



(12) **DEMANDE DE BREVET CANADIEN**
CANADIAN PATENT APPLICATION
(13) **A1**

(86) Date de dépôt PCT/PCT Filing Date: 2018/05/22	(51) Cl.Int./Int.Cl. <i>B65D 85/804</i> (2006.01)
(87) Date publication PCT/PCT Publication Date: 2018/11/22	(71) Demandeur/Applicant: K-FEE SYSTEM GMBH, DE
(85) Entrée phase nationale/National Entry: 2019/11/19	(72) Inventeurs/Inventors: KRUGER, MARC, DE; EMPL, GUNTER, DE
(86) N° demande PCT/PCT Application No.: EP 2018/063396	(74) Agent: SMART & BIGGAR LLP
(87) N° publication PCT/PCT Publication No.: 2018/211147	
(30) Priorité/Priority: 2017/05/19 (DE10 2017 208 578.9)	

(54) Titre : DOSETTE SOUS FORME DE CAPSULE SERVANT A PREPARER UNE BOISSON DANS UNE MACHINE DE PRODUCTION DE BOISSON ET PROCEDE SERVANT A FABRIQUER UNE DOSETTE SOUS FORME DE CAPSULE

(54) Title: PORTION CAPSULE FOR PREPARING A DRINK IN A DRINKS PRODUCTION MACHINE, AND METHOD FOR PRODUCING A PORTION CAPSULE

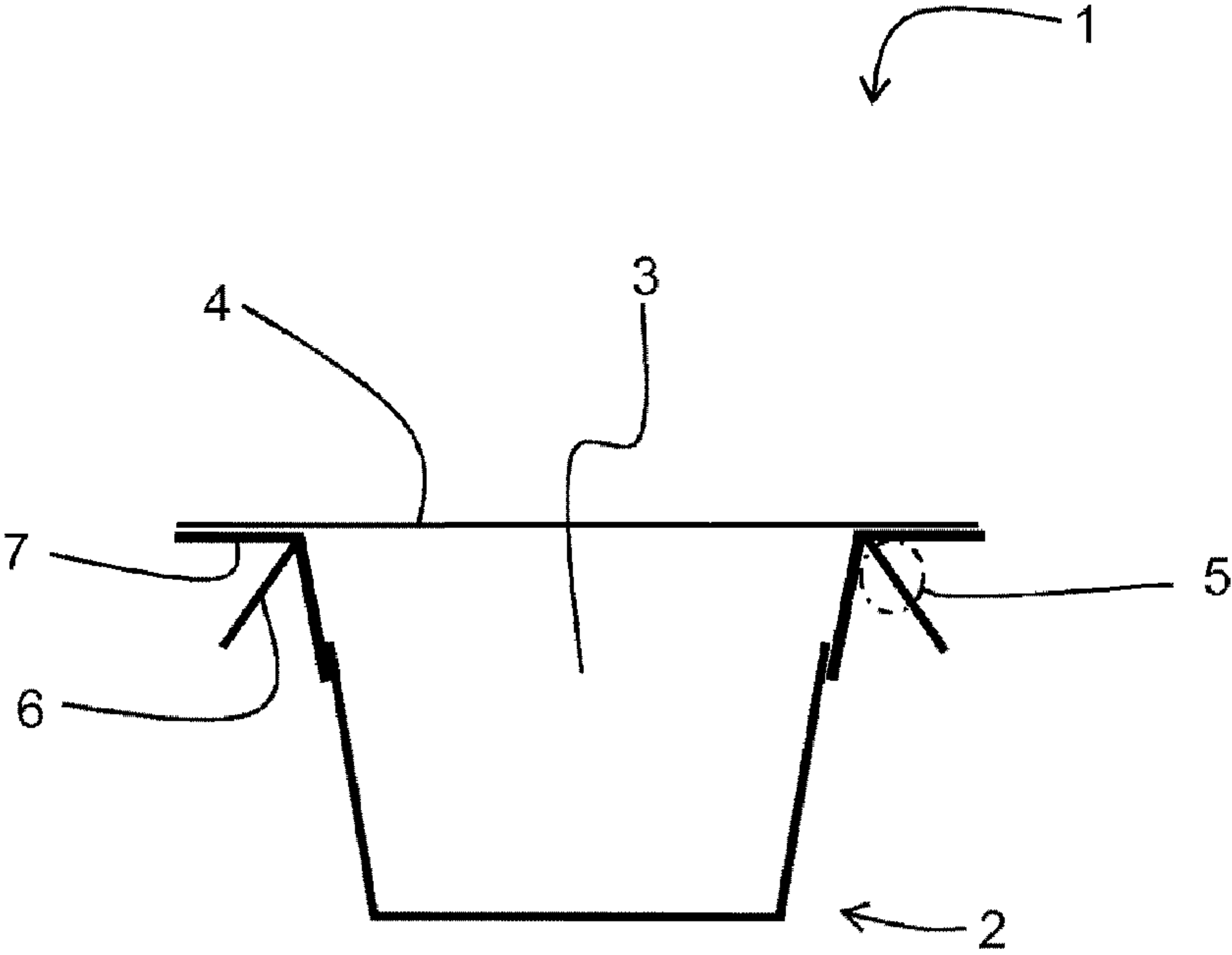


Fig. 1

(57) **Abrégé/Abstract:**
The invention relates to a portion capsule for preparing a drink in a drinks production machine, wherein the portion capsule has a base element with a cavity for receiving a raw drink material and a capsule cover closing the cavity, wherein the capsule cover is secured to a circumferential flange of the base element, wherein a sealing element is provided on an underside of the flange facing away from the capsule cover, characterised in that the sealing element is provided as a circumferential separate ring element. The invention also relates to a method for producing a portion capsule according to the invention.

Abstract

The invention relates to a portion capsule for preparing a drink in a drinks production machine, wherein the portion capsule has a base element with a cavity for receiving a raw drink material and a capsule cover closing the cavity, wherein the capsule cover is secured to a circumferential flange of the base element, wherein a sealing element is provided on an underside of the flange facing away from the capsule cover, characterised in that the sealing element is provided as a circumferential separate ring element. The invention also relates to a method for producing a portion capsule according to the invention.

SPECIFICATION**Title**

Portion capsule for preparing a drink in a drinks production machine, and method for producing a portion capsule

Prior art

The present invention proceeds from a portion capsule for preparing a beverage in a beverage production machine, wherein the portion capsule has a base element having a cavity for receiving a beverage raw material, and a capsule lid that closes the cavity, wherein the capsule lid is fastened to an encircling flange of the base element, wherein a sealing element is provided on a lower side of the flange that faces away from the capsule lid.

Such portion capsules are known from the prior art. For example, DE 10 2012 223 291 A1, DE 10 2013 215 274 A1, DE 10 2012 109 186 A1, and DE 10 2012 105 282 A1 disclose portion capsules for portion capsule machines, having in each case a rigid or semi-rigid base element which encloses a cavity for receiving a beverage raw material such as roasted coffee granules, instant coffee, chocolate powder, tea blends, milk powder, or the like, wherein the cavity after the filling of the portion capsule is closed with a capsule lid. In order for the beverage raw material not to lose the aroma thereof when the portion capsule is stored and transported, the base element is configured so as to be gas-tight and liquid-tight. In order for a coffee beverage to be prepared, the portion capsule is incorporated into a brewing chamber of a preparation apparatus. Prior to, after, or while the portion capsule is introduced into the brewing chamber, the portion capsule is preferably opened at the base side of said portion capsule, and after the brewing chamber has been sealed the filling side of the portion capsule that is closed by a closure foil/film is pierced by means of piercing means. Preparation liquid, preferably hot water, is subsequently conveyed under pressure into the portion capsule. The preparation liquid flows through the beverage substrate and extracts and/or dissolves from the beverage substrate the substances that are required for producing the beverage.

In the production of the beverage the base element has to withstand comparatively high mechanical forces since the extraction liquid is directed into the cavity under high pressure and at a high temperature, so as to produce the beverage while interacting with the beverage raw

material. In portion capsules known from the prior art to date it is disadvantageous that liquid makes its way past the base element into the brewing chamber and contaminates or even damages the latter.

Disclosure of the invention

It is an object of the present invention to provide a portion capsule of the type mentioned at the outset which effectively prevents any ingress of extraction liquid into the brewing chamber from a region below the portion capsule.

The object of the present invention is achieved by a portion capsule for preparing a beverage in a beverage production machine, wherein the portion capsule has a base element having a cavity for receiving a beverage raw material, and a capsule lid that closes the cavity, wherein the capsule lid is fastened to an encircling flange of the base element, wherein a sealing element is provided on a lower side of the flange that faces away from the capsule lid, characterized in that the sealing element is provided as an encircling separate ring element.

