Preferably the identification member is coded by modulating a surface structure of a face of the capsule, e.g. by providing holes or recesses in an identification face of the capsule.

The identification face of the capsule can be covered by a displaceable, deformable or puncturable membrane such as a plastic layer, an aluminium layer or a laminate of plastic-aluminium. The cover thus is designed to be selectively perforated from outside or deformed at portions overlapping the recessions or holes. On the other hand, the cover can resist at least a certain penetration or deformation by being supported at regions which are not overlapping recessions or holes.

Alternatively also the cover member can remain unchanged, but the identification member will be manipulated (e.g. displaced) in order to transfer the capsule from the indetification-cover state to the identification-reading state.

In a preferred embodiment, the identification member can be formed in the front of a lid of the capsule which is associated to a cup-shaped body of the capsule to demarcate a cavity containing beverage forming ingredients.

The identification member can be formed as an integral part of the lid. For instance, the lid can be made of a moulded plastic onto which the identification means are moulded.

For limiting the space required for the detection system, the plurality of predetermined localized contact receivers

is arranged on the front of the lid in a non-linear pattern. For instance, the receivers can be grouped in a substantially polygonal, star-shaped or curved pattern or a non-regular substantially closed pattern covering the surface of the lid.

The invention also relates to a beverage production system comprising a beverage production machine designed for producing a beverage from ingredients containing the capsule, as well as a capsule as defined above.

A further aspect of the present invention relates to a beverage production machine designed for use with a beverage ingredient containing capsule. The beverage production machine is equipped with means for physically contacting a capsule in order to read information thereof. Further on, the beverage production machine is provided with control means which are functionally connected with the means and are designed to control operation parameters of the beverage production machine in response to the read information. The contact means preferably comprise at least one displaceable probe which mechanically contacts the capsule, wherein the control means are initially arranged with the at least one probe to detect an identification information in relation to the degree of displacement of the probe in response of its contact with the capsule.

More particularly, the at least one displaceable probe is resiliably positioned at a distance of a circuitry of the control means and is selectively moved into contact with said circuitry depending on its contact with the capsule wherein the contact of the probe and circuitry constitutes a predetermined binary coded state (0 or 1) and the non-

contact of the probe and circuitry constitutes the other binary coded state.

In order to significantly reduce the size of the identification system, the identification member can be associated to a printed circuitry. The printed circuitry can be of a width of a few millimeters only and inserted in a small space of the machine adjacent the housing of the capsule. For instance, thickness of the printed circuitry is of 0.5 to 3 mm.

The printed circuitry comprises for instance, a plurality of printed circuits which are selectively closed or opened by a plurality of the probes to provide the coded state.

The at least one probe is preferably coupled or is at least part of a resilient support member and is associated to the circuitry for both providing the elasticity to the probe to enable its return into a non-contact position and the insulation of the circuitry from the humidity coming from the capsule.

The resilient support member can be, for instance, an elastomeric, preferably silicone member.

The probes can further be formed of pins which have a base embedded or inserted in a seat of the support member.

The control means can be designed to control, in response to the read information, a beverage production temperature such as for example the temperature of a liquid supplied to the interior of the capsule.

The beverage production machine can be designed to produce tea, coffee and/or other beverages.

The contacting means can comprise a plurality of movable pins forming a predetermined pattern which mechanically selectively contact the predetermined localized surface receivers of the capsule.

The control means can be designed to detect the identification information via the degree of displacement of the pin against the capsule.

The displacement of the pin can be made such that it selectively opens an associated contact of a circuitry of the control means.

The at least one pin is preferably electrically isolated from control means circuitry.

A further aspect of the present invention relates to a method for controlling the operation of a beverage production machine designed for producing a beverage from a beverage-ingredient containing capsule.

The method comprises the step of physically contacting the capsule by probe means of a beverage production machine in order to read identification information from a dedicated identification member of the capsule. In a further step, operation parameters of the beverage production machine are set in response to the read identification information.

Further advantages, features and objects of the present invention shall now be explained with reference to the figures of the enclosed drawing.

Figure 1 shows a schematic overview of a system according to the present invention designed for reading identification information from a beverage ingredient containing capsule.

Figure 2 shows a front view of a capsule according to the present invention.

Figure 3 shows a detailed view of the interaction part between probe means of the beverage production machine and identification member of the capsule.

Figure 4 shows elements of the interaction between the probe means and the capsule, i.e. the view of figure 3.

Figure 5 shows a printed circuit board which can associated with the probe means.

Generally it is an aspect of the present invention that a beverage production machine 11 is designed to produce a beverage from a capsule 1 positioned at a dedicated beverage production position of the beverage production machine 11. As shown in figure 1 the capsule has a dedicated compartment for containing beverage ingredients 5.

A liquid 3, controlled by a control unit 10 of the beverage production machine 11, is made to enter the capsule 1 in order to interact with the ingredients 5 contained therein. The result of the interaction, i.e. a produced beverage or liquid comestible, can then be obtained (reference 4) from the beverage production machine 11.

Typical examples for the nature of the interaction between the liquid 3 and the ingredients 5 is brewing, mixing, extracting, dissolving etc. Different types of ingredients can be present in the beverage compartment and different types of interactions can take place in the capsule.

The system as shown in figure 1 is provided with means for retrieving ("reading") identification data from the capsule 1 in order to transfer the read identification data to the control unit 10, such that the control unit 10 can control the operation of a following production cycle of the beverage production machine 11 depending on the content of the read identification data.

The identification data can refer to parameters of the capsule and/or the ingredients.

According to one aspect of the invention the identification information can be read from the capsule 1 in a non-optical manner, as the optical reading e.g. using a bar code has the disadvantages of having a negative impact on the aesthetic impression of the outer appearance of the capsule and of being prone to failure due to the legibility of the bar code in the environment of the beverage production process.

The capsule 1 according to the present invention is provided with an identification member 6 which carries, in a coded manner, identification information. Preferably the information is coded in a digital manner.

Preferably the information is coded by a modulation of the surface structure of a face of the capsule 1. E.g. a hole or a recession can represent one logical sate (e.g. "0"), while

another surface state ("no recession" or "no hole") can represent the other logical state (e.g. "1").

Replacing the bar code by a surface modulation which can then be detected in a non-optical manner (or even in an optical manner) enhances the reliability of the information reading from the capsule.

Preferably the identification member 6 is arranged at the capsule 1 such that it is not exposed to and usually not visible from outside. To this regard a cover 7 can be provided for the identification member 6. The cover 7 serves for aesthetic and/or protective purposes with regard to the identification member 6.

(As a side remark, such cover 7 is also useful in combination with a bar code and a visual reading of information.)

The cover 7 and the identification member 6 are part of the capsule and arranged such that at the beginning the identification member is in a protected state. Probe means of the beverage production machine can then manipulate the system cover means/identification member such that the system cover means/identification member is transferred from a covered state to an identification reading state in which the probe means can read visually or through mechanical contact the information encoded in the identification member. The manipulation can take place with regard to the identification member and/or the cover means.

Preferably the cover 7 is only carrying out the complete covering function as long as no detection process has been carried out. Along with the detection process, as will be

explained later on, the cover 7 can be e.g. at least partially removed, displaced, deformed or perforated.

Alternatively the cover 7, during the information reading process, is deflected in order to follow the surface contours of the identification member arranged below the cover. To this regard an flexible cover 7 can be foreseen which can be deflected from outside in order to read the surface structure of the identification member 6 arranged below the cover 7.

The beverage production machine 11 is provided with probe means 8 which are designed to read the information coded by modulating the surface structure of the identification member 6.

Preferably such detection is carried out by means of a physical mechanical contact or an electric contact, although as surface modulation can also be read optically.

To this regard the probe means 8 can preferably present a plurality of displaceable pins 17, which during the information reading process are biased against the identification member 6 of the capsule 1.

