



(11) **EP 2 391 559 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
12.12.2012 Bulletin 2012/50

(21) Application number: **09775613.4**

(22) Date of filing: **26.08.2009**

(51) Int Cl.:
B65D 85/804 (2006.01)

(86) International application number:
PCT/AT2009/000331

(87) International publication number:
WO 2010/085824 (05.08.2010 Gazette 2010/31)

(54) **PORTION CAPSULE**

PORTIONSKAPSEL

CAPSULE CONTENANT UNE PORTION

(84) Designated Contracting States:
**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 SE SI SK SM TR**

(30) Priority: **29.01.2009 AT 1552009**

(43) Date of publication of application:
07.12.2011 Bulletin 2011/49

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Description

[0001] The invention relates to a portion capsule with a liquid-extractable powdered substance for producing a beverage, whereby a filter device with a number of openings is arranged between the capsule base and the substance and/or a capsule lid and the substance, whereby the filter device has a filter surface arranged at a distance from the capsule base or lid via an external skirt-shaped frame section.

[0002] A portion capsule of this type is known from FR 2 556 323 A. Here, in order to create a hollow space between the base of the capsule and the interior of the capsule, which contains coffee powder, an essentially cylindrically-shaped filter device is incorporated, which on its outer circumferential frame has a type of flange with which the filter device is placed on the base of the capsule device. Basically such filter devices for forming a hollow space between the capsule base and the coffee powder work correctly; however, there is the risk of the filter surface breaking as a result of the pressure built up in the interior of the capsule during the extraction of the coffee beverage.

[0003] An essentially planar filter device is known from WO 2005/066040. Here, the planar filter device is held in the conically narrowing capsule at a distance from the capsule base. However, in this case too there is the risk of the planar filter device breaking as a result of the increased pressure in the interior of the capsule during preparation of the beverage.

[0004] Also from EP 1 344 724 B1 a planar filter device is known which is held via a projection in the shell of the portion capsule at a distance from the base of the capsule. But here again there is a risk of breakage and/or cracking of the planar filter device.

[0005] In addition, a portion capsule is also known from EP 1 101 430 A1 in which a filter device is envisaged. Here too the filter device is arranged at a distance from the capsule lid or capsule base, for which the shell of the portion capsule is designed to narrow in a step-wise manner. But here too there is a risk that the planar filter surface could break or crack due to the increased pressure in the portion capsule during the extraction of a beverage.

[0006] A further beverage capsule with a similar filter structure is also known from US 2,788,739.

[0007] Portion capsules with distribution and/or collecting devices are known from EP 1 792 850 B and EP 1 344 722 B. These disclose distribution/collecting devices which have embossings perpendicularly arranged to the plane of the distribution/collecting surface. The embossings are of the same height as or distend more than the outer frame of the distribution/collecting device so these embossings arranged distributed over the distribution/ collection surface act as spacers in that they stand on the base of the capsule and liquid channels for distributing or collecting liquid are formed thereby.

[0008] Another portion capsule with a filter device in the area of the base of the capsule is known from US

4,921,712. However, here the envisaged filter formation is essentially planar, apart from the grooves running in a radial direction.

[0009] EP 1 864 917 B1 also disclosed a portion capsule with a filter device which in the base area stands on the capsule base with elevations extending perpendicularly to the filter surface.

[0010] From EP 1 837 294 B1 a portion capsule is also known in which a filter device has spacer elements on the base side which rest on the capsule base, so that channels are formed between these spacers via which the ready-prepared beverage can flow out.

[0011] EP 1 595 817, upon which the preamble of claim 1 is based discloses a cartridge a container with a filter positioned within. The container is provided with bottom ribs.

[0012] The aim of the present invention is therefore to create a portion capsule with a filter device of the type set out in the introduction, whereby by means of the filter device, a hollow space - without the formation of specific liquid channels - is formed between the capsule base/ capsule lid and the actual filter surface and at the same time the risk of breakage of the filter device is reduced.

