an embodiment, the housing has a shape that is substantially complementary to the shape of the projecting portion. The housing of the shown exemplary embodiments has only lateral walls 18 on the side plus a lateral wall at the second end 14; the bottom wall of the housing is formed by inner wall 12 of the projecting portion; no top wall of the housing is provided to let the beverage flow freely inside the housing when it is dispensed. Projecting portion 5 also has lateral walls 16 including the wall at second end 14 and outside face 11.

**[0035]** To open the capsule, pressure is applied on the projecting portions, connection element 10, 10a is broken, i.e. ruptured, and the projecting portions are pushed towards the inside of the capsule and are housed in housing 6. Fig. 8 shows an enlarged sectional view of an opening means B in an open condition of the capsule 1. As visible in fig. 8, projecting portion 8 is located in housing 6. Preferably, the thickness Th2 of second end 14 of portion 5 is substantially the same, or less, than the thickness 15 of the housing 6, to avoid the top of portion 5 protruding above inner side 8 of outlet wall 4, which may impact on a filter 21 provided above wall 4. For this reason, in the embodiment of fig. 8 portion 4a of wall 4 may be mirrored by a symmetrical portion 4a on the other side of housing 6 (the additional portion 4a is not shown in fig. 7), so that a substantial plane is created amongst portions 4a of wall 4 and face 12 of the protruding part 5.

**[0036]** Between walls 16 of portion 5 and the walls 18 of housing 6 a passage is formed once the portion 5 has been moved inside the housing. In other words, the result of opening the capsule by breaking connection element 10 and by pressing the projecting portion 5 into its housing 6, is that when the beverage exits the capsule, the beverage flows through the passage 20 between the walls 18 of the housing and the walls 16 of the projecting portion that has been pushed into the housing and is located therein.

**[0037]** A control of the flow rate and, at least in part, of the brewing conditions in the capsule may be reached by designing and controlling the dimensions and the shape of passage 6. In a first approximation the indication of the flow rate imposed upon the beverage during the preparation phase may be defined (*ceteris paribus*, i.e. provided all other variables remain the same, such as pump type, hydraulic circuit, relevant characteristics of the dispensing apparatus' injecting nozzle etc.) by determining the free space i.e. the volume between the walls 18 (fig. 7) of housing 6 of outlet wall 4 (which are three in the shown embodiment and include wall 18 of that part of housing facing second end 14) and the respective fac-

ing walls 16 of portion 5 including the wall of second end 14.

**[0038]** In a second approximation, the flow rate imposed upon the drink can be more accurately further defined as represented by the total so called "free passage", that is the surface of passage of the liquid, as generated by the surface defined by the gap between the three walls 18 of outlet 6 facing the protruding portion 5 (when the portion 5 is in the housing) including the wall 18 facing second end 14 of portion 5 (see fig. 6), and the respectively facing walls 16 of protruding portion 5, including wall 16 of second end wall 14 (fig 6) as measured at the outer side 7 of wall 4. In a third approximation, the height of the passages, in conjunction with the length and width of the same, provide means to define and provide a complete control of the desired flowrate.

**[0039]** Fig. 7 shows an embodiment in which with respect to the plane of outer side 7 of wall 4, the walls 18 of housing 6 are angled by an angle  $\alpha$  and the walls 16 of projecting portion 5 are angled by angle  $\beta$ . The two angles are preferably different and most preferably  $\alpha$  is greater than  $\beta$ . Exemplary angles are 4-6° for  $\beta$  and 7-9° for  $\alpha$ . The result is that the walls 18 of the housing are inclined with respect to the walls 16 of projecting portion 5, whereby in an open condition of the capsule, when the projecting portion is housed in housing 5, an outlet having variable cross section is provided between said lateral walls 18 of the housing and said projecting portion 5. Additionally, the edge between walls 16 and face 11 of portion 5 may be rounded; the radius of the round edge is useful in the control of the flow rate through the passage 20.

**[0040]** The projecting portion 5 may be provided with at least a further hinge means located between first end 13 and second end 14 of the portion 5. The intermediate hinge means is shown with reference 19 and a broken line in fig. 6; it is located close to the second end 14 of the projecting portion and is obtained by a groove or a similar means that provides a reduction in the cross section of the said portion 5. Such second hinge may be alternatively positioned on the outer face 11 of the protruding part 5.

**[0041]** In an exemplary embodiment, shown in figures 1-8, the projecting portion 5 extends substantially completely outside from the outer side 7 of the outlet wall 4 of the capsule when the capsule is closed (i.e. in figures 1-7); in an open condition of the capsule, shown in fig. 8, projecting portion 5 is substantially completely contained within housing 6 of the outlet wall.

**[0042]** The shape and the arrangement of the projecting portions 5 can be modified according to the requirements of use of the capsule. Fig. 10 shows an example of a different arrangement, suitable to be used with capsules bearing a central outlet port, for instance apt at containing soluble products, such as chocolate mixes, instant soups, flavoured cold drinks mixes, milk and similar, as ingredients. In this embodiment, the projecting portions 5a are arranged in a spiral-like disposition

whereby the connection elements are defined by the conjunction lines between each portion 5a and the immediately adjacent one, and between the portions 5a and the respective connecting lines on the outlet wall 4'. Also in this case the thickness of the connection elements 10, 10a may be controlled to define different opening strengths and to provide appropriate breaking of the weakened, thinned portions. Moreover, the thickness of certain portions 5a may be increased with respect of the other(s) to provide preferential lines of flow, in case of manufacturing of the capsule via injection molding process. Other arrangements are possible.

**[0043]** The method for dispensing a beverage with the use of a capsule as above discussed comprises the steps of : providing a capsule having an outlet wall 4, a housing 6 located in said outlet wall and a projecting portion 5 of said outlet wall 4; in this capsule, the projecting portion 5 is integral with outlet wall 4 by means of a connection element 10, 10a, and extends outwardly from outlet wall 4 in correspondence to the housing 6. When the capsule is to be opened the projecting portion 5 is subjected to a force directed towards the inside of capsule 1, the connection element 10, 10a is broken and portion 5 is moved inside the said housing, to provide at least one passage 20 between housing 6 and projecting portion 5; the final step is dispensing a beverage through said passage.