Depending on the specific shape of the surface structure of the identification member 6 at the contact area between a pin 17 in the identification member 6, a pin 17 will thus be allowed to protrude more or less towards the capsule 1.
In case the information is coded in digital manner by the surface structure of the identification member 6, correspondingly also there will be a digital encoding of the displacement positions of the pins 17, i.e. there will only

be a more protruding and a less protruding position for the pins 17.

This relative displacement of the pins 17 is converted into electrical signals by a detection unit 9. The thus generated electrical detection signals can then be processed by the control unit 10.

The detection unit 9 thus is designed to convert a mechanically read information into electronic signals.

The control unit 10 will then set, as a function of the read identification data from the capsule, parameters of the beverage production process, such as for example (non-exhaustive list) the flow rate and temperature of the supplied liquid 3 as well as the interaction time etc..

Figure 2 shows a top view of the capsule 1. According to the embodiment shown in figure 2 the surface structure of the identification member is modulated by providing selectively a plurality of holes 12. Having a hole 12 at a predefined position represents one logical state, while not having the hole at the same position would represent respectively another digitally coded state.

Figure 3 illustrates the conversion of the mechanical reading of the digitally coded information of the identification member of the capsule 1 into electric signals.

As can be seen in figure 3, a pin 17 is isolated from an electronic circuitry board 15 by means of a resilient and electrically isolating material layer 14, such as e.g. silicone. The layer 14 will thus provide the necessary

biasing force in order to slightly press the pin 17 towards the capsule and eventually perforate or deform any cover provided on top of the identification member of the capsule.

The rear end of each pin 17 has an enlarged section 21 which is embedded in a protruding section 22 of the layer 14. Each pin 17 can be provided with a flange 23 which flushed with the top surface 24 of the protruding section 21 of the layer 14.

In the state shown in figure 3 the two depicted pins 17 are respectively protruding into holes 12 of the identification member and have perforated the cover 7. Thus these two pins 17 are not pushed rearwards are thus not activating electrical micro-switches 25 designed to selectively produce electrical short circuits of dedicated portions of a printed circuit board 15. Further details of the PCB 15 will be explained with reference to figure 5.

Each pin 17 can be inserted in a recess of the elastic layer 14 such as by press-fitting or overmoulding. The pins are preferably more rigid than the support layer 14. The pins can be made of metal or hard plastic. The pins and layer 14 can also be made by co-injection of a rubber elastic material of different hardness.

In case due to the surface structure of the identification member the pin 17 is not allowed to further protrude into the surface structure of the identification member 3, it will thus be slightly pushed rewards (to the left inside figure 3) thus pushing silicone material to activate (i.e. transfer in the conducting state) a electrically conducting micro switch 25 towards the printed circuit board 15. To this regard the face of the silicone material facing the

printed circuit board 15 can be coated with an electrically conducting layer which can selectively produce a defined short circuit on the printed circuit board 15, the defined short circuit corresponding to closing a switch.

Figure 5 shows more details of the printed circuit board 15. The reference numeral 20 designates those areas which can be selectively short-circuited.

Thus the displacement of the pin 17 can selectively activate (close or open) a switch on the electronic circuitry 15.

In figure 4 the isolation and biasing member 14 preferably made from a resilient material such as for example silicone is further illustrated.

The invention thus allows setting operation parameters individually for each beverage production cycle upon reading of information from the capsule from which the beverage or liquid comestible shall be produced.

The beverage production system of the invention, in particular, the displaceable probe can utilize also capsules having a visible identification member (i.e., without a protective membrane).

Claims:

1. A beverage ingredient capsule,
the capsule (1) being provided with an identification member (6) designed for being physically contacted from outside characterized in that the identification member (6) is covered by a deformable, displaceable, removeable and/or puncturable cover (7).

2. A beverage ingredient capsule,
the capsule (1) being provided with an identification member (6) designed for being contacted from outside characterized in that the identification member (6) is covered by a cover (7), wherein the cover and/or the identification member can be transferred from a covered state to an identification information reading state.

3. The capsule (1) according to claim 1 or 2,
wherein the identification member (6) is designed for representing information upon mechanical contact from outside.

4. The capsule (1) according to any of the preceding claims,
wherein the identification member (6) is not exposed to the exterior before being physically contacted.

5. The capsule (1) according to claim 4,
wherein the cover (7) is designed to be penetrated or deformed by probe means (8) from an associated beverage production machine (11).

6. The capsule according to claim 5, wherein the cover is made of an aluminium and/or plastic membrane or foil to be perforated or deformed to match the surface structure of the identification member.

7. The capsule (1)according to any of the preceding claims, wherein the identification member (6) comprises a plurality of predetermined localized contact receivers (12), each of them constituting a choice amongst two different surface levels that correspond upon a contact being established or not with an external probe member, to a predetermined binary coded state (0 or 1).

8. The capsule (1) according to claim 7, wherein first contact receivers are holes or recesses of a same depth whereas second contact receivers are holes or recesses of shorter depth or, alternatively, are filled or slightly in relief.

9. The capsule (1) according to claim 7, wherein first contact receivers are protruding elements of same height whereas second contact receivers are protruding elements of greater height.

10. The capsule according to any of claims 7 to 9, wherein the identification member (6) is formed in the front of a lid of the capsule which is associated to a cup-shaped body of the capsule to demarcate a cavity containing beverage forming ingredients.

11. The capsule according to claim 10, wherein the identification member (6) is formed as an integral part of the lid.

12. The capsule according to claim 11, wherein the lid is integrally made of moulded plastic.

13. The capsule according to any one of claims 7 to 12, wherein the plurality of predetermined localized contact receivers is arranged on the front of the lid in a non-linear pattern.

14. A beverage production system comprising beverage ingredient containing capsules (1) comprising an identification member (6) and a beverage production machine for receiving said capsules; said machine comprising
- means (8) for physically contacting a capsule (1) in order to read information thereof, and
- control means (10), functionally connected to the contacting means (8) and designed to control the operation of the beverage production machine (11) in response to the read information
characterized in that the contact means (8) comprise at least one displaceable probe which mechanically contacts the capsule (1), wherein the control means (10) are initially arranged with the at least one probe to detect an identification information in relation to the degree of displacement of the probe in response of its contact with the capsule (1).

15. The system according to claim 14, wherein the at least one displaceable probe is resiliably positioned at a distance of a circuitry of the control means and is selectively moved into contact with said circuitry depending on its contact with the capsule wherein the contact of the probe and circuitry constitutes a predetermined binary coded state (0 or 1) and the non-

contact of the probe and circuitry constitutes the other binary coded state.

16. The system according to claim 14 or 15, wherein the identification member is associated to a printed circuitry.

17. The system according to claims 14 to 16, wherein the at least one probe is coupled or part of a resilient support member (14) and is associated to a circuitry.

18. The system of claim 17, wherein the resilient support member is an elastomeric, preferably silicone member.

19. The system of claim 18, wherein the probes are formed of pins which have a base embedded or inserted in a seat of the support member.

20. The system of any one of claims 14 to 19, wherein the contacting means comprise a plurality of identical displaceable pins for contacting a plurality of predetermined localized contact receivers (12) of the capsule.

21. The system of any one of claims 15 to 20, wherein the identification member (6) of the capsule is covered by a deformable and/or puncturable cover (7).

22. The system of any one of claims 15 to 21, wherein the identification member (16) comprises a plurality of predetermined localized contact receivers (12), each of them constituting a choice amongst two

different surface levels that correspond upon a sufficient contact being established or not with the probes of the machine, to a predetermined binary coded state (0 or 1).

23. The system of claim 22,
wherein the plurality of predetermined localized contact receivers are placed along a non-linear pattern of a wall of the capsule.

24. The machine according to any one of claims 14 to 23, wherein the control means (10) are designed to control a beverage production temperature and/ or a brewing pause time in response to the read information.