As opposed to the prior art, the portion capsule according to the invention has the advantage that any ingress of extraction liquid into the brewing chamber of the beverage production machine is effectively prevented. The sealing element embodied as an encircling separate ring element effectively seals the portion capsule in relation to the brewing chamber. In particular, the ring element when closing the brewing chamber is pressed in the direction of the capsule periphery by the brewing dome. A liquid-tight closure of the brewing chamber in relation to a base plate of the brewing chamber that delimits the brewing chamber in a downward manner is thus created.

The portion capsule is preferably embodied so as to be shaped as a truncated cone or a cylinder. In one preferred embodiment the portion capsule, in particular the base element, comprises aluminum. In one alternative embodiment the portion capsule, in particular the base element, comprises a plastics material. The cavity formed by the base element serves for receiving beverage raw material, for example roasted coffee granules, instant coffee, chocolate powder, tea blends, milk powder, or the like. The ring element preferably has an internal and an external radius, wherein the difference between the internal and the external radius is preferably greater than the height of the ring element. In one preferred embodiment the height of the ring element is less than the wall thickness of the base element. This embodiment is preferably

applied to a portion capsule of which the base element is made substantially from plastics material. The internal radius is preferably insignificantly larger than the external radius of the base element in the region of the flange. The external radius is preferably insignificantly smaller than the internal radius of the brewing chamber in the region in which the flange is situated when the portion capsule is disposed in the brewing chamber. In one alternative embodiment the external radius is insignificantly larger than the external radius of the flange. In particular, the dimensions of the ring element are chosen such that the ring element when closing the brewing chamber completely seals the latter in a downward manner. The ring element when closing the brewing chamber is preferably folded over. The ring element performs the sealing function thereof when in the folded-over state. The ring element in the folded-over state herein is not to extend beyond the flange periphery. "Top" and "bottom" herein are defined by the flow direction of the extraction liquid; the extraction liquid flows from top to bottom. The ring element herein is preferably embodied in such a manner that the ring element when closing the brewing unit is pressed in the direction of the flange by the brewing dome and thus closes the brewing chamber in relation to the base plate.

Advantageous design embodiments and refinements of the invention can be derived from the dependent claims as well as the description with reference to the drawings.

According to one preferred embodiment of the present invention it is provided that the ring element comprises an elastic material. On account thereof, a ring element which flexibly adapts to the dimensions of the brewing chamber is advantageously provided. The ring element is preferably highly flexible and enables dynamic sealing by way of linking to the capsule body, that is to say the base element and/or the flange which facilitates the mobility in the direction of the external periphery of the flange. In particular, it is thus advantageously possible for the ring element to assume a sealing position when closing the brewing dome. In particular, the ring element when closing the brewing dome is pressed in the direction of the flange and is preferably pressed into a periphery of the flange. In one preferred embodiment the ring element comprises a plastics material, in particular a soft plastics material. In one further preferred embodiment the ring element comprises rubber. The elastic material is preferably water-impermeable.

According to one preferred embodiment of the present invention it is provided that an internal sub-region of the ring element is connected to the base element and/or the flange. A tight, in particular liquid-tight, closure between the ring element and the base element and/or the ring

element and the flange is advantageously generated on account thereof. In particular, the ring element is connected in a form-fitting and force-fitting manner to the base element and/or the flange. The linking to the capsule body, that is to say the base element and/or the flange, herein is performed such that the mobility in the direction of the capsule periphery, that is to say toward the outside, is facilitated. The flexibility of the ring element in an external sub-region, in particular in a sub-region in the region of the external diameter of the ring element, is maintained on account thereof. This advantageously enables dynamic sealing of the brewing chamber in relation to the base plate of the brewing chamber by way of the ring element. In the context of the present invention, the internal sub-region preferably comprises an encircling region which comprises at least the internal radius of the ring element. In one preferred embodiment the connection of the ring element to the base element and/or the flange is achieved by means of a friction fit. In one alternative, preferred, embodiment the ring element is connected to the base element and/or the flange directly in the production process. In particular, the ring element is chemically connected to the base element and/or the flange. The ring element and the base element and/or the ring element and the flange are preferably embodied as a single component. A separate manufacturing step in which the base element, or the flange, respectively, would first have to be provided with the ring is thus advantageously dispensed with. A strong and reliable connection between the ring element and the base element and/or the ring element and the flange is achieved on account of the embodiment of the ring element and the base element and/or the ring element and the flange as a single component. In one alternative embodiment the ring element is fixedly sealed to the base element and/or the flange. The fixed sealing is in particular performed by welding, preferably ultrasonic welding. Additionally or alternatively, the ring element, in particular an internal sub-region of the ring element, can be latched onto the base element. To this end, the base element, in particular in a lower region of the base element that is assigned to the flange, has a fastening device into which the ring element, in particular the internal sub-region of the ring element, latches. The fastening device is preferably formed by an encircling groove on the external wall of the base element. It is also conceivable for two parallel protrusions to be disposed on the external wall of the base element, and for the ring element to be latched into the intermediate space formed between the two protrusions.

According to one preferred embodiment of the present invention it is provided that the flange has an encircling thickening, in particular a collar, and the ring element is capable of being placed in a space formed by the wall of the base element and the thickening. The ring element placed in the space formed in the case of a closed brewing chamber thus advantageously forms an annular seal between the brewing dome and the portion capsule, in particular the flange of the

portion capsule. In particular, the ring element when closing the brewing chamber is pressed into the space formed by the wall of the base element and the thickening of the flange.

According to one preferred embodiment of the present invention it is provided that the flange has an encircling thickening, in particular a collar, and the ring element can at least in part enclose the thickening. A ring element which, on account of pressure exerted by the brewing dome when closing the brewing chamber, can shape itself around the thickening is advantageously provided on account thereof.

According to one preferred embodiment of the present invention it is provided that an upper side of the ring element that faces away from the flange and/or a lower side of the ring element that faces the flange have/has reinforcements. It is advantageously guaranteed on account thereof that the closing force of the brewing chamber is not excessively utilized. In particular, the regions configured between the reinforcements can yield to a liquid pressure without the sealing effect of the ring element being compromised. In particular, web regions which can absorb the pressure are formed between the reinforcements. The reinforcements ensure that the ring element in its entirety does not yield to the pressure. The reinforcements are preferably embodied as thickened contours. The reinforcements are preferably connected to one another in an encircling manner.

According to one preferred embodiment of the present invention it is provided that an upper side of the ring element that faces away from the flange and/or a lower side of the ring element that faces the flange have/has a coating. The sealing process is advantageously additionally facilitated on account thereof. In particular, the upper side and/or the lower side have/has a soft surface coating, preferably comprising silicone.

According to one preferred embodiment of the present invention it is provided that the ring element is adhesively bonded to the base element and/or the flange. In particular, the internal sub-region of the ring element is adhesively bonded to the base element and/or the flange. A secure and stable connection between the ring element, in particular the internal sub-region of the ring element, and the base element and/or the flange is ensured on account thereof.

According to one preferred embodiment of the present invention it is provided that a silicone layer is disposed between the ring element and the base element and/or between the ring element and the flange. In particular, the internal sub-region of the ring element is adhesively

bonded to the base element and/or the flange by means of the silicone layer. A simple, cost-effective, hygienic, and liquid-sealing adhesive bond between the ring element and the base element and/or the flange is advantageously achieved on account thereof.

According to one preferred embodiment of the present invention it is provided that the portion capsule on a lower side of the flange that faces away from the capsule lid has a fastening device for receiving the ring element, wherein the ring element is latched into the fastening device. In particular, an internal sub-region of the ring element is latched into the fastening device. A further embodiment for connecting the ring element to the base element, or the flange of the base element, respectively, is advantageously provided on account thereof. In particular, the ring element by means of the fastening device can be connected in a simple, rapid, and force-fitting manner to the flange. In one preferred embodiment the ring element has a base into which the fastening device latches. The fastening device can be formed, for example, by a space configured between the wall of the base element and an encircling thickening, for example of the flange.

According to one preferred embodiment of the present invention it is provided that an internal sub-region of the ring element is connected to an upper side of the flange that faces the capsule lid and/or to a lower side of the capsule lid, or in an encircling manner is connected to the flange in such a manner that an external sub-region of the ring element is capable of being disposed on the lower side of the flange that faces away from the capsule lid. In particular, the external sub-region is configured as encircling wing which when closing the brewing chamber is placed around the flange and thus functions as a sealing element. The sub-region configured as an encircling wing by virtue of the restoring forces advantageously acts as a retrieval aid when retrieving the portion capsule. The internal sub-region is configured as a ring. A sealing element which can be attached from below, that is to say from the capsule lid side, onto the base element, in a simple and rapid manner is advantageously provided on account thereof. In one preferred embodiment the internal sub-region of the ring element is disposed between the capsule lid and the flange. Alternatively, the internal sub-region is disposed in an encircling manner on the flange. In one further, alternative, embodiment the internal sub-region is disposed on the upper side of the capsule lid that is remote from the flange. That is to say that the cavity of the base element is first closed with the capsule lid, and the ring element is attached only thereafter.