**[0044]** In addition to selecting a shape and/or a dimension of the passage 20 between walls 16 and 18, a control of the flow rate of the beverage through passage 20 may be obtained by controlling how much of the projecting portion 5 is inserted into housing 6. The greater is the amount of projecting portion 5 inserted into the housing 6, the greater will be the length of the passage 20 and thus the greater may be the resistance provided by said passage to the beverage outlet flow. In order to control the amount of insertion of the portion 5 into housing 6, several possible ways can be used; a possible way is that the machine used to prepare the beverage from a capsule of the invention can be used with e.g. different degrees of compression of the projecting portions 5 of the capsule.

**[0045]** Another, simpler, way to control the degree of insertion of the projecting portion into the housing 6 is possible when using a conveyor cap coupled with the outlet wall 4 of the capsule, as discussed in above mentioned PCT/EP2016/057844 and in co-pending application that claims priority of PCT'844. A suitable conveyor cap is shown in figures 11 and 12. The conveyor 21 has a lateral wall 24 which is mounted on the lower part of capsule 1 so as to enclose the outlet wall 4 of the capsule within the space defined by wall 24 and outlet wall 26 of conveyor 21.

**[0046]** Internally the conveyor has a collecting funnel 22 around which are positioned a plurality of abutment elements 23; the collecting funnel 22 ends with a dispensing opening 25. In this embodiment the projecting portions 5 of the capsule are pressed by the abutment elements 23 into the housing 6 when the conveyor cap

21 is axially moved closer to the outlet wall 4 of the capsule. The abutment elements 23 are in this case positioned along a circumference because the portions 5 are arranged in a circular disposition, elements 23 are alternated with passages for helping the beverage to flow into funnel 22.

**[0047]** Figure 13 shows a sectional view of an assembly of a capsule according to the invention and a conveyor cap, in which the capsule is in a closed condition, i.e. outlets B are closed. In the assembly, lateral wall 24 of conveyor 21 is located outside the bottom (with respect to the figure) portion 3a (see also fig. 2) of lateral wall 3 of the capsule; the abutment elements 23 are located close to or in contact with projecting portions 5 of the capsule 1. The conveyor 21 can slide along lateral wall 3a as shown by arrow F, to press portions 5 into housing 6 after having broken connection elements 10 or 10a. In fig. 13 the edge 29 of the conveyor cap 21 is spaced by a distance 27 from a shoulder 28 on lateral wall 3 of the capsule; in an opened condition of the capsule, edge 29 has been moved closer to shoulder 28 of the capsule.

**[0048]** It may be possible to control the distance from outlet wall 4 that the abutment elements 23 of the cap can reach when the conveyor cap 21 is pressed against the projecting portions to open the capsule. In an embodiment, this effect may be obtained by having a capsule wherein the edge 29 contacts shoulder 28 in the closed condition of the capsule and by setting different values for distance 27 between edge 29 of cap 21 and shoulder 28 of capsule 1 when the capsule is closed.

**[0049]** Distance 27 may be set at different values by e.g. changing the position of shoulder 28 with respect to inlet wall 2 in the capsule design and/or by designing a cap 21 having longer or shorter length of the lateral wall 24 of the cap 21. In this way, different conveyor caps may have abutment elements 23 that, in an opened condition of the capsule, reach different distances from the outlet wall 4; thus, the same capsule may be coupled with different conveyor caps 21 (or the same conveyor cap may be used with different capsules) with the result that the portions 5 will be inserted into their housing 6 by a percent of the thickness of portion 5 according to the distance of the abutment elements 23 from the outlet wall 4 in an opened condition of the capsule. This distance may depend on distance 27 between edge 29 and shoulder 28 in a closed capsule.

**[0050]** A combination of the above disclosed two ways of flow control is also possible, e.g. shape and dimensions of the walls of the housing 6 and of the projecting portion 5 are combined to form a passage with a required resistance and, in addition, the degree of insertion of the projecting portions is controlled by using different conveyor caps 21.

**[0051]** In the embodiments above discussed, the therein disclosed housing 6 was obtained in the outlet wall 4 of capsule 1; in other embodiments, housing 6 may be formed at least in part in an additional wall located above wall 4, inside the capsule. Such a wall may be e.g.

part of the structure of a spacer located in the capsule to divide the capsule's volume in two or more parts. Although the invention was disclosed with reference to a capsule in which the projecting portions are extending outwards of the capsule and are pressed into the inside of the capsule, in the housing, an inverted embodiment where the projecting portions are located internally to the capsule and are moved into the relevant housings of the outlet wall 4, may be included in the present invention.

