

(19) **DANMARK**

(10) **DK/EP 3134331 T3**



Patent- og
Varemærkestyrelsen

(12) Oversættelse af
europæisk patentskrift

-
- (51) Int.Cl.: **B 65 D 85/804 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2018-10-22**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2018-07-11**
- (86) Europæisk ansøgning nr.: **16744555.0**
- (86) Europæisk indleveringsdag: **2016-05-13**
- (87) Den europæiske ansøgnings publiceringsdag: **2017-03-01**
- (86) International ansøgning nr.: **NL2016050343**
- (87) Internationalt publikationsnr.: **WO2016186490**
- (30) Prioritet: **2015-05-15 WO PCT/NL2015/000018**
- (84) Designerede stater: **AL 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 RS SE SI SK SM TR**
- (73) Patenthaver: **Koninklijke Douwe Egberts B.V., Vleutensevaart 35, 3532 AD Utrecht, Holland**
- (72) Opfinder: **DIJKSTRA, Hielke, c/o Vleutensevaart 35, 3532 AD Utrecht, Holland**
GROOTHORNTÉ, Arend Hendrik, c/o Vleutensevaart 35, 3532 AD Utrecht, Holland
VAN GAASBEEK, Erik Pieter, c/o Vleutensevaart 35, 3532 AD Utrecht, Holland
OTTENSCHOT, Marc Henrikus Joseph, c/o Vleutensevaart 35, 3532 AD Utrecht, Holland
Kamerbeek, Ralf, c/o Vleutensevaart 35, 3532 AD Utrecht, Holland
EIJSSACKERS, Armin Sjoerd, c/o Vleutensevaart 35, 3532 AD Utrecht, Holland
Flamand, John Henri, c/o Vleutensevaart 35, 3532 AD Utrecht, Holland
- (74) Fuldmægtig i Danmark: **NORDIC PATENT SERVICE A/S, Bredgade 30, 1260 København K, Danmark**
- (54) Benævnelse: **KAPSEL, SYSTEM TIL TILBEREDNING AF EN DRIKKELIG DRIKKEVARE UD FRA EN SÅDAN KAPSEL OG ANVENDELSE AF EN SÅDAN KAPSEL I EN DRIKKEVARETILBEREDNINGSINDRETNING**
- (56) Fremdragne publikationer:
WO-A1-2006/045536
WO-A1-2007/122206
WO-A1-2014/184652
WO-A1-2014/184653
WO-A2-2014/012779

DESCRIPTION

[0001] The invention relates to a capsule containing a substance for the preparation of a potable beverage by extracting and/or dissolving the substance by means of supplying a fluid under pressure into the capsule, wherein the capsule comprises an aluminum capsule body having a central capsule body axis, said aluminum capsule body being provided with a bottom, a side wall and an outwardly extending flange, the capsule further comprising an aluminum cover attached to the outwardly extending flange, the cover hermetically closing the capsule, wherein the capsule further comprises a sealing member at the outwardly extending flange for providing a fluid sealing contact with an enclosing member of a beverage preparation device if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of a closing member of the beverage preparation device, such as an extraction plate of the beverage preparation device, such that the outwardly extending flange of the capsule and at least a portion of the sealing member of the capsule are sealingly engaged between the enclosing member and the closing member of the beverage preparation device, wherein the enclosing member of the beverage preparation device comprises an annular element having a central annular element axis and a free contact end, said free contact end of the annular element optionally being provided with a plurality of radially extending open grooves.

[0002] The invention also relates to a system for preparing a potable beverage from a capsule using a fluid supplied under pressure into the capsule comprising:

a beverage preparation device comprising an enclosing member for receiving the capsule, wherein the enclosing member comprises fluid supply means for supplying fluid under pressure into the capsule, wherein the beverage preparation device further comprises a closing member, such as an extraction plate, for closing the enclosing member of the beverage preparation device, wherein the enclosing member of the beverage preparation device further comprises an annular element having a central annular element axis and a free contact end, said free contact end of the annular element optionally being provided with a plurality of radially extending open grooves;

a capsule containing a substance for the preparation of a potable beverage by extracting and/or dissolving the substance by means of the fluid supplied under pressure into the capsule by the fluid supply means of the beverage preparation device, wherein the capsule comprises an aluminum capsule body having a central capsule body axis, said aluminum capsule body being provided with a bottom, a side wall and an outwardly extending flange, the capsule further comprising an aluminum cover attached to the outwardly extending flange, the cover hermetically closing the capsule, wherein the capsule further comprises a sealing member at the outwardly extending flange for providing a fluid sealing contact with the enclosing member of the beverage preparation device if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of the closing member of the beverage preparation device, such that the outwardly extending flange of the capsule and at least a portion of the sealing member of the capsule are sealingly engaged

between the enclosing member and the closing member of the beverage preparation device.

[0003] Furthermore the invention relates to the use of a capsule in a beverage preparation device comprising an enclosing member for receiving the capsule, wherein the enclosing member comprises fluid supply means for supplying fluid under pressure into the capsule, wherein the beverage preparation device further comprises a closing member, such as an extraction plate, for closing the enclosing member of the beverage preparation device, wherein the enclosing member of the beverage preparation device further comprises an annular element having a central annular element axis and a free contact end, said free contact end of the annular element optionally being provided with a plurality of radially extending open grooves; wherein the capsule contains a substance for the preparation of a potable beverage by extracting and/or dissolving the substance by means of the fluid supplied under pressure into the capsule by the fluid supply means of the beverage preparation device, wherein the capsule comprises an aluminum capsule body having a central capsule body axis, said aluminum capsule body being provided with a bottom, a side wall and an outwardly extending flange, the capsule further comprising an aluminum cover attached to the outwardly extending flange, the cover hermetically closing the capsule, wherein the capsule further comprises a sealing member at the outwardly extending flange for providing a fluid sealing contact with the enclosing member of the beverage preparation device if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of the closing member of the beverage preparation device, such that the outwardly extending flange of the capsule and at least a portion of the sealing member of the capsule are sealingly engaged between the enclosing member and the closing member of the beverage preparation device.

[0004] Such a capsule, system and use are known from WO 2014/184653 or EP-B-1700548. In the known system the capsule is provided with a sealing member having the shape of a step, i.e. a sudden increase of the diameter of the side wall of the capsule, and the enclosing member of this known system has a sealing surface acting on the sealing member to provide deflection of the sealing member, the sealing surface being inclined so that the deflection of the sealing member is an inwards and downwards deformation of the step. Furthermore, in the known system the enclosing member comprises a capsule holder and a manually operated or an automatic mechanism for relative displacement of the enclosing member and the capsule holder. The manually operated or an automatic mechanism applies a force on the sealing member of the capsule when the enclosing member closes on the capsule holder. This force should ensure the fluid tight seal between the enclosing member and the capsule. Because the manually operated or an automatic mechanism is arranged to be moved relative to the base, the sealing capabilities of the system can depend on the pressure of the fluid supplied by the fluid supply means. If the pressure of the fluid increases, the force between the sealing member of the capsule and the free end of the enclosing member increases too and thereby the force between the sealing member of the capsule and the free end of the enclosing member increases also. Such a system is described further on. The sealing member of the

capsule must be arranged such that upon reaching the maximum fluid pressure in the enclosing member the sealing member should still provide a fluid sealing contact between the enclosing member and the capsule. However, the sealing member must also be arranged such that prior to, or at the start of, brewing when the pressure of the fluid in the enclosing member outside the capsule is relatively low, the sealing member also provides a fluid sealing contact between the enclosing member and the capsule. If at the start of brewing, there would not exist a fluid sealing contact between the capsule and the enclosing member, leakage will occur. However, if leakage occurs there is a real chance that the pressure in the enclosing member and outside the capsule will not sufficiently increase for increasing the force on the sealing member by means of the free end of the enclosing member if the manually operated or an automatic mechanism moves the enclosing member towards the capsule holder. Only if there is a sufficient initial sealing, the pressure in the enclosing member will increase whereby also the force of the free end of the enclosing member acting on the sealing member of the capsule will increase for providing a sufficient fluid sealing contact at also the increased fluid pressure. Moreover, this increased fluid pressure outside the capsule also provides an increased fluid pressure inside the capsule which is essential if the capsule is provided with a cover which is arranged to tear open on relief members of the capsule holder (also called an extraction plate) of the beverage preparation device under the influence of fluid pressure in the capsule.

