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(54) **A CAPSULE FOR PREPARATION OF BEVERAGES**

(57) A capsule for preparation of beverages, comprising a beaker body provided with an external wall and a bottom wall, the external wall defining an opening closed by a covering element, the external wall, the bottom wall and the covering element defining a containing chamber of a substance for preparation of the beverage; at least a groove is realized on the bottom wall of the beaker body, which groove is defined by a first and a

second lateral wall, mutually facing and connected by a breakable portion, the breakable portion being dimensioned such as to break following flexion of at least one between the first and the second lateral wall towards an outside of the capsule when the pressure internally of the compartment exceeds a predetermined threshold, thus creating a dispensing opening of the beverage.

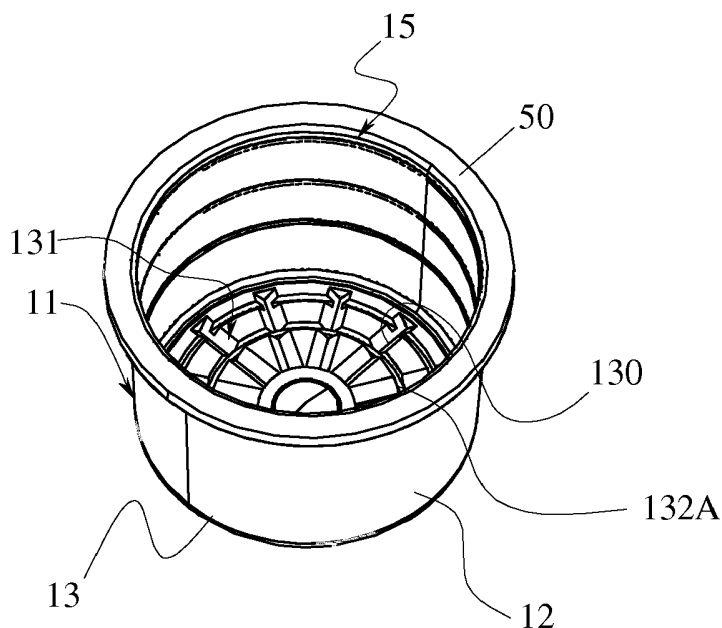


FIG. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to a single-use capsule for preparation of beverages, typically coffee, tea or other beverages obtainable by infusion/extraction or by solution of a granular or powdered comestible substance.

PRIOR ART

[0002] As is known, for preparation of beverages, typically coffee, tea or other beverages obtainable by infusion/extraction or by solution of a granular or powdered comestible substance, single-use capsules are used, generally comprising a beaker-shaped container, defined by a lateral wall, a bottom wall and an opposite opening, a dose of the comestible substance contained in the container, and a covering element able to close the opening of the container, so as to retain the dose of comestible substance internally of the capsule.

[0003] In some embodiments, the container and the covering element are perforated, with sufficiently small holes to retain the comestible substance internally of the capsule, but large enough to enable passage of the water and/or the steam necessary for preparing the beverage.

[0004] In other embodiments, the container and/or the covering element are made of a continuous and impermeable material, so as to completely isolate the comestible substance from the external environment.

[0005] In both above-mentioned cases, the covering element can be a slim film which is fixed, for example by heat-welding or gluing, on a flange of the container which delimits the opening.

[0006] Starting from a single-use capsule of this type, the preparation of the beverage is carried out with the aid of a special dispensing machine which enables introducing hot water and/or steam internally of the capsule, and then to extract the beverage obtained, leaving the remains of the comestible substance internally of the capsule.

[0007] The dispensing machine is generally further predisposed to perforate both the covering element and the container body, so as to enable introduction of the hot water and/or steam, and then enable exit of the beverage obtained. The complete exploitation of the product contained internally of the container, and consequently the quality of the beverage obtained, requires a perfect saturation of water/steam in the product.

[0008] In particular, in the case of preparation of coffee, to obtain a high-quality product high-pressure hot water or steam must be used in order to obtain a beverage having the correct consistency and creamy quality.

[0009] However, in known-type capsules, the presence of holes for dispensing the beverage does not allow the fluid to reach the pressure required for obtaining a good quality of infusion.

