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(54) **CAPSULE FOR PREPARING BEVERAGES**

KAPSEL ZUR ZUBEREITUNG VON GETRÄNKEN

CAPSULES POUR PRÉPARER DES BOISSONS

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## Description

**[0001]** The present invention relates to an improved capsule for preparing beverages.

**[0002]** In particular, the present invention relates to a capsule for preparing beverages, which, on the one hand, has a simplified structure and, on the other hand, once used, may be completely recycled.

**[0003]** The description which follows will refer to a capsule containing coffee powder, for preparation of the corresponding beverage. However, as will become clear from the description below, the principles of the present invention apply also to capsules containing granular or powder substances for the preparation of beverages other than coffee, such as tea or infusions.

**[0004]** Many types of capsule are known from the prior art. Among these, a capsule comprising a body made of polymeric material is described for example in the patent EP 1608569, in the name of the same applicant. The capsule body has a slightly frustoconical form and is made of food grade propylene. It may be manufactured for example by thermoforming a sheet or by means of injection-moulding.

**[0005]** The capsule body has a continuous perimetral top edge projecting towards the outside of the capsule in the radial direction and a perimetral bottom edge projecting in the longitudinal direction from the bottom of the body. An intermediate wall divides the capsule into two zones: a first zone inside which the powdery or granular substance is contained and a second zone for collecting the beverage being prepared, before it is dispensed. The intermediate wall is provided with at least one hole for allowing the beverage being prepared to pass from the first zone to the second zone.

**[0006]** The top perimetral edge and the bottom perimetral edge are sealed, respectively, with a top foil and a bottom foil, both made of aluminium, or other fluid-impermeable material of the food grade type known per se.

**[0007]** The expression "sealing an edge" is understood as meaning applying a foil to the top edge or bottom edge of the capsule so that there is no fluid communication between the inside and outside of the capsule through this foil. In a manner known per se, in fact, the edges sealed by means of the foils prevent the coffee powder from losing its organoleptic properties as a result of coming into contact with air.

**[0008]** This type of capsule, although widely used, is not without drawbacks.

**[0009]** As mentioned further above, the capsule body is made of polypropylene, a material which - albeit to a small degree - allows oxygen to pass through. Therefore, the powdery or granular substance contained inside the first zone is not totally isolated from the external environment, even if the top edge is sealed with an aluminium foil. In fact, it is possible, albeit to a very small degree, for air to pass between the inside of the capsule and the outside of the capsule and vice versa.

**[0010]** For this reason, the capsules are normally pack-

aged inside an outer sealing wrapping so as to safeguard as far as possible the organoleptic properties of the powdery or granular material contained inside the capsule.

**[0011]** Usually the outer wrapping is made of TRIPLEX<sup>®</sup>, a material widely used in the packaging sector, consisting of three layers of combined materials, at least one of which is aluminium.

**[0012]** It is evident that the packaging with the outer TRIPLEX<sup>®</sup> wrapping results in a longer and more costly process for manufacture of the end product.

**[0013]** Moreover, the material forming the wrapping, such as TRIPLEX<sup>®</sup>, although highly satisfactory from the point of view of isolation, constitutes packaging which is difficult to recycle.

**[0014]** The object of the present invention is therefore to overcome, at least partly, the drawbacks of the prior art.

**[0015]** The idea which has occurred, therefore, is that of providing a capsule for preparing a beverage from a powdery or granular raw material, provided with a body of polymeric material comprising a seat suitable for containing the powdery or granular raw material. The capsule is characterized in that the seat comprises an opening provided with a first edge sealed by a first foil impermeable to fluids; and a collection chamber divided from the seat by means of a bottom wall having a second edge projecting in the longitudinal direction, said edge being sealed with a second foil impermeable to fluids. It is characterized furthermore in that the body is made of plastic material impermeable to fluids, in particular to gases and even more particularly to atmospheric oxygen.

**[0016]** In the preferred embodiment said plastic material is polyethylene terephthalate (PET).

**[0017]** The characteristic features and advantages of a capsule provided by applying the principles of the present invention will emerge more clearly from the description below of a number of examples of embodiment provided by way of non-limiting illustration with reference to the accompanying drawings in which:

Fig. 1 shows a front view of a capsule according to the present invention;

Fig. 2 shows a cross-sectional view along a longitudinal plane of a capsule according to the present invention.

Fig. 3 shows a perspective view of a possible embodiment of a capsule according to the present invention;

Fig. 4 shows a perspective view of an alternative embodiment of a capsule according to the present invention;

Fig. 5 shows a partially exploded view of the capsule according to Figure 4; and

Figs. 6 and 7 show two partial schematic views of two components of the capsule according to the present invention.