[0005] It follows from the above that the sealing member is a member which is very critical in design. It should be able to provide a fluid sealing contact between the enclosing member and the capsule at a relatively low fluid pressure if only a relatively small force is applied on the sealing member by means of the free end of the enclosing member but it should also provide a fluid sealing contact at a much higher fluid pressure in the enclosing member outside the capsule if a higher force is applied by means of the free end of the enclosing member to the sealing member of the capsule. In particular when the free contact end of the enclosing member is provided with radially extending open grooves which act as air inlet passage once the force between the enclosing member and the capsule holder is released so that it is easier for a user to take out the capsule, the sealing member must also be able to 'close' the radially extending open grooves to provide an effective seal.

[0006] It is an object of the invention to provide an alternative sealing member which is relatively easy to manufacture, which is environmentally friendly if the capsule is disposed of after use and/or which provides a satisfactory sealing both at a relatively low fluid pressure if only a relatively small force is applied on the sealing member by means of the free end of the enclosing member (sometimes also called initial seal) and at a much higher fluid pressure if a higher force is applied (e.g. during brewing) by means of the free end of the enclosing member to the sealing member of the capsule, even in case of an enclosing member of which the free contact end is provided with radially extending open grooves.

[0007] The invention has also as an object to provide an alternative system for preparing a potable beverage from a capsule and to provide an alternative use of a capsule in a beverage preparation device.

[0008] In accordance with the invention there is provided in a first aspect a capsule containing a substance for the preparation of a potable beverage by extracting and/or dissolving the substance by means of supplying a fluid under pressure into the capsule, wherein the capsule comprises an aluminum capsule body having a central capsule body axis, said aluminum capsule body being provided with a bottom, a side wall and an outwardly extending flange, the capsule further comprising an aluminum cover attached to the outwardly extending flange, the cover hermetically closing the capsule, wherein the capsule further comprises a sealing member at the outwardly extending flange for providing a fluid sealing contact with an enclosing member of a beverage preparation device if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of a closing member of the beverage preparation device, such as an extraction plate of the beverage preparation device, such that the outwardly extending flange of the capsule and at least a portion of the sealing member of the capsule are sealingly engaged between the enclosing member and the closing member of the beverage preparation device, wherein the enclosing member of the beverage preparation device comprises an annular element having a central annular element axis and a free contact end, said free contact end of the annular element optionally being provided with a plurality of radially extending open grooves, characterized in that, at least the surface of the sealing member is machined to form a surface texture. Since the surface of the sealing member is machined to form a surface texture it is not only relatively easy to manufacture but in addition it appears to be able to provide a satisfactory sealing during use. In particular it can provide a satisfactory sealing with the free contact end provided with radially extending open grooves. In addition it is environmentally friendly if the capsule is disposed of after use.

[0009] In this application the existence of a fluid sealing contact means that 0-6%, preferably 0-4%, more preferably 0-2.5% of the total fluid supplied to the enclosing member for preparing the beverage may leak away due to leakage between the free contact end and the sealing member of the capsule.

[0010] The invention is in particular advantageous when in an embodiment of a capsule contains an extractable product as substance for the preparation of a potable beverage, said extractable product preferably being 5-20 grams, preferably 5-10 grams, more preferably 5-7 grams of roasted and ground coffee.

[0011] In an embodiment of a capsule according to the invention which is in particular easy to manufacture the outer diameter of the outwardly extending flange of the capsule is larger than the diameter of the bottom of the capsule. Preferably, the outer diameter of the outwardly extending flange is approximately 37.1 mm and the diameter of the bottom of the capsule is about 23.3 mm.

[0012] The invention is in particular advantageous when in an embodiment of a capsule the wall thickness of the aluminum capsule body is such that it is deformed easily if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of a closing member of the beverage preparation device,

preferably the thickness of the aluminum capsule body is 20 to 200 micrometer, preferably 100 micrometer.

[0013] The invention is in particular advantageous when in an embodiment of a capsule the wall thickness of the aluminum cover is 15 to 65 micrometer, preferably 30 to 45 micrometer, most preferred 39 micrometer.

[0014] In an embodiment of a capsule according to the invention the wall thickness of the aluminum cover is smaller than the wall thickness of the aluminum capsule body.

[0015] In a further embodiment of a capsule according to the invention the aluminum cover is arranged to tear open on a closing member of the beverage preparation device, such as an extraction plate of the beverage preparation device under the influence of fluid pressure in the capsule.

[0016] In an embodiment of a capsule according to the invention which is in particular easy to manufacture the side wall of the aluminum capsule body has a free end opposite the bottom, the outwardly extending flange extending from said free end of the side wall in a direction at least substantially transverse to the central capsule body axis. Preferably, the outwardly extending flange comprises a curled outer edge, which is beneficial in obtaining for a satisfactory sealing with the free contact end provided with radially extending open grooves.

[0017] The radius about the central capsule body axis of an inner edge of the curled outer edge of the outwardly extending flange is preferably at least 32 mm, so that clearance from the annular end surface of the enclosure member is ensured. It is then preferred that the sealing member is positioned between the free end of the side wall of the aluminum capsule body and an inner edge of the curled outer edge of the outwardly extending flange to obtain a still further satisfactory sealing.

[0018] To ensure that the curled outer edge does not interfere with operation of a wide variety of commercially available and future beverage preparation apparatuses, the curled outer edge of the outwardly extending flange has a largest dimension of about 1.2 millimeter.

[0019] The invention is in particular beneficial for capsules of which the inner diameter of the free end of the side wall of the aluminum capsule body is about 29.5 mm. The distance between the free end of the side wall of the aluminum capsule body and an outermost edge of the outwardly extending flange can be about 3.8 millimeter. The preferred height of the aluminum capsule body is about 28.4 mm.

[0020] In an embodiment of a capsule according to the invention which after use is easier for a user to take out of a beverage preparation device the aluminum capsule body is truncated, wherein preferably the side wall of the aluminum capsule body encloses an angle with a line transverse to the central capsule body axis of about 97.5°.

[0021] In an advantageous embodiment of a capsule according to the invention the bottom of the aluminum capsule body has a largest inner diameter of about 23.3 mm. It is preferred that the bottom of the aluminum capsule body is truncated, preferably having a bottom height of about 4.0 mm and that the bottom further has a generally flat central portion opposite the cover having a diameter of about 8.3 mm.

[0022] In practically all cases a satisfactory seal can be obtained in an embodiment of a capsule according to the invention in which the height of the sealing member is between about 0.4 mm to about 1.0 mm.

[0023] In a preferred embodiment of a capsule according to the invention the capsule comprises an inner surface, and wherein on the inner surface of at least the side wall of the capsule an inner coating is provided. In particular when the capsule is manufactured by deep drawing the inner coating facilitates the deep drawing process. In case the aluminum cover of the capsule is attached to the outwardly extending flange by means of a sealing lacquer it is then in particular advantageous when said inner coating being composed of the same material as the sealing lacquer. In dependence of the inner coating used it is preferred that the sealing member is free from an inner coating in order to prevent crumbling off of the inner coating from the sealing member.

[0024] In a further embodiment of a capsule according to the invention the capsule comprises an outer surface, wherein on the outer surface of the capsule a color lacquer is provided. In order to facilitate in deep drawing it is preferred to provide on an outer surface of the color lacquer an outer coating. Alternatively, in order to improve the sealing during use on the outer surface of the sealing member an outer coating is provided, whereas the outer surface of the sealing member is free from a color lacquer.

[0025] Although it is possible that only the surface of the sealing member is machined, from a manufacturing point of view it is easier when further the surface of the outwardly extending flange opposite the aluminum cover is machined to form a surface texture. Preferably, the surface texture of the sealing member and the surface texture of the outwardly extending flange are identical. The sealing member can thus be formed by an outwardly extending flange with a machined surface. Preferably, the lay of the surface texture is vertical, horizontal, radial, isotropic, cross-hatched or circular. Such a lay appears to be beneficial for a satisfactory sealing during use. The surface texture has a roughness R_a and the surface texture has an average waviness W_a , a total waviness W_t , and, in the lateral direction along the machined surface, a waviness spacing W_{sm} sufficient to provide a satisfactory sealing.

[0026] In a further embodiment of a capsule according to the invention the sealing member further comprises a profile in the outwardly extending flange. It has appeared that in combination with a sealing member with a machined surface the sealing can be improved when the sealing member further comprises a profile in the outwardly extending flange.