25. The machine according to any one of claims 14 or 24, which the control means are designed to vary water temperature parameters, flow rate and/or brewing pause time in the brewing of different brewed tea beverages according to capsules containing leaf tea ingredients having different characteristics and/or origins.

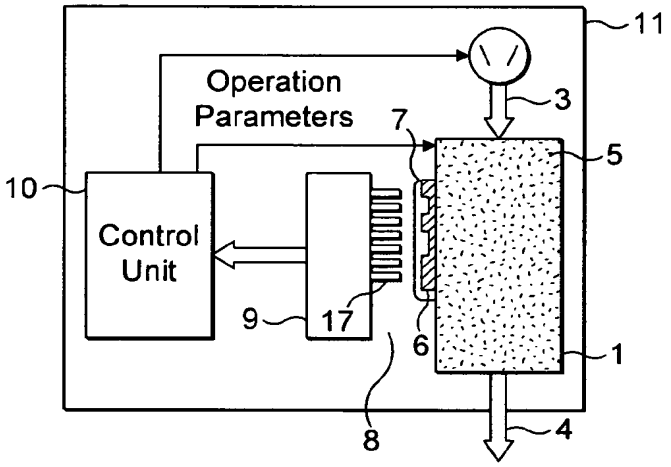


FIG. 1

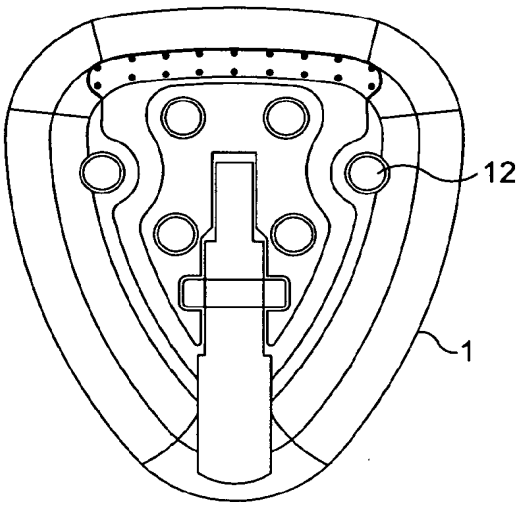


FIG. 2

K-FEE SYSTEM GMBH, EX2009, page 1121
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

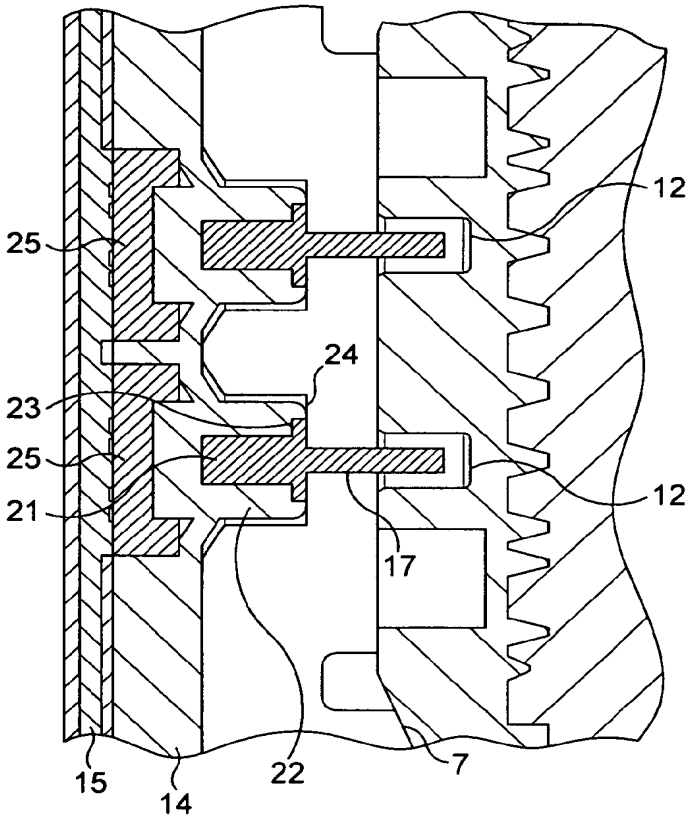


FIG. 3

K-FEE SYSTEM GMBH, EX2009, page 1122
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

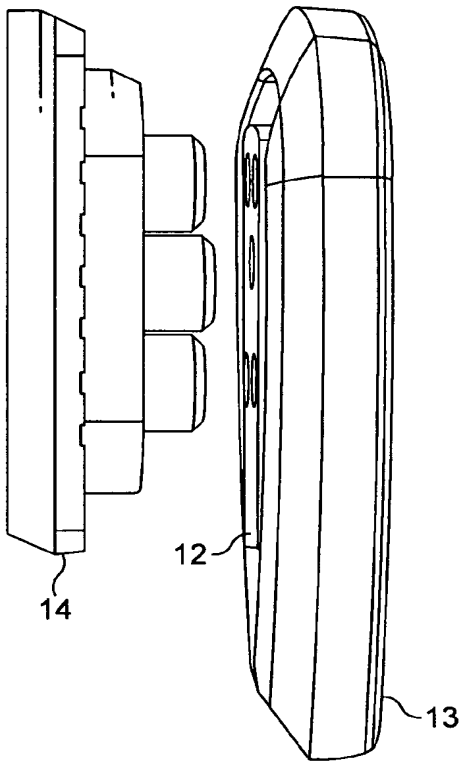


FIG. 4

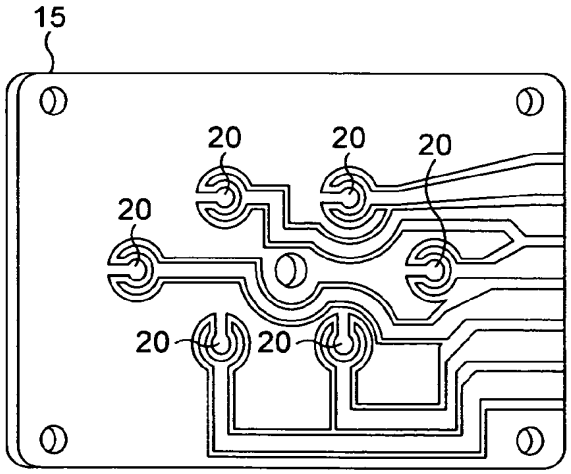


FIG. 5

K-FEE SYSTEM GMBH, EX2009, page 1123
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13697297
Filing Date	2012-11-09
First Named Inventor	Jarisch et al.
Art Unit	1792
Examiner Name	L. Long
Attorney Docket Number	3712036-01693

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2001328663	JP		2001-11-27	DAIWA CAN CO LTD		☐
	2	2001250161	JP		2001-09-14	SANDEN CORP		☐
	3	2001203232	JP		2001-07-27	TANAKA ELECTRONICS IND CO LTD		☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13697297
	Filing Date	2012-11-09
	First Named Inventor	Jarisch et al.
	Art Unit	1792
	Examiner Name	L. Long
	Attorney Docket Number	3712036-01693

	4	2000079046	JP		2000-03-21	SUSHITARO KK		☐
	5	2004276964	JP		2004-10-07	DAINIPPON PRINTING CO LTD		☐
	6	2756921	JP		1996-03-26	KURAZUSHI KK		☐
	7	2399404	GB		2004-09-15	THE BOC GROUP		☐
	8	2259078	GB		1993-03-03	ALL-ROUND CONSULTING		☐
	9	2022050	GB		1979-12-12	DAVIS R A		☐
	10	2010026053	WO		2010-03-11	NESTEC .A.		☐
	11							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Potter et al, "Barcode" Einfuhrung und Anwendungen; 1993	☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13697297
	Filing Date	2012-11-09
	First Named Inventor	Jarisch et al.
	Art Unit	1792
	Examiner Name	L. Long
	Attorney Docket Number	3712036-01693

