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(54) Title: INFUSION ASSEMBLY AND SYSTEM FOR THE PREPARATION OF BEVERAGES WITH THE USE OF CAPSULES OR THE LIKE

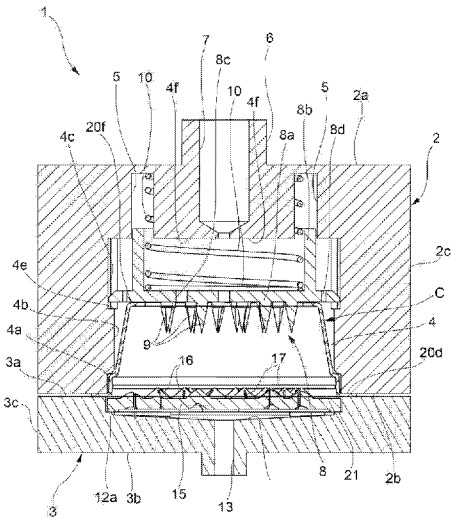


FIG.6

(57) Abstract: The infusion assembly (1) comprises a capsule-holder (2) and a cooperating body (3), adapted to assume an open configuration for positioning a capsule (C) therebetween, and a closed configuration for preparing a beverage through the capsule (C) clamped in a liquid- tight manner therebetween. In the capsule-holder (2) there is defined a recess (4) adapted to receive a capsule (C) with the bottom wall (20a, 20f) facing the interior of the capsule- holder (2) and wherein is provided a first piercing member (8) provided with at least a piercing point (9) adapted to penetrate through the bottom wall (20a) of said capsule (C). The capsule-holder (2) is adapted to supply a flow of fluid introduced into the capsule (C) through the tear created in its bottom wall (20a) from the at least one point (9). In the cooperating body (3) a dispensing conduit (13) is defined for the beverage and a second piercing member (14) is provided, having at least one point (16) adapted to penetrate through the cover (21) of the capsule (C) to allow the outflow of the beverage from the capsule (C) towards said dispensing conduit (13). In the capsule-holder (2) there are provided fluid communication passages (8c; 8d; 11), which put into communication a region upstream of the first piercing member (8) such that, during the preparation of a beverage, the fluid introduced into the recess (4) of the capsule-holder (2) exerts on the first piercing member (8) a force lower than a predetermined value

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towards the capsule (C), the first piercing member (8) being mounted in the recess (4) of the capsule-holder (2) such as to be movable under the action of a spring (10) tending to displace it towards the cooperating body (3).

Infusion assembly and system for the preparation of beverages with the use of capsules or the like

The present invention relates generally to the preparation of beverages, such as espresso coffee, with the use of pre-packaged capsules or the like.

The present invention relates in particular to an infusion assembly for the preparation of a beverage with the use of a sealed capsule containing a substance for the preparation of the beverage having a predetermined axial height or length and comprising a cup-shaped body with a bottom wall and a tearable closing cover for the introduction into the capsule of a flow of liquid under pressure and, respectively, for the outflow of the beverage.

More specifically, the invention relates to an infusion assembly of the type comprising

a capsule-holder and an associated cooperating body, at least one of which is movable with respect to the other, between an open configuration for positioning a capsule therebetween, and a closed configuration for preparing a beverage through the capsule positioned and clamped in a liquid-tight manner therebetween; wherein

in the capsule-holder there is defined a recess adapted for receiving a capsule with the bottom wall facing the inside of the capsule-holder and wherein there is defined a first piercing member provided with at least one point adapted to penetrate through said bottom wall of said capsule, the capsule-holder being provided with a means for supplying a flow of a fluid to be introduced into said capsule through the passage torn in said bottom wall of the capsule by said at least one point; and

in the cooperating body, there is defined a dispensing conduit for the beverage and a second piercing member is provided, having at least one point adapted to penetrate through the cover of said capsule and to allow the outflow of the beverage from the capsule toward said dispensing conduit.

Infusion assemblies of this type are known and widely used for the preparation of hot beverages, such as espresso coffee and the like.

One object of the present invention is to provide an improved infusion assembly, with a simple structure, economic construction and reliable operation.

This and other objects are achieved according to the invention with an infusion assembly of the type specified above, characterized in that in a capsule-holder fluid communication means is provided, which puts the region upstream into communication with a region downstream of the first piercing member such that during the preparation of a beverage the pressurized fluid introduced into said recess of the capsule-holder exerts on the first piercing member a force lower than a predetermined value in the direction of the capsule and in particular a force which is substantially null, said first piercing member being mounted in the recess of the capsule-holder such as to be movable under the action of an associated resilient means tending to displace it towards the cooperating body.

Due to these features, in an infusion assembly according to the present invention in operation, the first piercing member associated with the capsule-holder, is almost exclusively subjected to the force of the associated resilient means, the hydraulic forces acting on it being substantially in equilibrium therebetween.

The present invention also relates to a system for the preparation of beverages, including an infusion assembly having the features defined in one or more of the appended claims 1 to 5 and at least one capsule of at least one type, comprising

a cup-shaped body of a material impermeable to liquids, having a tearable bottom wall, a lateral wall which defines an opening or mouth around which a flange-like formation extends, protruding transversely towards the outside,

a tearable cover, in liquid-tight connection with said flange-like formation to close the corresponding opening or mouth of the cup-shaped body, and

a quantity of a substance for the preparation of a beverage, such as ground roasted coffee, contained in said body.

According to a further feature, such a system for the preparation of beverages comprises an infusion assembly according to one or more of the appended claims 1 to 5 and capsules of at least two different types, different from each other essentially in the fact of having different respective axial heights or lengths.

Further features and advantages of the present invention will become apparent from the de-

tailed description that follows, provided by way of non-limiting example with reference to the accompanying drawings, wherein:

- Figure 1 is an axial section perspective view of an infusion assembly according to the present invention;
- Figure 2 is a axial section front view of the infusion assembly according to figure 1;
- Figure 3 is a perspective view of a capsule used for the preparation of a beverage having an infusion assembly according to the preceding figures;
- Figure 4 is a section view along the line IV-IV of figure 3, and
- Figure 5 is a similar view to that of figure 1 and shows the infusion assembly wherein a capsule of the type according to figures 3 and 4 has been positioned and locked;
- Figure 6 is an axial section front view corresponding to the perspective view of figure 5;
- Figure 7 is a perspective view of another capsule for use in an infusion assembly according to figures 1 and 2;
- Figure 8 is a section view along the line VIII-VIII of figure 7;
- Figure 9 is a sectional view of the infusion assembly according to the invention, wherein a capsule according to figures 7 and 8 is positioned and locked;
- Figure 10 is a perspective view of a further type of capsule for use in an infusion assembly according to the present invention;
- Figure 11 is a section view along the line XI-XI of figure 10, and
- Figure 12 is an axial section view of the infusion assembly according to the present invention, wherein a capsule according to figures 10 and 11 is positioned and locked;

In the drawings and in particular in figures 1, 2, 5, 6, 9 and 12, an infusion assembly for preparing beverages according to the present invention is indicated collectively at 1.

Such infusion assembly 1 essentially comprises a capsule-holder 2 and an associated cooperating body 3.

In the illustrated embodiment the capsule-holder 2 has an essentially cylindrical-type general configuration, with an upper flat surface or face 2a, a lower flat surface or face 2b and a cylindrical side surface 2c (see in particular figure 1). In this embodiment, also the asso-

ciated cooperating body 3 has a substantially cylindrical configuration of reduced height or thickness with an upper flat surface or face 3a, a lower flat surface or face 3b and a cylindrical side surface 3c.

In the capsule-holder 2, starting from its lower flat surface or face 2b, a recess indicated collectively at 4 extends upwards.

In particular, the recess 4 comprises a lower portion 4a, an overlying intermediate portion 4b of reduced diameter and a top portion 4c of similar diameter to that of the lower portion 4a (see in particular figure 2).

Advantageously, although not necessarily, the intermediate portion 4b of the recess 4 is slightly tapered upwardly and its lower end is connected to the portion 4a forming a rounded step 4d (figure 2).

The upper portion 4c of the recess 4 is joined to the intermediate portion 4b forming an annular shoulder 4e (see, again, figure 2).

In the upper wall of the recess 4, which defines the ceiling 4f of the recess, an annular groove 5 is formed.

In the particular embodiment illustrated, the groove 5 is coaxial with the recess 4 and has a reduced diameter greater than the diameter of the upper portion 4c of said recess 4.

From the upper flat surface 2a of the capsule-holder 2, a tubular appendage 6 extends upwards wherein an axial duct 7 is made, which tapers downward and flows into the upper portion 4c of the recess 4.