[0027] In a preferred embodiment of a capsule according to the invention the sealing member

is formed by aluminum. Please note that with aluminum also aluminum alloys are meant.

[0028] In accordance with the invention there is provided in a second aspect a system for preparing a potable beverage from a capsule using a fluid supplied under pressure into the capsule comprising:

a beverage preparation device comprising an enclosing member for receiving the capsule, wherein the enclosing member comprises fluid supply means for supplying fluid under pressure into the capsule, wherein the beverage preparation device further comprises a closing member, such as an extraction plate, for closing the enclosing member of the beverage preparation device, wherein the enclosing member of the beverage preparation device further comprises an annular element having a central annular element axis and a free contact end, said free contact end of the annular element optionally being provided with a plurality of radially extending open grooves;

a capsule containing a substance for the preparation of a potable beverage by extracting and/or dissolving the substance by means of the fluid supplied under pressure into the capsule by the fluid supply means of the beverage preparation device, wherein the capsule comprises an aluminum capsule body having a central capsule body axis, said aluminum capsule body being provided with a bottom, a side wall and an outwardly extending flange, the capsule further comprising an aluminum cover attached to the outwardly extending flange, the cover hermetically closing the capsule, wherein the capsule further comprises a sealing member at the outwardly extending flange for providing a fluid sealing contact with the enclosing member of the beverage preparation device if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of the closing member of the beverage preparation device, such that the outwardly extending flange of the capsule and at least a portion of the sealing member of the capsule are sealingly engaged between the enclosing member and the closing member of the beverage preparation device, characterized in that, at least the surface of the sealing member is machined to form a surface texture. Since the surface of the sealing member is machined to form a surface texture it is not only relatively easy to manufacture but in addition it appears to be able to provide a satisfactory sealing during use. In particular it can provide a satisfactory sealing with the free contact end provided with radially extending open grooves. In addition it is environmentally friendly if the capsule is disposed of after use.

[0029] Regarding the preferred embodiments of the system as mentioned in the dependent claims which relate to the same features as the features of the dependent claims of the capsule reference is made to the above.

[0030] Preferably the system is arranged such that, in use, during brewing, a free end of the enclosing member of the beverage preparation device exerts a force F_2 on the sealing member of the capsule to provide a fluid sealing contact between the outwardly extending flange of the capsule and the enclosing member of the beverage preparation device, wherein

F2 is in the range of 500-1500 N preferably in the range of 750-1250 N when the fluid pressure P2 in the enclosing member of the beverage preparation device outside the capsule is in the range of 6-20 bar, preferably between 12 and 18 bar. In particular the system is arranged such that, in use, prior to or at the start of brewing, a free end of the enclosing member of the beverage preparation device exerts a force F1 on the sealing member of the capsule to provide a fluid sealing contact between the outwardly extending flange of the capsule and the enclosing member of the beverage preparation device, wherein F1 is in the range of 30-150 N preferably in the range of 40-150 N, more preferably 50-100 N, when the fluid pressure P1 in the enclosing member of the beverage preparation device outside the capsule is in the range of 0.1 - 4 bar, preferably between 0.1 - 1 bar.

[0031] In an embodiment of a system according to the invention wherein the plurality of radially extending open grooves are uniformly spaced relative to each other in tangential direction of the free contact end of the annular element of the beverage preparation device so that it is easier for a user to take out the capsule while a satisfactory seal between capsule and beverage preparation device can still be provided.

[0032] In an advantageous embodiment of a system according to the invention the longest tangential width of each groove (top to top, i.e. equal to the groove to groove pitch) is 0.9 - 1.1 mm, preferably 0.95 to 1.05 mm, more preferably 0.98 to 1.02 mm, wherein a maximal height of each groove in an axial direction of the enclosing member of the beverage preparation device is 0.01 - 0.09 mm, preferably 0.03 to 0.07 mm, more preferably 0.045 to 0.055 mm, most preferred 0.05 mm and wherein the number of grooves is 90 to 110, preferably 96. The radial width of the annular end surface at the location of the grooves may for instance be 0.05-0.9 mm, preferably 0.2- 0.7 mm and more preferably 0.3 - 0.55 mm. The invention is in particular suitable when applied to an embodiment of a system according to the invention in which during use when the closing member of the beverage preparation device closes the enclosing member of the beverage preparation device at least the free contact end of the enclosing member of the beverage preparation device can move relative to the closing member of the beverage preparation device under the effect of the pressure of the fluid in the enclosing member of the beverage preparation device towards the closing member of the beverage preparation device for applying the maximum force between the flange of the capsule and the free end of the enclosing member of the beverage preparation device. The enclosing member may comprise a first part and a second part wherein the second part comprises the free contact end of the enclosing member wherein the second part can move relative to the first part between a first and second position. The second part can move from the first position towards the second position in the direction of the closing member under the influence of fluid pressure in the enclosing member. The force F1 as discussed above may be reached if the second part is in the first position with a fluid pressure P1. The force F2 as discussed above may be reached if the second part is moved towards the second position under the influence of the fluid pressure P2 in the enclosing member.

[0033] In accordance with the invention there is provided in a third aspect a use of a capsule according to the invention in a beverage preparation device comprising an enclosing member

for receiving the capsule, wherein the enclosing member comprises fluid supply means for supplying fluid under pressure into the capsule, wherein the beverage preparation device further comprises a closing member, such as an extraction plate, for closing the enclosing member of the beverage preparation device, wherein the enclosing member of the beverage preparation device further comprises an annular element having a central annular element axis and a free contact end, said free contact end of the annular element optionally being provided with a plurality of radial grooves; wherein the capsule contains a substance for the preparation of a potable beverage by extracting and/or dissolving the substance by means of the fluid supplied under pressure into the capsule by the fluid supply means of the beverage preparation device, wherein the capsule comprises an aluminum capsule body having a central capsule body axis, said aluminum capsule body being provided with a bottom, a side wall and an outwardly extending flange, the capsule further comprising an aluminum cover attached to the outwardly extending flange, the cover hermetically closing the capsule, wherein the capsule further comprises a sealing member at the outwardly extending flange for providing a fluid sealing contact with the enclosing member of the beverage preparation device if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of the closing member of the beverage preparation device, such that the outwardly extending flange of the capsule and at least a portion of the sealing member of the capsule are sealingly engaged between the enclosing member and the closing member of the beverage preparation device. Regarding the advantage of the inventive use and the preferred embodiments of the use as mentioned in the dependent claims which relate to the same features as the features of the dependent claims of the capsule or the dependent claims of the system reference is made to the above.

[0034] The invention will now be further elucidated by means of, nonlimiting, examples referring to the drawing, in which

Figs. 1 and 1A show a schematic representation of an embodiment of a system according to the invention;

Fig. 2 in a perspective view shows an embodiment of a beverage preparation device of a system according to the invention showing the free contact end of the enclosing member of the beverage preparation device with the plurality of radially extending open grooves;

Fig. 3A in cross section shows an embodiment of a capsule according to the invention before use;

Fig. 3B shows an enlarged detail of a the capsule of Fig. 3A showing the outwardly extending flange and the sealing member;

Fig. 3C shows an enlarged detail of the outwardly extending flange of the capsule in Figures 3A and 3B after use;

Fig. 4A shows a first embodiment of a sealing member at the outwardly extending flange of a capsule according to the invention;

Fig. 4B shows a second embodiment of a sealing member at the outwardly extending flange of a capsule according to the invention;

Fig. 4C shows a third embodiment of a sealing member at the outwardly extending flange of a capsule according to the invention;

Fig. 4D shows a fourth embodiment of a sealing member at the outwardly extending flange of a capsule according to the invention;

Fig. 4E shows a fifth embodiment of a sealing member at the outwardly extending flange of a capsule according to the invention;

Fig. 4F shows a sixth embodiment of a seal member at the outwardly extending flange of a capsule according to the invention; and

Fig. 4G shows a seventh embodiment of a seal member at the outwardly extending flange of a capsule according to the invention.

[0035] In the Figures and the following description, like reference numerals refer to like features.

[0036] Fig. 1 shows a schematic representation, in cross sectional view, of an embodiment of a system 1 for preparing a potable beverage from a capsule using a fluid supplied under pressure into the capsule. The system 1 comprises a capsule 2, and a beverage preparation device 4. The device 4 comprises enclosing member 6 for holding the capsule 2. The device 4 further comprises a closing member, such as an extraction plate, 8 for supporting the capsule 2.