According to one preferred embodiment of the present invention it is provided that the internal sub-region of the ring element has a fastening element. According to one preferred embodiment of the present invention it is provided that the flange has a receptacle for the fastening element. A strong and stable connection between the flange and the ring element is enabled on account thereof. The ring element is connected to the flange in that the fastening element is incorporated in the receptacle. In one preferred embodiment the receptacle is disposed on the upper side of the flange that faces the capsule lid. In one alternative embodiment the receptacle is disposed in an encircling manner on the external edge of the flange.

According to one preferred embodiment of the present invention it is provided that the capsule lid has a receptacle for the fastening element. On account thereof, it is advantageously possible for the ring element to be connected in a stable and fixed manner exclusively or additionally to the capsule lid. In one preferred embodiment the receptacle is disposed on the upper side of the capsule lid that faces away from the flange. Fastening the ring element to the upper side of the capsule lid, that is to say in the case of a closed base element, thus becomes possible. In one alternative, preferred, embodiment the receptacle is disposed on the upper side of the capsule lid that faces the flange. Fastening the ring element in the case of the internal sub-region being disposed between the flange and the capsule lid becomes possible on account thereof. Said fastening can in particular be a substitute for the fastening to the flange, or alternatively take place additionally to the fastening to the flange. It is also conceivable for a first receptacle to be disposed on the upper side of the flange that faces the capsule lid, and for a second receptacle to be disposed on the lower side of the capsule lid that faces the flange, such that the fastening element can in each case be partially incorporated in both receptacles. A particularly stable bond is thus achieved.

According to one preferred embodiment of the present invention it is provided that the fastening element has latching hooks. In particular, the latching hooks can be disposed in an encircling manner in the internal sub-region of the ring element. The latching hooks are preferably disposed so as to be equidistant. In particular, the latching hooks are to be suitably latched into a receptacle. It is conceivable for the latching hooks to be configured in such a manner that a first hook region latches into a first receptacle, and a second hook region latches into a second receptacle. At least four latching hooks are preferably provided; a larger number of latching hooks as a function of the circumference of the portion capsule is particularly preferably provided.

According to one preferred embodiment of the present invention it is provided that the fastening element has an encircling ring. A wear-resistant fastening element that is particularly simple to manufacture is provided on account thereof. In particular, the internal sub-region of the ring element is configured as a thickened ring, preferably having a round cross section. Said cross section is suitable for incorporation in a receptacle.

According to one preferred embodiment of the present invention it is provided that the receptacle has an encircling channel. The encircling channel is particularly suitable for receiving a plurality of latching hooks or a ring. The encircling channel is preferably disposed on the upper side of the flange that faces the capsule lid. In one alternative embodiment the channel is disposed in an encircling manner on the external edge of the flange. In one further alternative, preferred, embodiment the channel is disposed in an encircling manner on the lower side of the capsule lid that faces the flange.

According to one preferred embodiment of the present invention it is provided that the receptacle has a plurality of recesses that are disposed in an encircling manner. In particular, the recesses are suitable for receiving in each case one latching hook. The recesses are preferably disposed so as to be equidistant. The spacings between the recesses are determined in particular by the spacings between the latching hooks of the fastening element. The recesses are preferably disposed in an encircling manner on the upper side of the flange that faces the capsule lid. In one alternative embodiment the recesses are disposed in an encircling manner on the external edge of the flange. In one further alternative, preferred, embodiment the recesses are disposed in an encircling manner on the lower side of the capsule lid that faces the flange.

A further subject matter of the present invention is a method for producing a portion capsule as claimed in one of claims 1 to 7, wherein the portion capsule is produced by a forming method, in particular a thermoforming method, characterized in that the ring element is incorporated by a folding technique in the forming process. A portion capsule having a sealing element embodied as a ring element is thus advantageously provided. In particular, in the production method the ring element is integrated into the portion capsule as part of the latter. Additional method steps are saved on account thereof. Moreover, a safe, stable and tight, in particular liquid-tight, connection between the ring element and the base element, or the flange, respectively, is enabled on account of the production method according to the invention. Any ingress of extraction liquid past the portion capsule into the brewing chamber is thus effectively suppressed. The portion capsule is preferably produced substantially from aluminum.

A further subject matter of the present invention is a method for producing a portion capsule as claimed in one of claims 1 to 7, wherein the portion capsule is produced by a single-component injection-molding method or by a multi-component injection-molding method. On account thereof the ring element can be embodied as an integral component part of the portion capsule. In particular, the ring element is integrated into the base element in the production method. In one preferred embodiment the portion capsule is produced from plastics material by the injection-molding method. The ring element and the base element herein are preferably embodied as one component. In particular, the portion capsule comprising the ring element and the base element is made in one injection-molding tool. In one alternative embodiment the ring element in a first method step is made in a first injection-molding tool, and the base element in at least one second method step is produced in a second injection-molding tool. The ring element in the second method step herein can be incorporated in the second injection-molding tool and be insert molded and/or overmolded.

According to one preferred embodiment of the present invention it is provided that the portion capsule is produced by an in-mold method. A stable and durable, tight, connection between the ring element and the base element, or the flange, respectively, is advantageously guaranteed on account thereof.

A further subject matter of the present invention is a method for producing a portion capsule as claimed in one of claims 1 to 10, wherein in a first method step the base element is provided, wherein in a second method step the ring element is disposed on a lower side of the flange of the base element that faces away from the capsule lid, and in a third method step the ring element is connected to the base element and/or the flange. A method which permits simple retro-fitting of portion capsules with a sealing element is advantageously provided on account thereof. In particular, the ring element is disposed in a force-fitting and/or form-fitting manner on the lower side of the flange. The ring element and the base element herein are preferably connected to one another in at least a friction-fitting manner. The ring element in the second method step is preferably slid over the base element until an internal sub-region of the ring element contacts the flange. In particular, an internal sub-region of the ring element is connected to the base element and/or the flange in the third method step.

According to one preferred embodiment of the present invention it is provided that the ring element in the third method step is adhesively bonded to the base element and/or the flange. In particular, the internal sub-region of the ring element is adhesively bonded to the base element

and/or the flange. The connection between the ring element and the base element and/or the flange is advantageously improved beyond the friction fit on account thereof. In particular, a chemical connection between the ring element and the base element, or the flange, respectively, is established. In one preferred embodiment a silicone layer is disposed between the ring element and the base element and/or the ring element and the flange, the ring element being adhesively bonded to the base element, or the flange, respectively, by means of said silicone layer.

According to one preferred embodiment of the present invention it is provided that the ring element in the third method step is latched into a fastening device which is disposed on a lower side of the flange that faces away from the capsule lid. In particular, the internal sub-region of the ring element is latched into the fastening device. On account thereof, the connection between the ring element and the base element and/or the ring element and the flange is improved in addition to the friction fit. In particular, the ring element is held on the flange by mechanical forces.

According to one preferred embodiment it is provided that the ring element in the third method step is shrink-fitted onto the base element and/or the flange. In particular, the ring element is heated prior to being attached to the base element and/or the flange. After being attached to the base element and/or the flange, the ring element contracts on account of cooling and is thus imparted a firm seat on the base element and/or the flange.

A further subject matter of the present invention is a method for producing a portion capsule as claimed in one of claims 11 to 18, wherein in a first method step the base element is provided, wherein in a second method step the ring element is disposed on an upper side of the flange that faces the capsule lid, wherein in a third method step the ring element is connected to the flange, and in a fourth method step the cavity of the base element is closed with the capsule lid. A production method for a portion capsule of which the sealing element can be placed onto the portion capsule from the capsule lid side is thus advantageously provided. In particular, the ring element is snap-fitted onto the base element from the capsule lid side preferably in such a manner that the external sub-region of the ring element can bear on the lower side of the flange. In particular, the external sub-region configured as a wing forms a sealing assembly of the brewing chamber, while the internal sub-region serves for fastening the ring element to the base element. The external sub-region, by virtue of the acting restoring forces, function as a retrieval

aid when retrieving the portion capsule. The ring element is preferably sealed onto the base element from the capsule lid side.

According to one preferred embodiment of the invention it is provided that in the third method step a fastening element of the ring element is incorporated in a receptacle of the flange. The ring element is connected to the flange in a reversible and stable manner on account thereof. According to one preferred embodiment of the invention it is provided that in the fourth method step the ring element is connected to the capsule lid. Additional fastening of the ring element is in particular enabled on account thereof. According to one preferred embodiment of the invention it is provided that in the fourth method step a fastening element of the ring element is incorporated in a receptacle of the capsule lid. The fastening element herein can be partially incorporated in the receptacle of the flange and partially in the receptacle of the capsule lid.

A further subject matter of the invention is a method for producing a portion capsule as claimed in one of claims 11 to 18, wherein in a first method step the base element is provided, wherein in a second method step the ring element is disposed in an encircling manner on the flange, wherein in a third method step the ring element is connected to the flange, and in a fourth method step the cavity of the base element is closed with the capsule lid. In particular, the internal sub-region here also fulfills a sealing function. The capsule lid can be attached directly to the flange and connected thereto.