As will be better described below, when in use, the conduit 7 allows a flow of fluid under pressure (for example hot water and/or steam) to be fed towards the recess 4, for the preparation of a beverage.

In the recess 4 and in the annular groove 5 of the capsule-holder 2, a piercing member, indicated collectively at 8, is mounted in an axially translatable way.

In the particular embodiment illustrated, the piercing member 8 comprises an essentially circular plate-shaped portion 8a, from the lower face from which extends a plurality of piercing points 9.

From the upper surface or face of the plate-like portion 8a, a cylindrical annular portion 8b extends upwards, extending partly into the annular groove 5.

As best seen, for example, in figure 2, the plate-like portion 8a of the piercing member 8 extends radially also to the outside of the tubular portion 8b.

A coil spring 10 extends in part into the groove 5 of the capsule-holder 2 and in part within the tubular or annular portion 8b of the piercing member 8.

The spring 10 tends to push the piercing member 8 in the direction of the cooperating body 3.

When no capsule is positioned in the recess 4 for the preparation of a beverage, the spring 10 maintains the piercing member 8 in the position illustrated in figures 1 and 2, wherein the peripheral part of its plate-like portion 8a presses against the annular stop shoulder 4e, which defines a predetermined axial position of rest.

In this condition, the distance d (figure 2) between the plate-like portion 8a of the piercing member 8 and the lower flat surface or face 2b of the capsule-holder 2 is less than the axial length or height of the capsules for use with the infusion assembly 1, as will be described better below.

Between the region of the recess 4 above the plate-shaped portion 8a of the piercing member 8 and the underlying portion of said recess, a condition of hydraulic communication is made.

Such permanent condition of communication is obtained through one or more steps, for example, one or more of the following:

- in the plate-shaped portion 8a of the piercing member 8, radially inside of the annular portion 8b of the piercing member, one or more through openings 8c are made;
- in the part of the plate-shaped portion 9a of the piercing member 8 that protrudes radially beyond the annular portion 8b, one or more through openings or slots 8d are made;
- between the piercing member 8 and the walls of the recess 4 and the groove 5 are provided radial clearances adapted to allow the communication of fluid (liquid) between the regions above and below said piercing member 8; and
- at least one by-pass passage 11 (figure 2) is made in the body of the capsule-holder 2, between the portion 4b of the recess 4 below the piercing member 8 and the top part of the upper portion 4c of such recess and/or the groove 5.

In the cooperating body 3, starting from its top flat surface or face 3a, a recess 12 extends downwards which in the particular embodiment illustrated includes an essentially cylindrical upper portion 12a, followed by a frustoconical underlying portion 12b, which communicates with an axial central supply passage 13.

In the upper portion 12a of the notch or recess 12 of the body 3 is positioned a second piercing member 14, of a per se known type. Such a piercing member 14 comprises a plate-shaped body 15 which forms on the upper part a plurality of piercing points 16 crossed by respective through openings 17 to permit in use the outflow of the beverage made in a capsule towards the dispensing conduit 13, as will be described better below.

Figures 3 and 4 illustrate by way of example a first type of capsule C for the preparation of a beverage, for use in an infusion assembly according to the present invention.

The capsule C shown in these figures comprises a cup-shaped body 20 having a bottom wall 20a and a side wall 20b. The latter, on the side opposite to the bottom wall 20a, defines an opening 20c around which extends a flange-like formation 20d protruding transversely towards the outside.

The capsule C also comprises a cover 21, in liquid-tight connection, for example by heat sealing, to the flange-like formation 20d of the body 20, for closing the opening 20c.

Preferably, the side wall 20b is stiffer and/or thicker than the bottom wall 20a and the cover 21.

In the capsule C is contained a quantity 22 of a substance for the preparation of a beverage, for example ground roasted coffee. Such substance may partially or completely fill the capsule C. In addition, such substance may be compressed and a vacuum may be formed in the capsule, for example in accordance with the solution described in the international patent application WO 2008/015642 in the name of the same Applicant.

In the illustrated embodiment, the side wall 20b of the cup-shaped body 20 in the vicinity of the flange-like formation 20d forms a perimeter step 20e, from which said side wall 20b gradually tapers, in the manner of a truncated cone, in the direction of the bottom wall 20a.

Said bottom wall 20a of the cup-shaped body 20 advantageously has a central portion of reduced thickness, surrounded by a relatively thicker annular peripheral portion 20f. In the illustrated embodiment, the annular peripheral portion 20f protrudes toward the outside relative to the central circular portion of the bottom wall 20a, but in alternative embodiments, it may instead protrude toward the inside of the capsule.

Also, the side wall 20b of the cup-shaped body 20 preferably has a thickness greater than that of the central portion of the bottom wall 20a to confer to the body 20 an adequate resistance to compression in the axial direction.

In principle, the body 20 and the cover 21 of the capsule C may be made in a manner known per se with different materials, such as plastic materials possibly with materials added to form a barrier against the penetration of oxygen and moisture, metallic materials, composite materials, etc.

The capsule C may also be made of compostable materials, for example in accordance to

the solution described in the previous Italian patent application TO2014A001083 in the name of the same Applicant, or with traditional, non-compostable materials but still with the form and structural features described in that application.

Capsule C described above, with reference to figures 3 and 4, has an axial length or height h1 (figure 4), defined as the distance between the substantially parallel planes wherein extends the outer surface of the peripheral annular portion 20f of the bottom wall and the plane wherein extends the annular peripheral portion of the cover 21 coupled to the flange 20d of the cup-shaped body 20.

With reference to Figures 3 and 4, the height h1 of the capsules of the type according to figures 3 and 4 is greater than the distance d which at rest separates the lower face of the plate-shaped portion 8a of the piercing member 8 from the lower end surface 2b of the capsule-holder 2 of the infusion assembly 1.

In a manner known per se, the capsule-holder 2 and the cooperating body 3 of the infusion assembly 1 are likely to be arranged in an open configuration wherein the mutual distance is such as to allow the positioning of a capsule C therebetween, with the bottom wall 20a facing the inside of the capsule-holder 2, i.e. towards the piercing member 8, and a closed configuration for preparing a beverage through the capsule C, positioned and locked with a liquid-tight seal therebetween, as is shown in figures 5 and 6.

When a capsule C enters the capsule-holder 2 of the assembly 1 in the open configuration, it, along with its bottom wall, is in contact with the points 9 of the piercing member 8. When the assembly 1 passes to the closed configuration, these points 9 penetrate through the relatively thinner central portion of the bottom wall of the capsule C and the annular peripheral portion 20f of the bottom wall of the capsule C abuts against the lower surface of the plate-like portion 8a of the piercing member 8.

Since, as mentioned previously, the height h1 of the capsule C is greater than the distance d (figure 2), the piercing member 8 is then moved away from the stop shoulder 4e (figure 6), by the action of the spring 10.

In the closed configuration of the infusion assembly 1, the flange-like formation 20d and the cover 21 of the capsule C are locked in a liquid-tight seal between the capsule-holder 2 and the associated cooperating body 3 (see again figure 6).

In the embodiment illustrated in figures 5 and 6 in the closing phase of the infusion assembly 1, the cover 21 of the capsule C is torn by the points 16 of the piercing member 14 on the body 3.

Furthermore, in a manner known per se, the cover 21 of the capsule C may tear, not when the infusion assembly 1 closes, but rather subsequently, due to the effect of the pressure of the fluid injected into the capsule C through the tears of the bottom wall of the latter made by the piercing member 8.

In the closed infusion assembly 1, a pressurized fluid, for example hot water, is fed to the recess 4, through the supply conduit 7 arranged in the capsule-holder 2.

This fluid also strikes the surface of the piercing member 8 and in particular both the upper surface and the lower surface of its plate-like portion 8a.

This fluid also reaches the interspace defined between the central portion of the bottom wall of the capsule C and the lower surface or face of the plate-shaped portion 8a of the piercing member 8 and penetrates inside the capsule C through the tears made in this bottom wall.

Thus, the pressurized fluid comes into contact with the substance contained in the capsule C. The gradually prepared beverage flows from the capsule C through the passages 17 made by the points 16 of the piercing member 14 on the cooperating body 3.

The beverage then reaches the outlet conduit 13, from which, in a manner known per se, it may be conveyed towards a collection container, such as a cup or the like.

As mentioned previously, during the preparation of the beverage, the forces exerted by the

pressure of the fluid on the piercing member 8 are in substantial equilibrium between them, to which the piercing force of the bottom wall of the capsule C is determined substantially by only the coil spring 10.

During dispensing, also the capsule C is substantially in a hydrostatic condition.

The infusion assembly 1 described above is also suitable for use with additional types of capsules, different from the type according to the figures 3 and 4 essentially due to the fact of having a greater axial length or height.