	2	ISO/IEC "Information technology - Automatic identification and data capture techniques - Bar code verifier conformance specification - ISO/IEC 15426-1:2006(E)	☐
	3	Rosenbaum "Das Barcod-Lexikon"Olas Schlierf Satz, Grafic & DTP: 1997	☐
	4	Fairley, "Codes and Coding Technology" LCGS, FIP3 and FLOM3; Published 2015	☐
	5	Rosenbaum "Bar-code" Verlag Tachnik, Theorie, Lexikon, Software; Berlin 2000	☐
	6	English Translation JPH01233688A	☐
	7	Wikipedia "Binarcode"	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

K-FEE SYSTEM GMBH, EX2009, page 1126
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13697297
Filing Date	2012-11-09
First Named Inventor	Jarisch et al.
Art Unit	1792
Examiner Name	L. Long
Attorney Docket Number	3712036-01693

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Aaron J. Morrow/	Date (YYYY-MM-DD)	2019-07-19
Name/Print	Aaron J. Morrow	Registration Number	55,819

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

K-FEE SYSTEM GMBH, EX2009, page 1127
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

K-FEE SYSTEM GMBH, EX2009, page 1128
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13697297
Filing Date	2012-11-09
First Named Inventor	Jarisch et al.
Art Unit	1792
Examiner Name	L. Long
Attorney Docket Number	3712036-01693

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7673558		2010-03-09	Panesar et al.	
	2	7614524		2009-11-10	Girad et al.	
	3	7607385		2009-10-27	Halliday et al.	
	4	7461584		2008-12-09	Blanc et al.	
	5	7258061		2007-08-21	Campbell et al.	
	6	6985119		2006-01-10	Forster et al.	
	7	6820535		2004-11-23	Fischer	
	8	6655260		2003-12-02	Lazaris et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13697297
	Filing Date	2012-11-09
	First Named Inventor	Jarisch et al.
	Art Unit	1792
	Examiner Name	L. Long
	Attorney Docket Number	3712036-01693

	9	6253820		2001-07-03	Landan et al.	
	10	6155322		2000-12-05	Landan et al.	
	11	6117471		2000-09-12	King	
	12	5974950		1999-11-02	King	
	13	5520278		1996-05-28	Hughes	
	14	5392102		1995-02-21	Toyoizumi et al.	
	15	5273392		1993-12-28	Bernad, II et al.	
	16	5260556		1993-11-09	Lake et al.	
	17	5094153		1992-03-10	Helbling	
	18	2603927		1952-07-22	Grey	
	19	2451195		1948-10-12	Brown	

K-FEE SYSTEM GMBH, EX2009, page 1130
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13697297
Filing Date	2012-11-09
First Named Inventor	Jarisch et al.
Art Unit	1792
Examiner Name	L. Long
Attorney Docket Number	3712036-01693

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20100071562		2010-03-25	Brezovnik et al.	
	2	20100000960		2010-01-07	Anderson	
	3	20090205747		2009-08-20	Lillard JR.	
	4	20080309495		2008-12-18	Chrisholm	
	5	20080302251		2008-12-11	Rijskamp et al.	
	6	20080105130		2008-05-08	Koeling et al.	
	7	20080081089		2008-04-03	Blanc	
	8	20080068178		2008-03-20	Meyer	
	9	20070245901		2007-10-25	Blanc et al.	

K-FEE SYSTEM GMBH, EX2009, page 1131
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13697297
	Filing Date	2012-11-09
	First Named Inventor	Jarisch et al.
	Art Unit	1792
	Examiner Name	L. Long
	Attorney Docket Number	3712036-01693

	10	20070209524		2007-09-13	Kim	
	11	20060239742		2006-10-26	Bateman et al.	
	12	20050249052		2005-11-10	Benedetti et al.	
	13	20050150391		2005-07-14	Schifferle	
	14	20050029287		2005-02-10	Mobbs	
	15	20050022674		2005-02-03	Campbell et al.	
	16	20040191372		2004-09-30	Halliday et al.	
	17	20040129145		2004-09-30	Halliday et al.	
	18	20030001016		2003-01-02	Fraier	

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]

K-FEE SYSTEM GMBH, EX2009, page 1132
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13697297
	Filing Date	2012-11-09
	First Named Inventor	Jarisch et al.
	Art Unit	1792
	Examiner Name	L. Long
	Attorney Docket Number	3712036-01693

	1	2159167	WO		2010-03-03	Cense d'Almez S.A.		☐
	2	2128802	EP		2008-05-29	FREUDENBERG CARL KG		☐
	3	1950150	EP		2010-03-03	NESTEC S.A.		☐
	4	1944264	EP		2010-04-21	MDS GLOBAL HOLDING LTD.		☐
	5	1890271	EP		2008-02-20	GRIMAC S.r.l.		☐
	6	1781151	EP		2012-01-18	SARA LEE		☐
	7	1764015	EP		2007-03-21	GRIMAC S.R.L.		☐
	8	1637457	EP		2011-09-14	DAI NIPPON PRINTING CO., LTD.		☐
	9	1593329	EP		2004-05-04	DATALOGIC S.P.A.		☐
	10	1586534	EP		2005-10-19	MDS GLOBAL HOLDING LTD.		☐
	11	1440644	EP		2006-04-12	KRAFT FOODS R&D, INC.		☐

K-FEE SYSTEM GMBH, EX2009, page 1133
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13697297
	Filing Date	2012-11-09
	First Named Inventor	Jarisch et al.
	Art Unit	1792
	Examiner Name	L. Long
	Attorney Docket Number	3712036-01693

	12	1440638	EP		2004-07-28	KRAFT FODS R&D INC.		☐
	13	0868295	EP		1999-07-07	LAINE		☐
	14	0765821	EP		2000-02-09	TATSUYA		☐
	15	0638486	EP		1996-10-23	KRAFT JACONS SUCHARD LTD.		☐
	16	0455337	EP		1991-11-06	KRAFT GENERAL FOODS LIMITED		☐
	17	0449533	EP		1991-10-02	KRAFT GENERAL FOODS LIMITED		☐
	18	0339807	EP		1989-11-02	MB GROUP		☐
	19	8612623	DE		1986-08-28	PONTECH GESELLSCHAFT FUER TECHNOLOGISCHE ENTWICK		☐
	20	4421910	DE		1996-01-04	KAPPNER HELMUT DIPL ING		☐
	21	2938096	CN		2007-08-22	TENG HAORAN		☐
	22	2625310	CA		2008-09-29	TCHIBO GMBH		☐

K-FEE SYSTEM GMBH, EX2009, page 1134
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13697297
	Filing Date	2012-11-09
	First Named Inventor	Jarisch et al.
	Art Unit	1792
	Examiner Name	L. Long
	Attorney Docket Number	3712036-01693

	23	2259078	GB		1993-03-03	ALL-REOUND CONSULTING		☐
	24	2022050	GB		1979-12-12	RAYMOND ARTHUE DAVIS		☐
	25	2912124	FR		2008-08-08	CIE MEDITERRANEENNE DES CAFES		☐
	26	2528485	EP		2015-07-01	NESTEC S.A.		☐
	27	2525691	EP		2014-04-16	NESTEC S.A.		☐
	28	2512956	EP		2014-11-12	K FEE SYSTEM		☐
	29	2011060292	WO		2011-05-19	GENERATION I.D.E.A. LLC		☐
	30	2493357	EP		2015-09-02	RIVERA ADRIAN		☐
	31	2470430	EP		2014-07-30	KORTHAUER, MANFRED		☐
	32	2427066	EP		2012-11-21	NESTEC S.A.		☐
	33	2384133	EP		2013-03-27	NESTEC S.A.		☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13697297
	Filing Date	2012-11-09
	First Named Inventor	Jarisch et al.
	Art Unit	1792
	Examiner Name	L. Long
	Attorney Docket Number	3712036-01693

