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(71) Applicant: **Reati, Marco**
50058 Signa (FI) (IT)

(72) Inventor: **Reati, Marco**
50058 Signa (FI) (IT)

(74) Representative: **Pennacino, Enrico**
Porsia & Associati S.r.l.
Via Brigata Liguria 3/16 A
16121 Genova (IT)

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(54) **Pre-charged ground coffee capsule**

(57) Pre-charged ground coffee capsule comprising a preferably cylindrical or frustoconical container body (1) made of a metal foil material combined with a film of thermoplastic material, said container body (1) being open at one end, said end being joined to a closing sur-

face (201) made of the same material, said container body being associated with a structural stiffening member (2; 3; 4; 5; 6; 7; 8; 9) provided with a plurality of through-openings and arranged in a plane which is substantially perpendicular to the longitudinal axis of said container body (1).

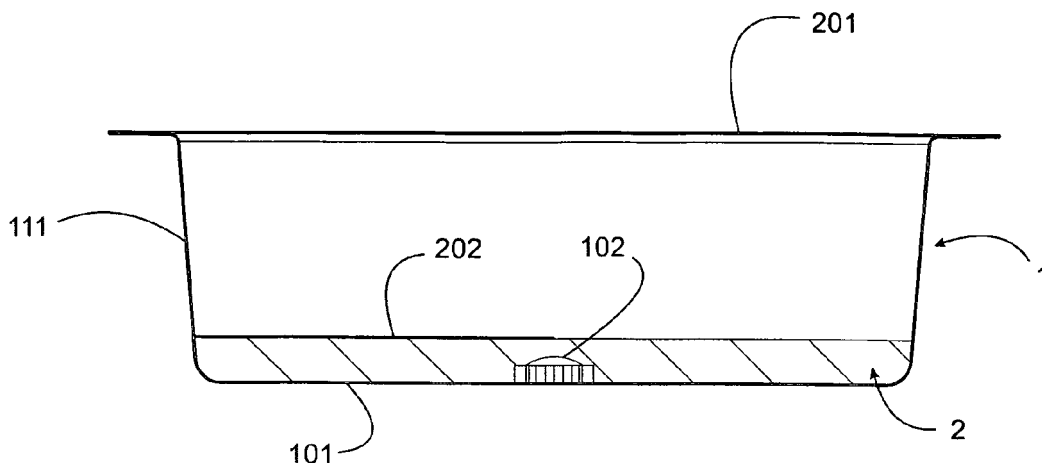


Fig. 1

Description

[0001] The present invention relates to devices for preparing alimentary beverages, and particularly to a pre-charged ground coffee capsule.

[0002] For many years now the preparation of coffee, both for domestic use and for professional use, both in machines requiring manual preparation and in automatic and semi-automatic machines, involves the use of pre-charged capsules or pods of varying shape and design which normally have a dual function, the primary function being that of allowing preparation of the coffee infusion without using coffee powder in loose form, so that the working process is "cleaner" and general maintenance is simpler.

[0003] A major problem with regard to the choice of materials and the structure to be given to the pre-charged capsule or pod, consists in achieving a suitable compromise between robustness and efficient use; in other words, if, on the one hand, the water-permeable materials such as filter paper, nonwoven fabric and the like ensure an effective use of the capsule or pod, on the other hand they give rise to notable defects both from the point of view of storage and as regards positioning inside the filter holder.

[0004] Document EP1997748, in the name of the same Applicant, describes a pre-charged ground coffee capsule comprising a container body with a polygonal cross-section, and preferably a circular cross-section, which is made of a liquid-impermeable material, open at one end and provided on the bottom wall with a large axial opening, two walls of liquid-permeable material being arranged, respectively, above said open end and along said bottom wall; said impermeable material comprises a support layer made of metallic material and a layer of thermoplastic material facing the inside of said container body, said permeable walls being joined to said container body by means of said layer of thermoplastic material, an outwardly projecting radial flange being provided at said open end of said container body.

[0005] This type of pre-charged capsule solves many of the problems associated with the prior art, but nevertheless has a number of drawbacks. In particular, the structure so designed, although being effectively configured, is somewhat weak and therefore poses problems from the point of view of packaging and use by the end user. Comparing this type of pre-charged capsule with those made entirely of thermoplastic resin, it is entirely clear that the latter have better handling properties and are easier to use both in espresso coffee machines and in traditional "moka" or similar coffee machines, but have the problem that they require further packaging, preferably in an inert atmosphere, in order to preserve the aroma of the coffee powder.

[0006] Thus, the object of the present invention is to provide a pre-charged ground coffee capsule which, on the one hand, is able to preserve the quality of the product contained therein and, on the other hand, has a structural

strength which allows it to be managed easily both during storage and during use.

[0007] Therefore, the object of the present invention is a pre-charged ground coffee capsule comprising a preferably cylindrical or frustoconical container body made of a metal foil material combined with a film of thermoplastic material, said container body comprising a structural stiffening member provided with a plurality of through-openings and arranged in a plane which is substantially perpendicular to the longitudinal axis of said container body. Said stiffening member has arranged thereon a water-permeable layer of filter material facing the inside of the container body.

[0008] In a preferred embodiment, said stiffening member includes a substantially disc-shaped element comprising a peripheral ring and a plurality of radial elements converging toward the center and equally spaced from each other. A recess communicating with the aforementioned openings is preferably formed in the center of said member.

[0009] Alternatively, said stiffening member can be provided with a peripheral wall which is perpendicular to the plane of said stiffening member, said wall being continuous or discontinuous. Furthermore, such a wall can be provided with an outwardly projecting radial flange.

[0010] In a further embodiment, the bottom wall of said stiffening member can be made so as to be deformable and it is provided with means adapted to perforate the wall of said container body at the outwardly-facing side thereof. Alternatively, said stiffening member is positioned externally of said container body and it is provided with means adapted to perforate the wall of said container body at the outwardly-facing side of its bottom wall. In a preferred embodiment, said stiffening member is provided with a plurality of channels formed at the internal side-wall thereof and communicating with the bottom wall.