[0037] In Fig. 1 a gap is drawn between the capsule 2, the enclosing member 6 and the extraction plate 8 for clarity. It will be appreciated that, in use, the capsule 2 may lie in contact with the enclosing member 6 and the extraction plate member 8. Commonly, the enclosing member 6 has a shape complementary to the shape of the capsule 2. The apparatus 4 further comprises a fluid supply means 10 for supplying an amount of a fluid, such as water, under a pressure in the range of 6 - 20 bar, preferably between 12 and 18 bar, to the exchangeable capsule 2.

[0038] In the example shown in Fig. 1, the exchangeable capsule 2 comprises an aluminum capsule body 12 having a central capsule body axis 12A and an aluminum cover 14. In the present context, the meaning of 'aluminum' is understood to also include aluminum alloy. In this example, the aluminum capsule body 12 comprises a side wall 16, a bottom 18 closing the side wall 16 at a first end, and a outwardly extending flange 20 extending outwardly of the circumferential wall 16 at a second end opposite the bottom 18. In the shown embodiment the surface of the outwardly extending flange 20 opposite the 14 is machined to form a surface texture. The side wall 16, the bottom 18 and the cover 14 enclose an inner space 22

comprising a substance for the preparation of a potable beverage by extracting and/or dissolving the substance. Preferably the substance is an extractable product for the preparation of a potable beverage, said extractable product preferably being 5-20 grams, preferably 5-10 grams, more preferably 5-7 grams of roasted and ground coffee for the preparation of a single beverage. The capsule is initially sealed, i.e. is hermetically closed prior to use.

[0039] The system 1 of Fig. 1 comprises bottom piercing means 24 for piercing the bottom 18 of the capsule 2 for creating at least one entrance opening 25 in the bottom 18 for supplying the fluid to the extractable product through the entrance opening 25.

[0040] The system 1 of Fig. 1 further comprises cover piercing means 26, here embodied as protrusions of the closing member 8, for piercing the cover 14 of the capsule 2. The cover piercing means 26 may be arranged to tear the cover 14 once a (fluid) pressure inside the inner space 22 exceeds a threshold pressure and presses the cover 14 against the cover piercing means 26 with sufficient force. The aluminum cover 14 thus is arranged to tear open on the closing member 8 of the beverage preparation device under the influence of fluid pressure in the capsule.

[0041] The capsule 2 further comprises a sealing member 28, in Figures 1, 3A and 3B indicated as a general box but more detailed described with regard to Figures 1A and 4, which sealing member 28 is arranged at the outwardly extending flange 20 for providing a fluid sealing contact with the enclosing member 6 if the capsule 2 is positioned in the enclosing member 6 and the enclosing member 6 is closed by means of the extraction plate 8, such that the outwardly extending flange 20 of the capsule 2 and at least a portion of the sealing member 28 are sealingly engaged between the enclosing member 6 and the extraction plate 8. According to the invention at least the surface of the sealing member 28 is machined to form a surface texture thereon. In most cases it suffices for a satisfactory sealing to be obtained during use, when the surface of the outwardly extending flange 20 opposite the cover 14 is machined and is a flat surface which extends transversely to the central axis 12A from the side wall 16 to the curled edge 43. In this case the outwardly extending flange 20 forms the sealing member. In the embodiments described with reference to Figure 4 the sealing member 28 further comprises a profile in the outwardly extending flange 20, which thus means that the surface of this profile is also machined. In the shown embodiments the lay of the surface texture is vertical, horizontal, radial, isotropic, cross-hatched or circular, the surface texture has a roughness R_a , and the surface texture has an average waviness W_a , a total waviness W_t , and, in the lateral direction along the machined surface, a waviness spacing W_{sm} sufficient to provide a satisfactory sealing. This means that a fluid sealing contact between the sealing member and the free contact end is established.

[0042] As shown in Figure 2 the enclosing member 6 of the beverage preparation device comprises an annular element 41 having a central annular element axis 41A and a free contact end 30. The free contact end 30 of the annular element 41 is provided with a plurality of radially extending open grooves 40. The plurality of radially extending open grooves 40 are

uniformly spaced relative to each other in tangential direction of the free contact end 30 of the annular element 41. The longest tangential width of each groove 40 is 0.9 - 1.1 mm, preferably 0.95 to 1.05 mm, more preferably 0.98 to 1.02 mm, wherein a maximal height of each groove 40 in an axial direction of the enclosing member 6 is 0.01 - 0.09 mm, preferably 0.03 to 0.07 mm, more preferably 0.045 to 0.055 mm, and most preferred 0.05 mm. The number of grooves 40 lies in the range of 90 to 110, preferably 96. Usually, the radial width of the free end at the location of the grooves is 0.05 - 0.9 mm, more specifically 0.2 - 0.7 mm, more specifically 0.3 - 0.55 mm.

[0043] An embodiment of a capsule according to the invention is shown more detailed in Figures 3A and 3B. In the shown embodiment the outer diameter ODF of the outwardly extending flange 20 is larger than the diameter DB of the bottom 18 of the capsule 2. In the shown embodiment the outer diameter ODF of the outwardly extending flange 20 is approximately 37.1 mm and the diameter DB of the bottom 18 is about 23.3 mm. The wall thickness of the aluminum capsule body 12 is 100 micrometer, but in other embodiments the wall thickness can be 20 to 200 micrometer.

[0044] In the shown embodiment the wall thickness of the aluminum cover 14 is 39 micrometer, although in other embodiments the thickness can be 15 to 65 micrometer, and is preferably smaller than the thickness of the aluminum capsule body 12.

[0045] The side wall 16 of the aluminum capsule body 12 has a free end 42 opposite the bottom 18. The inner diameter IDF of the free end 42 of the side wall 16 of the aluminum capsule body 12 is about 29.5 mm. The outwardly extending flange 20 extends from that free end 42 in a direction at least substantially transverse to the central capsule body axis 12A. The outwardly extending flange 20 comprises a curled outer edge 43 which is beneficial for obtaining a seal between the capsule and the enclosing member. In the shown embodiment the curled outer edge 43 of the outwardly extending flange 20 has a largest dimension of about 1.2 millimeter. The distance DIF between the free end 42 of the side wall 16 of the aluminum capsule body 12 and an inner edge 43A of the curled outer edge 43 is about 2.7 mm, while the distance DOF between the free end 42 of the side wall 16 of the aluminum capsule body 12 and an outermost edge 43B of the outwardly extending flange 20 is about 3.8 millimeter. The radius about the central capsule body axis of the inner edge 43A of the curled outer edge 43 is preferably at least 32 mm.

[0046] As shown in Figures 3A and 3B the sealing member 28 is positioned between the free end of the side wall 16 of the aluminum capsule body 12 and the inner edge 43A of the curled outer edge 42 of the outwardly extending flange. The sealing member 28 is indicated as a general box, but will be described in more detail below. Irrespective of the embodiment of the sealing member 28 the height of the sealing member is between about 0.4 mm to about 1.0 mm for providing a correct seal.

[0047] As can be seen from Figure 3A the aluminum capsule body 12 is truncated. In the embodiment shown, the side wall 16 of the aluminum capsule body 12 encloses an angle A

with a line transverse to the central capsule body axis 12A of about 97.5° . The bottom 18 of the aluminum capsule body 12 has a largest inner diameter DB of about 23.3 mm. The bottom 18 of the aluminum capsule body 12 is also truncated, and in the shown embodiment has a bottom height BH of about 4.0 mm. The bottom 18 further has a generally flat central portion 18A opposite the cover 14, which generally flat central portion 18A has a diameter DEE of about 8.3 mm and in which generally flat central portion 18A the entrance opening 25 may be made. The entrance openings may also be made in the truncated portion between the central portion 18A and the side wall 16. The total height TH of the aluminum capsule body 12 of the capsule is about 28.4 mm.

[0048] The system 1 shown in Fig. 1 is operated as follows for preparing a cup of potable coffee, wherein the substance is roasted and ground coffee.

[0049] The capsule 2 is placed in the enclosing member 6. The extraction plate 8 is brought into contact with the capsule 2. The bottom piercing means 24 pierce the bottom 18 of the capsule 2 for creating the entrance openings 25. The fluid, here hot water under pressure, is supplied to the extractable product in the inner space 22 through the entrance openings 25. The water will wet the coffee grounds and extract the desired substances to form the coffee beverage.