[0010] In fact the high-pressure fluid which comes into contact with the product internally of the capsule creates preferential flow channels which connect the inlet holes with the dispensing holes. Therefore the fluid, flowing mainly internally of the channels, extracts the aromatic components or solubilizes only those parts of product situated close to the channels. It follows that the aromatic components of the majority of the product internal of the capsule are not extracted completely, or a part of the product remains insolubilized. WO 2008/017608 discloses a capsule for preparation of beverages in accordance with the preamble of independent claim 1.

[0011] An aim of the present invention is to provide a capsule which enables obviating the above-mentioned drawbacks of the prior art, with a solution that is simple, rational and relatively inexpensive.

[0012] In particular an aim of the present invention is to provide a capsule that enables excellent extraction of the aromatic components of practically all of the product contained therein, or an almost-total solubilisation thereof.

[0013] The aims are attained by the characteristics of the invention reported in the independent claim. The dependent claims delineate preferred and/or particularly advantageous aspects of the invention.

[0014] An embodiment of the invention discloses a capsule for preparation of beverages, comprising a beaker body provided with an external wall and a bottom wall, the external wall defining an opening closed by a covering element, the external wall, the bottom wall and the covering element defining a containing chamber of a substance for preparation of the beverage, characterised in that at least a groove is realized on the bottom wall of the beaker body, which groove is defined by a first and a second lateral wall, mutually facing and connected by a breakable portion, the breakable portion being dimensioned such as to break following flexion of at least one between the first and the second lateral wall towards an outside of the capsule when the pressure internally of the compartment exceeds a predetermined threshold, thus creating a dispensing opening of the beverage.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Further characteristics and advantages of the invention will emerge from a reading of the description that follows, provided by way of non-limiting example, with the aid of the figures of the accompanying tables, in which:

figure 1 is a perspective view from above of the capsule according to the present invention without a covering element;

figure 2 is a perspective view taken from below of the capsule of figure 1;

figure 3 is a plan view from above of the capsule of figure 1;

figure 4 is a section taken along line IV-IV of figure 3;

figure 5 is a section taken along line V-V of figure 3; figure 6 is a schematic section of the capsule of figure 1 closed by a covering element and located internally of a dispensing machine suitable for the capsule; for the sake of simplicity a product housable internally of a compartment defined by the capsule has been omitted; and

figure 7 is a simplified section taken along line VII-VII of figure 3.

DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

[0016] With particular reference to the figures, reference numeral 1 denotes in its entirety a single-use capsule for preparation of beverages, typically coffee, tea or other beverages obtainable by infusion/extraction or by solution of a granular or powdered comestible substance.

[0017] The capsule 1 comprises a beaker body 11 defined by an external wall 12, having a preferably circular section, and a bottom wall 13; the external wall defines an opening 15, destined to be closed by a covering element 14. The covering element is not visible in figures from 1 to 5, but can be clearly seen in figure 6, where the capsule is positioned internally of a machine for the production of a beverage.

[0018] The beaker body 11 is able to contain a dose of granular or powdered comestible substance (product) which, by infusion/extraction or solution in water, enables production of a beverage. The product is advantageously coffee in powder form.

[0019] The bottom wall 13 is made in a single piece with the external wall 12. The beaker body is advantageously made by moulding a plastic material, for example polypropylene (PP) for food use or PLA-type bioplastics.

[0020] As already mentioned, the capsule 1 further comprises a covering element 14 which closes the opening 15, and together with the external wall and the bottom wall defines a compartment 51 destined to contain the product.

[0021] The covering element 14 is applied after the filling of the beaker body 11 with the comestible substance. The covering element is preferably lacking in holes or orifices, and is configured such as to be sealedly associated with the beaker body (and specifically with the opening 15 thereof) so as to hermetically seal the comestible substance internally of the compartment with respect to the external environment.

[0022] The covering element 14 can be for example a film, possibly realised in a multi-layer material, which comprises aluminium, plastic, etc., and which is fixed to a flange of the beaker body by gluing, heat-welding etc.

[0023] Alternatively the covering element 14 can be made of rigid plastic snap-fitting and preferably sealably fitting to the part of the external wall which delimits the opening 15.

[0024] The shape of the beaker body 11, and in particular of the external wall 12, can be any, for example

truncoconical as in the figures, or cylindrical, hemispherical, polygonal or another shape.

[0025] In an aspect of the present invention the bottom wall 13 comprises a plurality of grooves 131, each defined by at least a first 131 A and a second lateral wall 131 B mutually facing and connected by a breakable portion 130.