In figures 7 and 8, a second type of capsule is illustrated with an axial length or height h2 greater than h1. In these figures, the same alphanumeric references used previously have been attributed again to the parts and elements already described.
The capsule according to figures 7 and 8 can be positioned and locked in the infusion assembly 1 previously described in such a way that in the closed condition of such assembly the configuration shown in Figure 9 is achieved: in this case also, the flange-like formation 20d of the capsule C and the associated peripheral portion of the cover 21 are locked in a liquid-tight seal between the capsule-holder 2 and the associated cooperating body 3. The bottom wall of the capsule C and in particular its annular peripheral portion 20f, is engaged against the plate-like portion 8a of the piercing member 8, which is now maintained in a more raised position, with respect to the configuration of figure 6, below the action of the spring 10 which is more compressed.

Figures 10 and 11 illustrate a third type of capsule, similar to those described previously, from which it differs essentially in that it has a greater axial length or height h3 greater than h2 and h1.

Figure 12 shows the configuration of the infusion assembly 1 in the closed condition, in the case of using a capsule C according to figures 10 and 11.

The various types of capsules suitable for use in an infusion assembly according to the invention can in general contain the same or different substances, for the preparation of

many different beverages.

From the foregoing description, it is evident to those skilled in the art that, in an infusion assembly according to the present invention, various types of capsules may be used, for which the requirements for compatibility are essentially limited to the geometry of the flange portion and the cover, which must be such as to ensure the seal between the capsule-holder 2 and the body 3 in the closed condition, and on the overall dimensions of the cup-shaped body 20, which must be compatible with the dimensions of the recess 4 of the capsule-holder and with the maximum travel of the piercing member 8 of the capsule-holder 2.

Although in the drawings accompanying the present description the infusion assembly 1 is always illustrated as operating in a substantially vertical arrangement, it is clear that this assembly is suitable for operation also positioned on the horizontal or oblique axis.
Furthermore, the systems for loading the capsules in the infusion assembly, the clamping of the assembly and discharge of the used capsules may be of any type known per se, automatic or manual.

Advantageously, the capsules used in the infusion assembly according to the invention may be made in such a way as to be suitable for use also with other types of infusion assemblies or machines for preparing beverages of the per se known type and already present on the market.

Advantageously, such capsules wherein the bottom wall 20a and the cover 21 have equal or similar tearing features for which an infusion assembly wherein liquid under pressure is introduced through the cover rather than through the bottom wall may also be used.

Naturally, without altering the principle of the invention, the embodiments and the details of construction may vary widely with respect to those described and illustrated purely by way of non-limiting example, without thereby departing from the scope of the invention as defined in the appended claims.

CLAIMS

1. Infusion assembly (1) for preparing a beverage using a capsule (C) containing a substance (22) for the preparation of the beverage and comprising a cup-shaped body (20) having a bottom wall (20a, 20f) and a closing cover (21), tearable for introducing into the capsule (C) a flow of a pressurized fluid, and for the outflow of the beverage, respectively;

the infusion assembly (1) comprising

a capsule-holder (2) and a cooperating body (3), at least one of which is movable with respect to the other, between an open configuration for positioning a capsule (C) therebetween, and a closed configuration for preparing a beverage through the capsule (C) positioned and clamped in a liquid-tight manner therebetween; wherein

in the capsule-holder (2) there is defined a recess (4) for receiving a capsule (C) with said bottom wall (20a, 20f) facing to the inside of the capsule-holder (2) and wherein there is defined a first piercing element (8) provided with at least one piercing point (9) adapted to penetrate through said bottom wall (20a) of said capsule (C); the capsule-holder (2) being provided with supply means (7) for supplying a flow of a fluid to be introduced into said capsule (C) through the passage torn in said bottom wall (20a) of the capsule (C) by said at least one point (9); and

in the cooperating body (3) there is defined a dispensing conduit (13) for the beverage and a second piercing element (14) is provided, having at least one point (16) adapted to penetrate through the cover (21) of said capsule (C) and to allow the outflow of the beverage from the capsule (C) towards said dispensing conduit (13);

the infusion assembly (1) being characterized in that in the capsule-holder (2) there are provided fluid communication means (8c; 8d; 11) which put into communication a region upstream with a region downstream of the first piercing member (8) in the operational path of said flow of fluid, such that during the preparation of a beverage the pressurized fluid introduced into said recess (4) of the capsule-holder (2) exerts on the first piercing member (8) a force lower than a predetermined value towards the capsule (C) and in particular a force which is substantially null, said first piercing member (8) being mounted in the recess (4) of the capsule-holder (2) such as to be movable under the action of an associated resilient means (10) tending to displace it towards the cooperating body (3).

2. Infusion assembly according to claim 1, wherein said fluid communication means comprises at least one of the following:

- at least one through opening (8c; 8d) in the first piercing member (8);
- at least one by-pass passage (11) defined between a wall (4c) of said recess (4) of the capsule-holder (2) and the first piercing member (8); and
- at least one by-pass passage (11) provided in the capsule-holder (2), between the region upstream and the region downstream of said first piercing member (8).

3. Infusion assembly according to claim 1 or claim 2, wherein said recess (4) of the capsule-holder (2) has a shape such that when a capsule (C) is clamped between the capsule-holder (2) and the associated cooperating body (3), an annular interspace is defined between the lateral wall (20b) of the cup-shaped body (20) of said capsule (C) and a wall (4b) of said recess (4) of the capsule-holder (2).

4. Infusion assembly according to any of the preceding claims, wherein in the recess (4) of the capsule-holder (2) there are provided stop means (4e) capable, when in said recess (4) there is not positioned any capsule (C), of retaining the first piercing member (8) in a predetermined axial position wherein the distance of the first piercing member (8) from the inlet of said recess (4) is less than the axial height or length (h1; h2; h3) of a capsule (C), such that when a capsule (C) is positioned in said recess (4) and is clamped between the capsule-holder (2) and the cooperating body (3), said first piercing member (8) is moved away from said stop means (4e) against the action of said resilient means (10).

5. Infusion assembly according to claim 4, wherein starting from said predetermined axial position the first piercing member (8) is displaceable in the recess (4) of the capsule-holder (2) to an extent such as to allow the positioning in said recess (4) of capsules (C) of a plurality of different types, having different axial heights or lengths (h1; h2; h3).

6. A system for preparing beverages including an infusion assembly according to one or more of the preceding claims and at least one capsule (C) of at least one predetermined type comprising:

a cup-shaped body (20) of a material impermeable to liquids, having a tearable bot-

tom wall (20a), a lateral wall (20b) which defines an opening (20c) around which a flange-like formation (20d) extends, protruding transversely towards the outside;

a tearable cover (21) connected in a liquid-tight manner to said flange formation (20d); and

a quantity of a substance (22) for the preparation of a beverage, such as ground roasted coffee, contained in said body (20).

7. System according to claim 6, including capsules (C) of a plurality of different types having different axial heights or lengths (h1; h2; h3).

8. System according to claim 6 or claim 7, wherein said at least one capsule (C) is made with compostable materials.

9. System according to one of claims 6 to 8, wherein in said at least one capsule (C) the lateral wall (20b) is more rigid and/or thicker than the bottom wall (20a) and the cover (21), and wherein the bottom wall (20a) and the cover (21) preferably have the same or similar tearability features.

10. System according to one of claims 6 to 9, wherein the capsule (C) is of a kind which is compatible for use with another infusion assembly of a per se known type, in particular an infusion assembly adapted to inject a pressurized fluid through the cover (21) of said at least one capsule (C).