	34	2349176	EP		2016-03-23	MANREC PTY. LTD.		☐
	35	2341804	EP		2012-10-17	VITAL PRODUCTS B.V.		☐
	36	2299851	EP		2018-08-22	NESTEC S.A.		☐
	37	2005079638	WO		2005-09-01	KRAFT DOOS R & D, INC.		☐
	38	2005063091	WO		2005-07-14	KONINKLIJKE PHILIPS ELECTRONICS N.V.		☐
	39	2004065258	WO		2004-08-05	KRAFT FOODS R&D, INC.		☐
	40	8804262	WO		1988-06-16	DAI NIPPON		☐
	41	9302219	NL		1995-07-17	GERRITSE BEHEER BV		☐
	42	1998040090	KR		1998-08-17	UNKNOWN		☐
	43	6423936	JP		1989-01-26	ASAHI CHEMICAL IND		☐
	44	11120445	JP		1999-04-30	ISHINO SEISAKUSHO KK		☐

K-FEE SYSTEM GMBH, EX2009, page 1136
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13697297
	Filing Date	2012-11-09
	First Named Inventor	Jarisch et al.
	Art Unit	1792
	Examiner Name	L. Long
	Attorney Docket Number	3712036-01693

	45	07125750	JP		1995-05-16			☐
	46	0977125	JP		1997-03-25	FUJI SEAL IND CO LTD		☐
	47	03297728	JP		1991-12-27	RIKAGAKU KENKYUSHO		☐
	48	JPH0540112	JP		1993-05-28	UNKNOWN		☐
	49	2010516364	JP		2015-11-05	FUJI ELECTRIC CO LTD		☐
	50	2002360493	JP		2002-12-17	ISHINO SEISAKUSHO		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

K-FEE SYSTEM GMBH, EX2009, page 1137
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13697297
Filing Date	2012-11-09
First Named Inventor	Jarisch et al.
Art Unit	1792
Examiner Name	L. Long
Attorney Docket Number	3712036-01693

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

K-FEE SYSTEM GMBH, EX2009, page 1138
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13697297
Filing Date	2012-11-09
First Named Inventor	Jarisch et al.
Art Unit	1792
Examiner Name	L. Long
Attorney Docket Number	3712036-01693

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Aaron J. Morrow/	Date (YYYY-MM-DD)	2019-07-19
Name/Print	Aaron J. Morrow	Registration Number	50,819

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

K-FEE SYSTEM GMBH, EX2009, page 1139
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

K-FEE SYSTEM GMBH, EX2009, page 1140
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Electronic Patent Application Fee Transmittal

Application Number:	13697297
Filing Date:	09-Nov-2012
Title of Invention:	CAPSULE, SYSTEM AND METHOD FOR PREPARING A BEVERAGE BY CENTRIFUGATION
First Named Inventor/Applicant Name:	Christian Jarisch
Filer:	Aaron J. Morrow/Katie Cochrane
Attorney Docket Number:	3712036-01693

Filed as Large Entity

Filing Fees for U.S. National Stage under 35 USC 371

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1615	3	100	300
INDEPENDENT CLAIMS IN EXCESS OF 3	1614	1	460	460
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
RCE- 2ND AND SUBSEQUENT REQUEST	1820	1	1900	1900
		Total in USD ($)		**2660**

Electronic Acknowledgement Receipt

EFS ID:	36637559
Application Number:	13697297
International Application Number:	
Confirmation Number:	1065
Title of Invention:	CAPSULE, SYSTEM AND METHOD FOR PREPARING A BEVERAGE BY CENTRIFUGATION
First Named Inventor/Applicant Name:	Christian Jarisch
Customer Number:	29157
Filer:	Aaron J. Morrow/US Patent Mail
Filer Authorized By:	Aaron J. Morrow
Attorney Docket Number:	3712036-01693
Receipt Date:	19-JUL-2019
Filing Date:	09-NOV-2012
Time Stamp:	16:41:03
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$2660
RAM confirmation Number	072219INTEFSW00003274021818
Deposit Account	021818
Authorized User	US Patent Mail

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.17 (Patent application and reexamination processing fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		01693response.pdf	97998 ac0f27be47219fdd2cd2f25dff297f509b2c1c6b	yes	6
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Applicant Arguments/Remarks Made in an Amendment		6	6	
	Claims		2	5	
	Amendment Submitted/Entered with Filing of CPA/RCE		1	1	
Warnings:					
Information:					
2	Transmittal Letter	01693idstrans.pdf	90994 4d6780103672c005bd1f397f62941f17a69abca3	no	3
Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	01693SB08-1.pdf	2178071 9fa91b6a2b45f985468cbdb73093c54042df89ed	no	12
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
4	Information Disclosure Statement (IDS) Form (SB08)	01693sb08-2-use.pdf	1555137 9b44ea5a830fcae924d0f488b258493ec923ccc1	no	5
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					

5	Non Patent Literature	npl1.pdf	3017124 fe45062018ab5e5dc5c7ee6428ec51a7beac875e	no	9
Warnings:					
Information:					
6	Non Patent Literature	npl2.pdf	11710218 0ddcaa8c3db0e4a255be1f03820b40208070e81f	no	12
Warnings:					
Information:					
7	Non Patent Literature	npl3.pdf	6850990 3bdc5aad4ed66cd66144f083464ba1725da71ce5	no	7
Warnings:					
Information:					
8	Non Patent Literature	npl4.pdf	3052565 e0d75e43526a01083bce00abde996806721f91a8	no	13
Warnings:					
Information:					
9	Non Patent Literature	npl5.pdf	4610556 6be6a323f01c6d6cfcfc2369e89b4182b2f25152	no	5
Warnings:					
Information:					
10	Non Patent Literature	npl6.pdf	3029021 54f01a27f21d9a8930c17e64fdd1a09de72a29a2	no	5
Warnings:					
Information:					
11	Non Patent Literature	npl7.pdf	802830 f23ef1b7b2da65dcaf02311f139862106ba4ddfb	no	20
Warnings:					
Information:					

12	Request for Continued Examination (RCE)	01693rce.pdf	1112439 9accfd0863310aede390a12cbaa7b1b805d3cfab	no	3
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
13	Fee Worksheet (SB06)	fee-info.pdf	34083 d0b32c96d1b349d31423d2eab037a38fd02bac2a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	38142026		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors:	Jarisch et al.
Appl. No.:	13/697,297
Conf. No.:	1065
Filed:	November 9, 2012
Title:	CAPSULE, SYSTEM AND METHOD FOR PREPARING A BEVERAGE BY CENTRIFUGATION
Art Unit:	1792
Examiner:	Long, Luana Zhang
Docket No.:	3712036-01693

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CONTINUED EXAMINATION

Examiner:

The enclosed Information Disclosure Statement (IDS), Request for Continued Examination (RCE), and Suggestion for Declaration of Interference Pursuant to 37 C.F.R. § 41.202 ("Interference Suggestion") are respectfully submitted for the above-identified patent application. **Amendments to the Claims** are reflected in the Listing of Claims which begins on page 2 of this paper. **Remarks** begin on page 6 of this paper.

K-FEE SYSTEM GMBH, EX2009, page 1147
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

REMARKS

The enclosed IDS, RCE, and Interference Suggestion are respectfully submitted for the above-identified patent application. The Director is authorized to charge the fee for the RCE and any additional fees that may be required or to credit any overpayment to Deposit Account No. 02-1818. If such a withdrawal is made, please indicate the Attorney Docket No. 3712036-01693 on the account statement.

For the reasons set forth in the enclosed Interference Suggestion, Applicant respectfully requests an early allowance of the application. If any impediment to allowance could be clarified in a telephonic interview, the Examiner is respectfully requested to initiate such an interview with the undersigned.