[0011] Other advantages and features will be apparent from the following detailed description of certain embodiments of the same which are provided by way of illustration, and not by way of limitation, with reference to the accompanying drawings in which:

Figure 1 is a section view of a first embodiment of the present invention;

Figure 2 is a cut-away perspective view of the embodiment of Figure 1;

Figure 3 is a section view of a second embodiment of the present invention;

Figure 4 is a cut-away perspective view of the embodiment of Figure 3;

Figure 5 is a section view of a third embodiment of the present invention;

Figure 6 is a cut-away perspective view of the embodiment of Figure 5;

Figure 7 is a section view of a fourth embodiment of the present invention;

Figure 8 is a cut-away perspective view of the embodiment of Figure 7;

Figure 9 is a section view of a fifth embodiment of the present invention;

Figure 10 is a cut-away perspective view of the embodiment of Figure 9;

Figure 11 is a cut-away perspective view of a sixth embodiment of the present invention;

Figure 12 is a section view of the embodiment of Figure 11;

Figure 13 is a cut-away perspective view of a seventh embodiment of the present invention;

Figure 14 is a section view of the embodiment of Figure 13; and

Figure 15 is a section view of an eighth embodiment of the present invention;

Figure 16 is an exploded perspective view of the embodiment of Figure 15.

[0012] Figure 1 shows a first embodiment of the pre-charged capsule according to the present invention; 1 denotes the container body of the pre-charged capsule according to the invention. Said container body 1 is provided with a bottom wall 101, a continuous side wall 111 and a closing surface 201; both the container body 1 and the closing surface 201 are made of a metal foil material, such as aluminum or the like, combined with a layer of a thermoplastic resin, such as polyethylene or the like, which allows them to be joined together. The stiffening member 2, which has a central cavity 102 and on which a layer of filter material 202 is placed, is arranged along the bottom wall 101 of the container body 1. As can be seen more clearly from Figure 2, which shows a cut-away perspective view of the pre-charged capsule, the member 2 comprises an annular element 302, which has the same cross-section as the bottom wall 101 of the container body 1, and a plurality of radial elements 312 converging towards the cavity 102 and forming the openings 322 directed towards the bottom wall 101 of the container body 1.

[0013] Figure 3 shows a second embodiment of the capsule according to the invention; the same parts are indicated by the same numbers. In this case, the stiffening member 3, in addition to comprising an annular element 303 and the radial elements 313 (see Figure 4) in a similar manner to that described for the embodiment in Figures 1 and 2, also has a continuous axial wall 403 which is arranged so as to actually contact with the side wall 111 of the container body 1. The layer 203 of filter material is placed on the surface of the member 3.

[0014] Entirely similar in nature is the embodiment shown in Figures 5 and 6, where the axial wall 404 of the stiffening member 4 has an outwardly projecting radial flange 414 onto which the closing surface 201 of the pre-charged capsule is joined. Otherwise, the stiffening member 4 has the annular element 304 and the radial elements 314 converging towards the cavity 104 and forming the openings 324 on which the layer 204 of filtering material is positioned.

[0015] In the variant embodiment shown in Figures 7

and 8, the stiffening member 5 has axial webs 405 which are joined at one end to the annular element 305, placed in contact with the bottom wall 101 of the container body 1, while at the opposite end they are connected to the flange 415 projecting radially outwards. In this case also, the stiffening member 5 has the annular element 305 and the radial elements 315 converging towards the cavity 105 and forming the openings 325 on which the layer 205 of filtering material is positioned.

[0016] The embodiment in Figures 9 and 10 shows the stiffening member 6 arranged in contact with the closing surface 201 instead of with the bottom wall 101. As can be noted from Figure 10, although the arrangement is shown as being completely overturned with respect to that of the devices of the embodiments previously shown and described, the characteristic features of the member 6 are in fact entirely the same. Said member 6 has the annular element 306 and the radial elements 316 converging towards the cavity 106 and forming the openings 326 on which the layer 206 of filtering material is positioned. As a particular feature, the member 6 has the outwardly projecting radial flange 406 which practically acts as a support for the closing surface 201 on the one hand, and for the outgoing edge of the side walls 111 of the container body 1 on the other hand.

[0017] Figure 11 shows a further embodiment of the pre-charged capsule according to the invention. In this embodiment, the stiffening member 7 is provided with a continuous side wall 107 similar to that of the embodiment according to Figures 5 and 6; the bottom wall 207 is formed with a central portion 217 substantially shaped as a dome and in the manner of an undulating membrane. The more rigid axial portion 227 has formed therein the nibs 237 which project axially outwards. The container body 1 encloses the member 7, and the closing surface 201 is mounted onto the edges of the radial flange 117 projecting from the side wall 107. Figure 12 shows, with reference to the same numbers, the structure of the dome portion 217 and the more rigid central portion 227 of the bottom wall 207, as well as the series of holes 247 formed in the dome portion 217.

[0018] Figure 13 shows a further alternative embodiment of the present invention. In this case, the container body 1 is inserted inside the member 8 which in this case imparts rigidity to the container body itself, supporting it externally. The bottom wall 101 of the container body 1 faces the bottom wall 208 of the member 8, which is provided with a plurality of through-holes 218 and pyramidal reliefs 228. In Figure 14 it is possible to note the arrangement of the bottom wall 101 of the container body 1 very close to the pyramidal reliefs 228.

[0019] Figure 15 shows a further embodiment of the present invention, and particularly a variant of the embodiment shown in Figures 13 and 14. In this case also, the stiffening member 9 is located outside of the container body 1, and the bottom wall 209 of the stiffening member also has pyramidal reliefs 219 in a similar way to that envisaged in the wall 208 of the stiffening member 8 as

shown in the embodiment according to Figures 13 and 14. In this case, however, the side wall 109 and the flange 119 connected thereto have grooves 129 which connect the bottom wall 209 to the environment outside of the pre-charged capsule. As can be noted from the exploded perspective view in Figure 16, the container body 1 is arranged inside the stiffening member 9 so that its outer walls create, in cooperation with the grooves 129, channels communicating with the bottom of the member 9.