[0050] During supplying the water under pressure to the inner space 22, the pressure inside the capsule 2 will rise. The rise in pressure will cause the cover 14 to deform and be pressed against the lid piercing means 26 of the extraction plate. Once the pressure reaches a certain level, the tear strength of the cover 14 will be surpassed and the cover 14 will rupture against the lid piercing means 26, creating exit openings. The prepared coffee will drain from the capsule 2 through the exit openings and outlets 32 (see Fig. 1) of the extraction plate 8, and may be supplied to a container such as a cup (not shown).

[0051] The system 1 is arranged such that prior to or at the start of brewing, the free end 30 of the enclosing member 6 exerts a force F1 on the sealing member 28 of the capsule 2 to provide a fluid sealing contact between the outwardly extending flange 20 of the capsule 2 and the enclosing member 6 of the beverage preparation device, wherein F1 is in the range of 30-150 N preferably 40-150 N, more preferably 50-100 N, when the fluid pressure P1 in the enclosing member of the beverage preparation device outside the capsule is in the range of 0.1-4 bar, preferably 0.1-1 bar. During brewing, the free end 30 of the enclosing member 6 exerts a force F2 on the sealing member 28 of the capsule 2 to provide a fluid sealing contact between the outwardly extending flange 20 of the capsule 2 and the enclosing member 6, wherein the force F2 is in the range of 500 -1500 N, preferably in the range of 750-1250 N, when the fluid pressure P2 in the enclosing member 6 of the beverage preparation device outside the capsule 2 is in the range of 6-20 bar, preferably between 12 and 18 bar. In the shown embodiment the free contact end of enclosing member 6 can move relative to the extracting plate 8 under the effect of the pressure of the fluid in the enclosing member 6 device towards the extraction plate 8 for applying the maximum force F2 between the outwardly extending flange 20 and the free end 30 of the enclosing member 6. This movement can take

place during use, i.e. in particular at the start of brewing and during brewing. The enclosing member 6 has a first part 6A and a second part 6B wherein the second part comprises the free contact end 30. The second part 6B can move relative to the first part 6A between a first and second position. The second part 6B can move from the first position towards the second position in the direction of the closing member 8 under the influence of fluid pressure in the enclosing member 6. The force F1 as discussed above may be reached if the second part 6B is in the first position with a fluid pressure P1. The force F2 as discussed above may be reached if the second part 6B is moved towards the second position under the influence of the fluid pressure P2 in the enclosing member 6.

[0052] As a result of the force applied the sealing member 28 of the capsule according to the invention undergoes a plastic deformation and closely conforms to the grooves 40 of the free contact end 30 and thus provides a fluid sealing contact between the enclosing member 6 and the capsule 3 at a relatively low fluid pressure during start up of brewing but also provides a fluid sealing contact at the much higher fluid pressure in the enclosing member outside the capsule during brewing. This close conformation to the grooves 40 of the enclosing member is indicated in Figure 3C which shows the capsule 2 of the invention after use, and which clearly indicates that the outwardly extending flange 20 comprises deformations 40' which conform to the grooves 40 of the enclosing member.

[0053] Now exemplary embodiments of a sealing member 28 with a machined surface and additionally comprising a profile in the outwardly extending flange 20 of the capsule 2 according to the invention will be described in more detail with regard to Figs. 1A and 4.

[0054] In Fig. 1A the outwardly extending flange is flat and has a highly textured surface. This flat outwardly extending flange 20 forms the sealing member.

[0055] Fig. 4A shows a first embodiment of a sealing member 28 forming an additional bearing at the outwardly extending flange 20 of a capsule 2 according to the invention. The sealing member 28 and the remainder of the capsule body are made of the same material. The sealing member 28 comprises two spaced projections 50 and 51, each projecting from the outwardly extending flange 20. A plateau 52 is present between the two projections 50 and 51. The distance between the two projections 50 and 51 is such that the free contact end of the annular element 6 is enclosed by the two projections 50 and 51 if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of a closing member of the beverage preparation device. In the embodiment shown in Figure 4A the plateau is positioned at a distance above the portion of the outwardly extending flange 20 between the sealing member 28 and the curled edge 43 and is substantially flat. The distance between the two projections 50 and 51 is further such that the free contact end of the annular element is contacted by the two projections 50 and 52 if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of a closing member of the beverage preparation device. Further, the two spaced projections 50, 51 and the plateau 52 are arranged such that the free contact end of the annular element is contacted by the plateau if the capsule is

positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of a closing member of the beverage preparation device. As can be seen in Figure 4A each projection 50, 51 comprises a projection side wall which is inclined with regard to the outwardly extending flange 20 of the aluminum capsule body.

[0056] Fig. 4B shows a second embodiment of a sealing member 28 at the outwardly extending flange 20 of a capsule according to the invention. When compared with Figure 4A the following differences are noted. Each projection 50, 51 now comprises projection side wall which is transverse with regard to the outwardly extending flange 20 of the aluminum capsule body. Further, in this second embodiment the plateau 52 is curved, preferably conforming to the shape of the free contact end of the annular element 6.

[0057] Fig. 4C shows a third embodiment of a sealing member 28 at the outwardly extending flange 20 of a capsule according to the invention, which together with the side wall 16 of the aluminum capsule body, forms an additional bearing for the enclosing member. The shown sealing member 28 comprises a projection 53 projecting from the outwardly extending flange 20 and an inclined, substantially flat plateau 52 between the top of the projection 53 and the side wall 16 of the aluminum capsule body. In this embodiment the bearing is formed by the projection 53, the plateau 52 and the side wall 16 of the aluminum capsule body. The distance between the top of the projection 53 and the side wall 16 is such that the free contact end of the annular element 6 is enclosed by the projection 53 and the side wall 16 of the aluminum capsule body if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of a closing member of the beverage preparation device. In particular the distance between the projection 53 and the side wall 16 of the aluminum capsule body is such that the free contact end of the annular element 6 is contacted by the projection 53 and the side wall 16 and in the shown embodiment also the plateau 52 of the aluminum capsule body if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of a closing member of the beverage preparation device.

[0058] Fig. 4D shows a fourth embodiment of a sealing member 28 at the outwardly extending flange 20 of a capsule according to the invention, which together with the side wall 16 of the aluminum capsule body, forms an additional bearing for the enclosing member. When compared with Figure 4C the following differences are noted. In this fourth embodiment the plateau 52 is curved, and comprises a curved portion and also a flat portion which is situated at the same level as the portion of the outwardly extending flange 20 between the projection 53 and the curved edge 43. The curved portion preferably conforms to the shape of the free contact end of the annular element 6. Fig. 4E shows a fifth embodiment of a sealing member 28 at the outwardly extending flange 20 of a capsule according to the invention, which together with the side wall 16 of the aluminum capsule body forms a bearing for the enclosing member. When compared with Figure 4D the following difference is noted. In this fifth embodiment the flat portion of the plateau 52 is situated at a distance above the portion of the outwardly extending flange 20 between the projection 53 and the curved edge 43.

[0059] In the embodiments shown in Figures 4C to 4E the projection 53 comprises an outer projection side wall 54 which is transverse to the portion of the outwardly extending flange between the projection 53 and the curled edge 43, but in other embodiments this outer projection side wall 54 can be inclined with regard to said portion of the outwardly extending flange 20.

[0060] In all the embodiments shown in Figures 4A to 4E each of the projections comprises a projection top. At least one projection but preferably all projections forming the additional bearing is/are configured such that its projection top exerts a radial force on the free contact end of the annular element 6 if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of a closing member of the beverage preparation device. Said radial force is exerted uniformly as a result of the sealing member being made of aluminum sponge.

[0061] Fig. 4F shows a sixth embodiment of a seal member 28 at the outwardly extending flange 20 of a capsule according to the invention. When compared with e.g. Figure 4B the following differences are noted. In this sixth embodiment the plateau 52 is V-shaped, with the bottom of the V-shaped being at the same level as the portion of the outwardly extending flange 20 between the outer projection 51 and the curled edge 43. In this manner no bearing for the free contact end of the annular member 6 is formed, but the projection top of the inner projection 50 exerts a radial force direct outwardly on the free contact end of the annular element 6 and the projection top of the outer projection 51 exerts a radial force direct inwardly on the free contact end of the annular element 6 if the capsule is positioned in the enclosing member of the beverage preparation device and the enclosing member is closed by means of a closing member of the beverage preparation device. In this manner the free contact end is squeezed by the sealing member 28 thereby providing a satisfactory seal.