[0013] In accordance with the invention this is achieved in the portion capsule of the type set out in the introduction in that the filter device has at least one brace which is arranged at a distance from the capsule base or lid beyond the frame, extending from the frame section to an essentially central area of the filter area.

[0014] Through providing at least one brace extending from the outer frame section towards the inside, the filter area is reinforced, in a similar way to a bridge structure, which thereby considerably reduces the risk of breakage and/or cracking of the filter device. By way of the spaced arrangement of the braces from the capsule base/capsule lid a free hollow space remains between the frame section of the filter device and the filter surface without creating specific liquid channels by the braces.

[0015] If the brace exhibits a preferably linearly rising course from the frame section towards the middle area, a particularly stable filter device is achieved.

[0016] In order to create a filter device which, if possible, has no weak points with regard to crack formation or a break, it is advantageous if a number of braces are provided, the intersections of which with the frame section being arranged, preferably evenly, distributed around the circumference of the frame section. In the case of a circular filter surface it is of particular advantage for optimising the support function of the braces for the brace to run in an essentially radial direction. In connection with this it is also beneficial if the braces essentially converge at the centre point of the filter area.

[0017] As an alternative to the braces converging at the centre point of the filter surface, a reliable support function is also assured via the braces if a ring-shaped brace is provided surrounding the centre point of the filter area to which the braces coming from the frame section connect. Here it is of advantage if pairs of braces running

from the frame section connect to the central, circular brace, at the same point. In this way the ring-shaped brace can, for example, be designed to be quadratic, with pairs of braces converging on a corner point of the quadratic brace.

[0018] In order to be able to fix the filter device in the portion capsule in a simple way, it is advantageous if on the outside of the frame section a tongue is provided extending in the direction of the filter surface, preferably around the entire circumference. The preferably sprung tongue can thus be easily locked into position in the portion capsule. With regard to this, it is advantageous if the inner surface of a shell of the portion capsule has a groove in the area of the capsule base or lid, preferably around its entire circumference, so that a tongue, more particularly provided on the outside of the frame section, or a locking latch in the end section of the tongue, can lock into position in the groove.

[0019] With regard to a reliable pressure build-up in the portion capsule and the holding back of particles of the extractable substance it is advantageous if the openings on the side of the filter surface facing the substance have a diameter of between 0.2 and 0.6 mm, more particularly 0.4 mm. It has also proven to be advantageous if the openings have, on the side of the filter surface facing the substance, a cylindrical section to which a conically widening section is attached.

[0020] In order to support the filter surface adequately, but at the same time to keep the material consumption and weight of the filter device low, it is beneficial if the braces have a width of between 0.8 mm and 2 mm, more particularly of essentially 1 mm.

[0021] With regard to a cost-effective embodiment of the filter device exhibiting adequate stability, it is of advantage if the filter device is made of a thermoplastic synthetic material, more particularly polypropylene.

[0022] The invention will be explained in more detail below with the aid of the preferred examples of embodiment shown in the drawing. In particular

Fig. 1 shows a view from below of a filter device with radially extending braces;

Fig. 2 shows a cross-section in accordance with line II-II in fig. 1;

Fig. 3 shows a cross-section in accordance with line III-III in fig. 1;

Fig. 4 shows a top view of the filter device in accordance with figures 1 to 3;

Fig. 5 shows a cross-section of a portion capsule with a filter device incorporated into the capsule in accordance with figures 1 to 4;

Fig. 6 shows a view from below of an alternative embodiment of a filter device;

Fig. 7 shows a cross-section in accordance with line VII-VII in fig. 6;

Fig. 8 shows a cross-section in accordance with line VIII-VIII in fig. 6;

Fig. 9 shows a view from above of the filter device in accordance with figures 6 to 8; and

Fig. 10 shows a cross-section of a portion capsule incorporating a filter device in accordance with figures 6 to 10.