[0020] The operating principle of the pre-charged capsule according to the present invention will become clear from the description below. As already mentioned, a pre-charged capsule totally made of a metal foil material such as aluminum or the like, internally lined with a plastic material, has the undoubted advantage of providing a light and impermeable packaging, but on the other hand has the defect of being an object which is not very strong from a structural point of view and which may give rise to problems both during storage handling operations and during final use. The insertion of a stiffening member inside the capsule clearly enhances the management thereof as regards these two different aspects; obviously, if in the embodiment according to Figures 1 and 2, the stiffening member has a certain prominence in the structure of the pre-charged capsule, in the embodiments according to Figures 3, 5 and 7, the container body 1 and the closing surface constitute in fact the sealing casing of a pre-charged capsule which has a structure made mainly of plastic, but which takes advantage from the fact of being completely lined by a container which isolates it from the external environment. Practically, the container body 1 in the embodiments according to Figures 3 and 5 ceases to be a container body in the full sense, while it is still partly so in the embodiment according to Figure 7, and becomes instead a lining which allows the pre-charged capsules to be configured without the need for further packaging which is normally added in order to preserve the integrity of the coffee aroma. In fact, the container body 1 and the closing surface 201 may be sealed together in a controlled atmosphere, for example an inert-gas atmosphere, so that the contents of the capsule are preserved without further measures.

[0021] The embodiment according to Figures 11 and 12 has, in addition to all the advantages of the embodiments shown in the other figures and described above, also a characteristic feature relating to the system for preparing the coffee infusion. In fact, the central portion 217 of the bottom wall 207 is designed so as to be sensitive to variations in pressure caused by the entry of hot water under pressure inside the container body 1 and, therefore, its expansion causes the central rigid portion 227 to come into contact with the bottom wall 101 of the container body 1 and, in particular, openings are formed in the bottom wall itself via the nibs 237. At this point, once the coffee infusion has passed through the holes 237 in the wall 207 of the stiffening member 7, it can percolate outside through the opening(s) formed in the container body 1 by the action of the nibs 237 projecting

from the portion 217 of the bottom wall 207.

[0022] The embodiments in Figures 13, 14 and 15, 16 are based on a functional concept slightly different from that described hitherto. In fact, in both cases, the stiffening member is positioned outside of the container body 1. As a result of this choice, it has also proved appropriate to design the bottom wall of the said stiffening member with a plurality of holes, and the said stiffening member has been provided with means which allow fluid communication between said bottom wall and the external environment. The aim is to cause the collapse, upon entry of hot water under pressure inside the container body 1, of the bottom wall 101 of the container body itself against the reliefs on the bottom wall of the stiffening member; then, the infusion may be discharged towards the dispensing and/or collection means via the holes formed in the bottom wall or via channels formed in the side walls.

[0023] With both solutions, the capsule according to the invention retains very effective functional properties and, in both cases, the pre-charged capsule has a strong and robust structure and the coffee powder is in any case preserved inside a sealed package until the infusion is produced.

[0024] Therefore, the pre-charged ground coffee capsule as conceived herein achieves the advantage of being easier to be handled with greater safety since it has a decidedly effective structural strength on the one hand, and offers undoubted advantages from the point of preservation of the coffee powder on the other hand.

Claims

1. Pre-charged ground coffee capsule comprising a preferably cylindrical or frustoconical container body (1) made of a metal foil material combined with a film of thermoplastic material, said container body (1) being open at one end, said end being joined to a closing surface (201) made of the same material, said container body being associated with a structural stiffening member (2; 3; 4; 5; 6; 7; 8; 9) provided with a plurality of through-openings and arranged in a plane which is substantially perpendicular to the longitudinal axis of said container body (1).
2. Pre-charged capsule according to claim 1, wherein said stiffening member (2; 3; 4; 5; 6; 7) is located within said container body (1).
3. Pre-charged capsule according to claim 1, wherein said stiffening member (8; 9) is located outside said container body (1).
4. Pre-charged capsule according to claim 2, wherein said stiffening member (3; 4; 5; 7) is provided with a peripheral wall (403; 404; 405; 207) which is perpendicular to the plane of said stiffening member (3; 4; 5; 7).

5. Pre-charged capsule according to claim 4, wherein said wall (404; 405; 107) is provided with an outwardly projecting radial flange (414; 415; 117). said side wall (109) is provided with a plurality of channels (119) communicating with said bottom wall (209).

6. Pre-charged capsule according to either one of claims 4 or 5, wherein said side wall is discontinuous and formed by a plurality of parallel webs (405) which are equally spaced from each other. 5

7. Pre-charged capsule according to claim 2 or any one of claims 4 to 6, wherein said stiffening member (2; 3; 4; 5; 6) has arranged thereon a water-permeable layer (202; 203; 204; 205; 206) of filter material facing the inside of said container body (1). 10

8. Pre-charged capsule according to claim 2 or any one of claims 4 to 7, wherein said stiffening member (2; 3; 4; 5; 6) includes a substantially disc-shaped element comprising a peripheral ring (302; 303; 304; 305; 306) and a plurality of radial elements (312; 313; 314; 315; 316) converging toward the center and equally spaced from each other, said radial elements defining a plurality of openings (322; 323; 324; 325; 326). 15
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9. Pre-charged capsule according to claim 8, wherein a recess (102; 103; 104; 105; 106) communicating with the aforementioned openings (322; 323; 324; 325; 326) is formed in the center of said member (2; 3; 4; 5; 6). 25
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10. Pre-charged capsule according to any one of the preceding claims 4 to 6, wherein said stiffening member (7) comprises a bottom wall (207) provided with a flexible dome shaped portion (217) and, centrally, with a more rigid body (227) which is provided with perforating means (237), a plurality of openings (247) being formed in said wall (207). 35

11. Pre-charged capsule according to claim 3, wherein said stiffening member is provided with a peripheral wall (108; 109) which is perpendicular to the plane of said stiffening member (8; 9). 40

12. Pre-charged capsule according to claim 11, wherein said wall (108; 109) is provided with an outwardly projecting radial flange. 45

13. Pre-charged capsule according to claim 11 or 12, wherein said stiffening member (8; 9) is provided, on its bottom wall (208; 209), with reliefs (228; 219) projecting toward said container body (1). 50