Figures 1 and 2 show a capsule 10 for the preparation of a beverage from a powdery or granular raw material according to the present invention. The cap-

sule 10 is provided with a body 12 made of polymeric material comprising:

- a seat 14 suitable for containing the powdery or granular raw material and comprising an opening 16 provided with a first edge or top edge 18 and sealed by a first foil 20 impermeable to fluids; and
- a collection chamber 22 divided from said seat 14 by means of a bottom wall 24.

**[0018]** The bottom wall 24 has a second edge 26 projecting in the longitudinal direction and sealed with a second foil 30 impermeable to fluids.

**[0019]** The capsule according to the present invention is characterized, as already mentioned, in that the body 12 is made of plastic material impermeable to fluids, in particular to gases and even more particularly to oxygen.

**[0020]** In the embodiment shown said plastic material is polyethylene terephthalate (PET) which is also advantageous because of its easy moulding also in complex forms.

**[0021]** With reference to Figure 1 the following are defined:

- an axial direction, parallel to the direction of the main axis 28 of the capsule 10; and
- a radial direction perpendicular to and passing through the main axis 28 of the capsule 10.

**[0022]** As is known, polyethylene terephthalate (PET) forms part of the family of polyesters and is a thermoplastic resin composed of phthalates, suitable for contact with food. The other main polyester polymers of the same family are polybutylene terephthalate (PBT) and polytrimethylene terephthalate (PTT). Unlike PET, which is amorphous/crystalline, PBT and PTT are crystalline. Moreover, PBT and PTT are more costly than PET. In particular, the type of PET advantageously used for capsules is a copolymer polyester or copolyester. Moreover, the PET polymer used is advantageously of a suitably pure type, with only one known additive of the type useful for preventing the formation of substances of the AA (Acetic Aldehyde) type which may alter the taste of water or food products which come into contact with the polymer. Any alteration of the taste of the coffee is thus avoided.

**[0023]** During processing, the crystallinity of the PET may also be advantageously controlled in a known manner so as to obtain an optimum barrier effect for oxygen and for the aromas/fragrances.

**[0024]** According to a possible embodiment of the present invention, the first foil 20 and the second foil 30 are made of aluminium.

**[0025]** Advantageously, the first foil 20, as can be clearly seen in the detail of Figure 6, may consist of a first layer 32 of aluminium and a second layer 34 of polyethylene terephthalate joined together in a manner known per se. In operating conditions, the first layer 32 is facing the outside of the seat 14 and the second layer 34 is facing the inside of the seat 14.

**[0026]** According to a possible embodiment of the present invention, the second foil 30, as can be clearly seen in the detail of Figure 7, consists of a first layer 38 of aluminium and a second layer 36 of polyethylene terephthalate joined together in a manner known per se. In operating conditions, the first layer 38 faces the outside of the seat 14 and the second layer 36 faces the inside of the seat 14.

**[0027]** The foils may be advantageously sealed by means of heat-sealing, magnetic induction or ultrasound.

**[0028]** Advantageously, as shown in the embodiments of Figures 3-5, the first foil 20 may be provided with a first tab 40. The first tab 40 is suitable for facilitating removal of the first foil 20 from the body 12 of the capsule 10 both before use of the capsule 10 and after, as will be clarified below.

**[0029]** Advantageously, as shown in Figures 3-5, the second foil 30 may be provided with a second tab 42. The second tab 42 is suitable for facilitating removal of the second foil 30 from the body 12 of the capsule 10 after use of the capsule 10.

**[0030]** According to a possible embodiment of the present invention, the first foil 20 is suitable for being perforated by perforation means (not shown) for supplying water to the inside of the seat 14 of the capsule 10.

**[0031]** Advantageously, the present invention envisages that the first foil 20 is removed before the capsule 10 is used. A permeable foil 44 fixed to the top edge 18 which covers the opening 16 is provided between the first foil 20 and the top edge 18. The permeable foil 44 prevents powdery or granular material from coming out of the seat 14, but allows water to pass through and be supplied to the seat 14.

**[0032]** The permeable foil 44 may be made of paper, fabric or polymeric material provided with holes 46 (as can be clearly seen in Figure 5).

**[0033]** Advantageously, the permeable foil 44 may be provided with a third tab 48 for facilitating removal of the foil from the top edge 18 of the body 10.

**[0034]** The advantages of a capsule according to the present invention compared to the capsules of the prior art are therefore clear.