[0023] Figs. 1 to 4 show a filter device 1 with an essentially planar, circular filter surface 2 having a number of openings 3. Adjoining the filter surface 2 is a skirt-shaped frame section 4 which is intended for holding the filter surface 2 at a distance from the capsule base 5 (cf. fig. 5).

[0024] In order to increase the strength of the filter device 1, more particularly the filter surface 2, starting from the frame section 4, braces 6 are provided which extend radially inwards and converge at the centre point 9 of the ring-shaped filter surface 2. In the example of embodiment shown in figs. 1 to 5 there are 6 braces rotationally arranged at 60° with regard to each other.

[0025] As can be seen particularly in figs. 2 and 3 the braces 6 rise linearly from the outer frame section 4 to the centre point 9 of the filter surface 2. Accordingly, in the position of the filter device 1 in a portion capsule 1 shown in fig. 5 only the end sections 4 rest on the base of the capsule 5; outside the frame area the braces 6 on the other hand are no longer in contact with the base of the capsule 5 so that the hollow space between the filter area 2 and the capsule base 5 is not divided into number of liquid channels.

[0026] It can also be seen especially in figs. 2 and 3 that on the outside of the outer frame section 4 there is a circumferential tongue 10 with a locking nose 11 at its end, extending in the direction of the filter surface 2. The sprung tongue 10 and locking nose 11 are intended for locking into position in a groove 12 of a shell 13 of the portion capsule 1', as can be seen in particular in fig. 5.

[0027] It can also be seen from fig. 5 that in the shown example of embodiment the filter device 1 is arranged in the area of the capsule base 5 of the portion capsule 1', and between the filter device 1 and a capsule lid 14 there is an extractable substance 15 in powder form, more particularly coffee powder. When preparing a coffee beverage a portion capsule 1' of this type is usually punctured in the area of the capsule lid 14 and capsule base 5 by a water supply and an outlet device respectively, whereby the outlet device can penetrate into the hollow space spanned by the filter device 1 between the filter surface 2 and the capsule base 5 without coming into contact with the coffee powder 15.

[0028] In figs. 6 to 10 an alternative example of embodiment is shown whereby this example of embodiment

differs from the one in figs. 1 to 5 in that in the centre area of the circular filter surface 2 there is a ring-shaped brace 6' which is quadratic in cross-section. The braces 6 extending inwards from the frame section 4 do not converge at the centre point 9 of the filter surface 2 as in the example of embodiment in accordance with figs. 1 to 5, but pairs of braces 6 converge at a corner point of the ring-shaped brace 6'. Accordingly, in this example of embodiment a total of eight inwardly extending braces 6 as well as the ring-shaped central brace 6' are envisaged.

[0029] As can be seen in particular from figs. 7 and 8 the ring-shaped brace 6' extends less in a vertical direction than the skirt-shaped frame section 4, so that in this example of embodiment too the braces 6 rise upwards towards the inside, converging at the ring-shaped brace 6'. Accordingly in the portion capsule 1' the freely overhanging end of the ring-shaped brace 6' is also arranged at distance from the capsule base 5 (cf. fig. 10).

[0030] The braces 6, 6' extending perpendicularly to the plane of the filter surface 2 have a width of approx. 1 mm. On the one hand this guarantees adequate support of the filter surface 2, and on the other hand the weight of the filter device 1 remains low.

[0031] On the side facing the powdered substances 15 the openings 3 have a diameter of 0.4 mm, whereby the openings 3 maintain this constant diameter over a length of approx. 0.4 mm; accordingly the openings 3 have a cylindrical cross-section. The openings 3 then widen conically at an angle of approx. 40° so that on the side facing the base of the capsule 5 the openings 3 are larger than on the side facing the powdered substance. This facilitates the flow-through of liquid and reduces the risk of blockage of the openings 3 by particles 15.