14. Pre-charged capsule according to claim 13, wherein said bottom wall (208) is provided with through-holes (218). 55

15. Pre-charged capsule according to claim 13, wherein

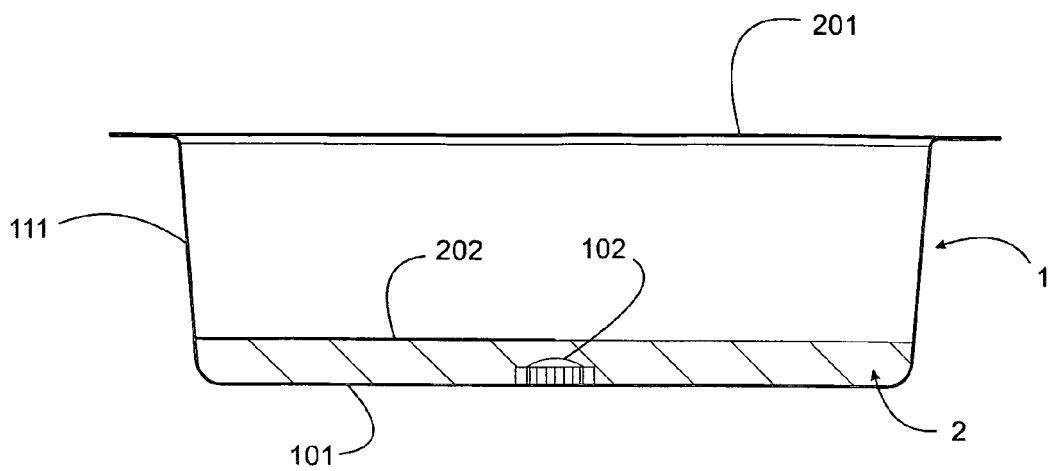