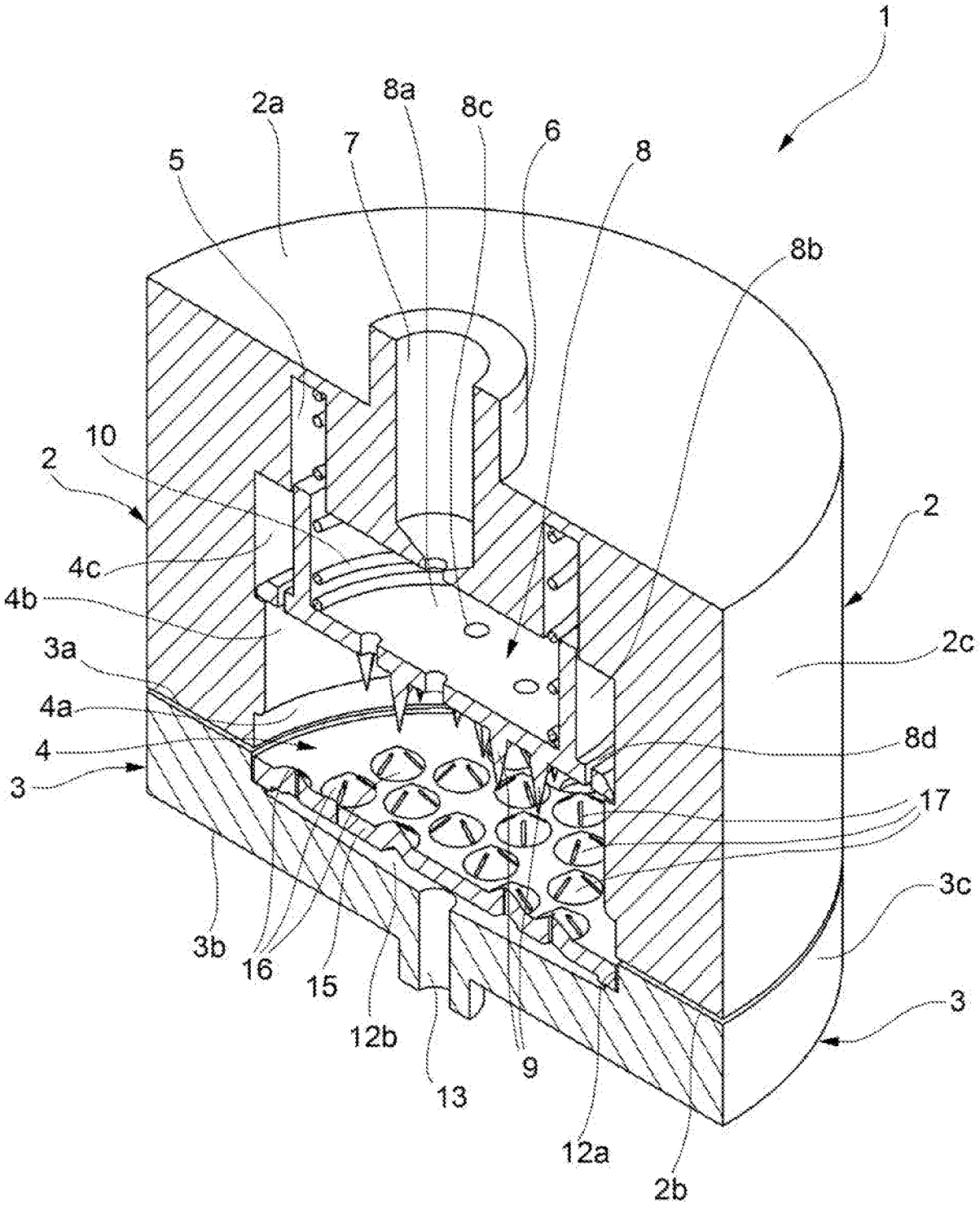

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FIG.1

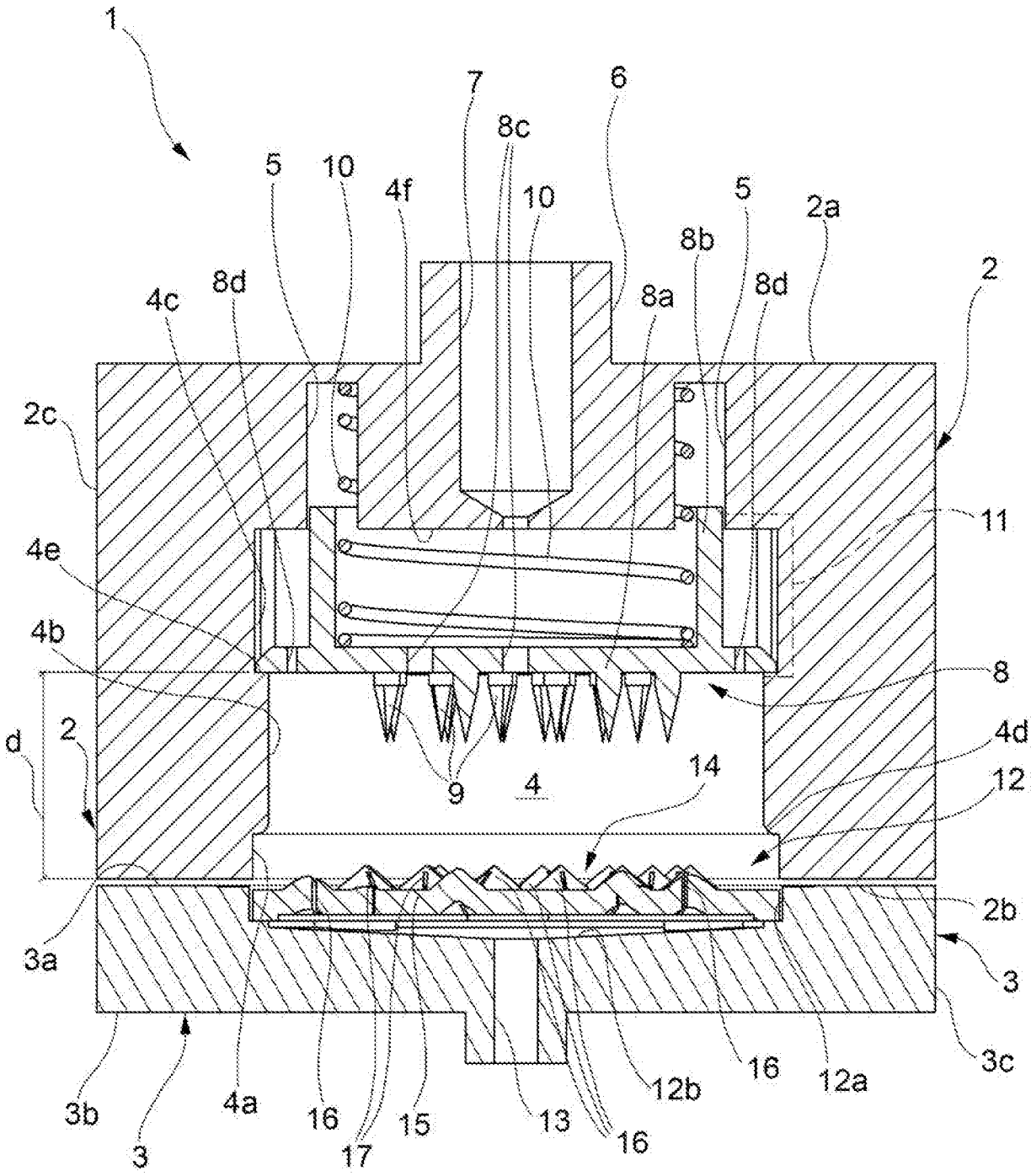

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16