Respectfully submitted,

K&L GATES LLP

BY /Aaron J. Morrow/
Aaron J. Morrow
Reg. No. 55,819
Customer No. 29157
Telephone No. 312-781-6043

Dated: July 19, 2019

K-FEE SYSTEM GMBH, EX2009, page 1148
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Amendments to the Claims:

This Listing of Claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1 (Previously Presented): A capsule for the preparation of a beverage, the capsule comprising a container configured to house a beverage ingredient, the container comprises a cup-shaped body having a flange-like rim, a lid connected to the cup-shaped body, and a code adapted for being identified or read by an external reader, the code is arranged on a bottom of the flange-like rim, which is opposed to the lid, to be read while the capsule is rotated around an axis of rotation traversing the capsule,

wherein the container comprises a circumference, the code comprises successive segments that extend substantially along at least an eighth of the circumference, the cup-shaped body extends from a bottom end of the cup-shaped body to a top end of the cup-shaped body where the cup-shaped body terminates such that a height of the cup-shaped body is the distance from the bottom end to the top end, the flange-like rim extends from the top end of the cup-shaped body, and the lid has a height that is less than the height of the cup-shaped body.

Claim 2 (Previously Presented): The capsule of Claim 1, wherein the code is arranged on the container along an arc-shaped or circular path of the circumference of the container.

Claims 3-4 (Canceled).

Claim 5 (Previously Presented): The capsule of Claim 1, wherein the code is repeated along the circumference of the container.

Claim 6 (Previously Presented): The capsule of Claim 1, wherein the code is a bit code formed by a series of discrete polygonal or dot surfaces printed on and/or embossed in the container.

Claim 7 (Previously Presented): The capsule of Claim 1, wherein the code is printed by an ink which is not visible by a human eye under natural light.

K-FEE SYSTEM GMBH, EX2009, page 1149
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Claim 8 (Previously Presented): The capsule of Claim 1, wherein the code is printed or embossed by a pattern which possesses surfaces having different reflective and/or absorbing properties to light.

Claim 9 (Previously Presented): The capsule of Claim 8, wherein the pattern possesses a first surface having inclined mirroring or absorbing properties to light and a second surface having flat mirroring or flat reflective properties to light.

Claim 10 (Previously Presented): The capsule of Claim 1, wherein the code is mechanically embossed or engraved on the container by a laser.

Claims 11-13 (Canceled).

Claim 14 (Withdrawn): A system for preparing a beverage from a capsule comprising a container and a beverage ingredient contained therein, the container comprises a code adapted for being identified or read by an external reader, the code is arranged on the container to be read while the capsule is rotated around an axis of rotation traversing the capsule and the beverage preparation device comprises a capsule holder for holding the capsule and rotational driver for driving the holder and capsule in rotation along the axis of rotation and reader arranged for reading the code when the capsule is rotated along the axis.

Claim 15 (Withdrawn): The system of Claim 14, wherein the reader comprises a light emitter and a light sensor or an inductive sensor.

Claim 16 (Withdrawn): The system of Claim 14, wherein the optical reader or inductive sensor is arranged to detect a code on the rim of the capsule.

Claim 17 (Withdrawn): A method of preparing a beverage from a system from a capsule comprising a container and a beverage ingredient contained therein, the container comprises a code adapted for being identified or read by an external reader, the method comprising rotating the container and reading the code while the capsule is rotated around an axis of rotation traversing the capsule and the beverage preparation device, the device comprises a capsule holder for holding the capsule and rotational driver for driving the holder and capsule in rotation along the axis of rotation and reader arranged for reading the code when the capsule is rotated

K-FEE SYSTEM GMBH, EX2009, page 1150
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

along the axis, and extracting the beverage from the capsule by rotating the capsule along the axis.

Claim 18 (Withdrawn): The method of Claim 17, wherein the code is read at a first rotational speed and the beverage is extracted from the capsule at a second rotational speed.

Claim 19 (Previously Presented): The capsule of Claim 1, comprising a peripheral edge that is an outermost circular line of the capsule, wherein the code is positioned within 10 mm of the peripheral edge.

Claim 20 (New): A single-serve capsule for making a beverage, comprising:

a base element with a cavity, in which a raw beverage material is provided,

a flange horizontally extending from the base element,

a membrane that is configured to close the cavity, the membrane is fastened to a top side of the flange, and

an identifier, which makes it possible to individualize the respective single-serve capsule,

wherein the identifier is a barcode that is provided on a bottom side of the flange, the identifier extends around an entire circumference of the flange, the bottom side of the flange is opposite the top side of the flange to which the membrane is fastened.

Claim 21 (New): The single-serve capsule according to Claim 20, wherein the barcode is printed by material removal.

Claim 22 (New): The single-serve capsule according to Claim 20, wherein the base element is made of metal.

Claim 23 (New): The single-serve capsule according to Claim 20, wherein the base element comprises a bottom and a wall region that extends between the flange and the bottom, the side wall has an electrically conductive section.

Claim 24 (New): The single-serve capsule according to Claim 20, wherein the identifier comprises metal.

K-FEE SYSTEM GMBH, EX2009, page 1151
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Claim 25 (New): The single-serve capsule according to Claim 20, wherein the barcode extends around an entire perimeter of the base element.

Claim 26 (New): The single-serve capsule according to Claim 20, wherein the barcode has at least two areas which differ in their optical properties.

Claim 27 (New): The single-serve capsule according to Claim 20, wherein the identifier is electrically conductive.

Claim 28 (New): The single-serve capsule according to Claim 20, wherein the identifier is a machine-readable imprint.

K-FEE SYSTEM GMBH, EX2009, page 1152
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	13/697,297	Filing Date	2012-11-09	Docket Number (if applicable)	3712036-01693	Art Unit	1792
First Named Inventor	Jarisch et al.			Examiner Name	Chaim A. Smith		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☒ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☒ Other SUGGESTION FOR DECLARATION OF INTERFERENCE PURSUANT TO 37 C.F.R. § 41.202

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 021818

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Aaron J. Morrow/	Date (YYYY-MM-DD)	2019-07-19
Name	Aaron J. Morrow	Registration Number	55819

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

K-FEE SYSTEM GMBH, EX2009, page 1155
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors:	Jarisch et al.
Appl. No.:	13/697,297
Conf. No.:	1065
Filed:	November 9, 2012
Title:	CAPSULE, SYSTEM AND METHOD FOR PREPARING A BEVERAGE BY CENTRIFUGATION
Art Unit:	1792
Examiner:	Chaim A. Smith
Docket No.:	3712036-01693

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT TRANSMITTAL LETTER

Sir:

Submitted herewith is an Information Disclosure Statement for consideration in the above-identified application. In accordance with the provisions of 37 C.F.R. 1.56, 37 C.F.R. 1.97, and 37 C.F.R. 1.98, Applicants request that a citation and examination of the references cited on the enclosed form PTO/SB/08a be made during the course of examination of the above-identified application for United States patent. Pursuant to 37 C.F.R. 1.98, copies of any cited foreign patent documents and non-patent documents are enclosed.

This Information Disclosure Statement is submitted as follows:

Submission without Certification

[X] Within three months of filing of a national application; within three months of the date of entry of the national stage as set forth in 37 C.F.R. §1.491 in an international application; before the mailing date of a first Office Action on the merits, or before the mailing of a first Office Action after the filing of a Request for Continued Examination.

[ ] After the period specified above, but before the mailing date of a Final Action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311, or an Action that otherwise closes prosecution in the application and is accompanied by payment of the fee set forth in 37 CFR 1.17(p).

Submission with Certification

[ ] Within three months of filing of a national application; within three months of the date of entry of the national stage as set forth in 37 C.F.R. §1.491 in an international application; before the mailing date of a first Office Action on the merits, or before the mailing of a first Office Action after the filing of a Request for Continued Examination.