**[0035]** Firstly, the product contained inside the capsule is completely sealed from the external environment by means of a combination of a plastic material impermeable to fluids, and in particular oxygen, such as polyethylene terephthalate, used for the capsule body, and foils which are impermeable to fluids. This enables the organoleptic properties of the powdery or granular material contained inside the capsule to be preserved for a very long time, without having to enclose the capsule inside an outer wrapping, such as a TRIPLEX® wrapping, in order to ensure a hermetic seal with respect to the oxygen of the external air.

[0036] The use of foils formed by a layer of polyethylene terephthalate and aluminium is in this connection particularly advantageous and preferable.

[0037] Moreover, since packaging of the capsules is preferably performed under a vacuum, the powdery or granular material does not come into contact with air which could negatively affect its organoleptic properties.

[0038] Moreover, polyethylene terephthalate has a high recyclability index and may be recycled essentially in two ways: either to produce fibres which are then used as fabrics, or chemically treated so as to be reutilizable for alimentary purposes.

[0039] The removability of the foils allows advantageously the degree of recyclability of the capsule to be increased still further, since the various materials may be separated.

### Claims

1. Capsule (10) for preparing a beverage from a powdery or granular raw material, provided with a body (12) of polymeric material comprising a seat (14) suitable for containing the powdery or granular raw material, wherein:

- said seat (14) comprises an opening (16) provided with a first edge (18) sealed by a first foil (20) impermeable to fluids;
- a collection chamber (22) is divided from said seat (14) by means of a bottom wall (24) having a second edge (26) projecting in the longitudinal direction (28), said edge (26) being sealed with a second foil (30) impermeable to fluids;
- said body (12) is made of plastic material impermeable to fluids, in particular to gases and even more particularly to atmospheric oxygen;

said capsule being

**characterized by** comprising a permeable foil (44) provided between the first foil (20) and the top edge (18), said permeable foil (44) covering the opening (16).

2. Capsule according to claim 1, wherein said plastic material is polyethylene terephthalate.

3. Capsule according to any one of the preceding claims, wherein said first foil (20) consists of a first layer (32) of aluminium and a second layer (34) of polyethylene terephthalate joined together, with the first layer (32) facing the outside of the seat (14) and the second layer (34) facing the inside of the seat (14).

4. Capsule according to any one of the preceding claims, wherein said second foil (30) consists of a first layer (38) of aluminium and a second layer (36)

of polyethylene terephthalate joined together, with the first layer (38) facing the outside of the seat (14) and the second layer (36) facing the inside of the seat (14).

5. Capsule according to claim 3, wherein said first foil (20) comprises a first tab (40) facilitating removal of the first foil.

6. Capsule according to claim 4, wherein said second foil is provided with a second tab (42) facilitating removal of the first foil.

### 15 Patentansprüche

1. Kapsel (10) zur Zubereitung eines Getränks aus einem Pulver oder granularem Rohstoff, aufweisend einen Körper (12) aus Polymer-Material, aufweisend einen Sitz (14), welcher geeignet ist, das Pulver oder den granularen Rohstoff zu enthalten, wobei:

- der Sitz (14) eine Öffnung (16) aufweist, welche mit einem ersten Rand (18) versehen ist, welcher mit einer für Fluide undurchlässigen ersten Folie (20) verschlossen ist;

- eine Sammelkammer (22) von dem Sitz (14) mittels einer Bodenwand (24), aufweisend einen zweiten Rand (26), welcher in Längsrichtung (28) vorspringt, abgetrennt ist, wobei der Rand (26) mit einer zweiten Folie (30), welche für Fluide undurchlässig ist, verschlossen ist;

- der Körper (12) aus Kunststoffmaterial hergestellt ist, welches undurchlässig für Fluide ist, speziell für Gase und noch spezieller für atmosphärischen Sauerstoff;

diese Kapsel wird **dadurch gekennzeichnet, dass** sie eine durchlässige Folie (44) aufweist, welche zwischen der ersten Folie (20) und dem oberen Rand (18) vorgesehen ist, wobei die durchlässige Folie (44) die Öffnung (16) bedeckt.

2. Kapsel gemäß Anspruch 1, wobei das Kunststoffmaterial Polyethylenterephthalat ist.

3. Kapsel gemäß einem der vorangegangenen Ansprüche, wobei die erste Folie (20) aus einer ersten Schicht (32) aus Aluminium und einer zweiten Schicht (34) aus Polyethylenterephthalat besteht, welche miteinander verbunden sind, wobei die erste Schicht (32) der Außenseite des Sitzes (14) zugewandt ist und die zweite Schicht (34) der Innenseite des Sitzes (14) zugewandt ist.