FIG.2

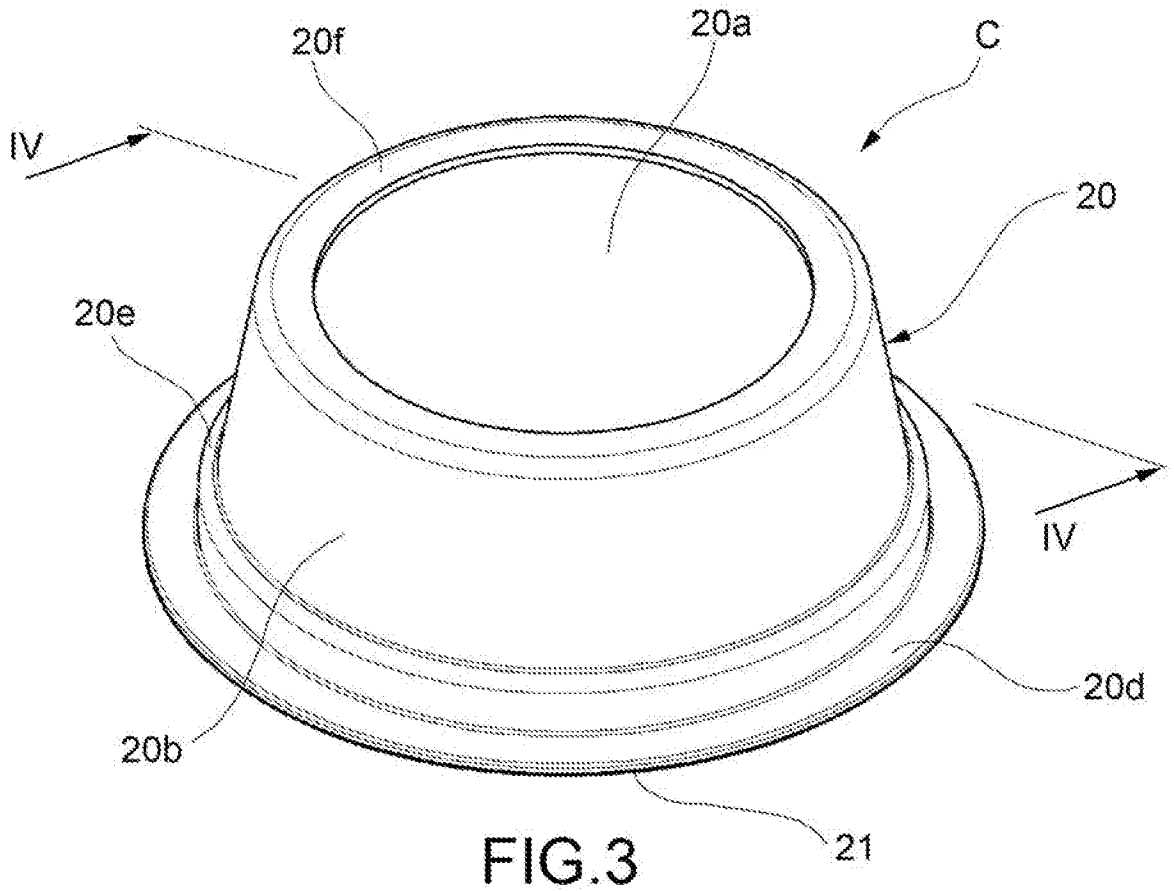

20f
20a
C
IV
20
20e
IV
20d
20b
21

FIG.3

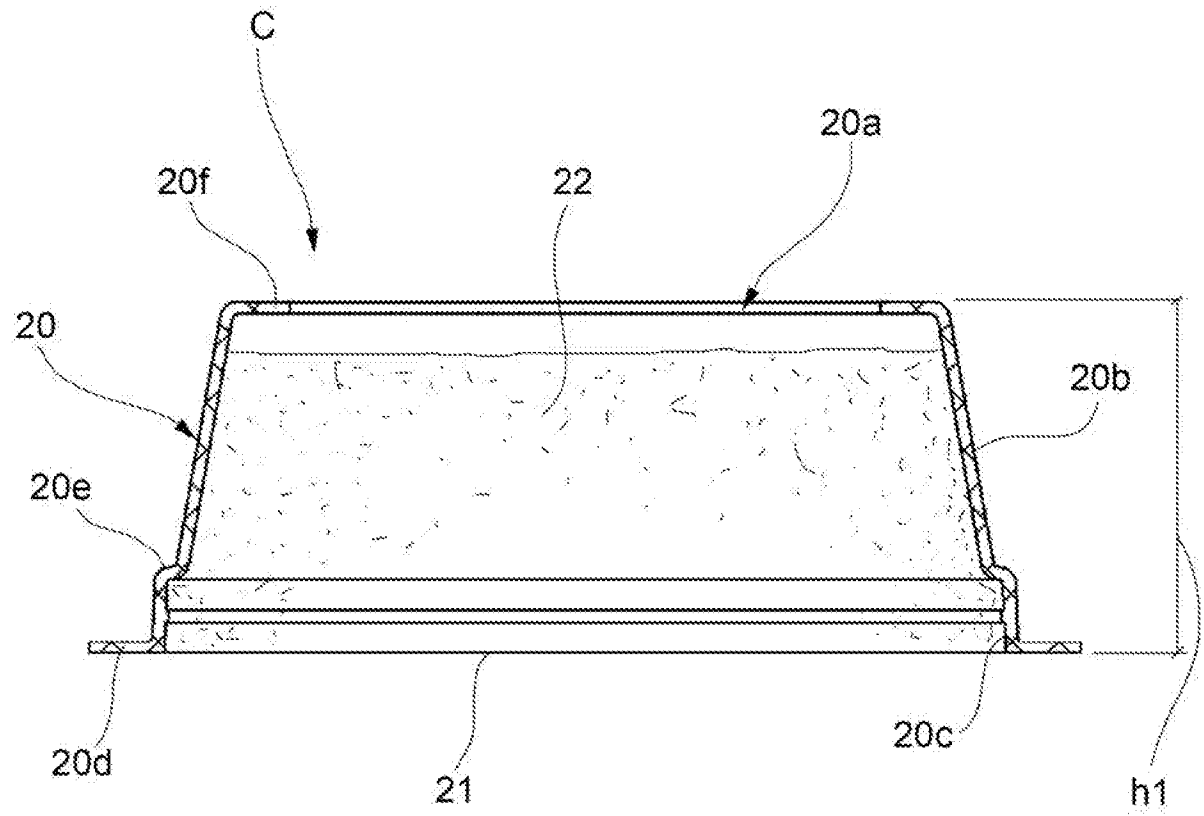

C
20a
20f
22
20
20b
20e
20d
21
20c
h1

FIG.4