K-FEE SYSTEM GMBH, EX2009, page 1156
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

[ ] After the period specified above, but before the mailing date of a Final Action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311, or an Action that otherwise closes prosecution in the application and is accompanied by the Certification specified in 37 CFR 1.97(e) which is set forth below.

[ ] After the mailing date of a Final Action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311, or an Action that otherwise closes prosecution in the application and is accompanied by the fee set forth in 37 CFR 1.17(p) and the Certification specified in 37 CFR 1.97(e) which is set forth below.

Certification under 37 CFR 1.97(e)

[ ] The undersigned counsel for applicant(s) hereby certifies that each item of information contained in the accompanying Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than **three months** prior to the filing of the Information Disclosure Statement.

[ ] The undersigned counsel for applicant(s) hereby certifies that no item of information contained in the accompanying Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned, after making reasonable inquiry, no item of information contained in the accompanying Information Disclosure Statement was known to any individual designated in 37 CFR 1.56(c) more than **three months** prior to the filing of the Information Disclosure Statement.

Statement under 37 CFR 1.704(d)

[ ] The undersigned counsel for applicant(s) hereby states that each item of information contained in the accompanying Information Disclosure Statement was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and/or is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in § 1.56(c) more than **thirty days** prior to the filing of the information disclosure statement.

[ ] A copy of a Search Report from a corresponding foreign patent application is enclosed.

[ ] The Commissioner is hereby authorized to charge the amount of $240.00 to cover the required fee to Deposit Account No. 02-1818.

K-FEE SYSTEM GMBH, EX2009, page 1157
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

[X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-1818.

Respectfully submitted,

K&L GATES LLP

BY /Aaron J. Morrow/
Aaron J. Morrow
Reg. No. 55,819
Customer No. 29157

Dated: July 19, 2019

K-FEE SYSTEM GMBH, EX2009, page 1158
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum
Internationales Büro

(43) Internationales Veröffentlichungsdatum
9. August 2007 (09.08.2007)

PCT

(10) Internationale Veröffentlichungsnummer
WO 2007/087890 A1

(51) **Internationale Patentklassifikation:**
A47J 31/40 **(2006.01)** *B65D 85/804* **(2006.01)**

(21) **Internationales Aktenzeichen:** PCT/EP2006/012529

(22) **Internationales Anmeldedatum:**
23. Dezember 2006 (23.12.2006)

(25) **Einreichungssprache:** Deutsch

(26) **Veröffentlichungssprache:** Deutsch

(30) **Angaben zur Priorität:**
10 2006 004 329.4 31. Januar 2006 (31.01.2006) DE

(71) **Anmelder** *(für alle Bestimmungsstaaten mit Ausnahme von US):* **BRAUN GMBH** [DE/DE]; Frankfurter Strasse 145, 61476 Kronberg (DE).

(72) **Erfinder; und**

(75) **Erfinder/Anmelder** *(nur für US):* **MARTINEZ, Candelario** [ES/ES]; Antonio Machado, 74-4 Ia, E-08860 Castelldefels (ES). **PEREZ, Pedro** [ES/ES]; Alamo, 5-3°2a, E-08940 Cornelia de Llobregat (ES). **CUESTA, Xavier** [ES/ES]; Sardenya, 230-ler Ia, E-08013 Barcelona (ES). **NAVARRO, Joan, Antoni** [ES/ES]; Ancianitat, 30-4art 2a, E-08225 Terrassa (ES). **KRESSMANN, Frank** [DE/DE]; Im Kleinfeldchen 3d, 65760 Eschborn (DE). **REBORDOSA, Antonio** [ES/ES]; Cau de la Guineu, n° 14, Brucardes, E-08272 Sant Fruitós de Bages (ES). **ROMAN, Jose, Luis** [ES/ES]; c/. de la Creu, 19-bis, ätic, E-08960 Sant Just Desvern (ES).

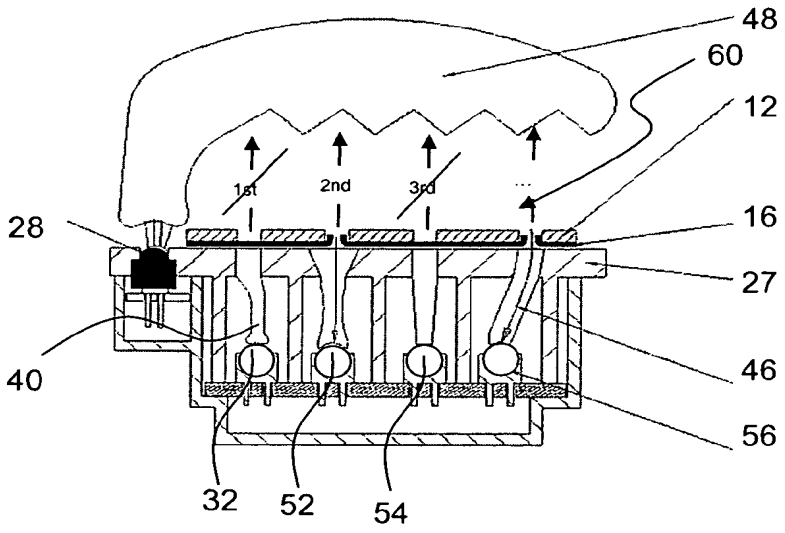
(74) **Gemeinsamer Vertreter: BRAUN GMBH;** Frankfurter Strasse 145, 61476 Kronberg (DE).

(81) **Bestimmungsstaaten** *(soweit nicht anders angegeben, für jede verfügbare nationale Schutzrechtsart):* AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO,

[Fortsetzung auf der nächsten Seite]

(54) Title: APPARATUS AND CARTRIDGE FOR PREPARING HOT BEVERAGES

(54) Bezeichnung: BEZEICHNUNG: VORRICHTUNG UND KARTUSCHE FÜR DIE ZUBEREITUNG VON HEISSGETRÄNKEN



(57) Abstract: The present invention relates to an apparatus for preparing hot beverages, having an optical recognition unit for exchangeable cartridges (10), in which a pulverulent beverage substance (14) is contained. The recognition unit is provided for reading out a code (11) provided on the cartridges (10), and it has at least one radiation emitter (32, 52, 54, 56) and at least one radiation detector (28, 34, 36, 38). The optical recognition unit here is designed for reading out the code (11), which is present in the form of an optical transmission pattern. The invention also relates to a method of recognizing cartridges (10) by optical transmission gauging, to cartridges (10) with an optical transmission pattern (11), and to a production method provided for this purpose.

[Fortsetzung auf der nächsten Seite]

WO 2007/087890 A1

K-FEE SYSTEM GMBH, EX2009, page 1159
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

(84) Bestimmungsstaaten *(soweit nicht anders angegeben, für jede verfügbare regionale Schutzrechtsart):* ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europaisches (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FT, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, **BJ,** CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Veröffentlicht:

— *mit internationalem Recherchenbericht*

Zur Erklärung der Zweibuchstaben Codes und der anderen Abkurzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT Gazette verwiesen

(57) Zusammenfassung: Die vorliegende Erfindung betrifft eine Vorrichtung zur Zubereitung für Heißgetranke mit einer optischen Erkennungseinheit für auswechselbare Kartuschen (10), in denen eine pulverartige Getrankesubstanz (14) aufgenommen ist Die Erkennungseinheit ist zum Auslesen eines an den Kartuschen (10) vorgesehenen Codes (11) vorgesehen und weist zumindest einen Strahlungsemitter (32, 52, 54, 56) und zumindest einen Strahlungsdetektor (28, 34, 36, 38) auf Die optische Erkennungseinheit ist hierbei zum Auslesen des als optischen Transmissionsmusters vorliegenden Codes (11) ausgebildet Weiterhin betrifft die Erfindung ein Verfahren zur Erkennung von Kartuschen (10) mittels optischer Transmissionsmessung sowie Kartuschen (10) mit einem optischen Transmissionsmuster (11) und ein dafür vorgesehenes Herstellungsverfahren

Bezeichnung: Vorrichtung und Kartusche für die Zubereitung von Heißgetränken

Beschreibung

Die vorliegende Erfindung betrifft eine Vorrichtung zur Zubereitung von Heißgetränken mit einer optischen Erkennungseinheit für Kartuschen mit einer pulverartigen oder flüssigen Getränkesubstanz, die für die Zubereitung des Heißgetränks in die Vorrichtung eingesetzt werden können. Weiterhin betrifft die Erfindung ein Verfahren für die optische Erkennung von in der Vorrichtung platzierten Kartuschen sowie entsprechende Kartuschen und ein Herstellungsverfahren für diese.