## Claims

1. A capsule (1) for a beverage dispensing apparatus, said capsule having beverage outlet means (B) for dispensing said beverage from an outlet wall (4) of the capsule (1), said outlet wall having an outer side (7) and an inner side (8), said beverage outlet means (B) being provided with at least one projecting portion (5) integral to said outlet wall (4) through a breakable portion (10,10a) of the capsule, said projecting portion (5) extending outwards of the capsule, **characterized in that**, said outlet wall comprises a housing (6) for said projecting portion, and **in that** said projecting portion (5) is at least in part movable into said housing (6) when the capsule is opened to dispense a beverage from said capsule.
2. A capsule according to claim 1, wherein said projecting portion comprises a first end (13) having a first thickness (Th1) and a second end having a second thickness (Th2), the first thickness being less than said second thickness, said first end (13) providing a hinge for said projecting portion (5).
3. A capsule according to claim 1 or 2, wherein said projecting portion has an inner face (12) and an outer face (11), at least part of said inner face (12) of said second end (14) of the projecting portion is spaced from said inner side 8 of the outlet wall 4 to provide said housing for said projecting portion (5).
4. A capsule according to any claim 1 to 3, wherein the height (15) of said housing is equal or greater than the thickness (Th2) of the projecting portion (5) whereby said first end (14) of the projecting portion can be housed in said housing (6).
5. A capsule according to any previous claim, wherein said projecting portions (5) are integral to said outlet wall (4) through a connecting element (10, 10a), said connecting element extending at least from said inner face (12) of the projecting portion (5) to said outlet wall (4) along at least part of the periphery of said inner face (12).
6. A capsule according to claim 5, wherein said projecting portion (5) has side walls (16) and said connecting element (10) extends also along the periphery (17) of the said projecting portions from a side wall (16) of said projecting portions to said outer side (7) of the outlet wall (4).
7. A capsule according to any previous claim, wherein said housing has lateral walls (18), said walls being inclined with respect to the walls (16) of said projecting portion (5), whereby in an open condition of the capsule, when the projecting portion is housed in said housing, a passage (20) having variable cross section is provided between said lateral walls (18) of the housing (6) and said projecting portion (5).
8. A capsule according to any claim 2 to 7, wherein said projecting portion is provided with at least a further hinge means (19) located between said first end (13) and said second end (14) of the portion.
9. A capsule according to any claim 2 to 8, wherein in a closed condition of the capsule said projecting portion (5) extends substantially completely outside from the capsule (1) and in an open condition said projecting portion (5) is substantially completely contained in said housing (6) of the outlet wall (4) of the capsule.
10. A capsule according to any previous claim, further comprising a conveyor cap movably mounted on said capsule (1), wherein said capsule beverage outlets (5) and said conveyor cap are configured to interact so that the capsule beverage outlets (5) are opened by the conveyor cap (7) due to a relative movement between the capsule (1) and the conveyor cap (21) and said projecting portions (5) of the outlets (B) are moved in said housing (6) by said conveyor caps (21).
11. A method of dispensing a beverage prepared from an ingredient housed in a capsule according to any claim 1 to 10, **characterized in** comprising the steps of : providing a capsule (1) having an outlet wall (4), a housing (6) located in said outlet wall and a projecting portion (5) of said outlet wall, wherein said projecting portion is integral with said outlet wall (4) and extends outwardly of said outlet wall from said housing; pressing said projecting portion (5) inside the said housing, to provide at least one passage (20) between housing and projecting portion; dispensing a beverage through said passage.
12. A method according to claim 11, wherein a flow rate of beverage is controlled by controlling shape and/or dimensions of said passage (20) between housing and projecting portion.
13. A method according to claim 12, comprising the step of controlling the amount of insertion of said project-



ing portion (5) into said housing (6).

- 14.** A method according to any claim 11 to 13, wherein said capsule comprises a conveyor cap movably mounted on said capsule (1), comprising the step of providing a movement between the capsule (1) and the conveyor cap (7) to open said capsule beverage outlets (5), said capsule beverage outlets (5) and said conveyor cap being configured to interact so that the capsule projecting portions (5) are opened by the conveyor cap (7) due to said relative movement between said capsule (1) and said conveyor cap.
- 15.** A method according to claim 14, wherein said conveyor cap has at least one abutment element that is pressed against said projecting portions (5) to break open the capsule (1) and move said projecting portions (5) into said housing (6).