Claims

1. Portion capsule (1') with a substance (15) in powder form extractable by way of liquid to produce a beverage, whereby a filter device (1) with a number of openings (3) is arranged between the capsule base (5) and the substance (15) and/or the capsule lid (14) and the substance, the filter device (1) having a filter surface (2) which is arranged at a distance from the capsule base (5) or lid (14) by an outer, skirt-shaped frame section (4), **characterised in that** the filter device (1) has at least one brace (6), wherein the brace (6) beyond the frame section (4) is arranged at a distance from the capsule base (5) or lid (14) and wherein the brace (6) extends from the frame section (4) to an essentially central area of the filter surface (2).
2. Portion capsule in accordance with claim 1 **characterised in that** the brace (6) extends from the frame section towards the central area, preferably in a linearly rising manner.

3. Portion capsule in accordance with claim 1 or 2 **characterised in that** a number of braces (6) are envisaged, the intersections of which with the frame section (4) are arranged, preferably evenly distributed, over the circumference of the frame section (4).
4. Portion capsule in accordance with any one of claims 1 to 3 **characterised in that** the braces (6) essentially run radially.
5. Portion capsule in accordance with any one of claims 1 to 4 **characterised in that** the braces (6) essentially converge at the centre point (9) of the filter surface (2).
6. Portion capsule in accordance with any one of claims 1 to 4 **characterised in that** surrounding the centre point (9) of the filter surface a ring-shaped brace (6') is provided at which the braces (6) extending away from the frame section (4) converge.
7. Portion capsule in accordance with claim 6 **characterised in that** pairs of braces (6) extending away from the frame section (4) converge at the same point of the central, ring-shaped brace (6').
8. Portion capsule in accordance with any one of claims 1 to 7 **characterised in that** on the outside of the frame section (4), preferably around the entire circumference, a tongue (10) is provided extending in the direction of the filter surface (2).
9. Portion capsule in accordance with any one of claims 1 to 8 **characterised in that** the inner surface of a shell (13) of the portion capsule (1') has, in the area of the capsule base (5) or lid (14), a groove (12), preferably around the entire circumference.
10. Portion capsule in accordance with any one of claims 1 to 9 **characterised in that** the openings (3) on the side of the filter (2) facing the substance (15) have a diameter of between 0.2 and 0.6 mm, more particularly 0.4 mm.
11. Portion capsule in accordance with any one of claims 1 to 10 **characterised in that** starting from the side of the filter surface (2) facing the substance (15), the openings (3) have a cylindrical section, to which a conically widening section adjoins.
12. Portion capsule in accordance with any one of claims 1 to 11 **characterised in that** the brace (6) has a width of between 0.8 mm and 2 mm, more particularly of essentially 1 mm.
13. Portion capsule in accordance with any one of claims 1 to 12 **characterised in that** the filter device (1) is made of a thermoplastic synthetic material, more

particularly polypropylene.