[0026] The breakable portion is configured so as to break when at least one of the two lateral walls 131 A, 131B flexes towards the outside of the capsule consequently to exceeding a predetermined pressure internally of the compartment 51.

[0027] In fact the thickness of the breakable portion determines the predetermined pressure at which the breakage occurs.

[0028] Once the breakable portion 131 of each groove has been broken, openings form on the bottom of the beaker body which enable dispensing of the beverage.

[0029] The presence of the breakable portions and the possibility of regulating, by means of the thickness of the breakable portions, the predetermined pressure at which the opening occurs, is particularly advantageous as the pressurized water entering the compartment "wets" all the product contained in the compartment before "breaking" the breakable portions.

[0030] This leads to an excellent extraction of the product, preventing formation of "preferential" channels in which the pressurized water is constrained to flow. Specifically, this predetermined threshold is comprised between 4 and 20 bar, and is preferably 9 bar.

[0031] The thickness of the breakable portions is instead comprised between 0.05 mm and 0.5 mm, preferably 0.2 mm.

[0032] The capsule described in the present embodiment of the invention is made of polypropylene and exhibits the breakable portions having a thickness of 0.2 mm.

[0033] In fact the air (nitrogen or another conserving gas of the comestible substance) present in the capsule yields its place to the water which cannot create preferential flowing channels given that the bottom of the capsule is lacking in perforations.

[0034] The extraction occurs very homogeneously and directly involves the near-totality of the product contained internally of the capsule.

[0035] In particular each breakable portion 130 is able to open following reaching of a critical predetermined pressure internally of the capsule 1.

[0036] In the embodiment illustrated in the figures, the bottom wall 13 is configured so as to be a dispensing wall of the beverage, while the covering element 14 is configured so as to be an inlet wall of the fluid for the infusion, for example water or steam.

[0037] From the analysis of figure 3, it can be noted that a plurality of grooves 131 is realised on the bottom wall 13, which grooves 131 exhibit a concavity facing towards the inside of the compartment 51. Further, the grooves are interconnected by at least a channel 132A,

132B open towards the inside of the compartment 51. Note that the channel includes a bottom wall which, on the contrary to the breakable portions 130, is able to withstand a pressure internally of the compartment that is higher than that which the breakable portions can withstand.

[0038] Further, a first 132A and a second 132B channel are advantageously provided, having a circular conformation. The first channel 132B is internal (inscribed) in the second channel 132B which has a larger radius. The outflow channels 132A, 132B intersect the grooves 131 in such a way that the beverage can be distributed efficiently internally of all the grooves, so as to facilitate the dispensing of the beverage.

[0039] Note that the outflow channels 132A, 132B are preferably uniformly distributed on the bottom wall 13 and are sufficiently distanced from one another so as not to constitute weakenings of the bottom wall.

[0040] In the described embodiment the grooves 131 are arranged radially on the bottom wall 13 and depart from a central portion C of the capsule, which is lacking in grooves.

[0041] As can be seen in figure 4 (and also figure 5), the central portion C exhibits a convexity facing towards the compartment, which constitutes a stiffening rib of the bottom.

[0042] In the invention, some embodiments might include the presence of a filtering element rested on the bottom wall 13. The filtering element has the function of retaining the powder substance internally of the capsule 1 during the dispensing of the beverage.

[0043] With particular reference to figure 7, it can be observed that the grooves exhibit a V-shaped section, while the breakable portion 130 is positioned/realised at the vertex of the V-shape.

[0044] The container 11 is made of an elastically yielding and water-repellent material.

[0045] As already mentioned, the beaker body 11 is made of plastic, for example by means of an injection moulding process, without excluding the possibility of its being made using other materials, among which for example aluminium, or a multi-layer material comprising aluminium.

[0046] The capsule 1 can be used by a machine M for production of a beverage, which generally comprises a boiler CD for heating the water, an infusion group 30 (see figure 6) able to accommodate the capsule 1, and a pump P for pumping the hot water from the boiler and supplying the water internally of the infusion group 30.

[0047] The pump and the boiler, like the body of the machine, and the hydraulic circuits are illustrated only schematically, as they are well known to the expert in the sector.