Fig. 1

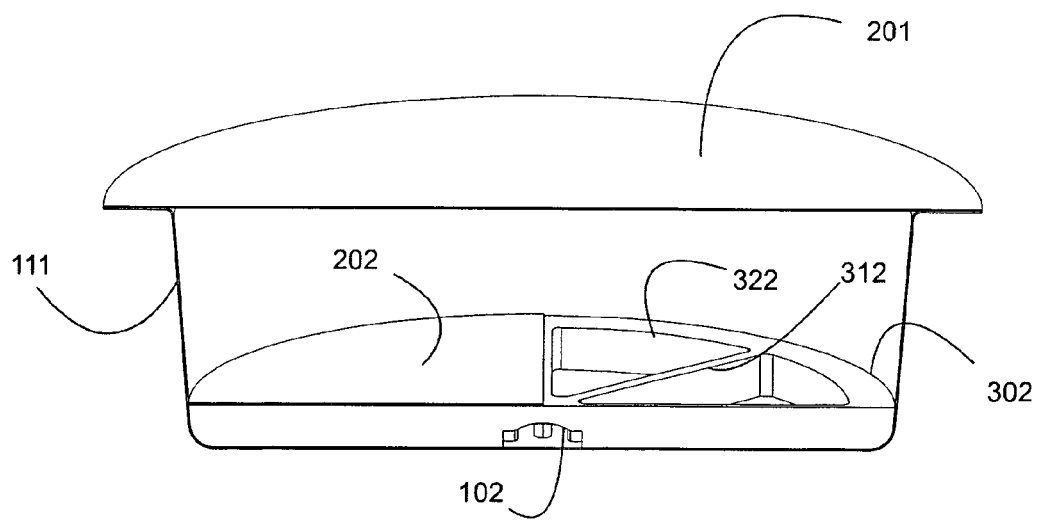


Fig. 2

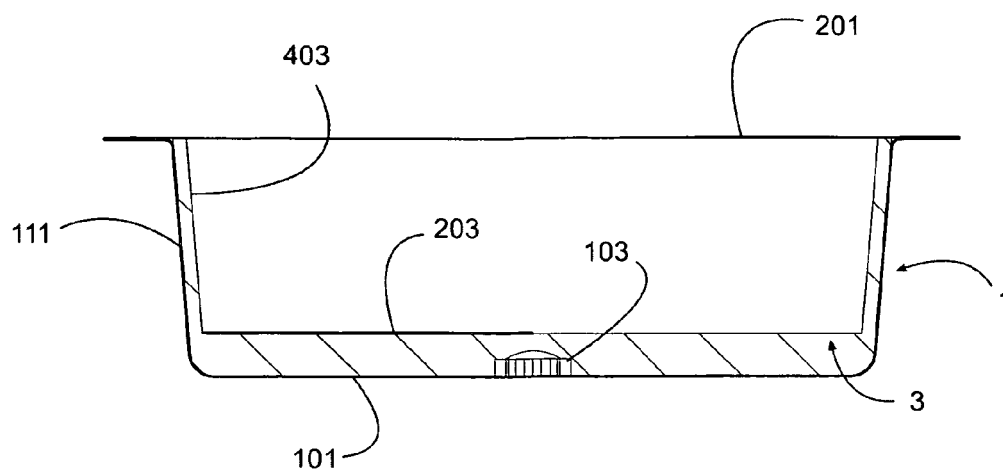


Fig. 3

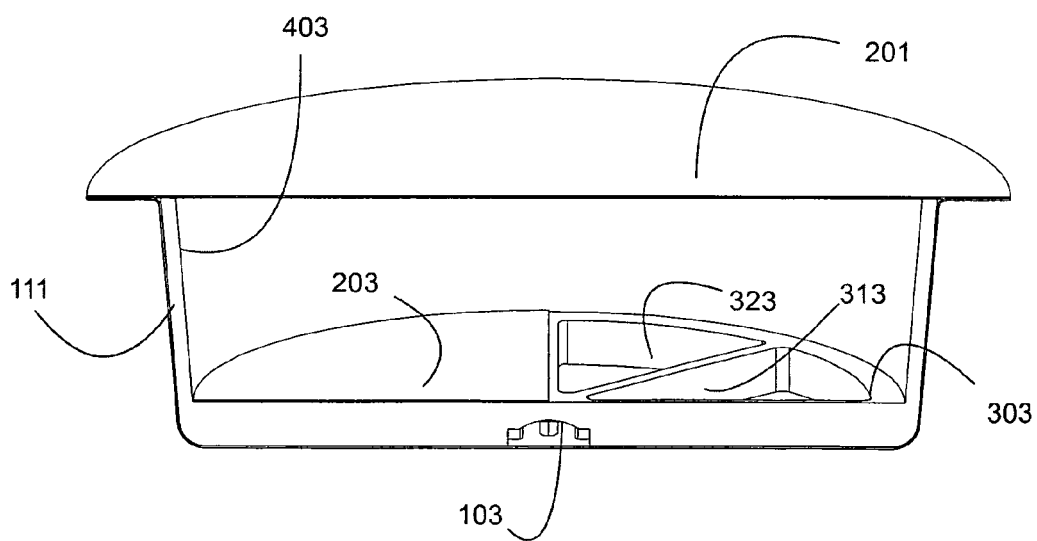


Fig. 4

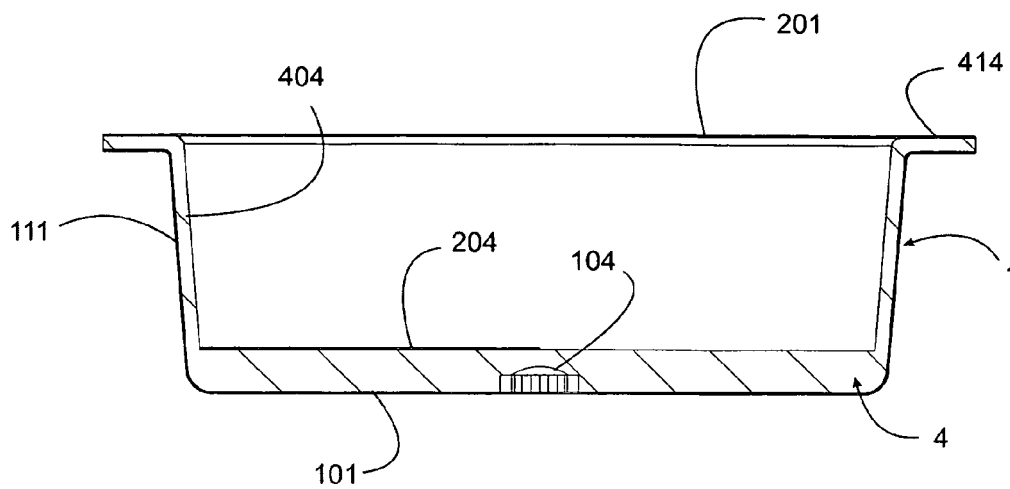


Fig. 5