Patentansprüche

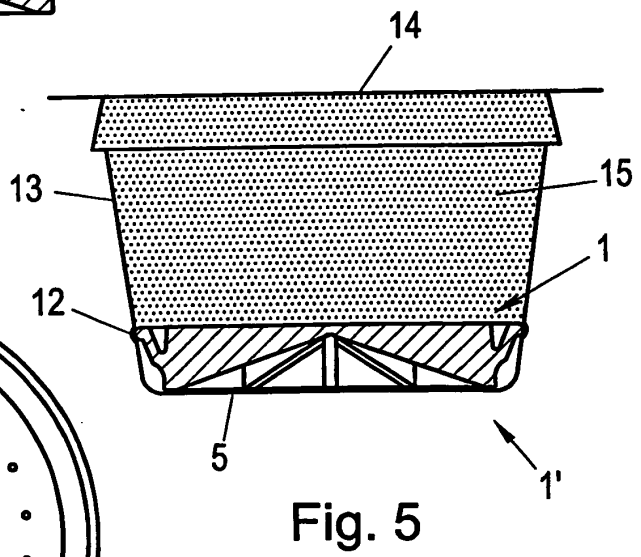
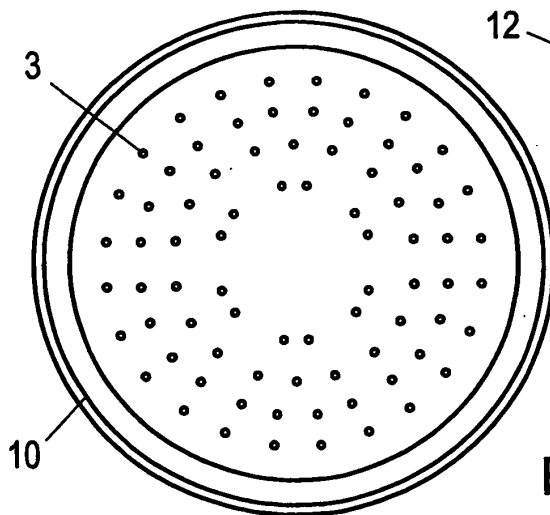
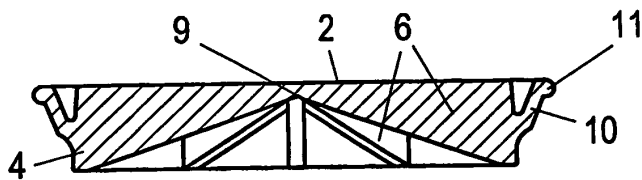
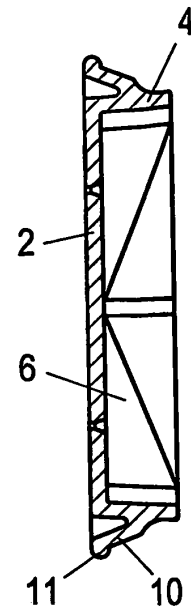
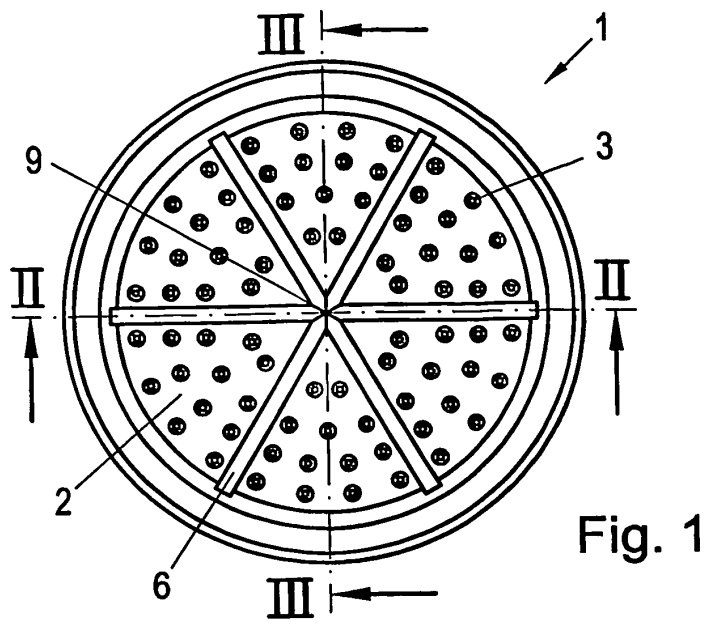
1. Portionskapsel (1') mit einer Substanz (15) in Pulverform, die über Flüssigkeit extrahierbar ist, um ein Getränk zu erzeugen, wobei eine Filtervorrichtung (1) mit einer Anzahl von Öffnungen (3) zwischen der Kapselbasis (5) und der Substanz (15) und/oder dem Kapseldeckel (14) und der Substanz angeordnet ist, wobei die Filtervorrichtung (1) eine Filteroberfläche (2) aufweist, die in einem Abstand von der Kapselbasis (5) oder vom Kapseldeckel (14) durch einen äußeren, schürzenförmigen Rahmenabschnitt (4) angeordnet ist, **dadurch gekennzeichnet, dass** die Filtervorrichtung (1) mindestens eine Strebe (6) aufweist, wobei die Strebe (6) jenseits des Rahmenabschnitts (4) in einem Abstand von der Kapselbasis (5) oder vom Kapseldeckel (14) angeordnet ist, und wobei die Strebe (6) sich vom Rahmenabschnitt (4) zu einem im Wesentlichen zentralen Bereich der Filteroberfläche (2) erstreckt.
2. Portionskapsel nach Anspruch 1, **dadurch gekennzeichnet, dass** sich die Strebe (6) vom Rahmenabschnitt in Richtung des zentralen Bereichs, vorzugsweise in einer linear ansteigenden Weise erstreckt.
3. Portionskapsel nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** eine Anzahl von Streben (6) in Erwägung gezogen wird, deren Schnittpunkte mit dem Rahmenabschnitt (4) vorzugsweise gleichmäßig verteilt über den Umfang des Rahmenabschnitts (4) angeordnet sind.
4. Portionskapsel nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die Streben (6) im Wesentlichen radial verlaufen.
5. Portionskapsel nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Streben (6) im Wesentlichen am Mittelpunkt (9) der Filteroberfläche (2) konvergieren.
6. Portionskapsel nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** den Mittelpunkt (9) der Filteroberfläche umgebend eine ringförmige Strebe (6') vorgesehen ist, an der die Streben (6), die sich vom Rahmenabschnitt (4) weg erstrecken, konvergieren.
7. Portionskapsel nach Anspruch 6, **dadurch gekennzeichnet, dass** Paare von Streben (6), die sich vom Rahmenabschnitt (4) weg erstrecken, am gleichen Punkt der zentralen, ringförmigen Strebe (6') konvergieren.