[0048] The infusion group 30 illustrated is of the laterally-open type and comprises a beaker body 31 able to accommodate the capsule 1. It exhibits, on the bottom thereof, a dispensing spout 310 of the beverage, and, opposite the spout, a mouth for introduction and extrac-

tion (after use) of the capsule 1. The infusion group 30 further comprises a cylindrical closing plate 32, which can close in abutment on the beaker body 11 (of the capsule), so as to define a closed infusion chamber, coinciding with the internal chamber of the beaker body 11, which completely closes the comestible substance (or product). The closing plate 32 advantageously includes one or more needles 35 (preferably having a conical point), which project towards the beaker body 31.

[0049] Each of the needles 35 exhibits a central hole 350 which is located hydraulically in communication with the water supply pump P.

[0050] The plate 32 and the beaker body 31 are reciprocally mobile so as to enable insertion of the capsule 1, and once neared the infusion chamber is hermetically closed, by means of appropriate seals G interposed between the beaker body 31 and the capsule 1 and the closing plate 32 and the capsule.

[0051] The hot water is supplied from the boiler to the infusion chamber through the holes 350 and the needles 35 which penetrate the covering element 14. The water mixes with or extracts the aromas of the comestible substance contained in the capsule 1, realizing a beverage by infusion or solution.

[0052] An inlet way is created for the fluid via the central holes 350, made by penetration in the capsule 1 through the covering element 14; however, in an initial step, the absence of an exit way means that by continuing supply of the fluid an increase of pressure is caused internally of the capsule 1.

[0053] In particular, in the non-limiting illustrated example shown in the figures, the beverage formed, when crossing the filter (optional), accumulates in the channels 132A and 132B, and at the yielding portions 131, pressing against the bottom wall 13, in particular against the breakable portions 130.

[0054] Thanks to the channels 132 in which the beverage flows freely, the beverage is distributed uniformly on the bottom wall 13 and in the grooves, completely wetting the product before the opening of the breakable portions, so as to obtain an infusion of greater quality and avoiding or minimising the formation of preferential flow channels.

[0055] When the pressure reaches a critical preset value, the breakable portions 130 break; the breakable portions represent a preferential fracture zone due to the smaller thickness of the bottom of the breakable portions.

[0056] The breaking of these portions is done at the same time and consequently to the flexion towards the outside of the capsule of the first and the second lateral wall which define each groove. In this way the dispensing of the beverage is achieved through the bottom wall 13 of the beaker body 11, in the direction of the dispensing spout 310.

[0057] Note that following the opening and during the dispensing, the first and the second lateral wall remain fixed to the capsule 1, at most slightly flexing towards the outside of the compartment.

[0058] This is particularly advantageous in a case in which the beverage under preparation is espresso coffee, as the high pressure obtained internally of the capsule enables obtaining a correct extraction of the aromatic components of the powder, and especially the generation of a more persistent cream.

[0059] The invention as it is conceived is susceptible to numerous modifications and variants, all falling within the scope of the inventive concept.

[0060] Further, all the details can be replaced by other technically-equivalent elements.

[0061] In practice, the materials used, as well as the contingent shapes and dimensions, can be any according to requirements, without forsaking the scope of protection of the following claims.

- 5 6. The capsule of one or more of the preceding claims, wherein the thickness of the breakable portions is comprised between 0.05 mm and 0.5 mm, preferably 0.2 mm.
7. The capsule of one or more of the preceding claims, wherein a filtering element is rested on the bottom wall (13).
- 10 8. The capsule of one or more of the preceding claims, wherein the at least a groove (131) exhibits a V-shaped section, the breakable portion being positioned at the vertex of the V-shape.

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Claims

1. A capsule (1) for preparation of beverages, comprising a beaker body (11) provided with an external wall (12) and a bottom wall (13), the external wall defining an opening (15) closed by a covering element (14), the external wall, the bottom wall and the covering element defining a containing chamber of a substance for preparation of the beverage, at least a groove (131) is realized on the bottom wall (13) of the beaker body (11), which groove (131) is defined by a first (131 A) and a second (131 B) lateral wall, mutually facing and connected by a breakable portion (130), the breakable portion being dimensioned such as to break following flexion of at least one between the first and the second lateral wall (131 A, 131B) towards an outside of the capsule when the pressure internally of the compartment (51) exceeds a predetermined threshold, thus creating a dispensing opening of the beverage, **characterized in that** the grooves (131) are arranged with a radial extension on the bottom wall (13) and depart from a central portion (C) of the capsule lacking in grooves.
2. The capsule of the preceding claim, wherein a plurality of grooves is realised on the bottom wall (13) which grooves exhibit a concavity facing towards an inside of the compartment (51).
3. The capsule of the preceding claim, wherein the bottom of the capsule includes at least a channel (132A, 132B) open towards an inside of the compartment, which channel (132A, 132B) interconnects the grooves (131).
4. The capsule of the preceding claim, wherein the at least a channel (132A, 132B) is circular.
5. The capsule of one or more of the preceding claims, wherein the central portion (C) exhibits a convexity facing towards the compartment.