4. Kapsel gemäß einem der vorangegangenen Ansprüche, wobei die zweite Folie (30) aus einer ersten Schicht (38) aus Aluminium und einer zweiten

Schicht (36) aus Polyethylenterephthalat besteht, welche miteinander verbunden sind, wobei die erste Schicht (38) der Außenseite des Sitzes (14) zugewandt ist und die zweite Schicht (36) der Innenseite des Sitzes (14) zugewandt ist.

5. Kapsel gemäß Anspruch 3, wobei die erste Folie (20) ein erstes Etikett (40) aufweist, welches das Entfernen der ersten Folie vereinfacht.
6. Kapsel gemäß Anspruch 4, wobei die zweite Folie mit einem zweiten Etikett (42) versehen ist, welches das Entfernen der ersten Folie vereinfacht.

## Revendications

1. Capsule (10) pour préparer une boisson à partir d'une matière première en poudre ou granulaire, prévue avec un corps (12) en matériau polymère comprenant un siège (14) approprié pour contenir la matière première en poudre ou granulaire, dans laquelle :
  - ledit siège (14) comprend une ouverture (16) prévue avec un premier bord (18) scellé par une première feuille (20) imperméable aux fluides ; une chambre de collecte (22) est séparée dudit siège (14) au moyen d'une paroi inférieure (24) ayant un second bord (26) faisant saillie dans la direction longitudinale (28), ledit bord (26) étant scellé avec une seconde feuille (30) imperméable aux fluides ;
  - ledit corps (12) est réalisé à partir de matière plastique imperméable aux fluides, en particulier aux gaz et encore plus particulièrement à l'oxygène atmosphérique ;
  - ladite capsule étant **caractérisée en ce qu'elle** comprend une feuille perméable (44) prévue entre la première feuille (20) et le bord supérieur (18), ladite feuille perméable (44) recouvrant l'ouverture (16).
2. Capsule selon la revendication 1, dans laquelle ladite matière plastique est du polyéthylène téréphtalate.
3. Capsule selon l'une quelconque des revendications précédentes, dans laquelle ladite première feuille (20) est constituée par une première couche (32) d'aluminium et une seconde couche (34) de polyéthylène téréphtalate assemblées ensemble, avec la première couche (32) orientée vers l'extérieur du siège (14) et la seconde couche (34) orientée vers l'intérieur du siège (14).
4. Capsule selon l'une quelconque des revendications précédentes, dans laquelle ladite seconde feuille

(30) est constituée d'une première couche (38) d'aluminium et d'une seconde couche (36) de polyéthylène téréphtalate assemblées ensemble, avec la première couche (38) orientée vers l'extérieur du siège (14) et la seconde couche (36) orientée vers l'intérieur du siège (14).

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5. Capsule selon la revendication 3, dans laquelle ladite première feuille (20) comprend une première languette (40) facilitant le retrait de la première feuille.

6. Capsule selon la revendication 4, dans laquelle ladite seconde feuille est prévue avec une seconde languette (42) facilitant le retrait de la première feuille.