[0062] In Fig. 4G a seventh embodiment of a sealing member 28 is shown being a crushable projection, optionally having a top surface with a reduced wall thickness wherein the outer surface is textured.

[0063] In the foregoing specification, the invention has been described with reference to specific examples of embodiments of the invention. It will, however, be evident that various modifications and changes may be made therein without departing from the scope of the invention as set forth in the appended claims.

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO2014184653A [0004]
- EP1700548B [0004]

PATENTKRAV

1. Kapsel (2), der indeholder en substans til tilberedning af en drikkelig drikkevare ved ekstrahering og/eller opløsning af substansen ved hjælp af tilførsel af en væske under tryk ind i
5 kapslen (2), hvor kapslen (2) omfatter en aluminiumkapselkrop (12) med en central kapselkropakse (12A), hvilken aluminiumkapselkrop (12) er forsynet med en bund (18), en sidevæg (16) og en flange (20), som strækker sig udad, idet kapslen (2) endvidere omfatter et aluminiumdæksel (14), der er fastgjort til flangen (20), som strækker sig udad, idet dækslet (14) lukker kapslen (2) hermetisk, hvor kapslen (2) endvidere omfatter et forseglingsselement (28)
10 ved flangen (20), som strækker sig udad, til tilvejebringelse af en væskeforseglingsskontakt med et indkapslingsselement (6) i en drikkevaretilberedningsindretning, hvis kapslen (2) placeres i indkapslingsselementet (6) i drikkevaretilberedningsindretningen, og indkapslingsselementet (6) lukkes ved hjælp af et tillukningsselement (8) i drikkevaretilberedningsindretningen, såsom en ekstraktionsplade i drikkevaretilberedningsindretningen, således at kapslens (2) flange (20),
15 som strækker sig udad, og mindst en del af kapslens (2) forseglingsselement (28) er i forseglende indgreb mellem indkapslingsselementet (6) og tillukningsselementet (8) i drikkevaretilberedningsindretningen, hvor indkapslingsselementet (6) i drikkevaretilberedningsindretningen omfatter et ringformet element (41) med en central ringformet element-akse (41A) og en fri kontaktende (30), hvilken frie kontaktende (30) i det
20 ringformede element (41) valgfrit er forsynet med en flerhed af åbne riller (40), der strækker sig radialt udad, **kendetegnet ved, at** mindst forseglingsselementets (28) overflade er bearbejdet til dannelse af en overfladetekstur.
2. Kapsel (2) ifølge krav 1, hvor overfladen af flangen (20), som strækker sig udad,
25 modsat aluminiumdækslet (14) endvidere er bearbejdet til dannelse af en overfladetekstur.
3. Kapsel (2) ifølge krav 2, hvor overfladeteksturen for forseglingsselementet (28) og overfladeteksturen for flangen (20), som strækker sig udad, er identiske.
- 30 4. Kapsel (2) ifølge et hvilket som helst af de foregående krav, hvor lægningen af overfladeteksturen er vertikal, horisontal, radial, isotropisk, dobbeltskraveret eller cirkulær.
5. Kapsel (2) ifølge et hvilket som helst af de foregående krav, hvor overfladeteksturen har en ruhed R_a , som er tilstrækkelig til at tilvejebringe en tilfredsstillende forsegling.

6. Kapsel (2) ifølge et hvilket som helst af de foregående krav, hvor overfladeteksturen har en gennemsnitlig krusethed W_a , en total krusethed W_t og, i lateral retning langs den bearbejdede overflade, en krusethedsafstand W_{sm} , som er tilstrækkelig til at tilvejebringe en tilfredsstillende forsegling.
7. Kapsel (2) ifølge et hvilket som helst af de foregående krav, hvor forseglingselementet (28) er deformerbart, således at lejevæsken forsegkende er i kontakt med mindst en del af den frie kontaktende (30) i det ringformede element (41), hvis den frie kontaktende (30) i det ringformede element (41) under brygning udøver en kraft F_2 på kapslens (2) forseglingselement (28), hvor F_2 er i intervallet 500-1500 N, fortrinsvis i intervallet 750-1250 N, når væsketrykket P_2 i indkapslingselementet (6) uden for kapslen (2) er i intervallet 6-20 bar, fortrinsvis mellem 12 og 18 bar.
8. Kapsel (2) ifølge et hvilket som helst af de foregående krav, hvor forseglingselementet (28) er deformerbart, således at lejevæsken forsegkende er i kontakt med mindst en del af den frie kontaktende (30) i det ringformede element (41), hvis den frie kontaktende (30) i det ringformede element (41) i brug, inden eller ved påbegyndelsen af brygning udøver en kraft F_1 på kapslens (2) forseglingselement (28), hvor kraften F_1 er i intervallet 30-150 N, fortrinsvis 40-150 N og mere fortrinsvis 50-100 N, når væsketrykket P_1 i indkapslingselementet (6) i drikkevaretilberedningsindretningen uden for kapslen (2) er i intervallet 0,1-4 bar, fortrinsvis 0,1-1 bar.
9. System til tilberedning af en drikkelig drikkevare ud fra en kapsel (2) under anvendelse af en væske, der under tryk tilføres kapslen (2), hvilket system omfatter:
en drikkevaretilberedningsindretning, der omfatter et indkapslingselement (6) til modtagelse af kapslen (2), hvor indkapslingselementet (6) omfatter væsketilførselsmidler (10) til tilførsel af væske under tryk ind i kapslen (2), hvor drikkevaretilberedningsindretningen endvidere omfatter et tillukningselement (8), såsom en ekstraktionsplade, til tillukning af indkapslingselementet (6) i drikkevaretilberedningsindretningen, hvor indkapslingselementet (6) i drikkevaretilberedningsindretningen endvidere omfatter et ringformet element (41) med en central ringformet element-akse (41A) og en fri kontaktende (30), hvilken frie kontaktende (30) i det ringformede element (41) valgfrit er forsynet med en flerhed af åbne riller (40), der strækker sig radialt udad;

en kapsel (2), der indeholder en substans til tilberedning af en drikkelig drikkevare ved ekstrahering og/eller opløsning af substansen ved hjælp af den væske, som under tryk tilføres kapslen (2) ved hjælp af væsketilførselsmidlerne (10) i drikkevaretilberedningsindretningen, hvor kapslen (2) omfatter en aluminiumkapselkrop (12) med en central kapselkropakse (12A), hvilken

5 aluminiumkapselkrop (12) er forsynet med en bund (18), en sidevæg (16) og en flange (20), som strækker sig udad, idet kapslen (2) endvidere omfatter et aluminiumdæksel (14), der er fastgjort til flangen (20), som strækker sig udad, idet dækslet (14) lukker kapslen (2) hermetisk, hvor kapslen (2) endvidere omfatter et forseglingselement (28) ved flangen (20), som strækker sig udad, til tilvejebringelse af en væskeforseglingsskontakt med indkapslingselementet (6) i

10 drikkevaretilberedningsindretningen, hvis kapslen (2) placeres i indkapslingselementet (6) i drikkevaretilberedningsindretningen, og indkapslingselementet (6) lukkes ved hjælp af tillukningselementet (8) i drikkevaretilberedningsindretningen, således at kapslens (2) flange (20), som strækker sig udad, og mindst en del af kapslens (2) forseglingselement (28) er i forseglende indgreb mellem indkapslingselementet (6) og tillukningselementet (8) i

15 drikkevaretilberedningsindretningen, **kendetegnet ved, at** mindst forseglingselementets (28) overflade er bearbejdet til dannelse af en overfladetekstur.

10. System ifølge krav 9, hvor kapslen (2) er en kapsel (2) ifølge et hvilket som helst af kravene 2-8.

20

11. System ifølge krav 9 eller 10, hvor systemet er ordnet således, at en fri ende (30) af indkapslingselementet (6) i drikkevaretilberedningsindretningen i brug under brygning udøver en kraft F2 på kapslens (2) forseglingselement (28) til tilvejebringelse af en væskeforseglingsskontakt mellem kapslens (2) flange (20), som strækker sig udad, og

25 indkapslingselementet (6) i drikkevaretilberedningsindretningen, hvor F2 er i intervallet 500-1500 N, fortrinsvis i intervallet 750-1250 N, når væsketrykket P2 i indkapslingselementet (6) i drikkevaretilberedningsindretningen uden for kapslen (2) er i intervallet 6-20 bar, fortrinsvis mellem 12 og 18 bar.