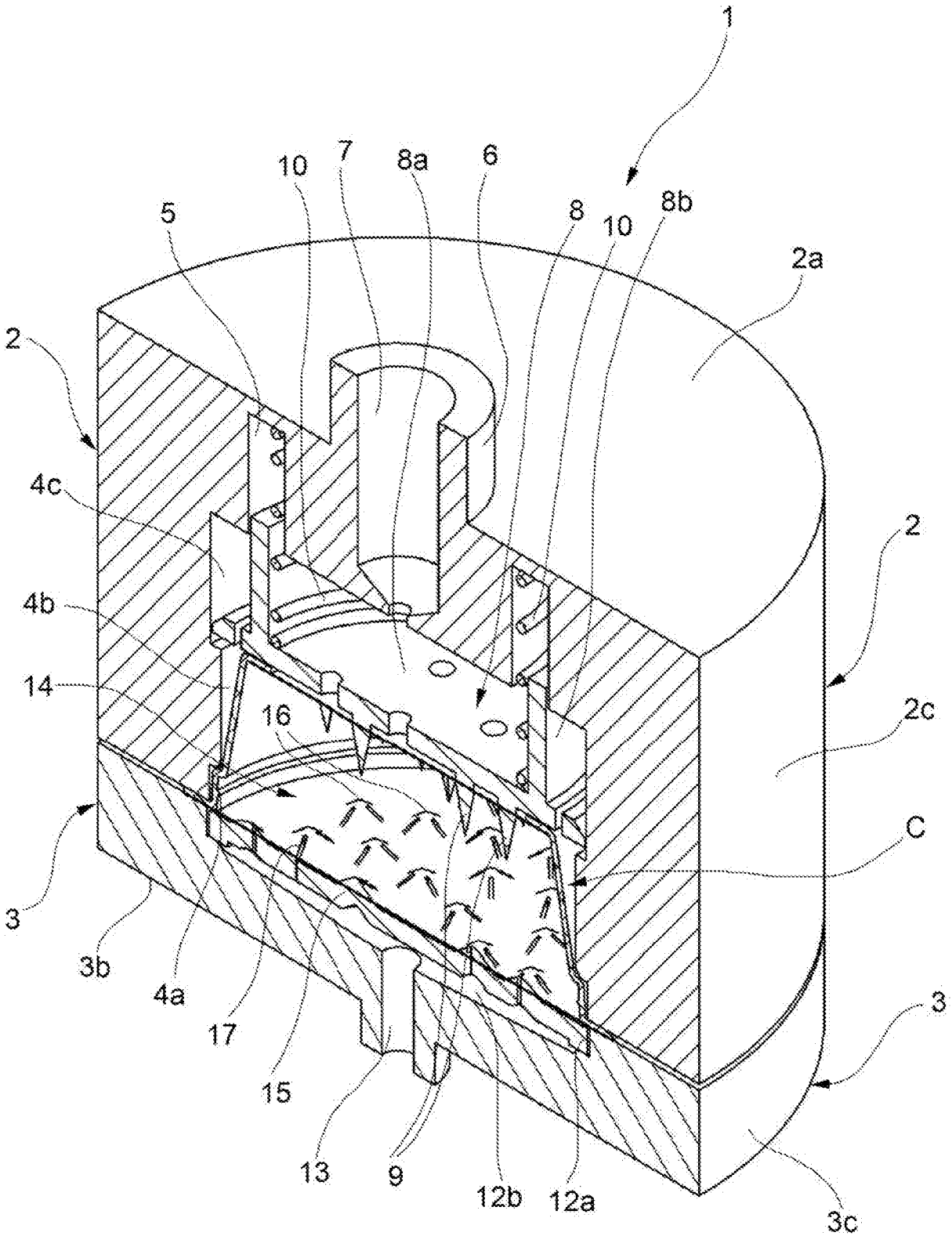


FIG.5

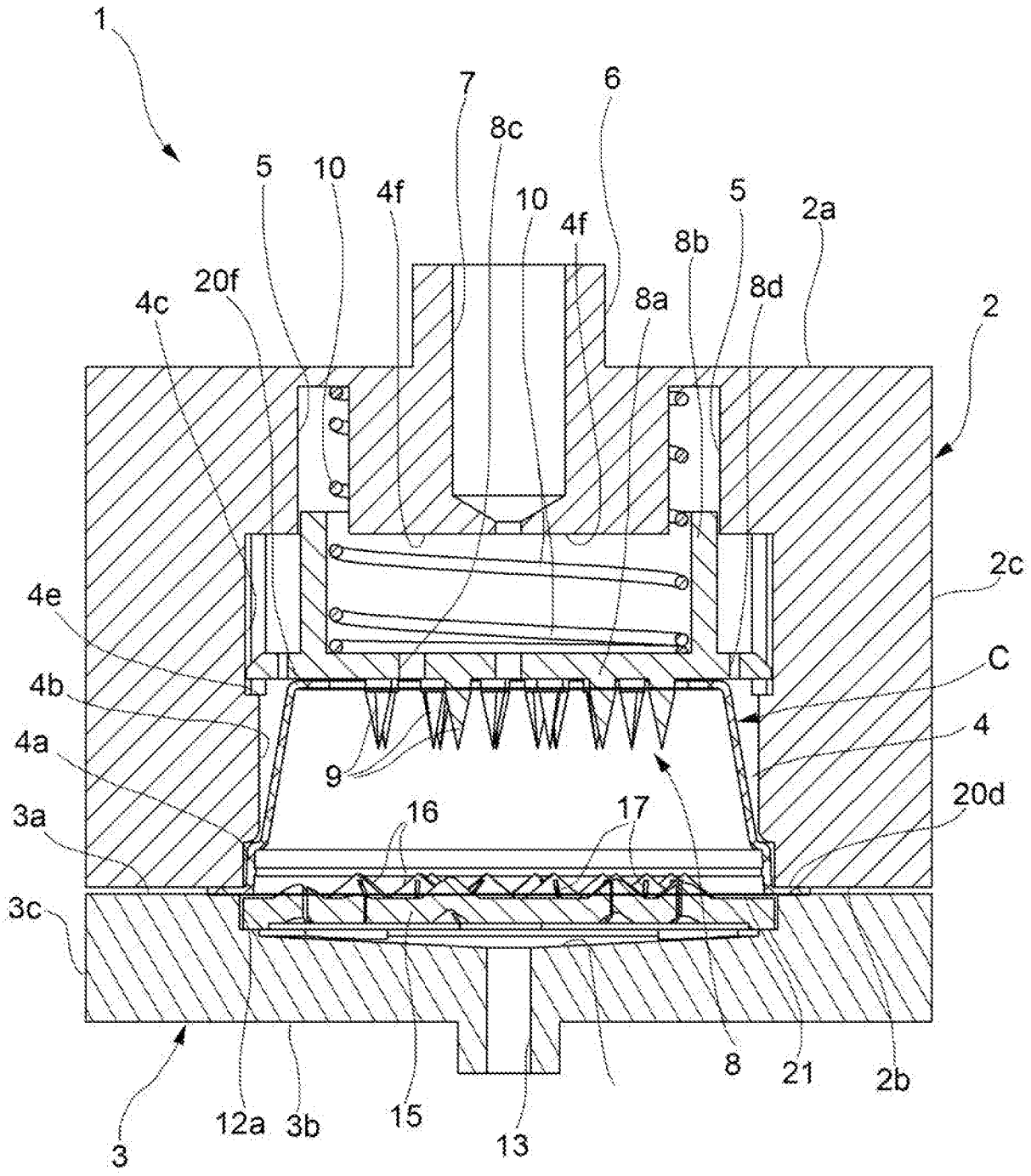

1
7
6
8c
5
10
4f
10
4f
5
2a
8b
20f
4c
8a
8d
2
2c
4e
C
4b
4
4a
9
20d
3a
16
17
3c
8
21
2b
3
12a
3b
15
13