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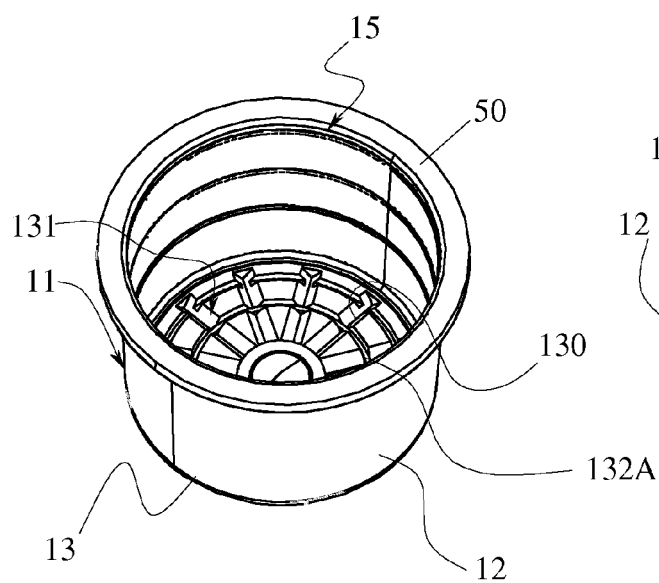


FIG. 1

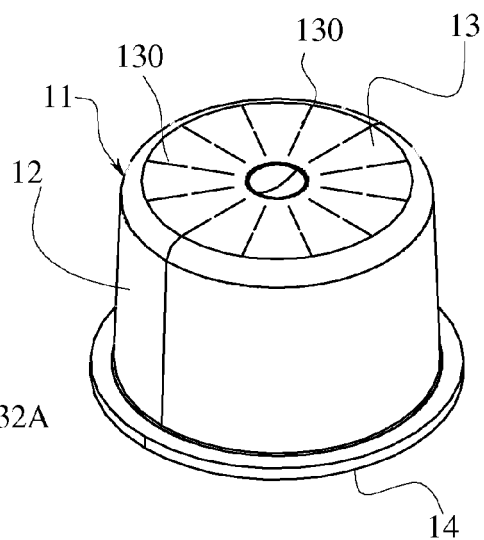