8. Portionskapsel nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** an der Außenseite des Rahmenabschnitts (4), vorzugsweise um den ganzen Umfang, eine Lasche (10) vorgesehen ist, die sich in der Richtung der Filteroberfläche (2) erstreckt.
9. Portionskapsel nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** die innere Oberfläche einer Schale (13) der Portionskapsel (1') im Bereich der Kapselbasis (5) oder des Kapseldeckels (14) eine Nut (12) vorzugsweise um den ganzen Umfang aufweist.
10. Portionskapsel nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** die Öffnungen (3) auf der Seite des Filters (2), die der Substanz (15) zugewandt ist, einen Durchmesser zwischen 0,2 und 0,6 mm, insbesondere von 0,4 mm aufweisen.
11. Portionskapsel nach einem der Ansprüche 1 bis 10, **dadurch gekennzeichnet, dass** ausgehend von der Seite der Filteroberfläche (2), die der Substanz (15) zugewandt ist, die Öffnungen (3) einen zylindrischen Abschnitt aufweisen, an den ein sich konisch erweiternder Abschnitt angrenzt.
12. Portionskapsel nach einem der Ansprüche 1 bis 11, **dadurch gekennzeichnet, dass** die Strebe (6) eine Breite zwischen 0,8 mm und 2 mm, insbesondere von im Wesentlichen 1 mm aufweist.
13. Portionskapsel nach einem der Ansprüche 1 bis 12, **dadurch gekennzeichnet, dass** die Filtervorrichtung (1) aus einem thermoplastischen synthetischen Material, insbesondere Polypropylen, besteht.

Revendications

1. Capsule (1') contenant une portion d'une substance (15) sous forme de poudre extractible au moyen d'un liquide pour produire une boisson, dans laquelle un dispositif de filtre (1) comportant un certain nombre d'ouvertures (3) est agencé entre la base (5) de la capsule et la substance (15), et/ou entre le couvercle (14) de la capsule et la substance, le dispositif de filtre (1) présentant une surface de filtre (2) qui est agencée à une distance de la base (5) ou du couvercle (14) de la capsule par une section de cadre extérieure en forme de jupe (4), **caractérisée en ce que** le dispositif de filtre (1) comprend au moins une entretoise (6), dans laquelle l'entretoise (6) au-delà de la section de cadre (4) est disposée à une distance de la base (5) ou du couvercle (14) de la capsule, et dans lequel l'entretoise (6) s'étend à partir de la section de cadre (4) jusqu'à une région essentiellement centrale de la surface de filtre (2).