FIG.6

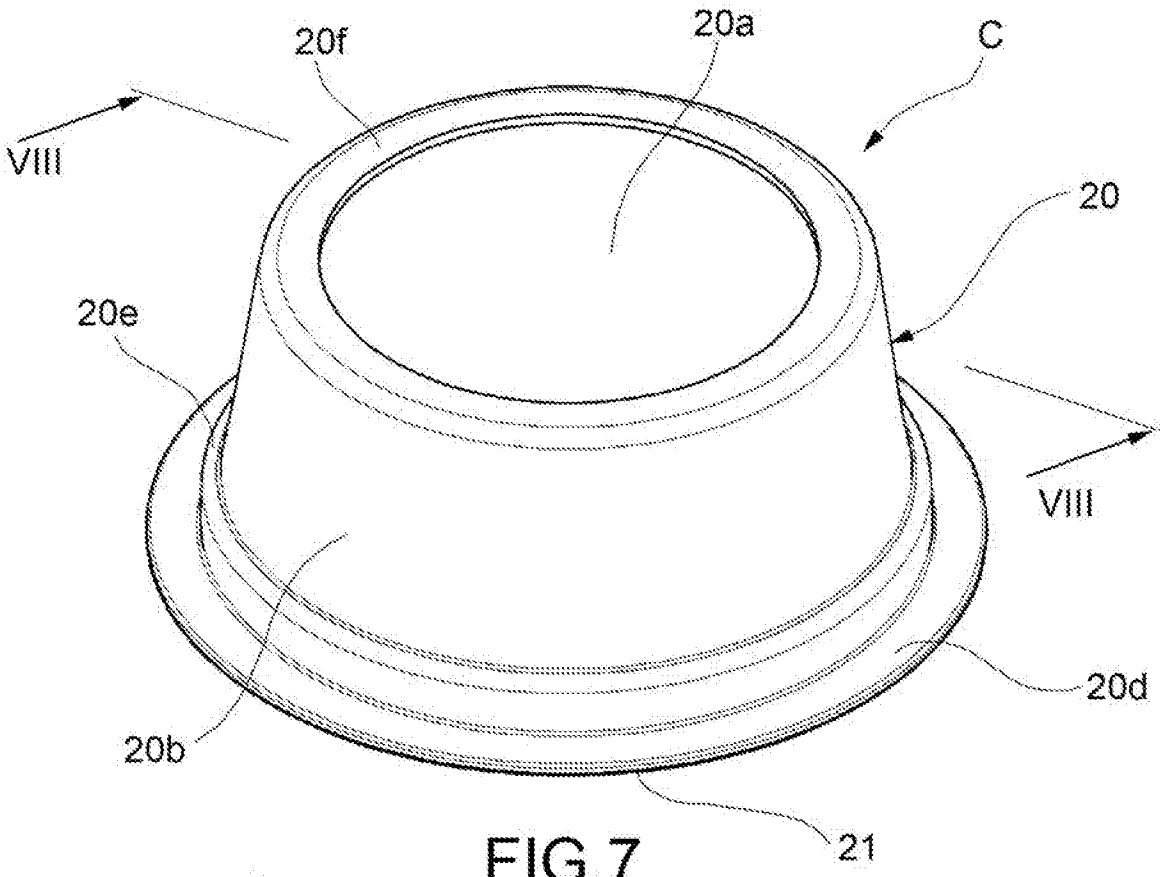

20f
20a
C
VIII
20
20e
VIII
20d
20b
21

FIG.7

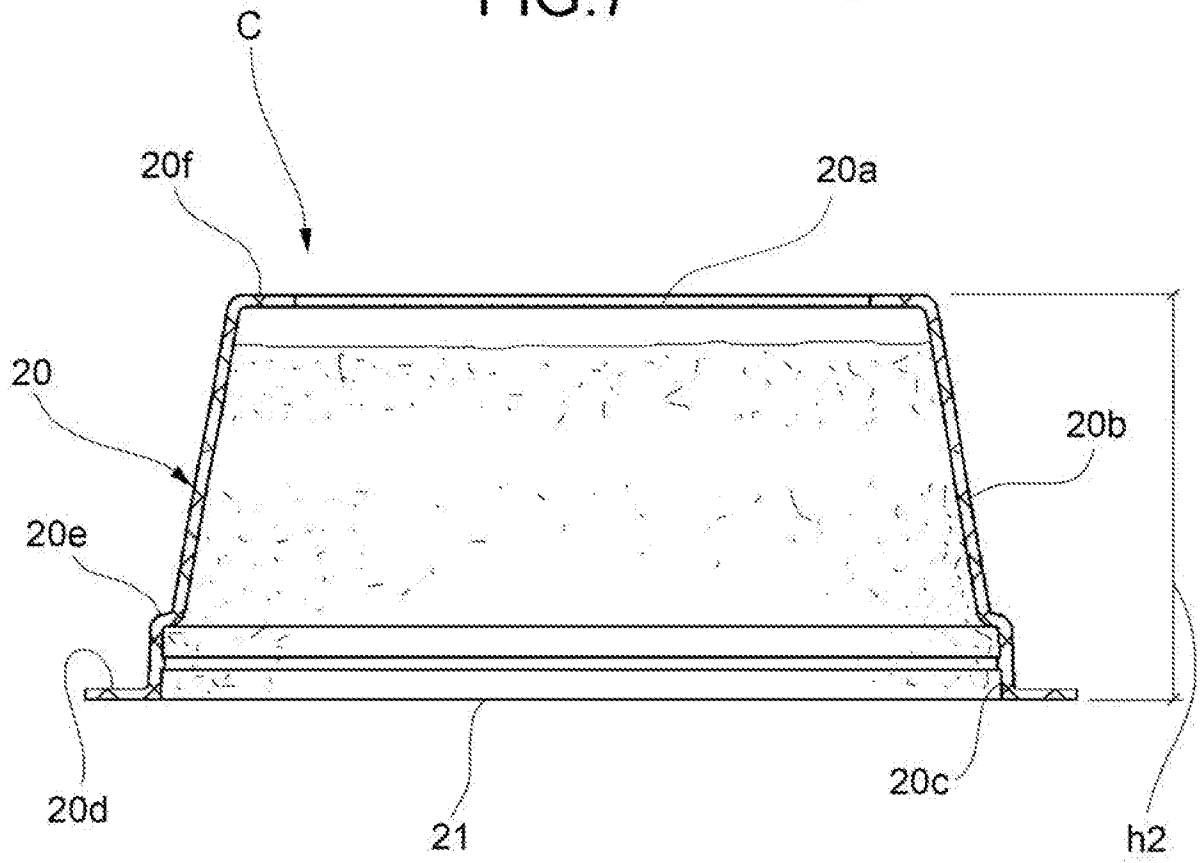

C
20f
20a
20
20b
20e
20d
21
20c
h2

FIG.8

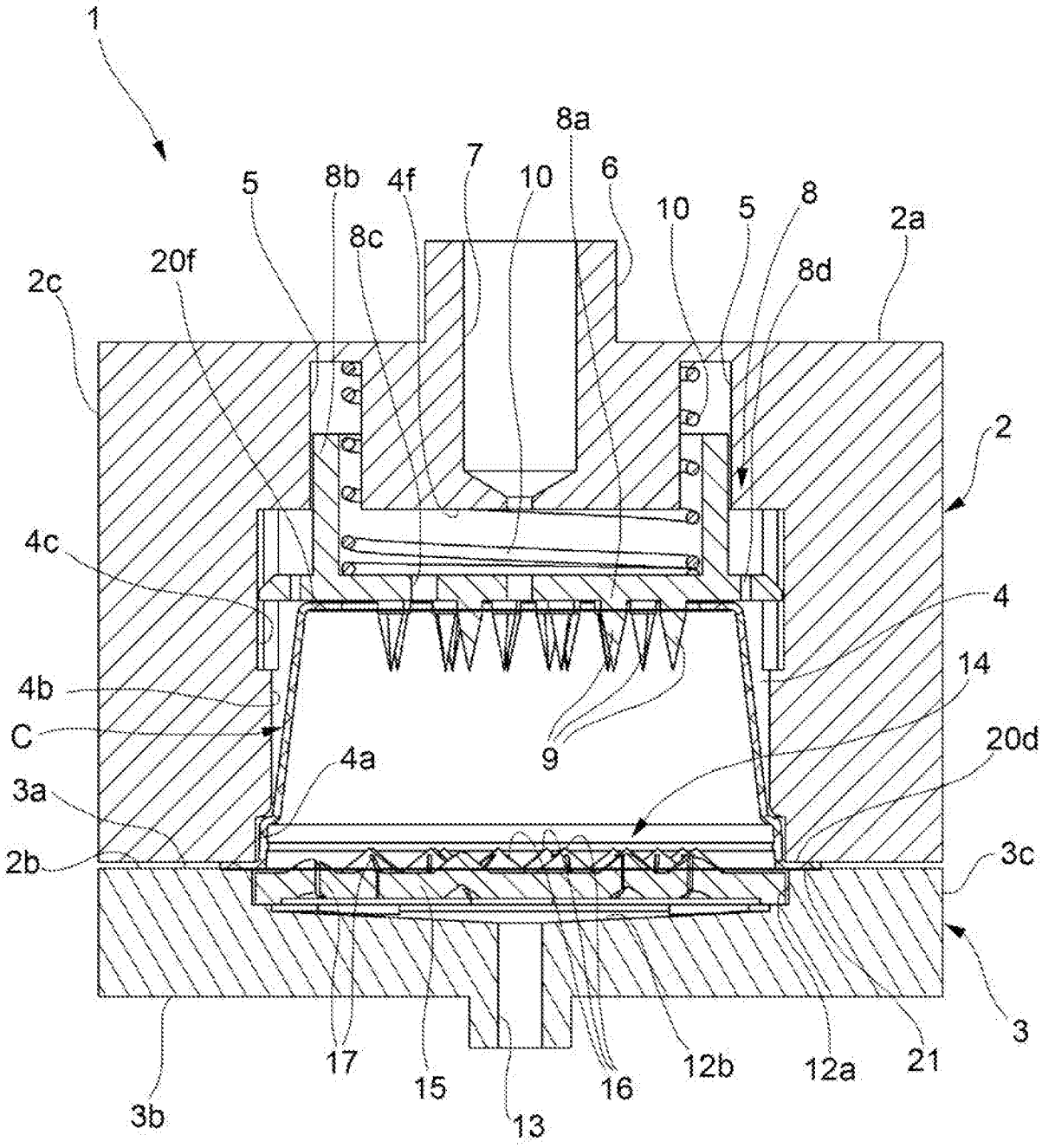

1
8a
7
5
8b
4f
10
6
10
5
8
2a
8c
20f
8d
2c
2
4c
4
14
4b
C
9
20d
4a
3a
2b
3c
3
3b
17
15
13
16
12b
12a
21