According to one preferred embodiment of the invention it is provided that in the third method step a fastening element of the ring element is incorporated in a receptacle of the flange. The fastening element is preferably incorporated in a receptacle, for example a channel or equidistantly disposed recesses, disposed on the external edge of the flange in an encircling manner.

A further subject matter of the invention is a method for producing a portion capsule as claimed in one of claims 11 to 18, wherein in a first method step the base element is provided and the cavity of the base element is closed with the capsule lid, wherein in a second method step the ring element is disposed on an upper side of the capsule lid that faces away from the flange, and in a third method step the ring element is connected to the capsule lid. A production method for portion capsule of which the sealing element is placed onto the closed capsule is advantageously provided on account thereof. In particular, the cavity of the base element is first closed by means of the capsule lid, and the sealing element is thereafter snap-fitted. A direct

connection between the capsule lid and the flange is advantageously enabled on account thereof.

According to one preferred embodiment of the invention it is provided that in the third method step a fastening element of the ring element is incorporated in a receptacle of the capsule lid. In particular, the receptacle of the capsule lid is disposed on the upper side of the capsule lid that faces away from the flange. Fastening the ring element to the capsule lid is enabled on account thereof.

A further subject matter of the invention is a method as claimed in one of claims 26 to 33, wherein the ring element is shrink-fitted to the flange or to the flange and the capsule lid. In particular, the ring element is heated prior to being attached to the flange and/or the capsule lid. The ring element contracts on account of cooling and is thus imparted a firm seat on the flange, or the flange and the capsule lid, respectively. This can be performed additionally or alternatively to fastening by means of the fastening element and the receptacle.

Further details, features, and advantages of the invention are derived from the drawings as well as from the description hereunder of preferred embodiments by means of the drawings. The drawings herein illustrate only exemplary embodiments of the invention which do not limit the essential concept of the invention.

Brief description of the drawings

- Figure 1** shows a schematic sectional view of a portion capsule according to one exemplary embodiment of the present invention;
- figure 2** shows a schematic view of the portion capsule according to one further exemplary embodiment of the present invention;
- figure 3** shows a schematic view of a detail of the ring element according to one exemplary embodiment of the present invention;
- figure 4** shows a schematic view of the ring element according to one further exemplary embodiment of the present invention;

- figure 5** shows a schematic view of a detail of the ring element according to the exemplary embodiment of the present invention illustrated in **figure 4**;
- figure 6** shows a further schematic illustration of a detail of the ring element according to the exemplary embodiment of the present invention illustrated in **figure 4**; and
- figure 7** shows a schematic view of the portion capsule according to one further exemplary embodiment of the present invention.

Embodiments of the invention

A schematic sectional view of a portion capsule 1 according to one exemplary embodiment of the invention for preparing a beverage in a beverage production machine (not illustrated) is illustrated in **figure 1**.

The portion capsule 1 has a cup-shaped base element 2 and a capsule lid 4 that is fastened to an encircling flange 7 of the base element 2. The capsule lid 4 herein is in particular welded to the flange 7. The capsule lid 4 is preferably embodied as a cover foil/film, particularly preferably from aluminum or plastics material. A cavity 3 which is filled with beverage raw material (not illustrated for reasons of clarity) and which is closed by the capsule lid 4 is configured within the base element 2.

The cup-shaped design embodiment of the base element 2 is preferably generated by thermoforming, for example vacuum forming, or forming with positive pressure, and/or a movable die. The base element 2 is preferably configured as a vacuum-formed plastics material part from polyethylene (PE), polypropylene (PP), polyvinylchloride (PVC), or polyethylene terephthalate (PET). In one alternative embodiment, the base element 2 is preferably configured as an aluminum part. Alternatively, the portion capsule 1 is produced by means of injection-molding methods, in particular by the single-component method, the multi-component method, or the in-mold method.

The portion capsule 1 in use in a beverage production machine is introduced into a brewing chamber. The capsule lid 4 and the base region are subsequently perforated successively or simultaneously, and extraction liquid is directed under pressure into the cavity 3 through the perforation openings in the capsule lid 4. The desired beverage is created on account of the

interaction between the extraction liquid and the beverage raw material, said beverage exiting the portion capsule 1 through the perforation openings in the base region and being supplied to a beverage vessel. Any potential particles of the beverage raw material can be filtered from the beverage and retained in the portion capsule 1 by way of an optional filter medium.

The portion capsule 1 has according to the invention a sealing element which is embodied as an encircling separate ring element 6. A portion capsule which protects a brewing chamber of the beverage production machine against any ingress of extraction liquid, for example during the beverage preparation process, is advantageously provided on account thereof. In particular, the ring element 6 seals the brewing chamber in a downward manner in relation to a base plate of the brewing chamber. The sealing herein is preferably performed in a liquid-tight manner.

In one preferred embodiment the portion capsule 1, in particular the base element 2 of the portion capsule 1, is provided with the ring element 6 directly in the production process. A stable and durable connection between the ring element 6 and the base element 2 is advantageously established on account thereof. Additional method steps in which the ring element 6 is connected to the base element are advantageously dispensed with. For example, the ring element 6 is incorporated by a folding technique in the forming process, in particular in the thermoforming process, of the base element 2. The base element 2 in this embodiment preferably comprises aluminum; the portion capsule 1 is thus embodied as an aluminum capsule. In one alternative embodiment the portion capsule 1 is embodied as an injection-molded capsule, and is thus produced by the injection-molding method. The ring element 6 can thus either be advantageously embodied by the single-component method so as to be integral to the base part 2. Alternatively, the ring element 6 by a multi-component method or an in-mold method can be fixedly and permanently connected to the base part. In particular, the ring element 6 is made in a first method step and is insert molded or overmolded in a second method step.

The ring element 6 is preferably embodied as a flat ring. In particular, the height of the ring element 6 is less than the width of the ring element 6, that is to say that the difference between the internal and the external radius of the ring element 6. In the case of an embodiment of the portion capsule 1 as a plastics material capsule, the ring element 6 has a height which is less than the wall thickness of the base element 2. The ring element 6 is preferably made from a flexible, in particular elastic, material. The ring element 6 comprises plastics material and/or rubber, for example. The ring element 6 in the production method of the portion capsule 1 is

connected to the base element 2 such that the mobility of the ring element 2 is facilitated in an external sub-region of the ring element, in particular toward the external periphery of the flange 7. A sealing element for a portion capsule which enables dynamic sealing of the brewing chamber is advantageously provided on account thereof. The ring element 6 preferably has an internal sub-region 5, for example an annular zone in the region of the internal radius of the ring element 6. The internal sub-region 5 is formed, for example, by a ring which extends from the internal radius of the ring element 6 up to a central radius of the ring element 6, wherein the central radius is larger than the internal radius and smaller than the external radius of the ring element 6. However, it is also conceivable for the internal sub-region 5 to comprise only corresponding annular segments. In one preferred embodiment the ring element 6 is connected to the base element 2 at the internal sub-region 5. An external sub-region of the ring element 6 remains flexible on account thereof. In particular, the ring element 6, in particular the external sub-region thereof, can bear on the flange 7 of the base element 2 and/or an internal wall of the brewing chamber when closing the brewing chamber. Efficient sealing of the brewing chamber is achieved on account thereof. The connection of the ring element 6 to the base element 2 is preferably performed in a region of the base element 2 that is adjacent to the flange 7. In particular, the ring element 6 is connected to a lower region of the base element 2 and/or to the flange 7, in particular in the region of the latter that adjoins the base element 2. The ring element herein is preferably configured such that is pressed onto the flange 7 when closing the brewing chamber by a brewing dome of the brewing chamber, and thus completely seals the brewing chamber in relation to the base plate of the brewing chamber. In one preferred embodiment the flange 7 has an encircling thickening, in particular a collar. The ring element 6 is preferably embodied such that said ring element 6 when closing the brewing chamber by the brewing dome is pressed into the space formed between the thickening and the external wall of the base element 2. In one alternative embodiment the ring element 6 is embodied such that said ring element 6 when closing at least partially reshapes the thickening. The ring element 6 preferably comprises an in particular soft surface coating. The surface coating advantageously improves the sealing characteristics of the ring element 6. The ring element 6 is provided with a coating on a lower side that faces the flange 7 and/or on an upper side that faces away from the flange 7. The coating preferably comprises silicone.