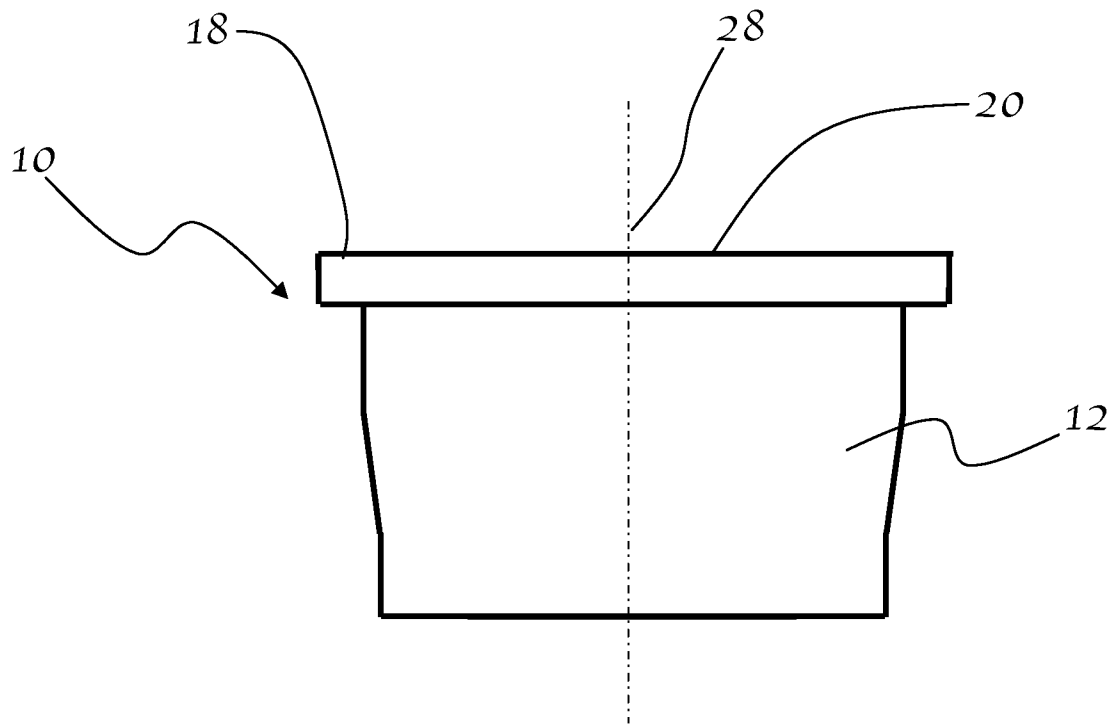


Fig. 1

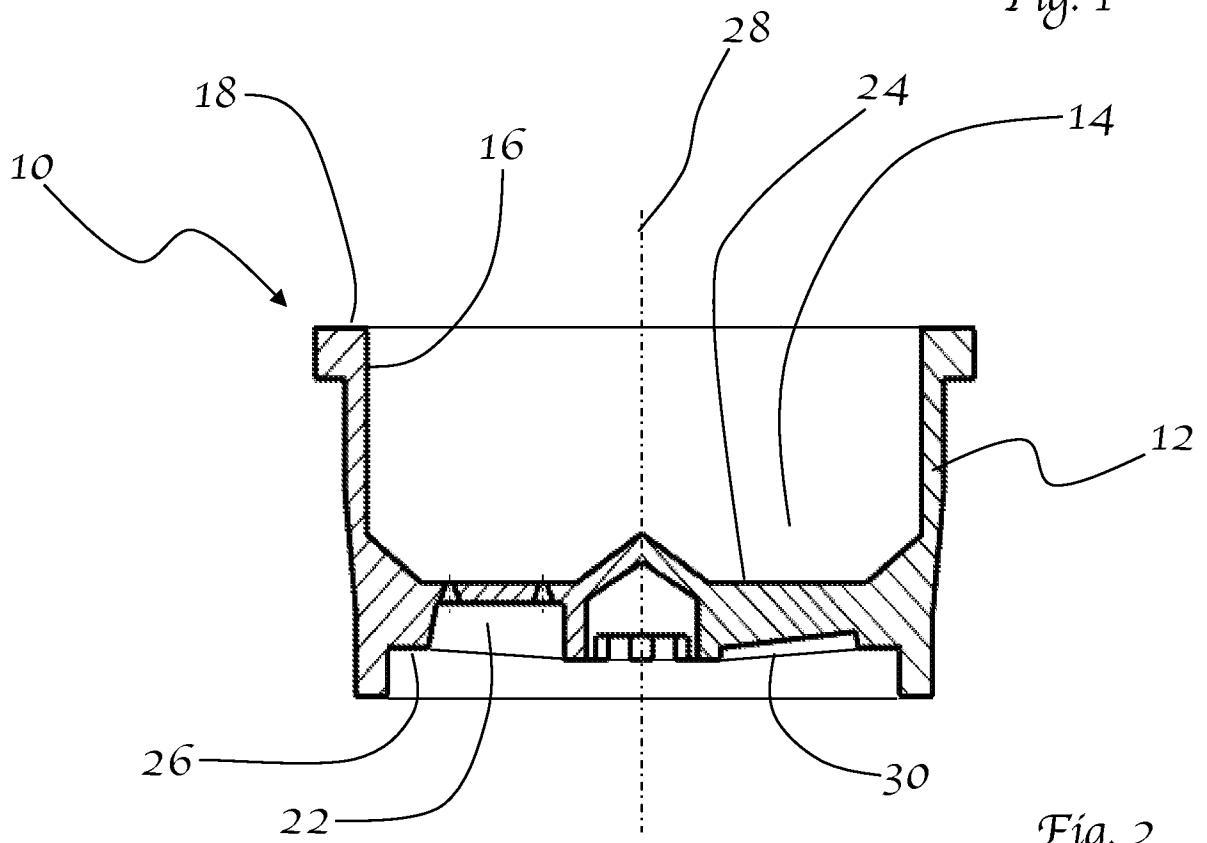


Fig. 2