FIG. 2

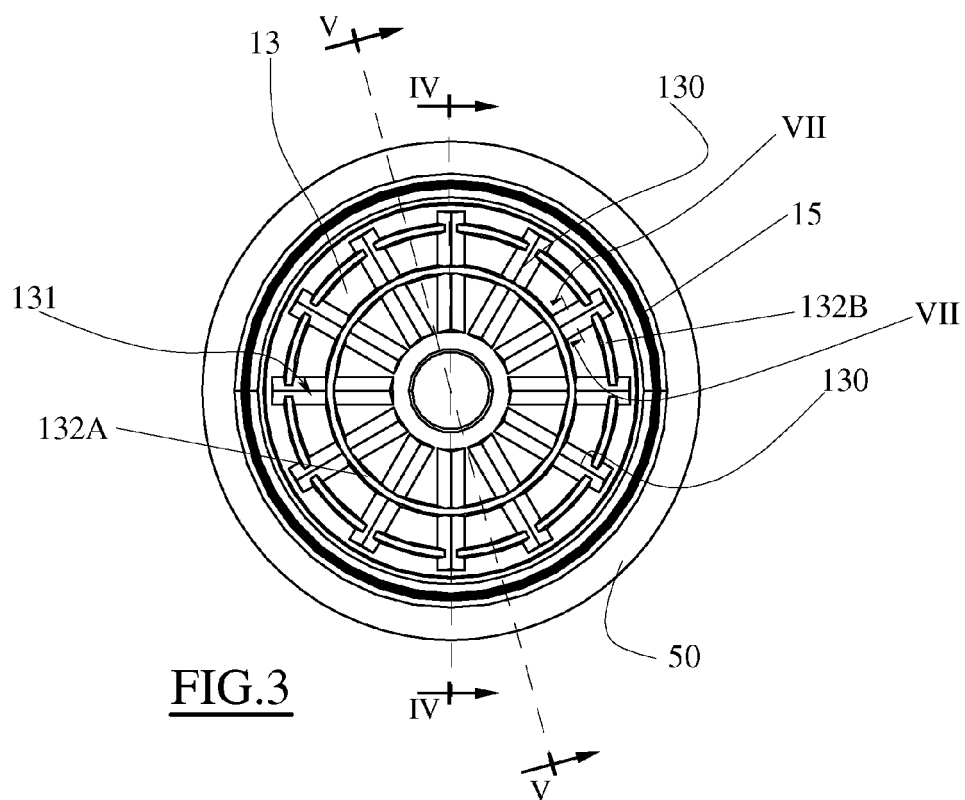
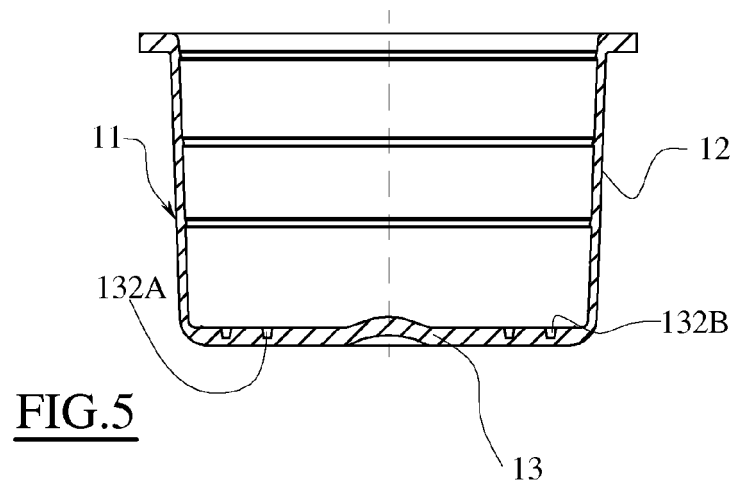
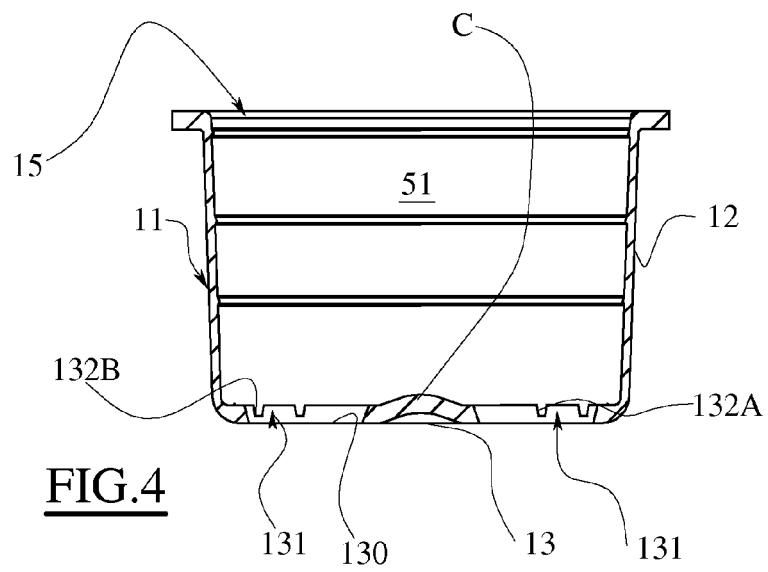