A schematic view of the portion capsule 1 according to one further exemplary embodiment of the present invention is illustrated in **figure 2**. The portion capsule 1 illustrated in **figure 2** differs from the portion capsule 1 of **figure 1** in that the ring element 6 is attached and connected to the base element 2 only retrospectively. In particular, the portion capsule 1 in this embodiment is

made by a forming method or an injection-molding method, for example, and subsequently provided with the ring element 6. A portion capsule 1 which can be retrofitted with a sealing element is advantageously provided on account thereof. In particular, the portion capsule 1 can be produced by known production methods and be provided with the ring element 6 in a subsequent method step. The ring element 6 herein can have all properties described in **figure 1**. The ring element 6, in particular an internal sub-region 5 of the ring element 6 is preferably adhesively bonded to the base element 2. The adhesive bonding can be performed by means of a silicone layer that is disposed in the connection region between the ring element 6 and the base element 2. However, other adhesive bonding methods are also conceivable. Alternatively or additionally, the base element 2 has a fastening device into which the ring element 6 latches. A connection that is to be achieved in a particularly rapid and simple manner is enabled between the base element 2 and the ring element 6 on account thereof. In particular, the ring element 6 is connected to the base element 2 directly when the former is being attached to the latter. Additional method steps, for example the application of an adhesive agent, are advantageously dispensed with. However, it is also conceivable for adhesive bonding of the ring element 6 to the base element 2 to be additionally performed. The fastening device is preferably disposed on a lower side of the flange 7 that faces away from the capsule lid 7. In particular, the lower side of the flange 7 that faces away from the capsule lid 4 has a thickening which, conjointly with the external wall of the base element 2, forms a space into which the ring element 6, in particular the internal sub-region 5 thereof, can latch.

A schematic view of a detail of the ring element 6 according to the embodiment of the present invention illustrated in **figure 2** is illustrated in **figure 3**. The ring element 6 preferably has a base 10 which, conjointly with the fastening device, provides a force-fitting connection between the ring element 6 and the base element 2. The base 10 is preferably embodied so as to latch into the fastening device. For example, the fastening device is formed by the encircling thickening of the flange 7. In particular, said thickening is disposed on an external periphery of the lower side of the flange 7 that faces away from the capsule lid 4 and forms a collar on said external periphery. The base 10 of the ring element 6 is preferably configured such that said base latches into the space formed between the thickening and the external wall of the base element. A simple, stable and rapid connection between the ring element 6 and the base element 2 is advantageously enabled on account thereof.

A schematic view of the ring element 6 according to one further exemplary embodiment of the present invention is illustrated in **figures 4 to 6**. The ring element 6 preferably has a plurality of

reinforcements 8. The reinforcements are disposed on a lower side that faces the flange 7 and/or on an upper side of the ring element 6 that faces away from the flange 7. Regions configured between the reinforcements 8 form web regions 9 which can advantageously yield to a pressure of the extraction liquid, see **figure 5**. The web regions 9 advantageously absorb the pressure of the extraction liquid. The reinforcements 8 ensure that the ring element 6 as an entity does not yield to the pressure and remains in its position, despite the pressure absorbed by the web regions 9. In particular, the reinforcements 8 ensure the sealing function of the ring element 6. It is thus advantageously ensured that the closing force of the brewing chamber is not excessively utilized, but effective sealing of the brewing chamber in relation to the base plate of the brewing chamber is performed at the same time. The reinforcements 8 are preferably embodied as contours that are connected to one another in an encircling manner. Said reinforcements 8 can be embodied as cruciform reinforcements 8, for example. The reinforcements per se can have a sub-structure, see **figure 6**. On account thereof, the stability and bending characteristics of the ring element 6 can be adapted in an optimal manner to the parameters of the beverage production machine, for example the maximum pressure in the brewing chamber and the maximum volume of the extraction liquid, etc.

A schematic view of the portion capsule 1 according to one further exemplary embodiment of the present invention is illustrated in **figure 7**. The portion capsule 1 illustrated in **figure 7** differs from the portion capsule 1 of **figure 2** in that the ring element 6 is attached from the capsule lid side. The ring element 6 has in particular an external sub-region 12 which is configured as a wing and in the closure of the brewing chamber bears on the lower side of the flange that faces away from the capsule lid 4. The external sub-region 12 during the brewing procedure thus acts as a sealing element. The external sub-region 12, by virtue of the acting restoring forces, acts as a retrieval aid when retrieving the portion capsule 1 from the brewing chamber. The ring element 6 can be attached to the base element 2 before or after the closure of the cavity 3 of the base element 2. That is to say that either the cavity 3 is first closed by means of the capsule lid 4, and the ring element 6, by means of the external sub-region 12, is thereafter snap-fitted to the flange 7 and the capsule lid 4, or the ring element by means of the external sub-region 12 is snap-fitted to the flange 7 and the cavity 3 is thereafter closed by means of the capsule lid 4. The ring element 6 is preferably sealed onto the flange 7, or the flange 7 and the capsule lid 4, respectively. The ring element 6 is particularly preferably shrink-fitted to the flange 7, or the flange 7 and the capsule lid 4, respectively. That is to say that the ring element 6 is heated prior to being attached to the flange 7, or to the flange 7 and the capsule lid 4. The ring element 6 contracts on account of the subsequent cooling and is thus imparted a firm seat on the flange 7,

or the flange 7 and the capsule lid 4, respectively. In one preferred embodiment the internal sub-region 5 has a fastening element 11. The fastening element 11 is embodied as a ring, for example. The fastening element 11 interacts with a receptacle 13. In particular, the fastening element 11 is capable of being incorporated in a receptacle 13. The receptacle 13 is preferably disposed on the upper side of the flange 7 that faces the capsule lid 4. Alternatively or additionally, the receptacle 13 is disposed on the lower side of the capsule lid 4 that faces the flange 7. Furthermore alternatively, it is conceivable that the receptacle 13 is disposed in an encircling manner on the external edge of the flange 7. The receptacle 13 is embodied, for example, as an encircling channel which is capable of being incorporated in the fastening element 11. The ring element 6 is thus fastened in a fixed and reversible manner to the flange 7 and/or the capsule lid 4.

WO 2018/211147

PCT/EP2018/063396

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List of reference signs

- 1 Portion capsule
- 2 Base element
- 3 Cavity
- 4 Capsule lid
- 5 Internal sub-region
- 6 Ring element
- 7 Flange
- 8 Reinforcement
- 9 Web region
- 10 Base
- 11 Fastening element
- 12 External sub-region
- 13 Receptacle