2. Capsule contenant une portion selon la revendication 1, **caractérisée en ce que** l'entretoise (6) s'étend à partir de la section de cadre en direction de la région centrale, de préférence d'une façon s'élevant linéairement. 5
3. Capsule contenant une portion selon la revendication 1 ou 2, **caractérisée en ce qu'un** certain nombre d'entretoises (6) sont envisagées, dont les intersections avec la section de cadre (4) sont agencées, de préférence uniformément distribuées, sur la circonférence de la section de cadre (4). 10
4. Capsule contenant une portion selon l'une quelconque des revendications 1 à 3, **caractérisée en ce que** les entretoises (6) s'étendent essentiellement radialement. 15
5. Capsule contenant une portion selon l'une quelconque des revendications 1 à 4, **caractérisée en ce que** les entretoises (6) convergent essentiellement au point central (9) de la surface de filtre (2). 20
6. Capsule contenant une portion selon l'une quelconque des revendications 1 à 4, **caractérisée en ce qu'une** entretoise de forme annulaire (6') est prévue autour du point central (9) de la surface de filtre, et vers laquelle les entretoises (6) qui s'étendent à partir de la section de cadre (4) convergent. 25
30
7. Capsule contenant une portion selon la revendication 6, **caractérisée en ce que** des paires d'entretoises (6) qui s'étendent à partir de la section de cadre (4) convergent au même point de l'entretoise centrale de forme annulaire (6'). 35
8. Capsule contenant une portion selon l'une quelconque des revendications 1 à 7, **caractérisée en ce que**, à l'extérieur de la section de cadre (4), de préférence autour de la totalité de la circonférence, une languette (10) est prévue et s'étend dans la direction de la surface de filtre (2). 40
9. Capsule contenant une portion selon l'une quelconque des revendications 1 à 8, **caractérisée en ce que** la surface intérieure d'une enveloppe (13) de la capsule contenant une portion (1) présente, dans la région de la base (5) ou du couvercle (14) de la capsule, une rainure (12), de préférence autour de la totalité de la circonférence. 45
50
10. Capsule contenant une portion selon l'une quelconque des revendications 1 à 9, **caractérisée en ce que** les ouvertures (3) sur le côté du filtre (2) qui fait face à la substance (15) présentent un diamètre compris entre 0,2 mm et 0,6 mm, plus particulièrement de 0,4 mm. 55
11. Capsule contenant une portion selon l'une quelconque des revendications 1 à 10, **caractérisée en ce qu'en** partant du côté de la surface de filtre (2) qui fait face à la substance (15), les ouvertures (3) présentent une section cylindrique, à laquelle une section s'élargissant de façon conique est contiguë.
12. Capsule contenant une portion selon l'une quelconque des revendications 1 à 11, **caractérisée en ce que** l'entretoise (6) présente une largeur comprise entre 0,8 mm et 2 mm, plus particulièrement d'essentielllement 1 mm.
13. Capsule contenant une portion selon l'une quelconque des revendications 1 à 12, **caractérisée en ce que** le dispositif de filtre (1) est constitué d'une matière synthétique thermoplastique, plus particulièrement de polypropylène.