5

10

15

20

25

30

35

40

45

50

55

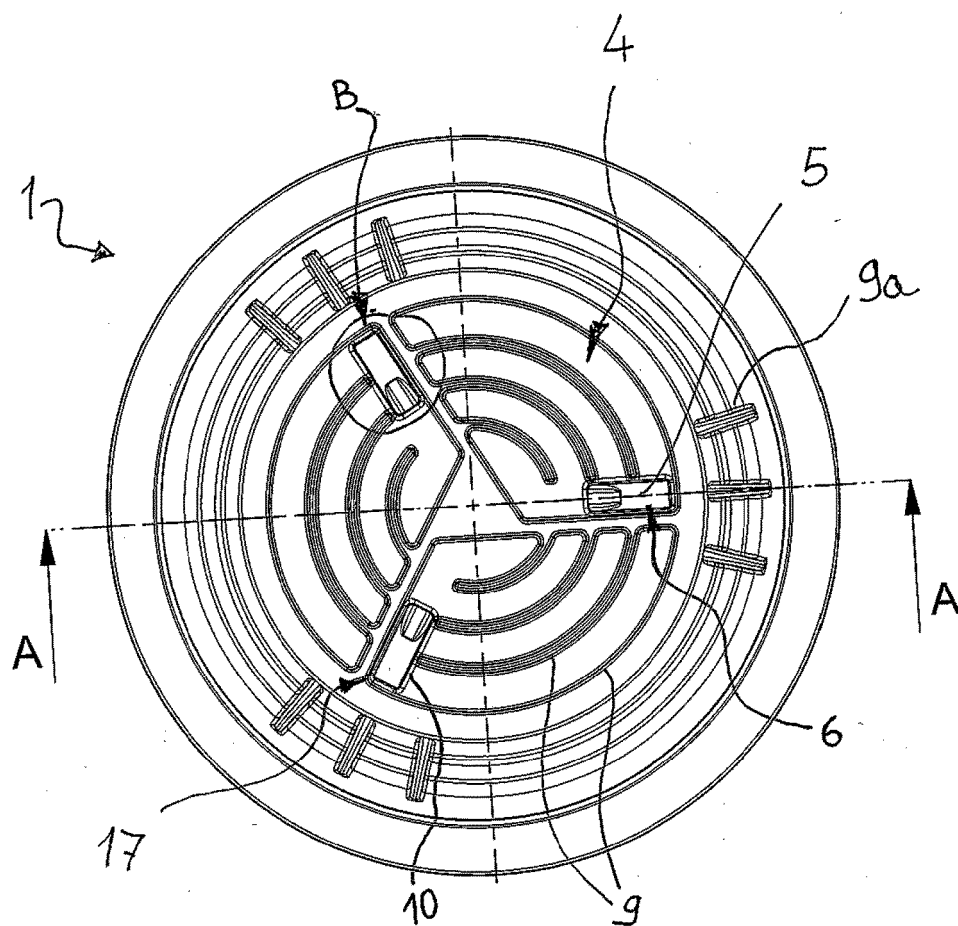


Fig. 1

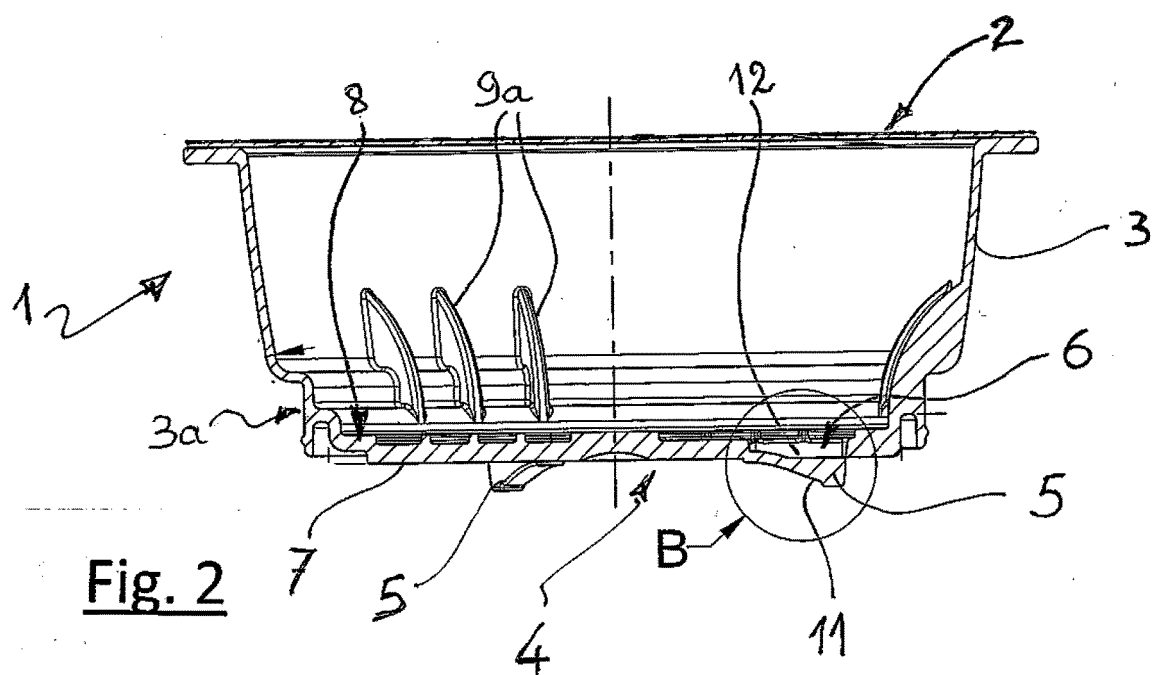
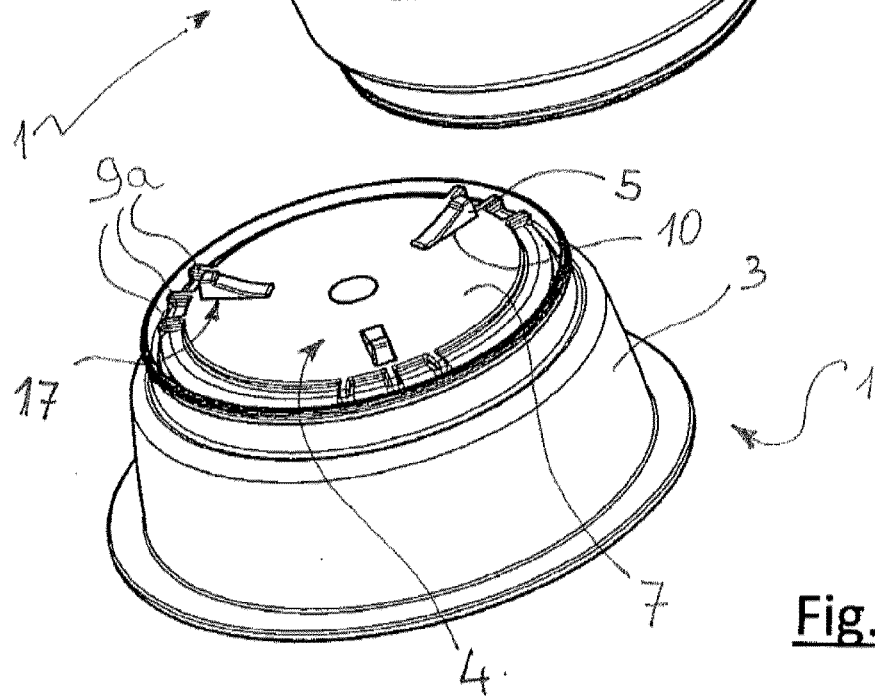
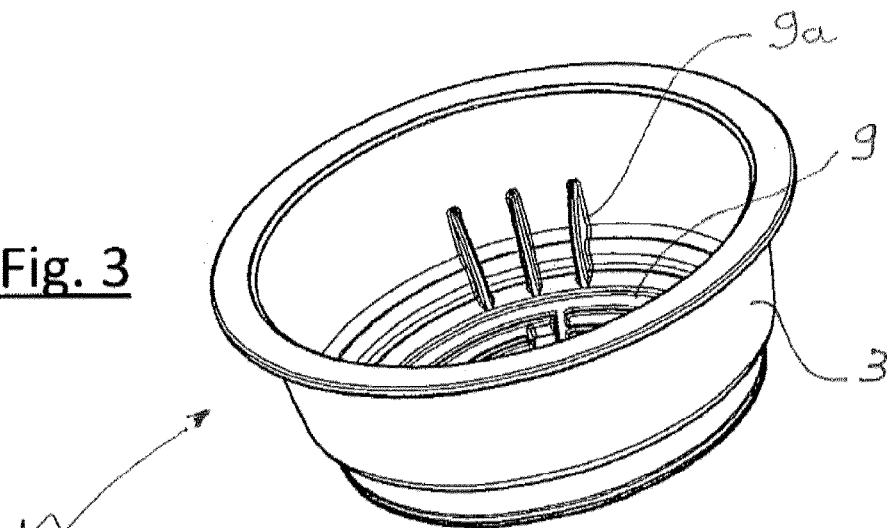
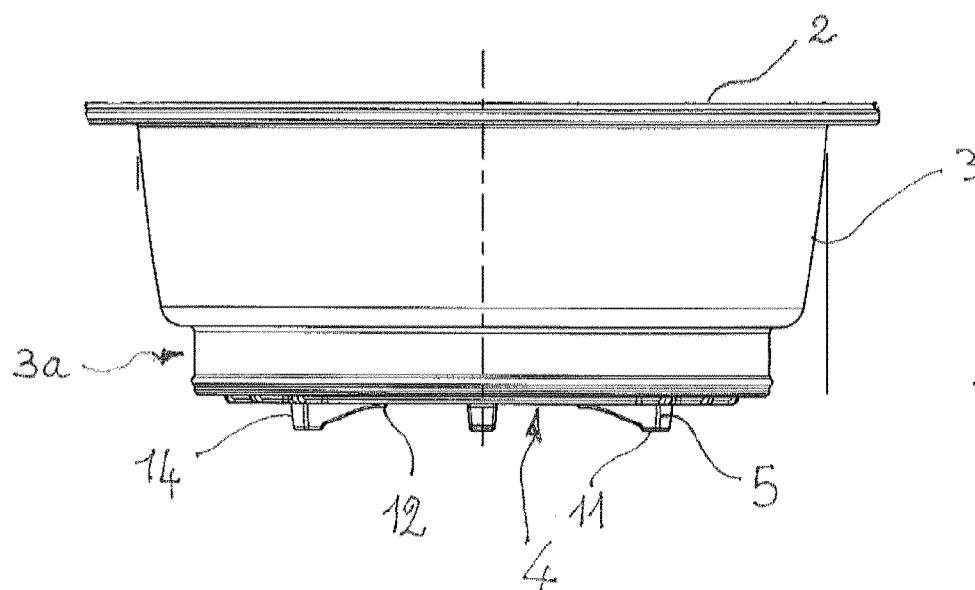