FIG. 3



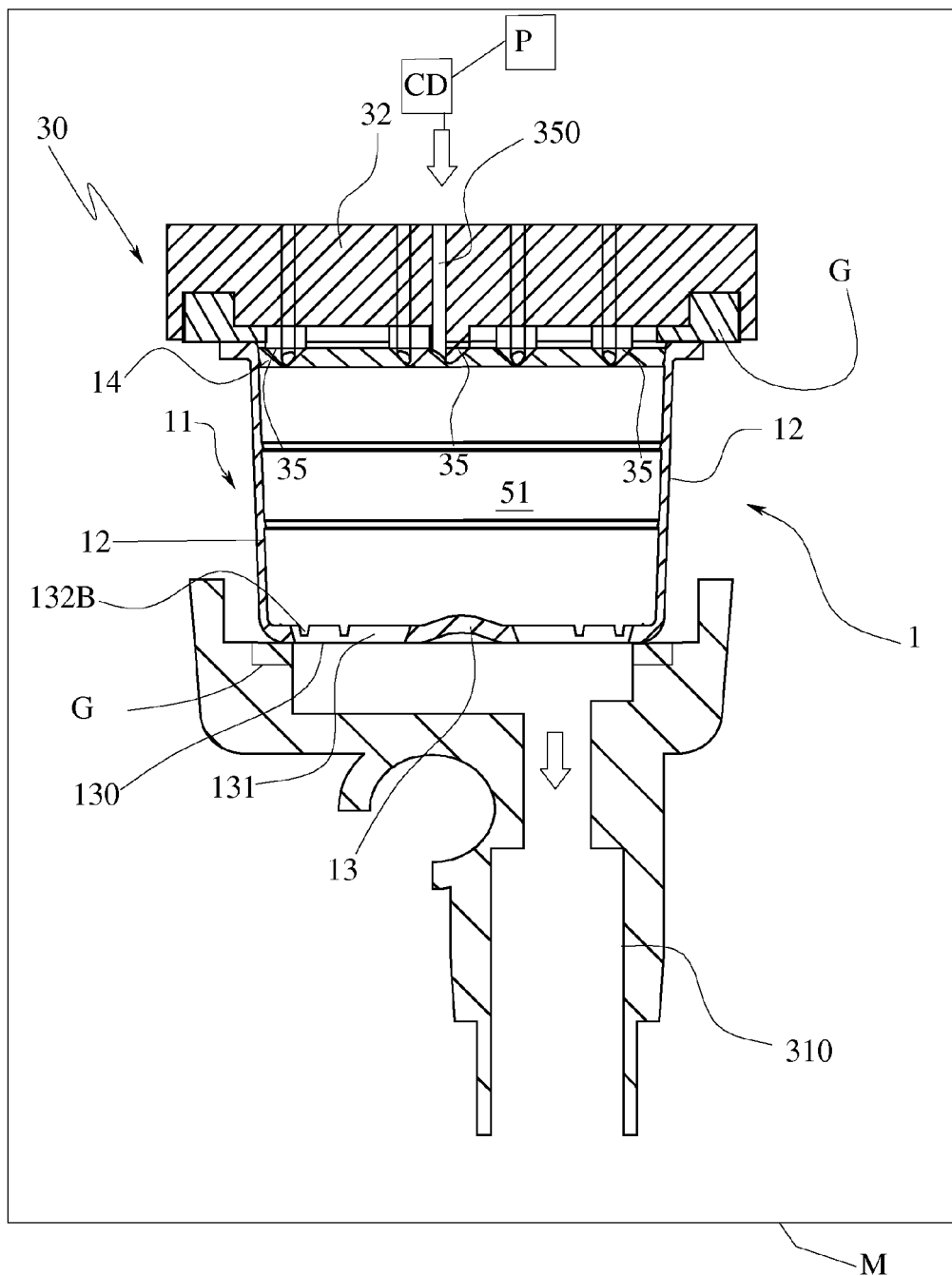


FIG. 6

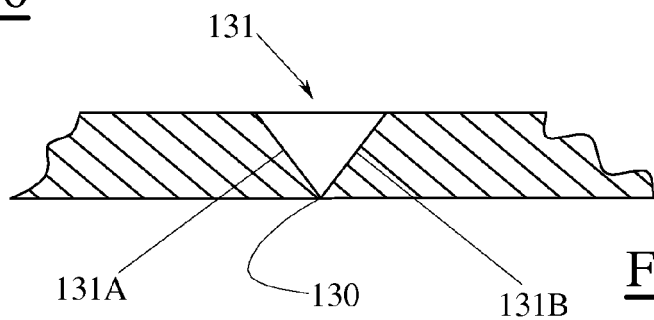


FIG. 7



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