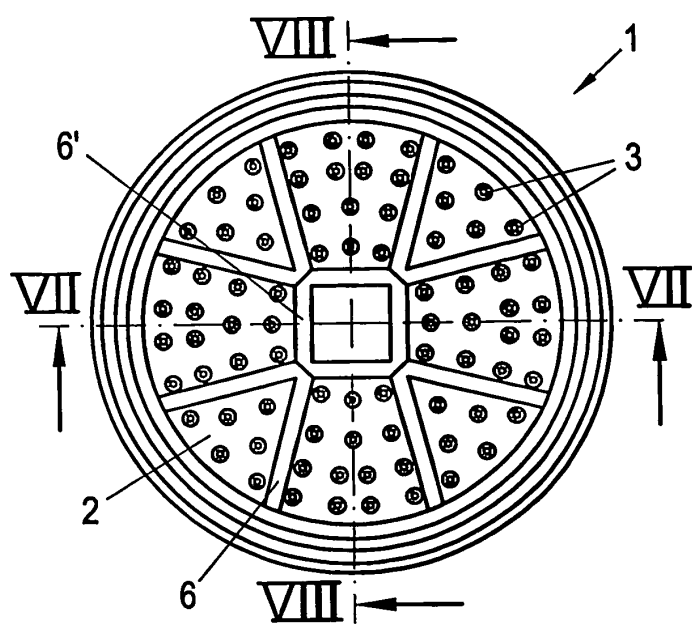


Fig. 6

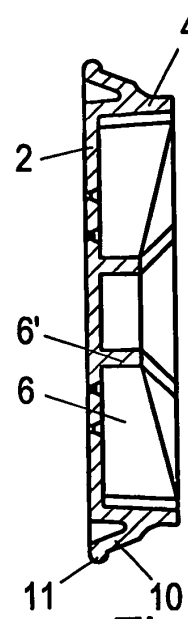


Fig. 8

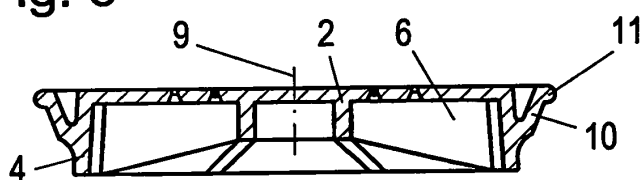


Fig. 7

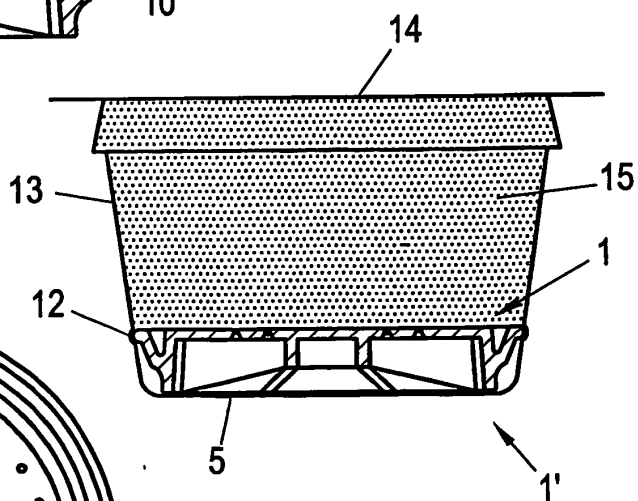


Fig. 10

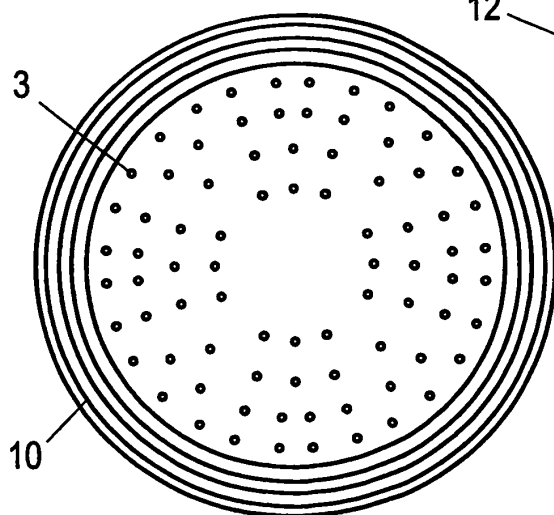


Fig. 9

REFERENCES CITED IN THE DESCRIPTION

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