Fig. 2

**Fig. 3**



**Fig. 4**



**Fig. 5**

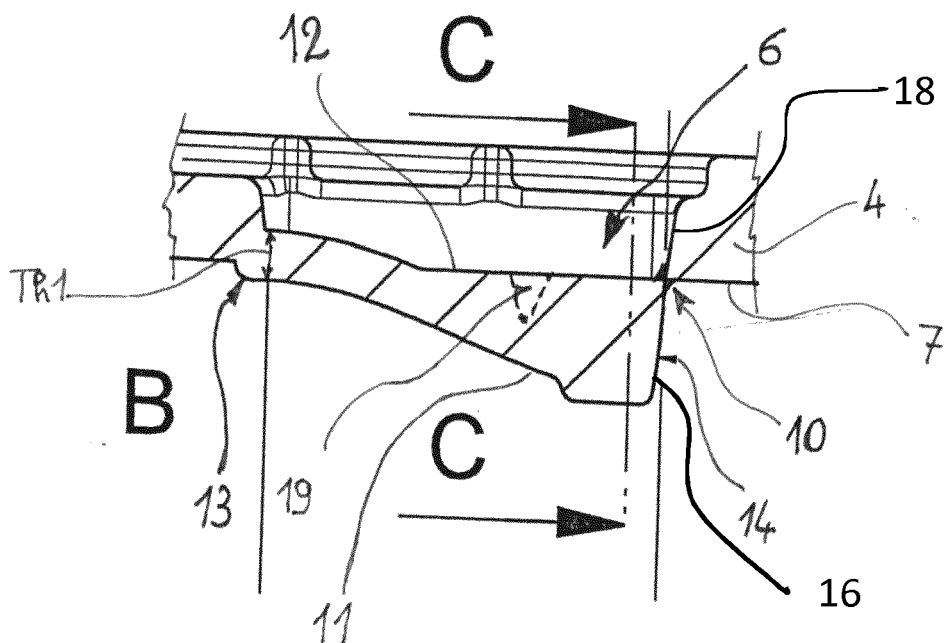


Fig. 6

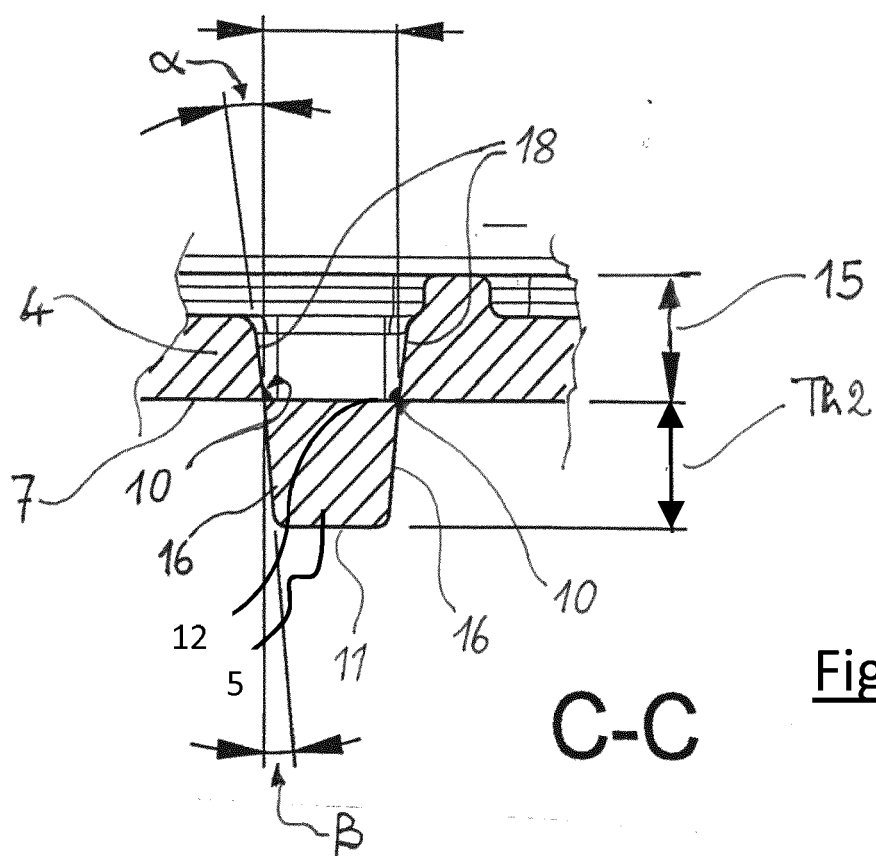


Fig. 7

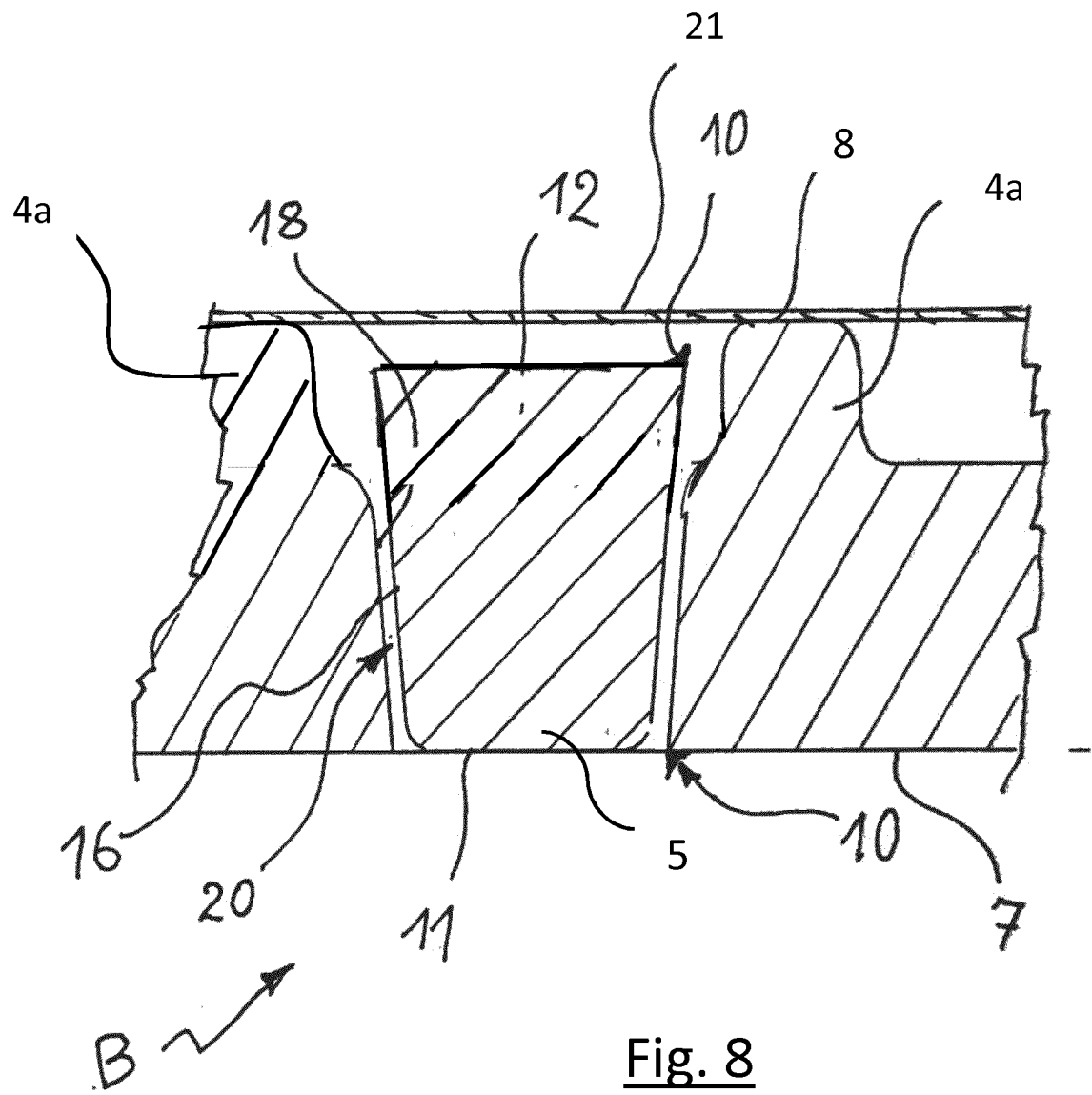


Fig. 8

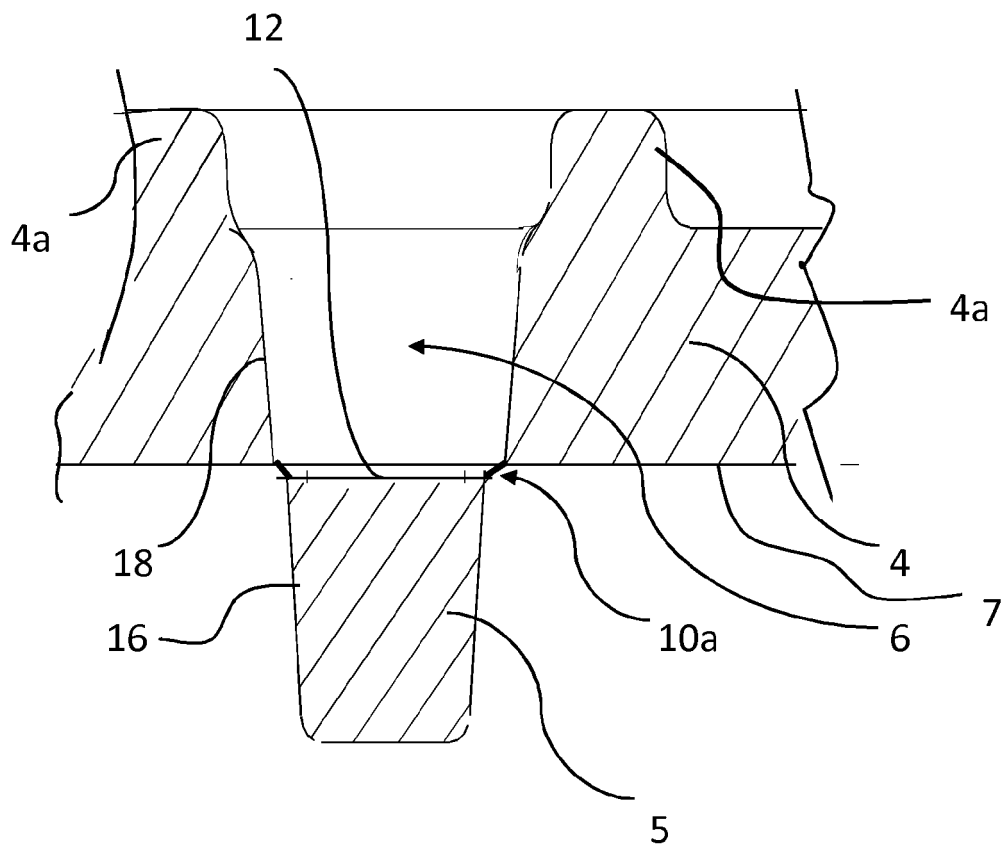


Fig. 9

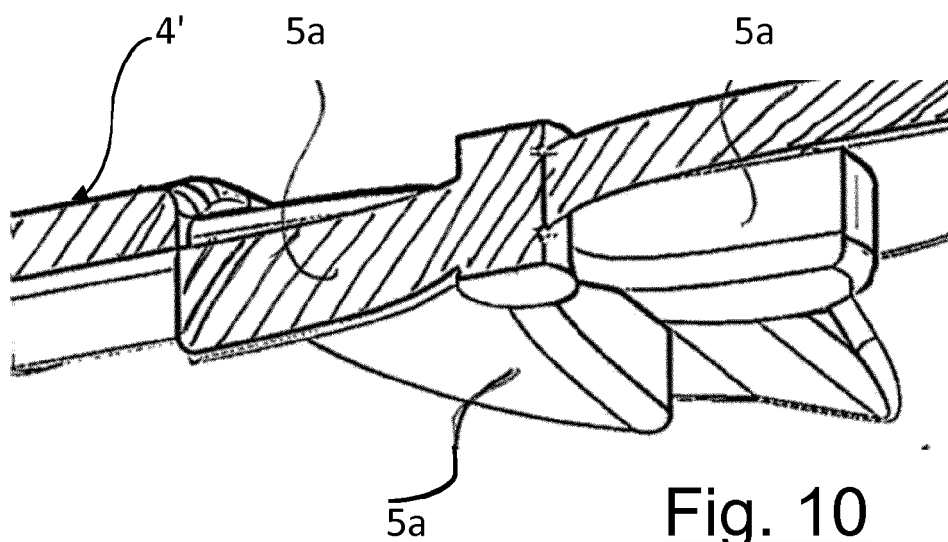


Fig. 10

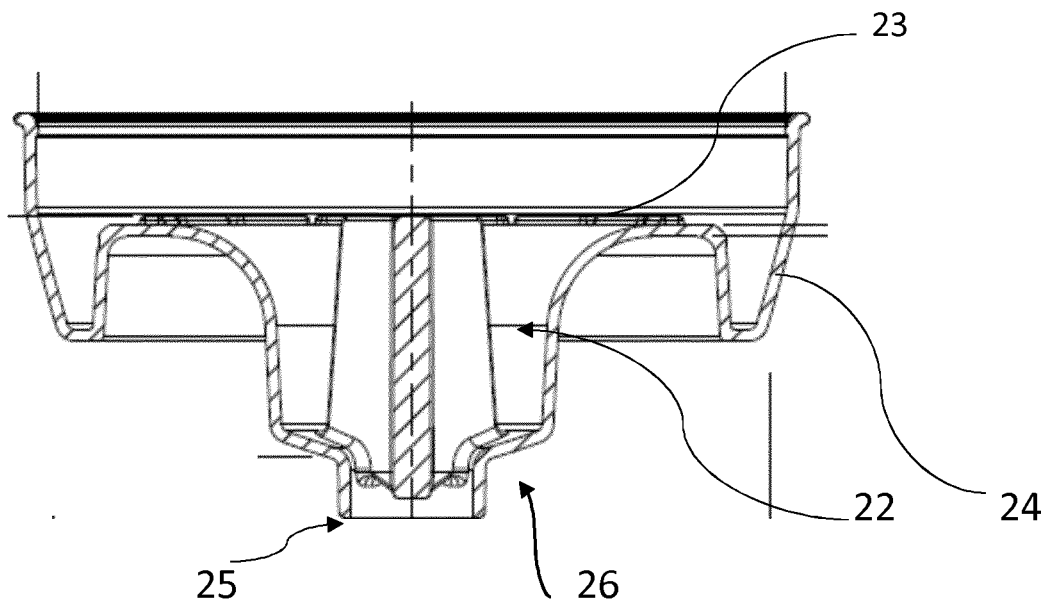


Fig. 11

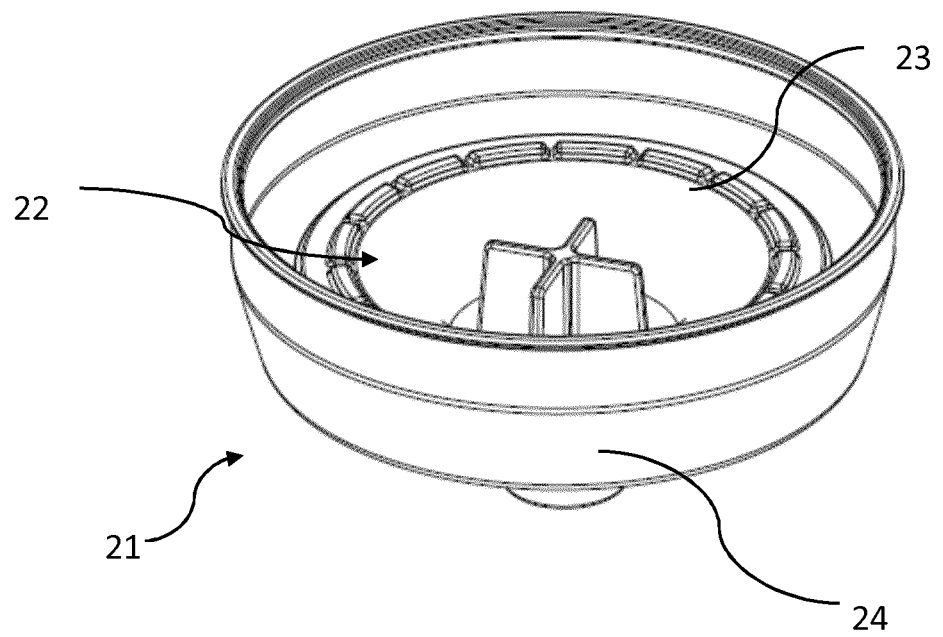
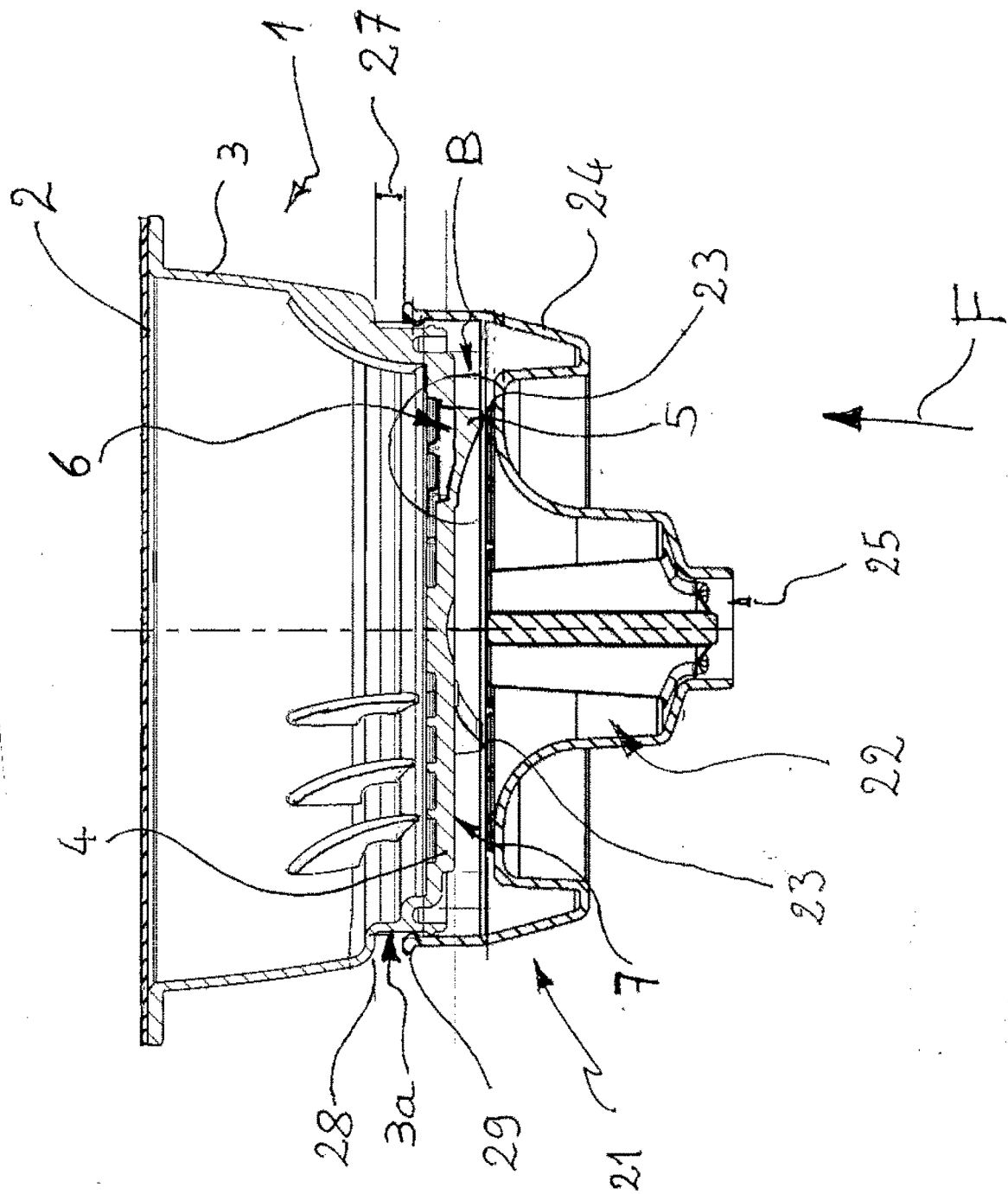


Fig. 12



**Fig. 13**





## EUROPEAN SEARCH REPORT

 Application Number  
 EP 17 15 0074

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2010/041179 A2 (ETHICAL COFFEE COMPANY SA [CH]; MARILLER ALAIN [CH]) 15 April 2010 (2010-04-15) * the whole document *	1-15	INV. B65D85/804