30 12. System ifølge et hvilket som helst af kravene 9 til 11, hvor systemet er ordnet således, at en fri ende (30) af indkapslingselementet (6) i drikkevaretilberedningsindretningen i brug, inden eller ved påbegyndelsen af brygning udøver en kraft F1 på kapslens (2) forseglingselement (28) til tilvejebringelse af en væskeforseglingsskontakt mellem kapslens (2) flange (20), som strækker sig udad, og indkapslingselementet (6) i drikkevaretilberedningsindretningen, hvor F1 er i intervallet

30-150 N, fortrinsvis 40-150 N, mere fortrinsvis 50-100 N, når væsketrykket P1 i indkapslingselementet (6) i drikkevaretilberedningsindretningen uden for kapslen (2) er i intervallet 0,1-4 bar, fortrinsvis 0,1-1 bar.

- 5 13. System ifølge et hvilket som helst af kravene 9 til 12, hvor mindst den frie kontaktende (30) af indkapslingselementet (6) i drikkevaretilberedningsindretningen i brug, når tillukningselementet (8) i drikkevaretilberedningsindretningen lukker indkapslingselementet (6) i drikkevaretilberedningsindretningen, kan bevæge sig i forhold til tillukningselementet (8) i drikkevaretilberedningsindretningen under virkningen af trykket af væsken i
- 10 indkapslingselementet (6) i drikkevaretilberedningsindretningen hen imod tillukningselementet (8) i drikkevaretilberedningsindretningen til påføring af den maksimale kraft mellem kapslens (2) flange (20) og den frie ende (30) af indkapslingselementet (6) i drikkevaretilberedningsindretningen, hvor indkapslingselementet (6) valgfrit omfatter en første del (6A) og en anden del (6B), hvor den anden del (6B) omfatter den frie kontaktende (30) af
- 15 indkapslingselementet (6), hvor den anden del (6B) kan bevæge sig i forhold til den første del (6A) mellem en første og anden position, hvor den anden del (6B) kan bevæge sig fra den første position hen imod den anden position i retning af tillukningselementet (8) under påvirkning af væsketryk i indkapslingselementet (6), hvor kraften F1 ifølge krav 12 valgfrit nås, hvis den anden del (6B) er i den første position med et væsketryk P1 i indkapslingselementet (6) som
- 20 angivet i krav 12, og hvor kraften F2 ifølge krav 11 valgfrit nås, hvis den anden del (6B) bevæges hen imod den anden position under påvirkning af væsketrykket P2 i indkapslingselementet (6) som angivet i krav 11.

14. System ifølge et hvilket som helst af kravene 9 til 13, hvor væsketilførselsmidlerne
- 25 (10) er ordnet med henblik på at tilføre en strøm af væske i intervallet 0,5-2 ml/s, og hvor den væskeforseglingsskontakt, der tilvejebringes af forseglingselementet (28), giver en lækageprocentdel på mindre end 4 %, fortrinsvis mindre end 2,5 % af strømmen.

15. Anvendelse af en kapsel (2) ifølge et hvilket som helst af kravene 1 til 8 i en
- 30 drikkevaretilberedningsindretning, der omfatter et indkapslingselement (6) til modtagelse af kapslen (2), hvor indkapslingselementet (6) omfatter væsketilførselsmidler (10) til tilførsel af væske under tryk ind i kapslen (2), hvor drikkevaretilberedningsindretningen endvidere omfatter et tillukningselement (8), såsom en ekstraktionsplade, til tillukning af indkapslingselementet (6) i drikkevaretilberedningsindretningen, hvor

indkapslingselementet (6) i drikkevaretilberedningsindretningen endvidere omfatter et ringformet element (41) med en central ringformet element-akse (41A) og en fri kontaktende (30), hvilken frie kontaktende (30) i det ringformede element (41) valgfrit er forsynet med en flæthed af radiale riller (40); hvor kapslen (2) indeholder en substans til

5 tilberedning af en drikkelig drikkevare ved ekstrahering og/eller opløsning af substansen ved hjælp af den væske, som under tryk tilføres kapslen (2) ved hjælp af væsketilførselsmidlerne (10) i drikkevaretilberedningsindretningen, hvor kapslen (2) omfatter en aluminiumkapsel (2)-krop med en central kapsel (2)-kropakse, hvilken aluminiumkapsel (2)-krop er forsynet med en bund (18), en sidevæg (16) og en flange (20),

10 som strækker sig udad, idet kapslen (2) endvidere omfatter et aluminiumdæksel (14), der er fastgjort til flangen (20), som strækker sig udad, idet dækslet (14) lukker kapslen (2) hermetisk, hvor kapslen (2) endvidere omfatter et forseglingselement (28) ved flangen (20), som strækker sig udad, til tilvejebringelse af en væskeforseglingsskontakt med indkapslingselementet (6) i drikkevaretilberedningsindretningen, hvis kapslen (2) placeres i

15 indkapslingselementet (6) i drikkevaretilberedningsindretningen, og indkapslingselementet (6) lukkes ved hjælp af tillukningselementet (8) i drikkevaretilberedningsindretningen, således at kapslens (2) flange (20), som strækker sig udad, og mindst en del af kapslens (2) forseglingselement (28) er i forseglende indgreb mellem indkapslingselementet (6) og tillukningselementet (8) i drikkevaretilberedningsindretningen.

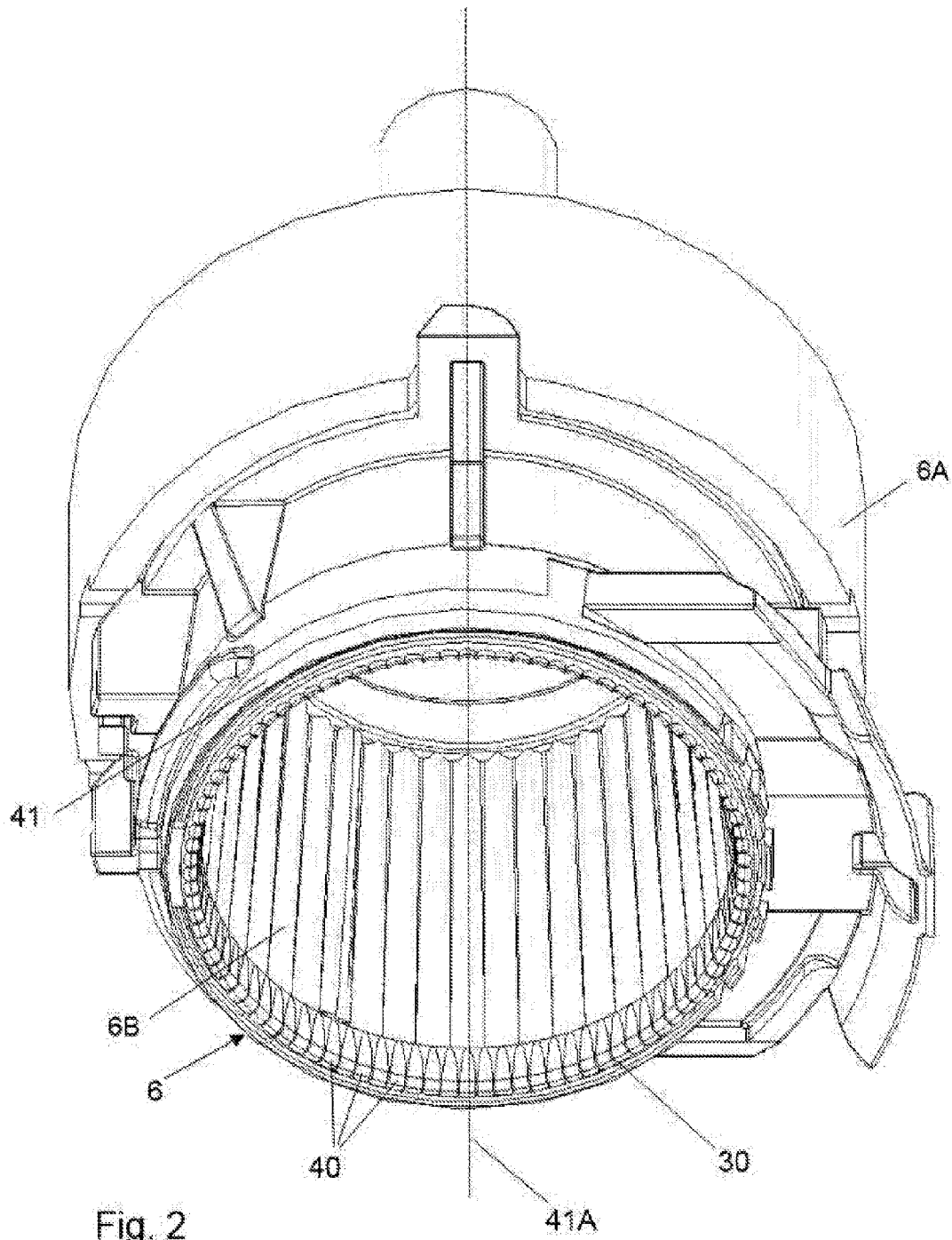
20

16. Anvendelse ifølge krav 15, hvor en fri ende (30) af indkapslingselementet (6) i drikkevaretilberedningsindretningen i brug, under brygning udøver en kraft F2 på kapslens (2) forseglingselement (28) til tilvejebringelse af en væskeforseglingsskontakt mellem kapslens (2) flange (20), som strækker sig udad, og indkapslingselementet (6) i