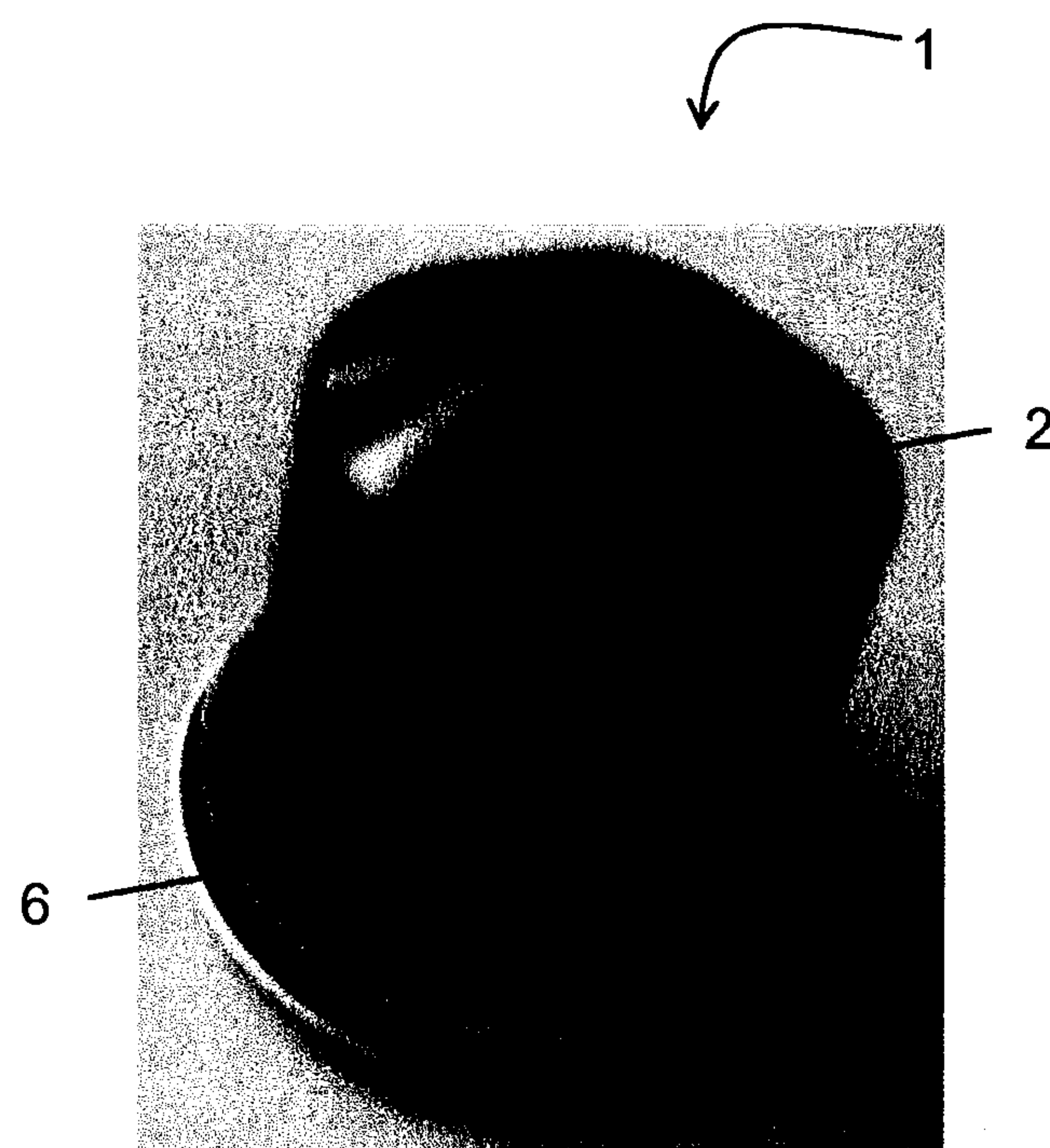
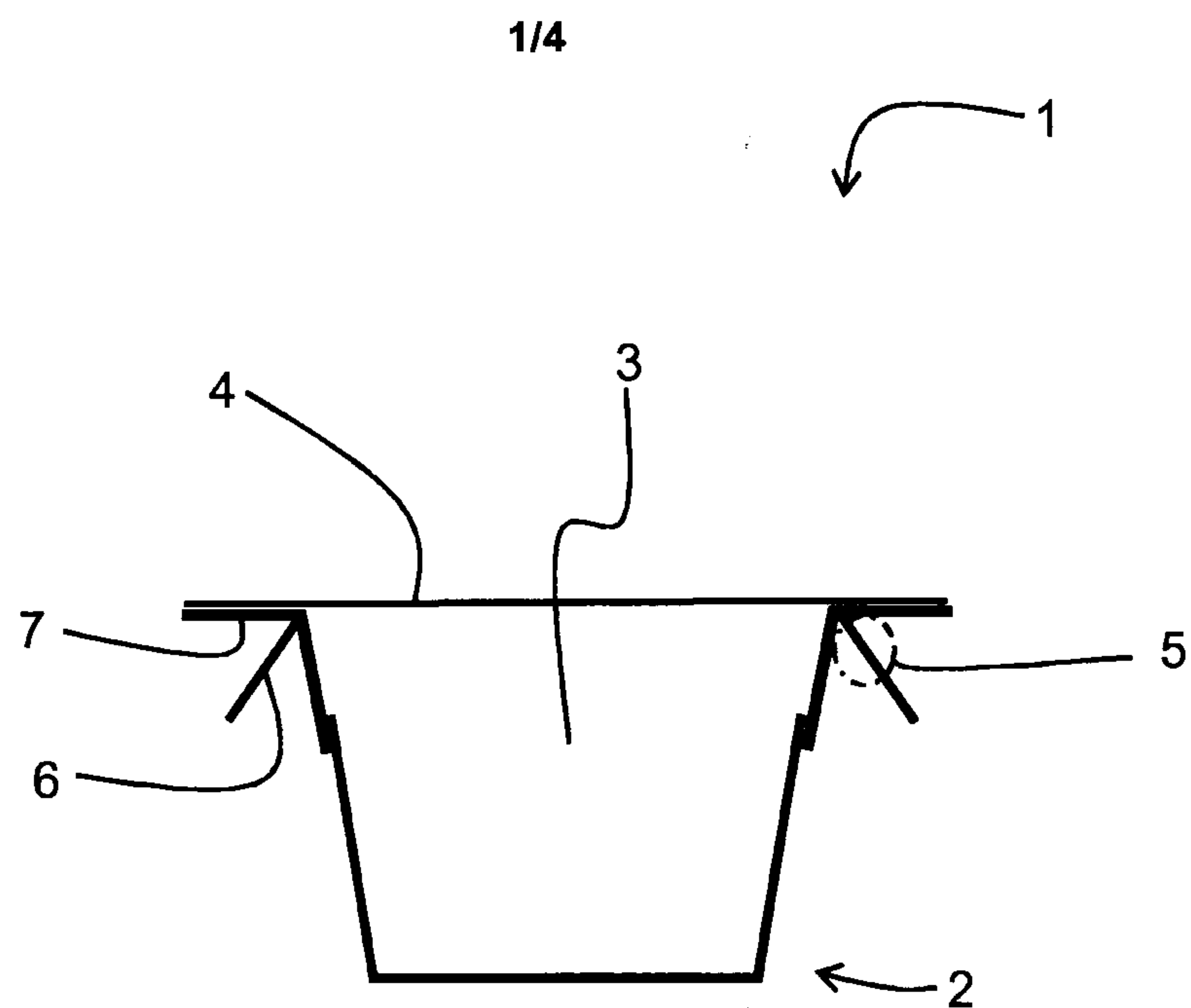
PATENT CLAIMS

1. A portion capsule (1) for preparing a beverage in a beverage production machine, wherein the portion capsule (1) has a base element (2) having a cavity (3) for receiving a beverage raw material, and a capsule lid (4) that closes the cavity (3), wherein the capsule lid (4) is fastened to an encircling flange (7) of the base element (2), wherein a sealing element is provided on a lower side of the flange (7) that faces away from the capsule lid (4), characterized in that the sealing element is provided as an encircling separate ring element (6), wherein an internal sub-region of the ring element is connected to the flange in an encircling manner such that an external sub-region of the ring element is capable of being disposed on the lower side of the flange that faces away from the capsule lid, wherein the external sub-region is configured as an encircling wing in such a manner that said external sub-region when closing the brewing chamber is placed on the lower side of the flange.
2. The portion capsule (1) as claimed in claim 1, wherein the ring element (6) comprises an elastic material.
3. The portion capsule (1) as claimed in claim 1 or 2, wherein an internal sub-region (5) of the ring element (6) is connected to the base element (2) and/or the flange (7).
4. The portion capsule (1) as claimed in one of the preceding claims, wherein the flange (7) has an encircling thickening, in particular a collar, and the ring element (6) is capable of being placed in a space formed by the wall of the base element (2) and the thickening.
5. The portion capsule (1) as claimed in one of the preceding claims, wherein an upper side of the ring element (6) that faces away from the flange (7) and/or a lower side of the ring element (6) that faces the flange (7) have/has reinforcements.
6. The portion capsule (1) as claimed in one of the preceding claims, wherein an upper side of the ring element (6) that faces away from the flange (7) and/or a lower side of the ring element (6) that faces the flange (7) have/has a coating.
7. The portion capsule (1) as claimed in one of the preceding claims, wherein the ring element (6) is adhesively bonded to the base element (2) and/or the flange (7).

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8. The portion capsule (1) as claimed in one of the preceding claims, wherein a silicone layer is disposed between the ring element (6) and the base element (2) and/or between the ring element (6) and the flange (7).
9. The portion capsule (1) as claimed in claim 1, wherein the internal sub-region (5) of the ring element (6) has a fastening element (11).
10. The portion capsule (1) as claimed in claim 9, wherein the flange (7) has a receptacle (13) for the fastening element (11).
11. The portion capsule (1) as claimed in one of claims 9 or 10, wherein the capsule lid (4) has a receptacle (13) for the fastening element (11).
12. The portion capsule (1) as claimed in claim 11, wherein the fastening element (11) has an encircling ring.
13. The portion capsule (1) as claimed in claim 12, wherein the receptacle (13) has an encircling channel.
14. A method for producing a portion capsule (1) as claimed in one of the preceding claims, wherein in a first method step the base element (2) is provided, wherein in a second method step the ring element (6) is disposed in an encircling manner on the flange (7), wherein in a third method step the ring element (6) is connected to the flange (7), and in a fourth method step the cavity (3) of the base element (2) is closed with the capsule lid (4).
15. The method as claimed in claim 14, wherein the ring element (6) is shrink-fitted to the flange (7) or to the flange (7) and the capsule lid (4).