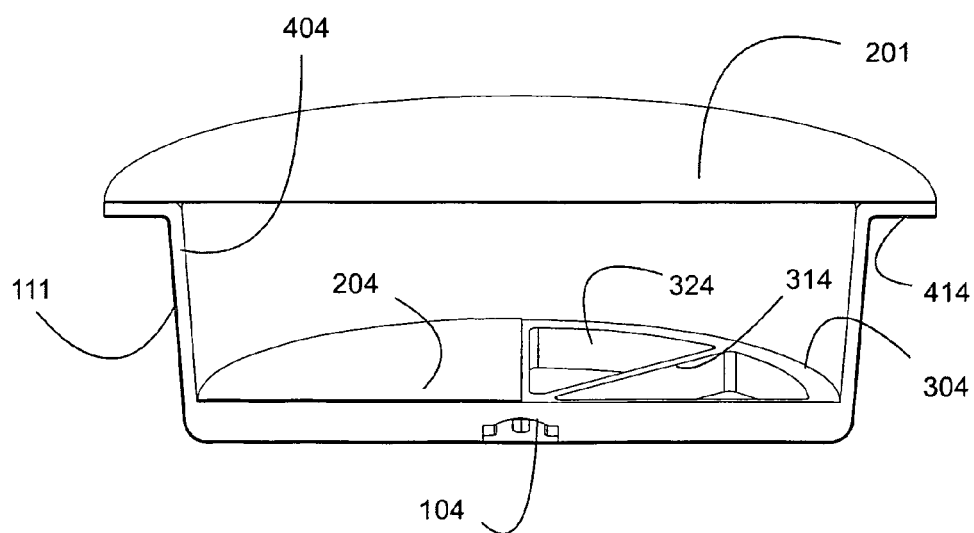


Fig. 6

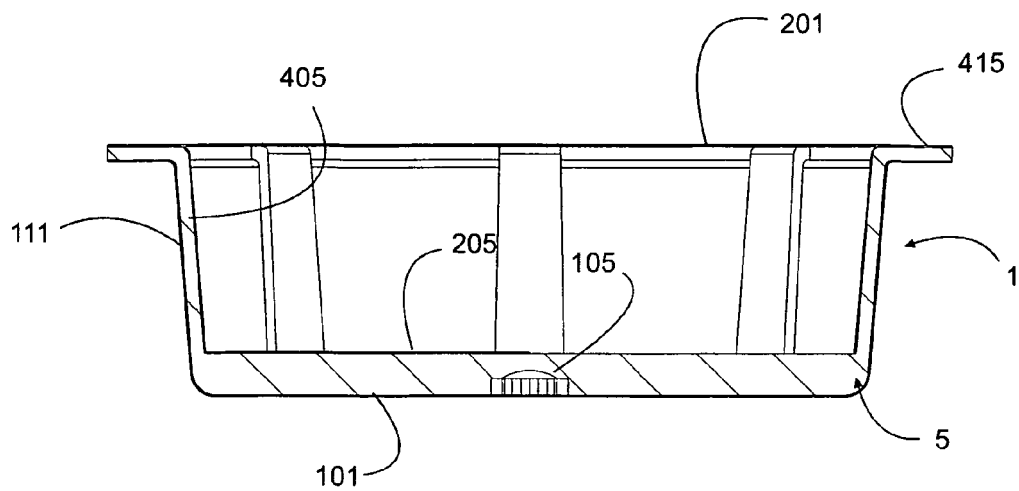


Fig. 7

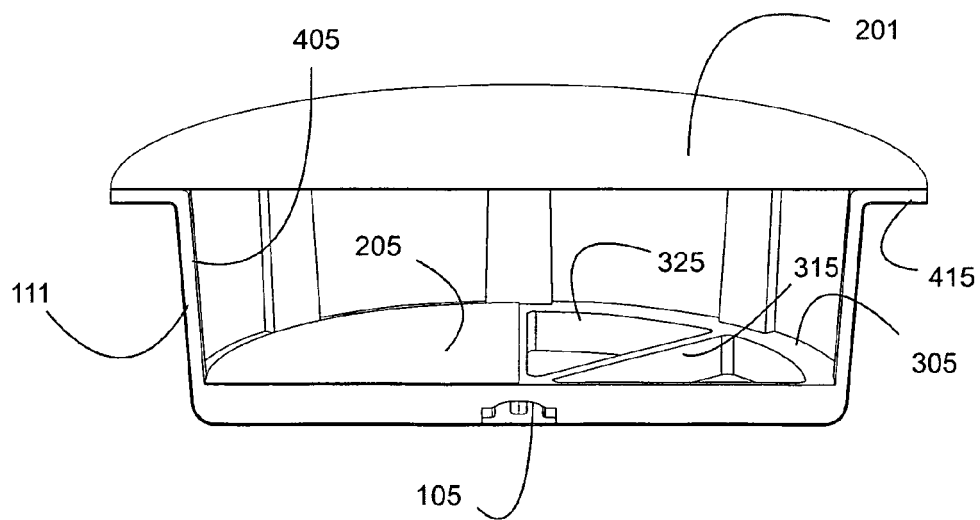


Fig. 8

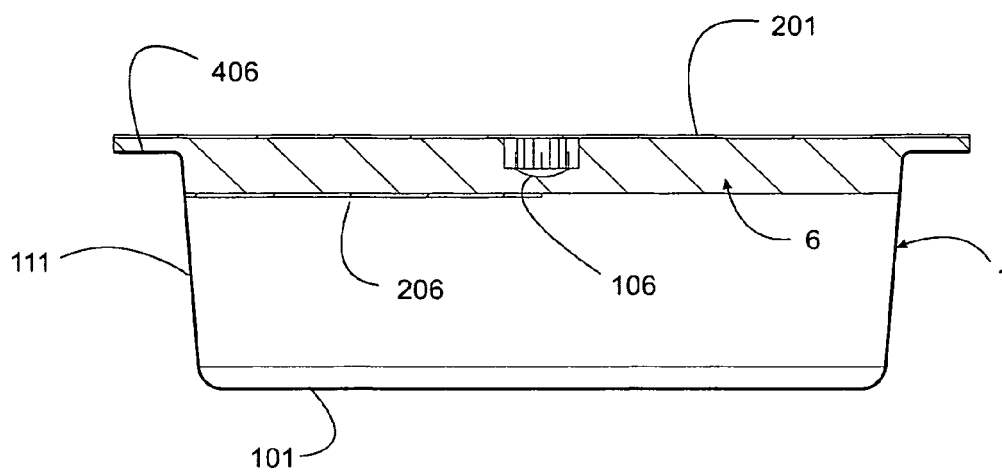


Fig. 9