FIG.9

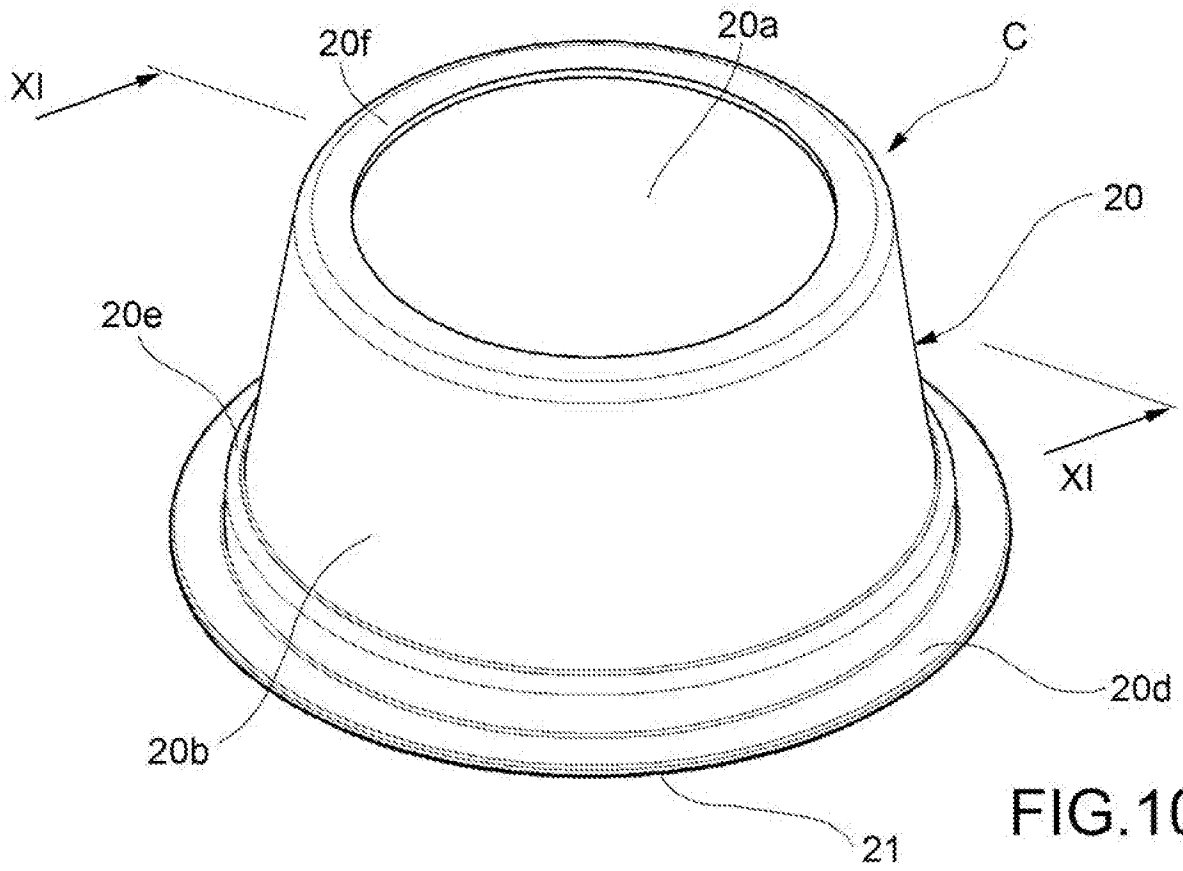


FIG.10

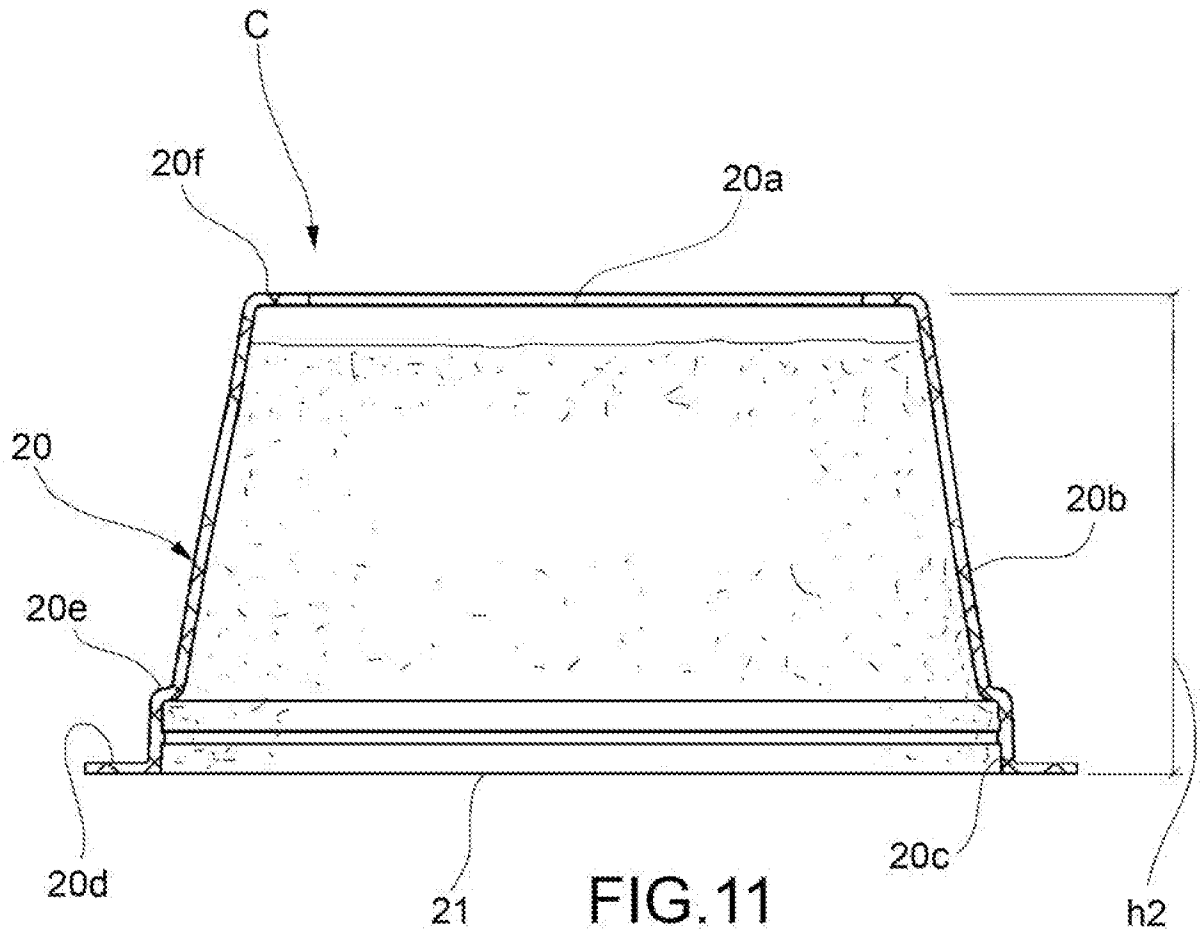


FIG.11

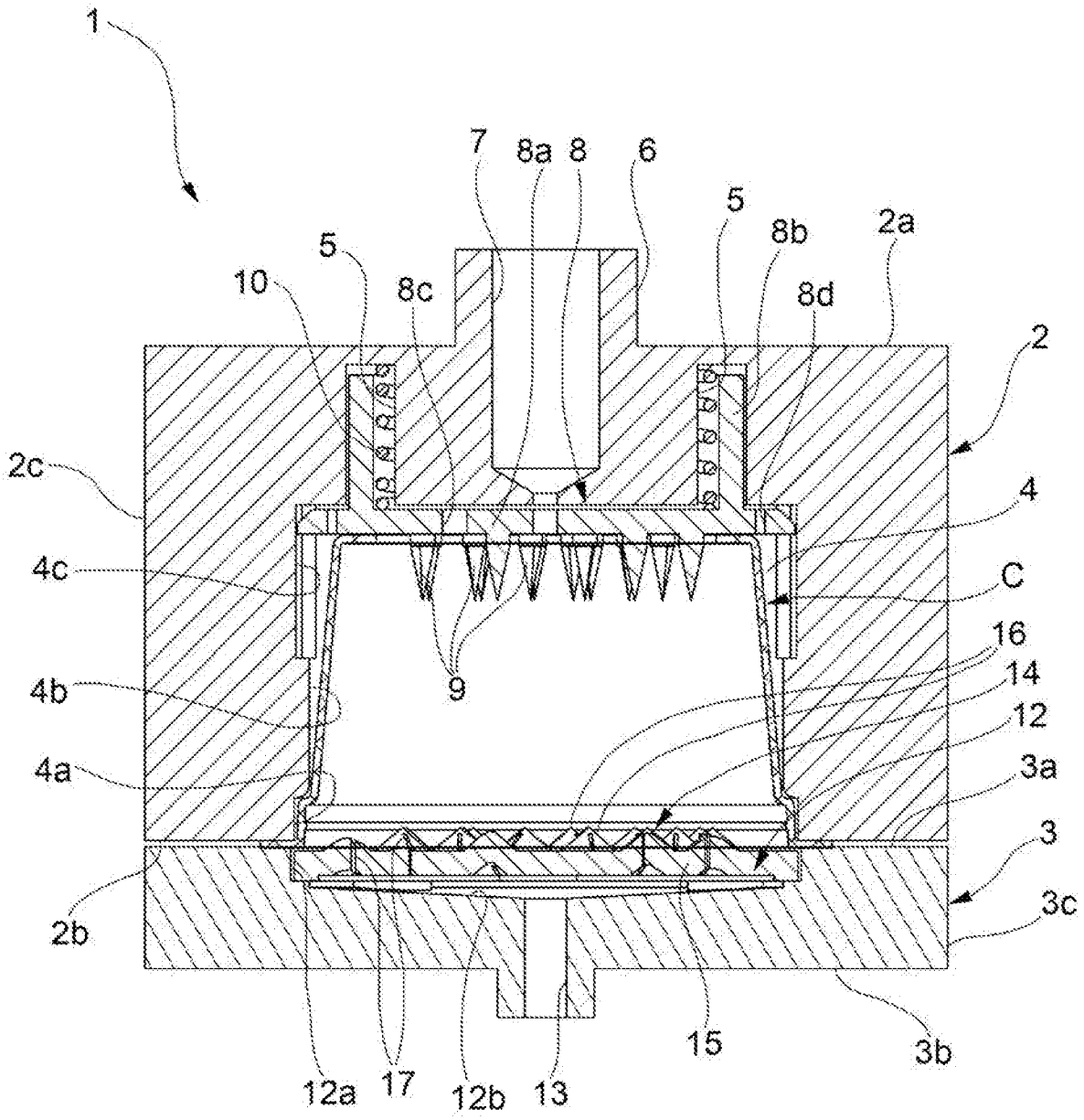

1
7
8a
8
6
5
8b
2a
5
10
8c
8d
2
2c
4
4c
C
16
9
14
4b
12
4a
3a
3
2b
3c
15
3b
12a
17
12b
13

FIG.12

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2017/050730

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47J31/36 A47J31/06
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2010/029512 A1 (ETHICAL COFFEE COMPANY SA) 18 March 2010 (2010-03-18) figure 1 -----	1-4,6,9, 10

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 March 2017	03/04/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Reichhardt, Otto

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2017/050730

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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