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Fig. 3

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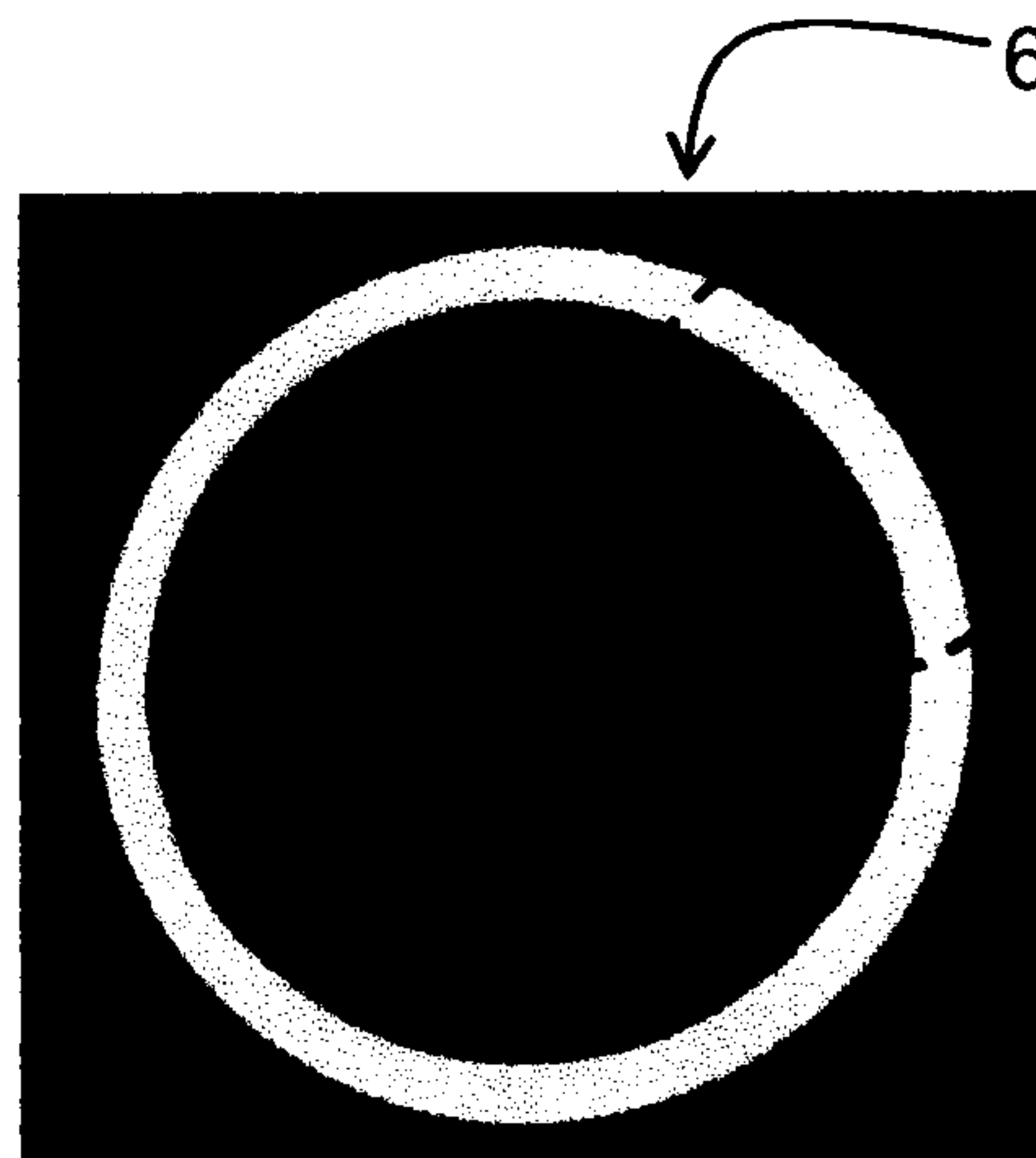


Fig. 4

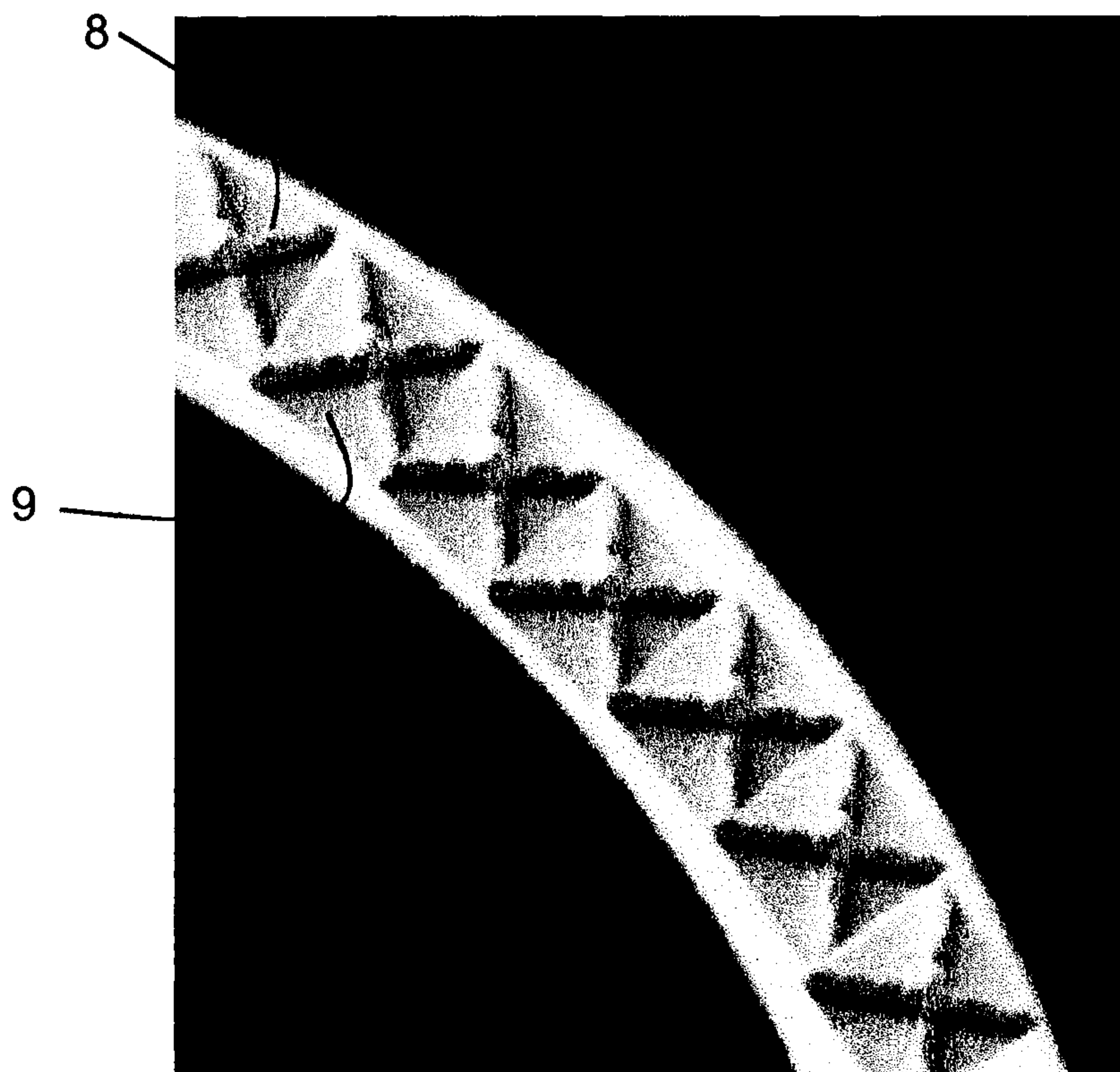


Fig. 5

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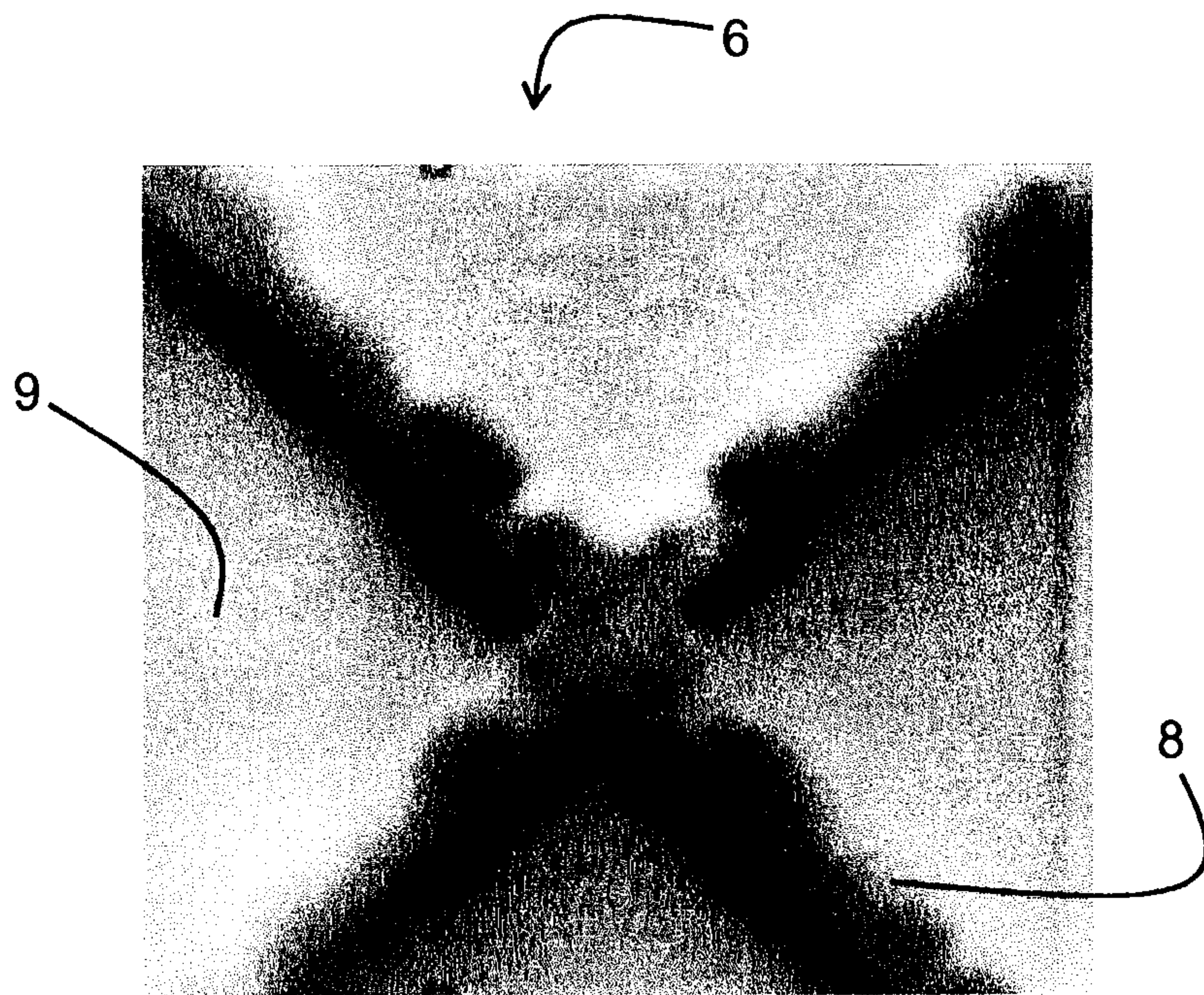