A	WO 2013/076519 A1 (TUTTOESPRESSO SRL [IT]; DOGLIONI MAJER LUCA [IT]) 30 May 2013 (2013-05-30) * the whole document *	1-15	
A	WO 2014/191044 A1 (TUTTOESPRESSO SRL [IT]) 4 December 2014 (2014-12-04) * the whole document *	1-15	
A	WO 2015/090390 A1 (TUTTOESPRESSO SRL [IT]) 25 June 2015 (2015-06-25) * the whole document *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>17 May 2017</b>	Examiner <b>Brochado Garganta, M</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

 1  
 EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 15 0074

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-05-2017

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2010041179	A2	15-04-2010	CN 102186747 A	14-09-2011
			EP 2337753 A2	29-06-2011
			ES 2410059 T3	28-06-2013
			JP 2012505128 A	01-03-2012
			US 2011212225 A1	01-09-2011
			WO 2010041179 A2	15-04-2010
-----				
WO 2013076519	A1	30-05-2013	AU 2012342167 A1	19-06-2014
			CA 2856494 A1	30-05-2013
			CN 104066659 A	24-09-2014
			DK 2782849 T3	12-09-2016
			EP 2782849 A1	01-10-2014
			ES 2599216 T3	31-01-2017
			HK 1202501 A1	02-10-2015
			JP 2015501693 A	19-01-2015
			KR 20140105764 A	02-09-2014
			PT 2782849 T	06-09-2016
			RU 2014125284 A	27-12-2015
			US 2014318380 A1	30-10-2014
			WO 2013076519 A1	30-05-2013
			WO 2013076551 A1	30-05-2013
-----				
WO 2014191044	A1	04-12-2014	AU 2013391092 A1	17-12-2015
			CN 105658544 A	08-06-2016
			EP 3003912 A1	13-04-2016
			JP 2016525910 A	01-09-2016
			KR 20160038880 A	07-04-2016
			WO 2014191044 A1	04-12-2014
-----				
WO 2015090390	A1	25-06-2015	AU 2013407942 A1	07-07-2016
			CA 2933700 A1	25-06-2015
			CN 106029527 A	12-10-2016
			EP 3083449 A1	26-10-2016
			JP 2017508489 A	30-03-2017
			KR 20160105806 A	07-09-2016
			US 2017036854 A1	09-02-2017
			WO 2015090390 A1	25-06-2015
-----				

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- WO 2015193774 A [0002]
- EP 1604915 A [0003]
- WO 2008011913 A [0004]
- EP 2628694 A [0004] [0005]
- EP 2016057844 W [0005] [0022] [0024] [0045]
- EP 1807318 A [0026]