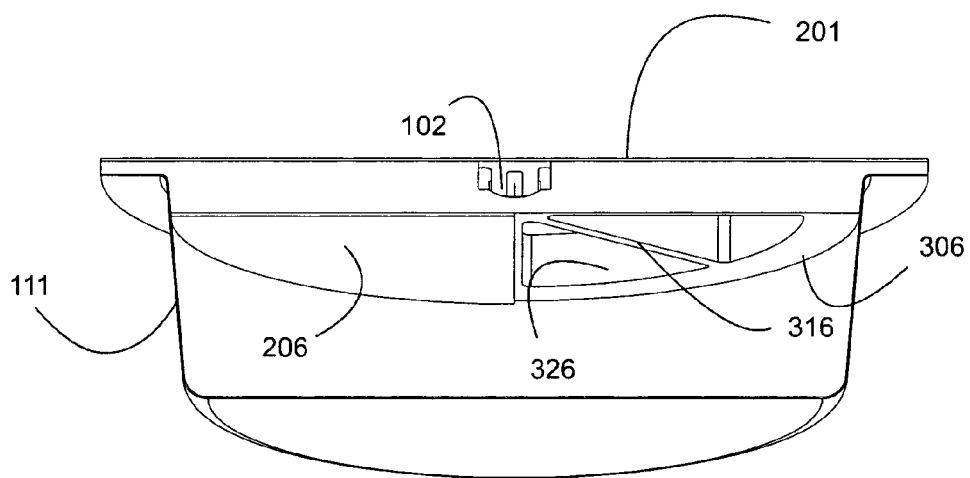


Fig. 10

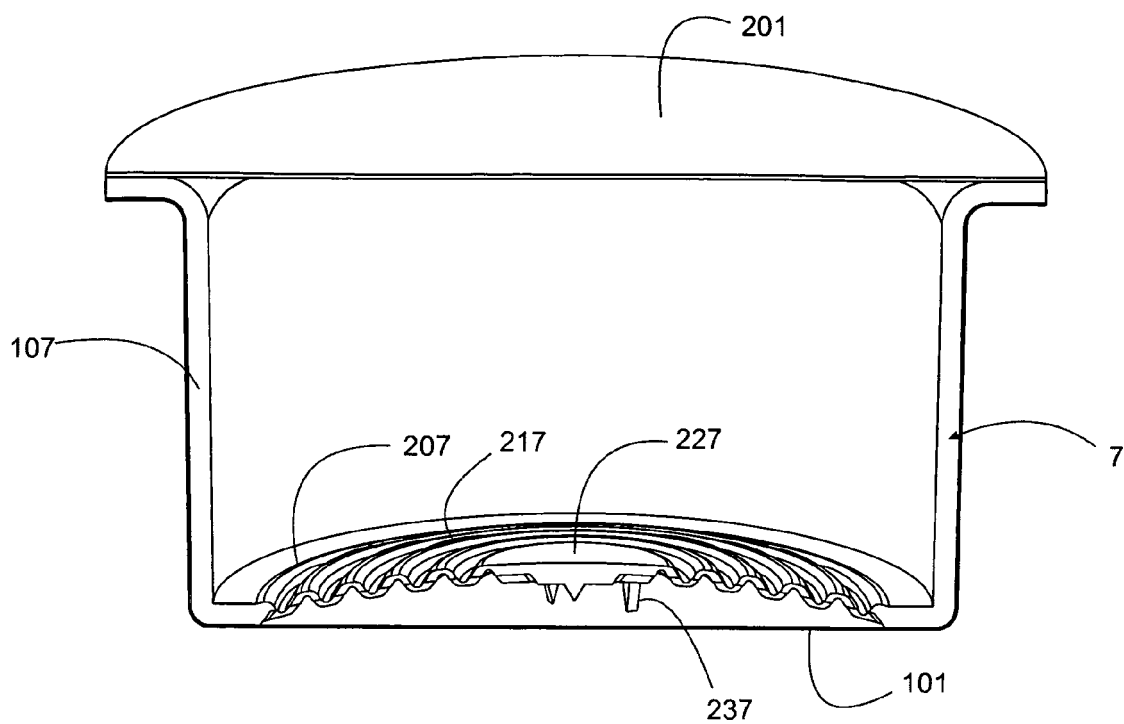


Fig. 11

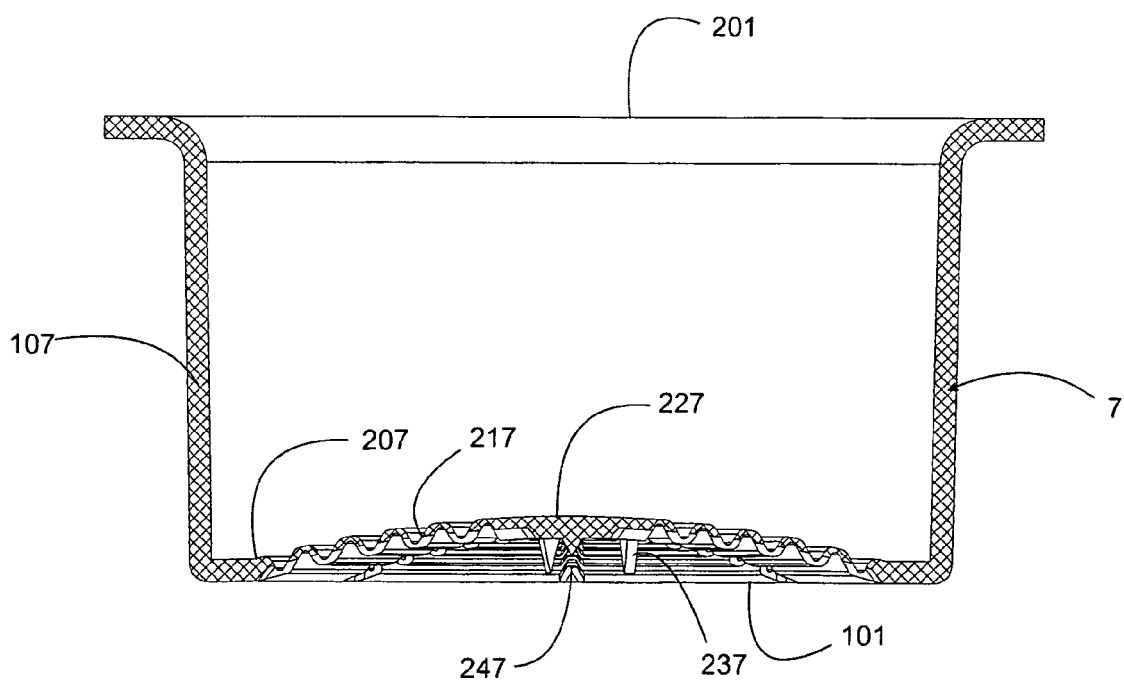
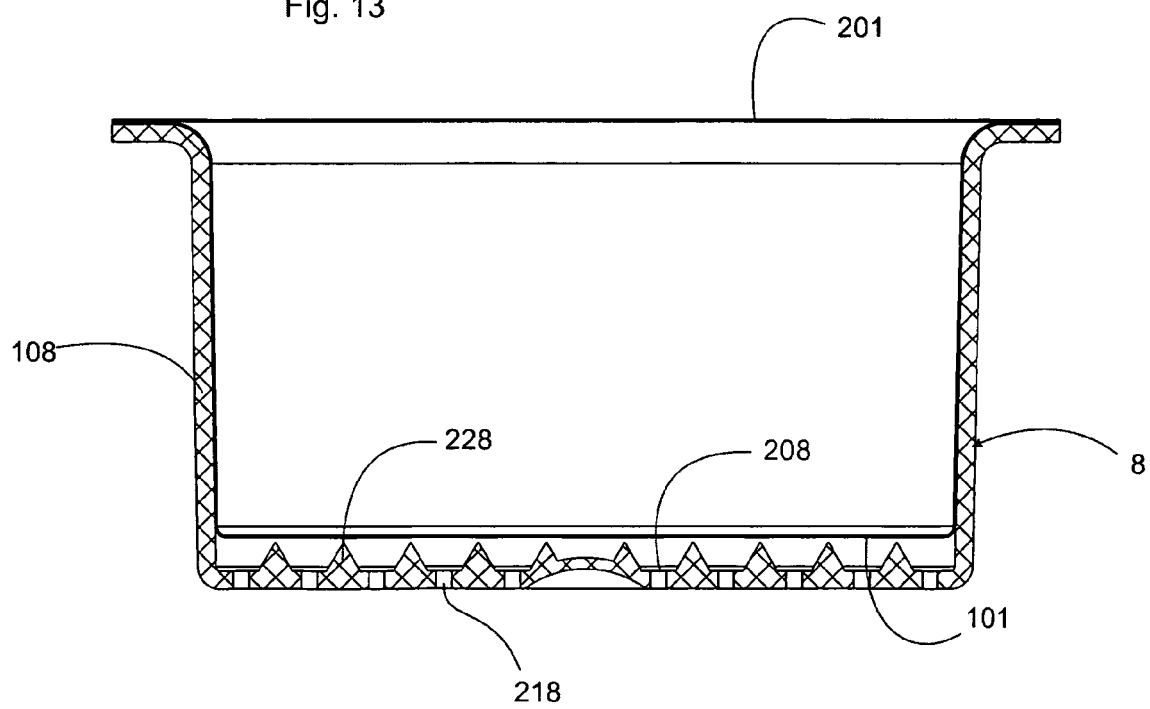
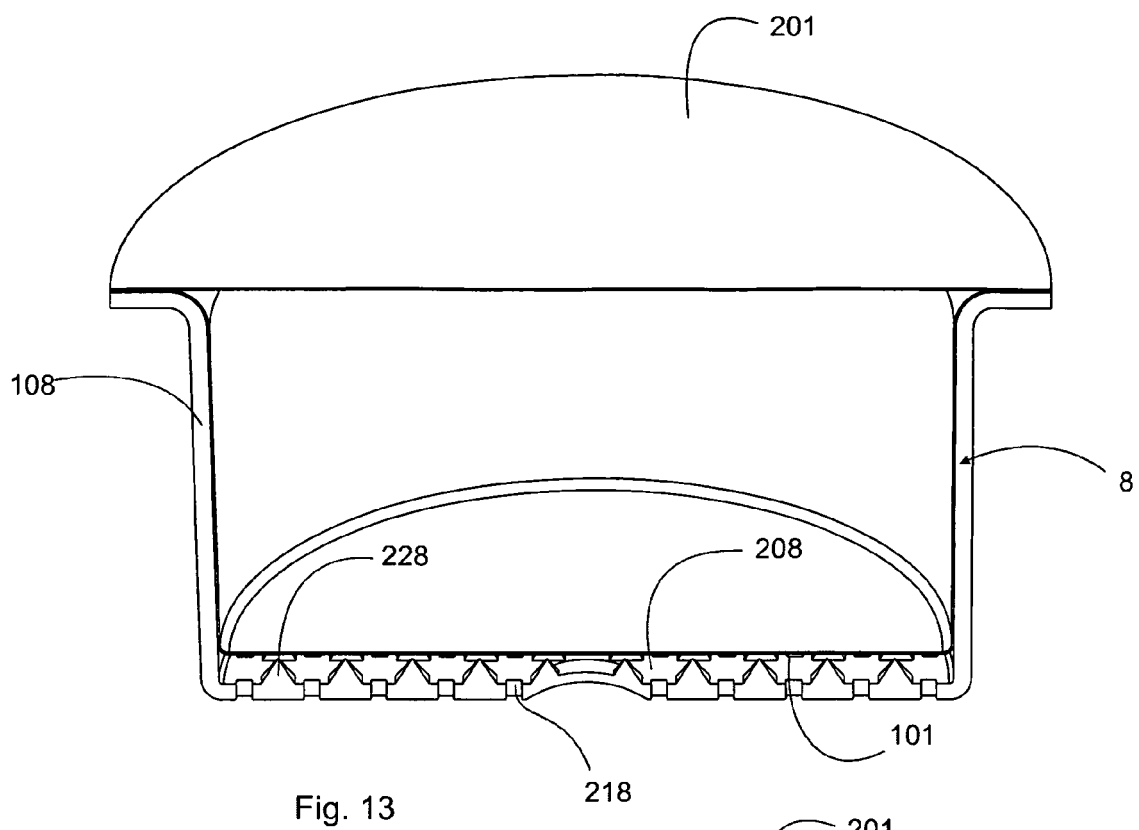