Fig. 6

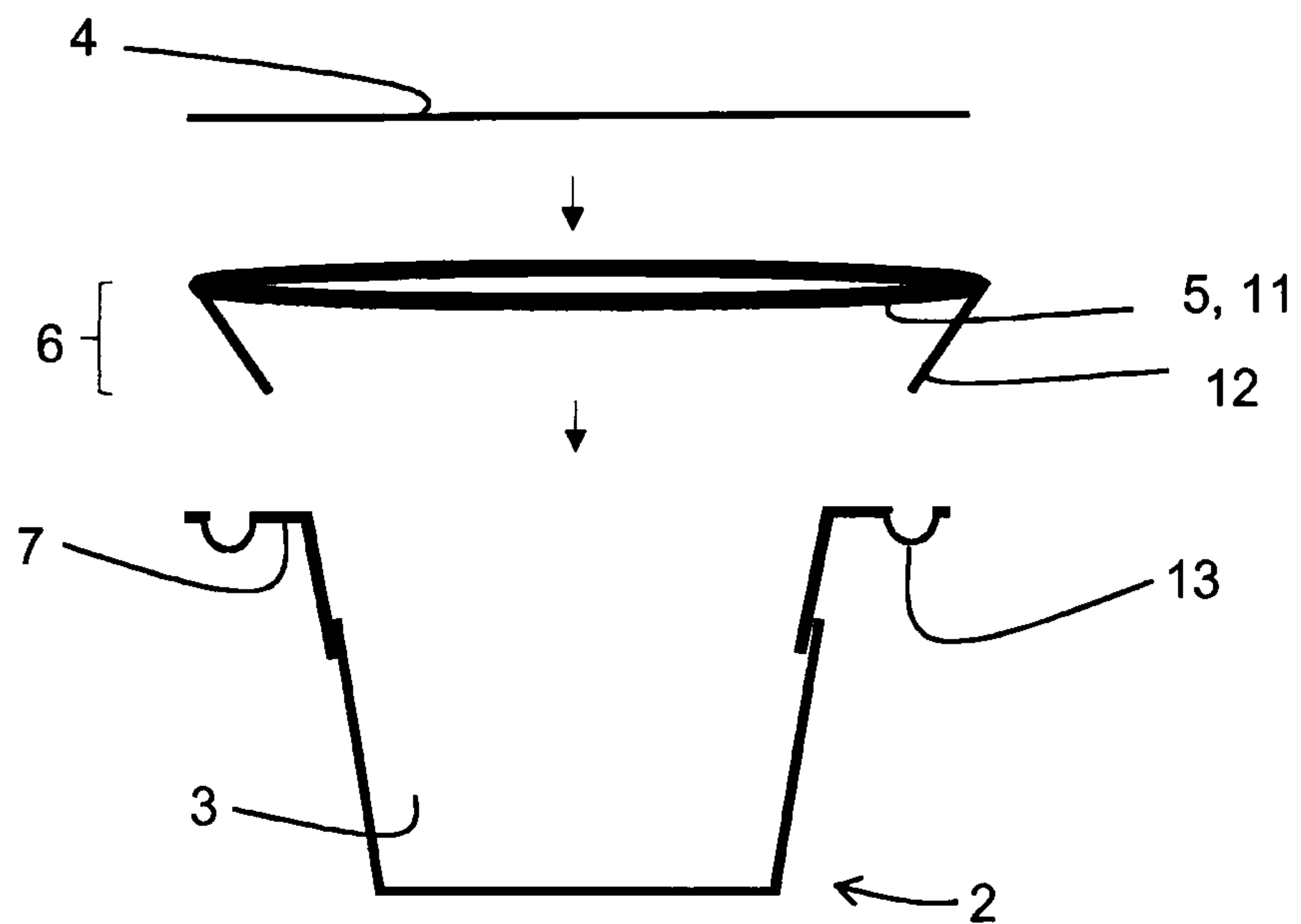


Fig. 7

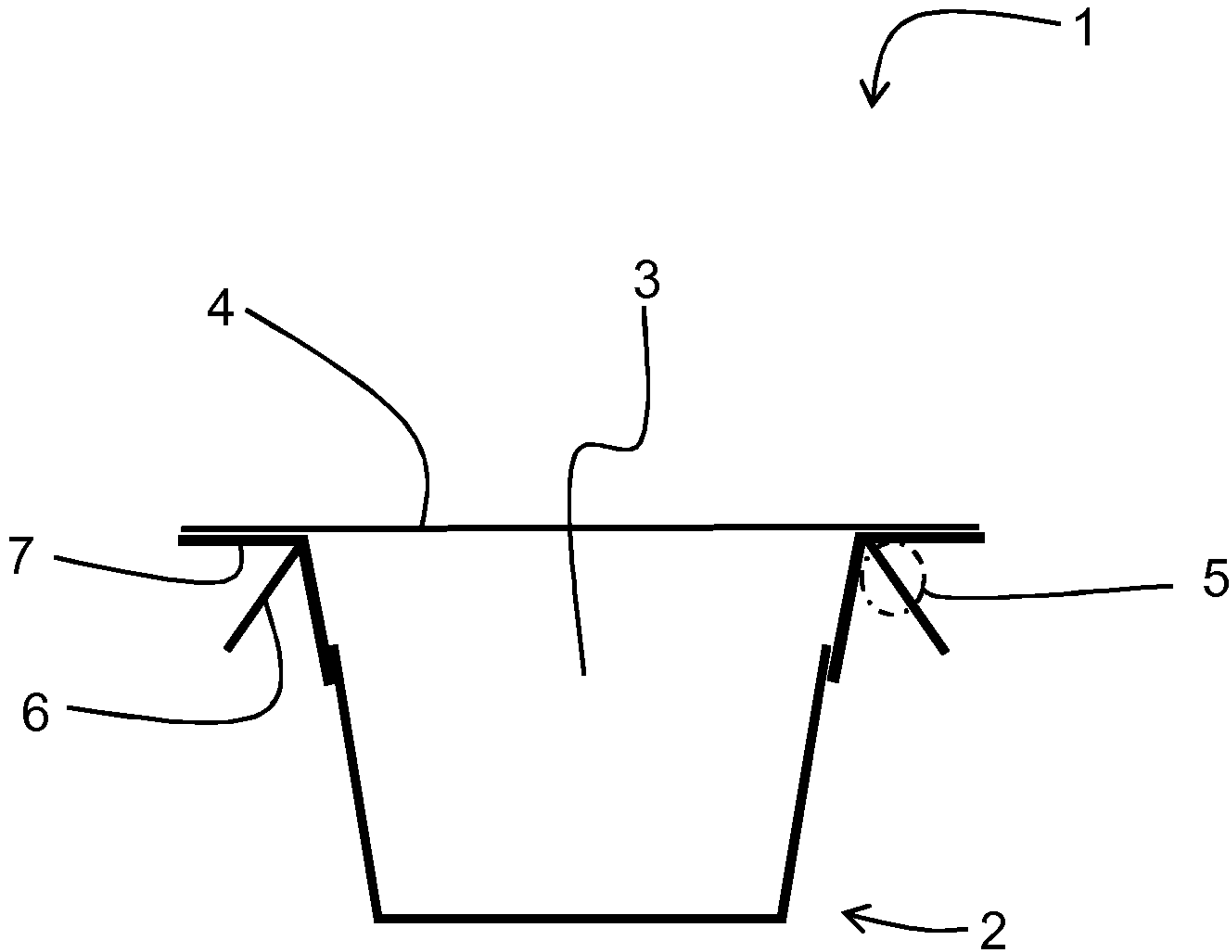


Fig. 1