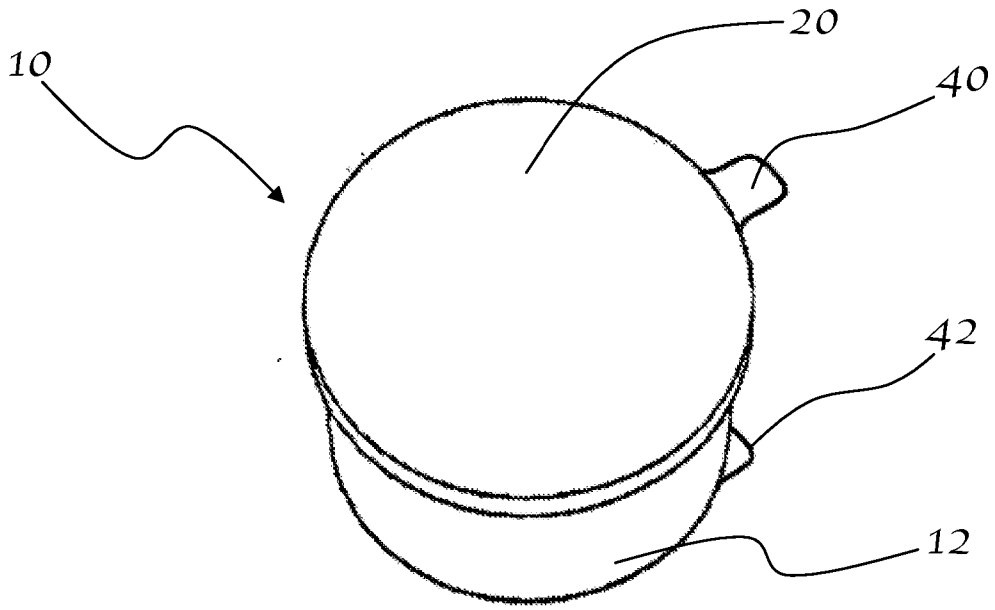


Fig. 3

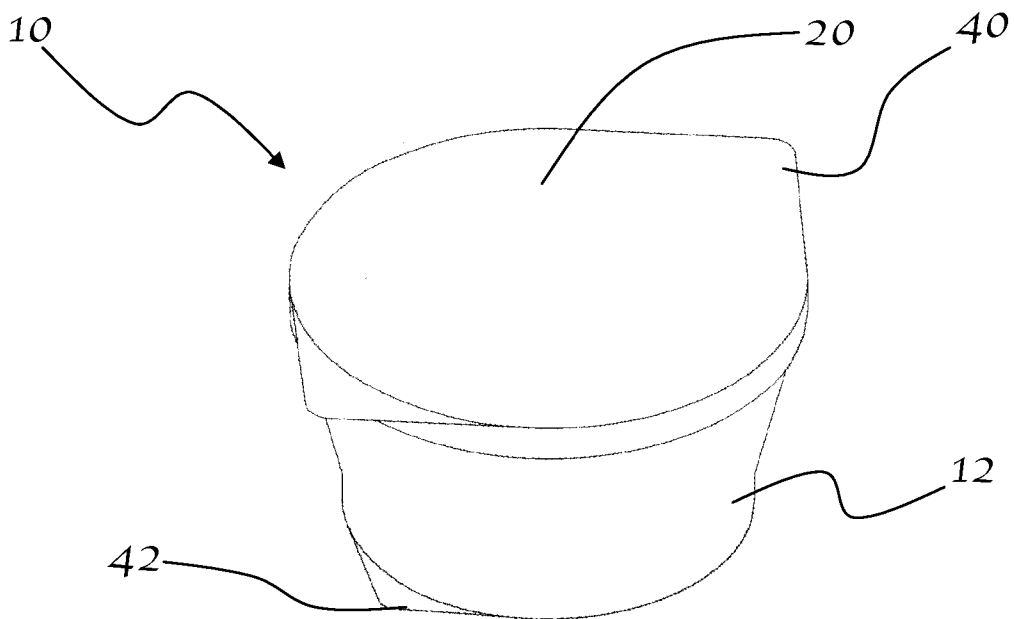


Fig. 4