Fig. 12



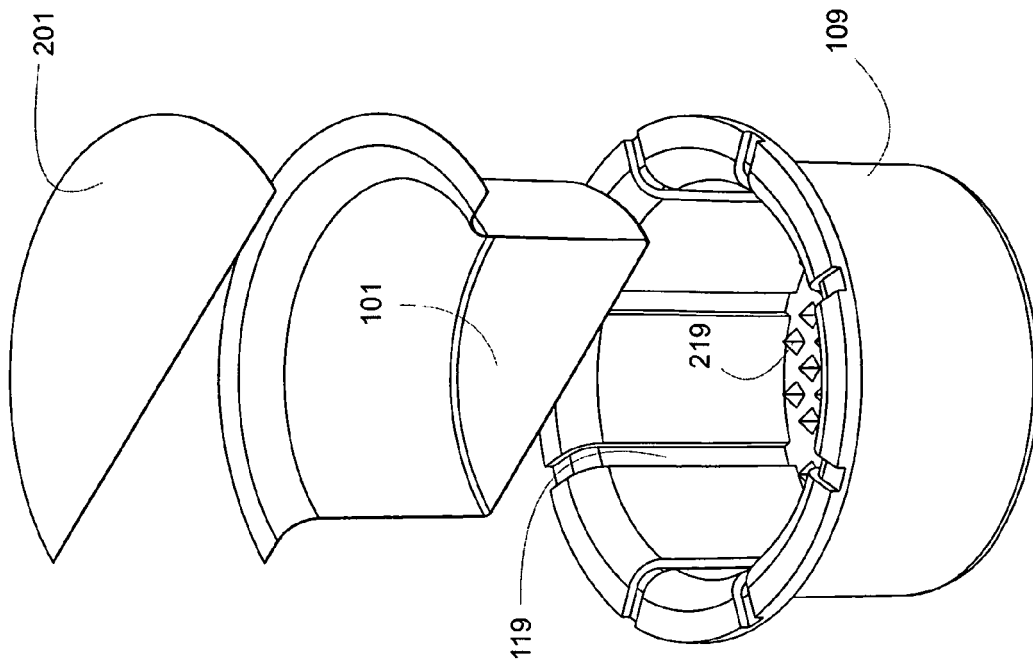


Fig. 16

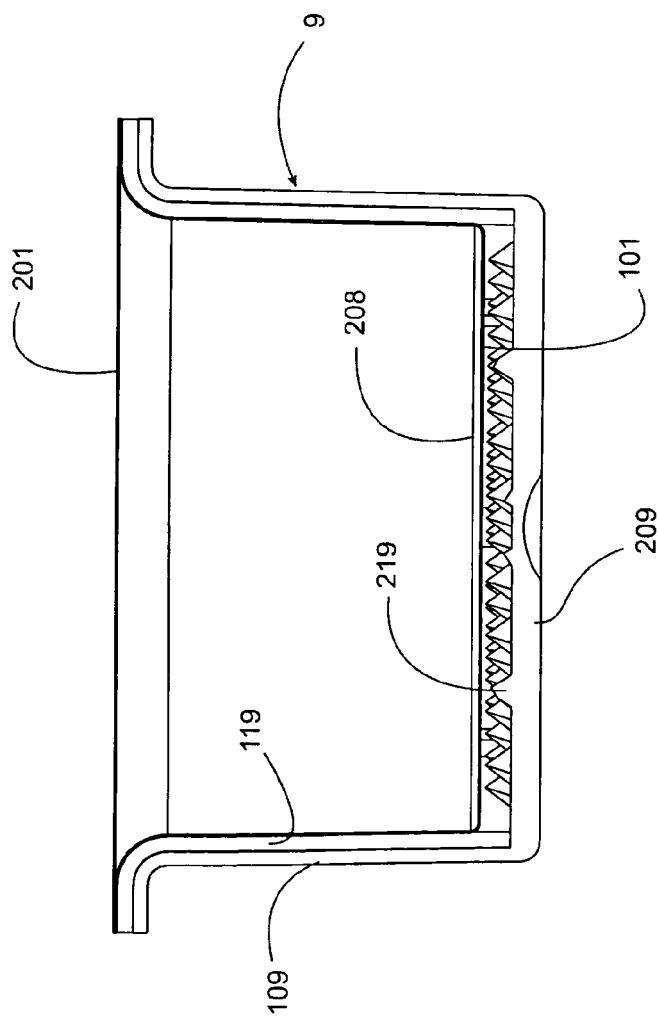


Fig. 15



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Application Number
EP 11 00 0461

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 18 May 2011	Examiner Bevilacqua, Vincenzo
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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