25 drikkevaretilberedningsindretningen, hvor F2 er i intervallet 500-1500 N, fortrinsvis i intervallet 750-1250 N, når væsketrykket P2 i indkapslingselementet (6) i drikkevaretilberedningsindretningen uden for kapslen (2) er i intervallet 6-20 bar, fortrinsvis mellem 12 og 18 bar, og hvor der forekommer væskeforseglingsskontakt.

30 17. Anvendelse ifølge krav 15 eller 16, hvor en fri ende (30) af indkapslingselementet (6) i drikkevaretilberedningsindretningen i brug, inden eller ved påbegyndelsen af brygning udøver en kraft F1 på kapslens (2) forseglingselement (28) til tilvejebringelse af en væskeforseglingsskontakt mellem kapslens (2) flange (20), som strækker sig udad, og indkapslingselementet (6) i drikkevaretilberedningsindretningen, hvor F1 er i intervallet 30-

150 N, fortrinsvis 40-150 N, mere fortrinsvis 50-100 N, når væsketrykket P1 i indkapslingselementet (6) i drikkevaretilberedningsindretningen uden for kapslen (2) er i intervallet 0,1-4 bar, fortrinsvis 0,1-1 bar, og hvor der forekommer væskeforseglingskontakt.



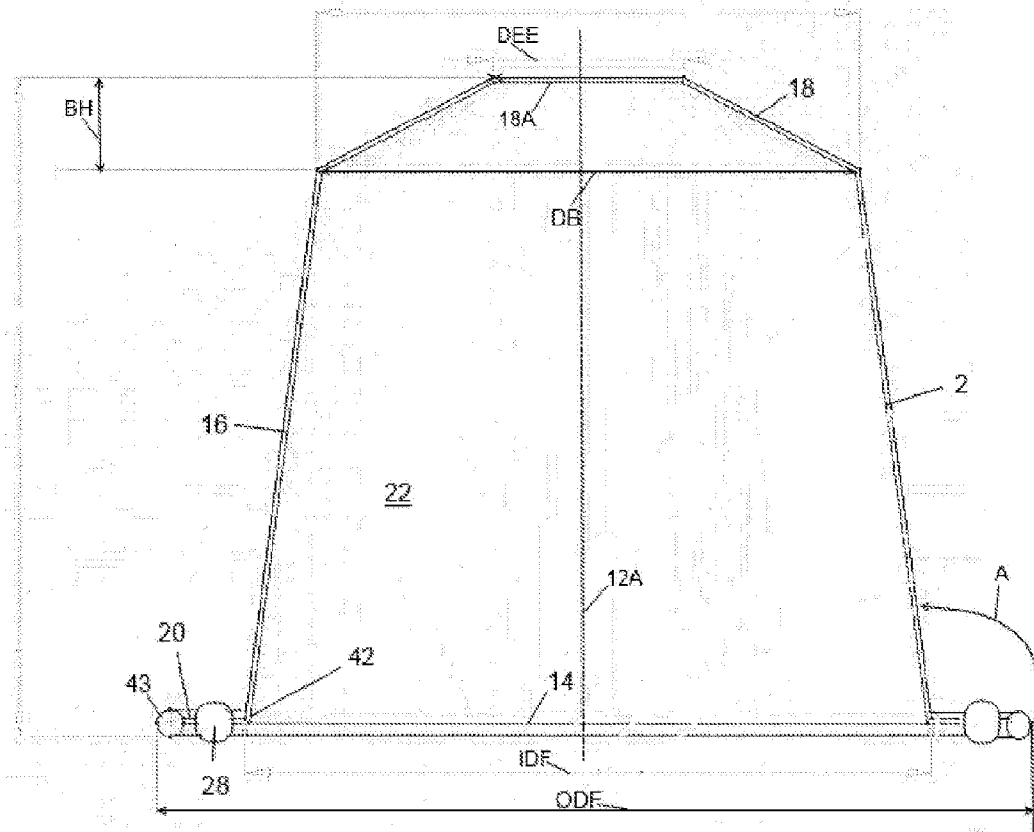


Fig. 3A

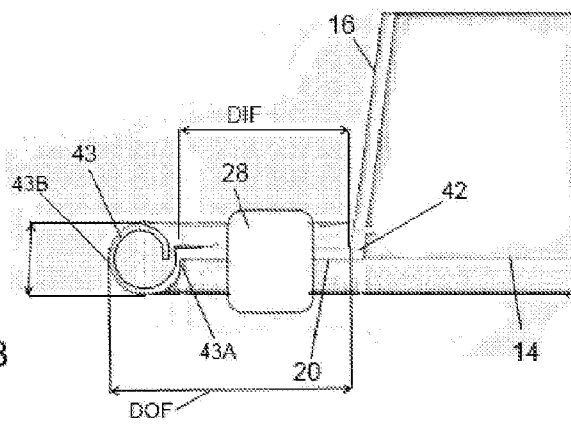


Fig. 3B

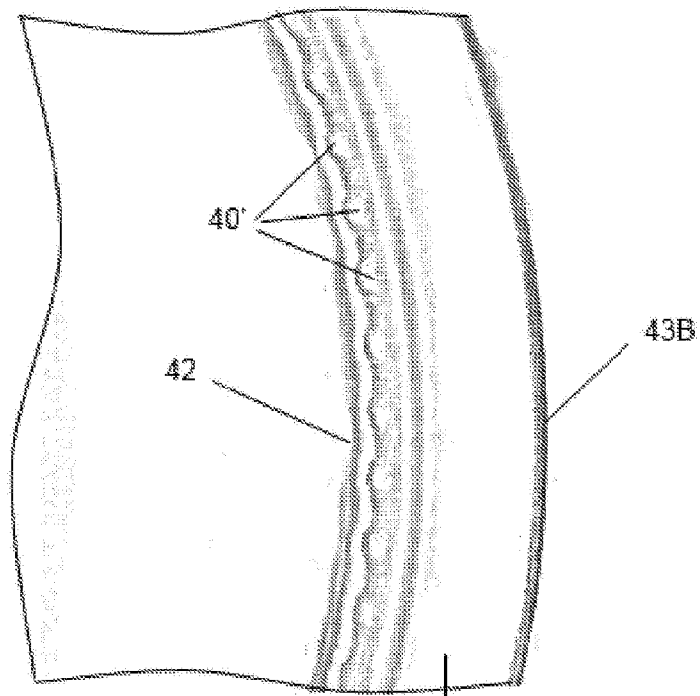


Fig. 3C

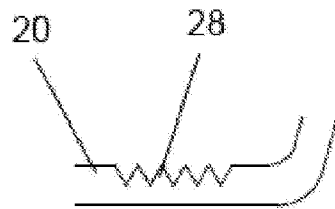


Fig. 1A

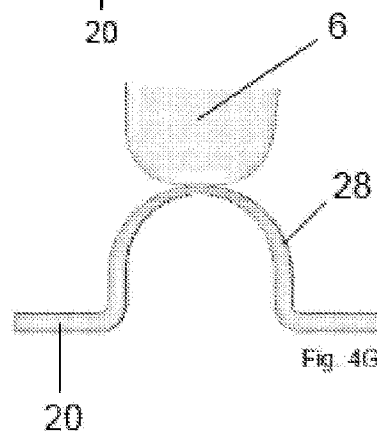


Fig. 4G