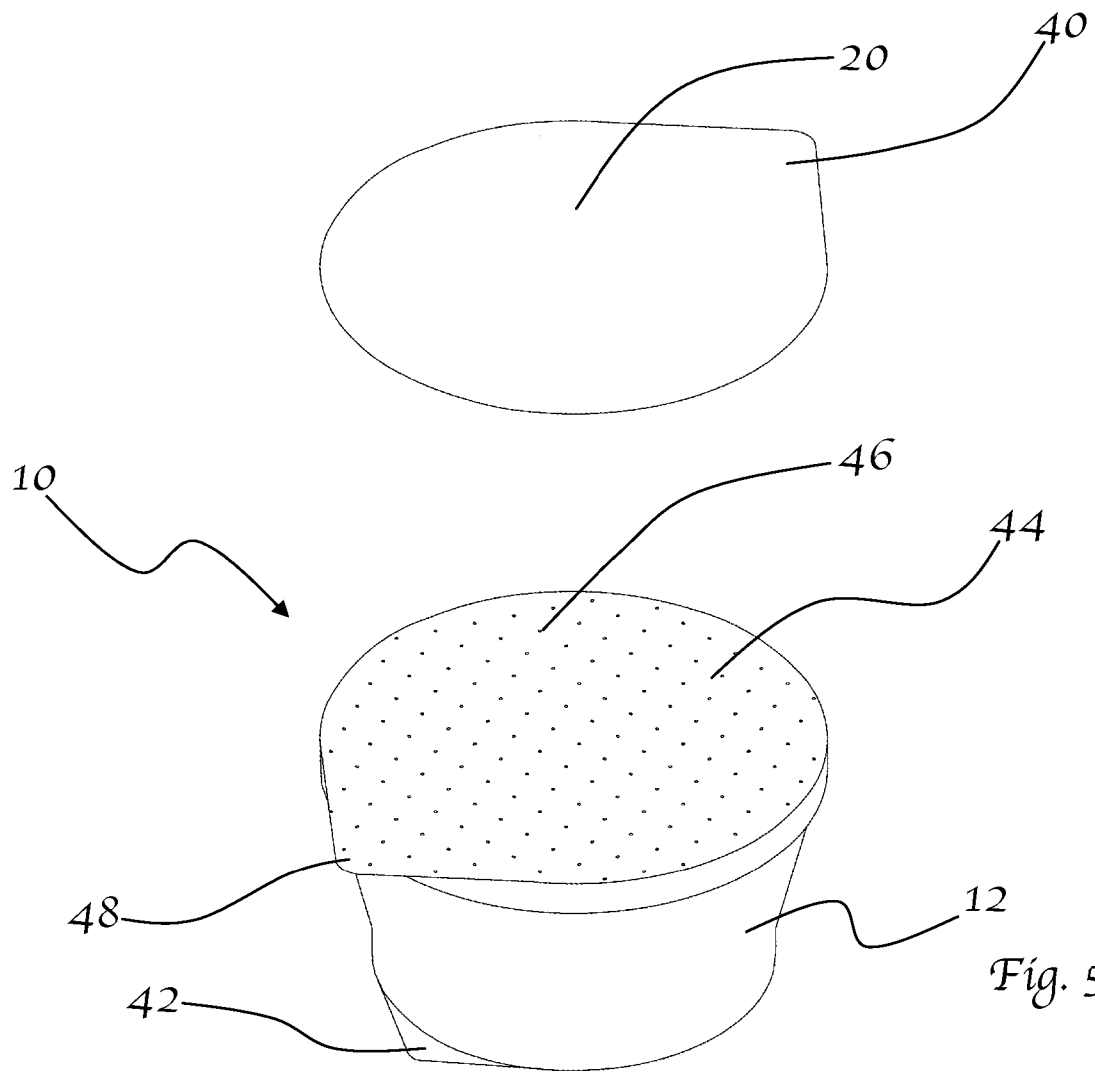
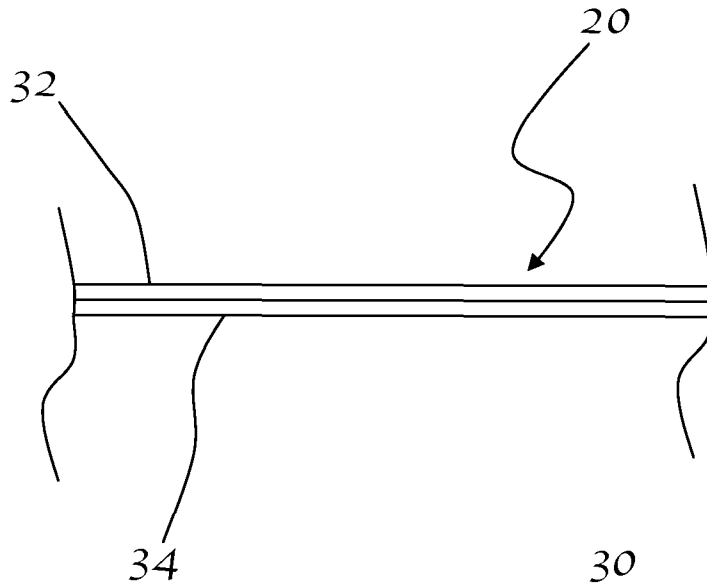
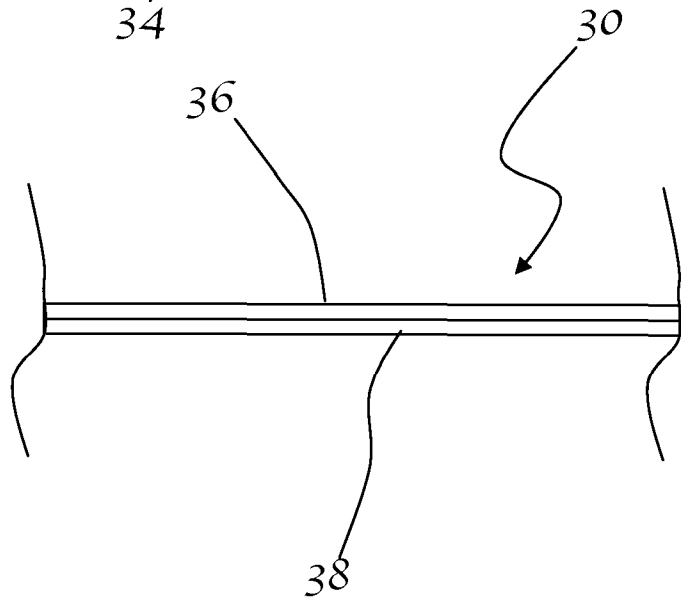


Fig. 5



*Fig. 6*



*Fig. 7*

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- EP 1608569 A [0004]



## KAPSZULA ITALOK KÉSZÍTÉSÉHEZ

## SZABADALMI IGÉNYPONTOK

1. Kapszula (10) itainak porszerű vagy szemcsés alapanyagból való készítéséhez, amely kapszulának van egy háza (12) polimer anyagból, amely magában foglal egy porszerű vagy szemcsés alapanyag befogadására alkalmas fészket (14), és

- a fészkek (14) magában foglal egy nyílást (16) első peremmel (18), amely áramló anyagokat át nem eresztő első fóliával (20) van lezárva;

- egy gyűjtőkamra (22) van elválasztva a fészektől (14) egy alsó fal (24) segítségével, amelynek van egy hosszanti irányban (28) kiálló második pereme (26), amely perem (26) áramló anyagokat át nem eresztő második fóliával (30) van lezárva;

- a ház (12) áramló anyagokat, különösen gázokat, még inkább légköri oxigént át nem eresztő műanyagból készült;

azzal jellemezve, hogy kapszula magában foglal egy, az első fólia (20) és a felső perem (18) között rendelkezésre álló átteresztő fóliát (44), amely átteresztő fólia (44) befedi a nyílást (16).

2. Az 1. igénypont szerinti kapszula, amelyben a műanyagot polietilén-tereftalát képezi.

3. Az 1. vagy a 2. igénypont szerinti kapszula, amelyben az első fólia (20) alumíniumból készült első rétegből (32) és polietilén-tereftalátból készült második rétegből (34) áll, amelyek egymáshoz vannak kötve úgy, hogy az első réteg (32) a fészkek (14) külseje felé, a második réteg (34) a fészkek (14) belseje felé néz.

4. Az előző igénypontok bármelyike szerinti kapszula, amelyben a második fólia (30) alumíniumból készült első rétegből (38) és polietilén-tereftalátból készült második rétegből (36) áll, amelyek egymáshoz vannak kötve úgy, hogy az első réteg (38) a fészkek (14) külseje felé, a második réteg (36) a fészkek (14) belseje felé néz.

5. A 3. igénypont szerinti kapszula, amelyben az első fólia (20) magában foglal egy, az első fólia eltávolítását megkönnyítő első fület (40).

6. A 4. igénypont szerinti kapszula, amelyben a második fólia el van látva egy, az első fólia eltávolítását megkönnyítő második fülel (42).

(A meghatalmazott)