Stand der Technik

Vorrichtungen und Maschinen zur Zubereitung von Heißgetränken, insbesondere zum Brühen von Kaffee sind als solche im Stand der Technik bekannt. So existieren mittlerweile verschiedene Systeme für die Heißgetränke- und Kaffeezubereitung, bei welchem separat verpackte und vorportionierte Mengen von Getränke- oder Kaffeepulver in eine dafür vorgesehene Brühvorrichtung eingesetzt und nach erfolgtem Brühvorgang aus dieser wieder entnommen werden. Die Verwendung derartiger vorportionierter, in Form von Pads oder Kapseln abgepackter Kaffeemengen erleichtern sowohl die Bedienung als auch eine Reinigung der Brühvorrichtung, da das Kaffeepulver in aller Regel nicht aus dem, nachfolgend als Kartusche bezeichneten Päd oder der Kapsel, austreten kann.

Weiterhin lassen sich mit auf Kartuschen basierenden Brühsystemen hervorragende Brühergebnisse erzielen, da die das Getränkepulver betreffenden Parameter, wie etwa die Kaffeemenge und der Mahlgrad bzw. der Körnungsgrad des Getränkepulvers, bereits auf die jeweils verwendete Kaffesorte bzw. Pulvermischung abgestimmt sind. Das Einstellen eines optimalen Mahlgrads sowie eine Bestimmung der optimalen Menge von Getränkepulver, wie dies bei Siebträgermaschinen aber auch Kaffeevollautomaten erforderlich ist, kann daher in vorteilhafter Weise entfallen.

Mittels Kartuschenbrühsystemen können somit auf einfache Art und Weise optimale Brüherergebnisse erzielt werden, da die für die Zubereitung wesentlichen Parameter des verwendeten Getränkepulvers stets vorgegeben sind, sodass ein Brühergebnis höchster Qualität, ins-

besondere hinsichtlich Geschmack, Aromenentfaltung, Konsistenz, Crema und Duft gewährleistet werden kann.

Während die Menge und der Körnungsgrad der in einer Kartusche aufgenommenen pulverartigen Getränkesubstanz stets vorgegeben ist, müssen für die Erzielung eines optimalen Brühergebnisses auch die die BruhVorrichtung betreffenden Parameter, wie etwa Brühtemperatur, Brühdruck, Wassermenge und -Durchsatz, individuell auf die verwendete Getränkesubstanz abgestimmt werden. Dies ist gerade bei Kartuschensystemen mit einer Vielzahl von in Frage kommenden Kartuscheninhalten, wie etwa unterschiedlichen Kaffeesorten, von Bedeutung. Denn gerade in einem reichhaltigen Sortiment unterschiedlicher Kartuschen liegt die unvergleichliche Vielseitigkeit von Kartuschenbrühsystemen für Kaffe und Espresso begründet

Um den unterschiedlichen Anforderungen eines großen Sortiments unterschiedlicher Kartuscheninhalten entsprechen zu können, ist es erforderlich, dass die maschinenseitigen Parameter einer Zubereitungsvorrichtung individuell an den Kartuscheninhalt angepasst werden können.

So beschreibt beispielsweise die WO 02/28241 A1 ein Brühpaket zur Zubereitung heißer oder kalter Getränke, welches kodierte Daten aufweist, die von einem Zubereitungsgerät gelesen werden können. Die auf dem Paket angebrachten Daten können zur Steuerung des Zubereitungsgeräts, insbesondere zur Verwendung spezifischer Brühkonfigurationen verwendet werden, die auf ein verwendetes Brühpaket abgestimmt sind.

Zur Kennzeichnung der Brüh-Pakete sind maschinenlesbare Kennzeichen, wie zum Beispiel Farben, Umrisse, Bildzeichen, Textzeichen, Strichcode und digitale Wasserzeichen vorgesehen, die mit optischen Mitteln detektiert und erkannt werden können.

Weiterhin kommen als Kennzeichnung Kerben, Rillen, Löcher, Erhebungen und Texturen infrage, welche mechanisch detektierbar sind.

Problem

Während eine mechanische Detektion von Brüh-Paketen bewegliche Bauteile mit einem damit zwangsläufig verbundenen Verschleiß und einem recht hohen Wartungs- und Pflegeaufwand erfordert, sind die vorbekannten optisch basierten Erkennungssysteme nur unter

einem relativ hohen Kostenaufwand zu implementieren. So erfordert die Erkennung von Textzeichen, Strichcodes, digitaler Wasserzeichen und/oder Bildzeichen eine optisch aufwändig gestaltete Bilderfassung mit einer sich daran anschließenden komplexen Bildverarbeitung, um eine fehlerfreie Erkennung der Kartusche realisieren zu können.

Aufgabe

Der vorliegenden Erfindung liegt daher die Aufgabe zugrunde, ein vereinfachtes, weniger störanfälliges und kostengünstigeres System zur Erkennung von Kartuschen für die Heißgetränkzubereitung zur Verfügung zu stellen. Es soll hierbei insbesondere eine einfachere Kennzeichnung von Kartuschen als auch ein kostengünstiges, verschleißfreies und wartungsarmes Erkennungssystem für eine Zubereitungsvorrichtung erzielt werden.

Erfindung und vorteilhafte Wirkungen

Die der Erfindung zugrunde liegende Aufgabe wird mittels einer Vorrichtung zur Heißgetränkezubereitung gemäß Patentanspruch 1, einem Verfahren zur optischen Erkennung von in Vorrichtungen zur Heißgetränkezubereitung einsetzbaren Kartuschen gemäß Patentanspruch 15, einer Kartusche zur Zubereitung von Heißgetränke gemäß Patentanspruch 20 und einem Herstellungsverfahren für diese Kartuschen gemäß Patentanspruch 30 gelöst. Weitere vorteilhafte Ausführungsformen der Erfindung sind in den jeweiligen Unteransprüchen angegeben.

Die erfindungsgemäße Vorrichtung zur Zubereitung für Heißgetränke ist mit einer optischen Erkennungseinheit für auswechselbare Kartuschen ausgestattet, in denen eine pulverartige Getränkesubstanz aufgenommen ist. Die Erkennungseinheit weist zum Auslesen eines an den Kartuschen vorgesehenen Codes zumindest einen Strahlungsemitter und zumindest einen Strahlungsdetektor für elektromagnetische Strahlung auf. Der zumindest eine Strahlungsemitter und der zumindest eine Strahlungsdetektor sind hierbei derart angeordnet und/oder ausgebildet, dass die optische Erkennungseinheit den als optisches Transmissionsmuster vorliegenden Code der Kartusche auslesen kann. Demnach erfolgt die optische Erkennung einer in der Vorrichtung angeordneten Kartusche anhand einer durch den Kartuschencode transmittierten Strahlung. Die optische Erkennungseinheit ist demgemäß in optischer Transmissionsgeometrie ausgebildet.

Im Unterschied zu vorbekannten optischen Erkennungsverfahren, die sämtlich in Reflexionsgeometrie arbeiten, kann die erfindungsgemäße Vorrichtung weniger aufwändig und kostengünstiger realisiert werden. Da bei der vorbekannten, auf Reflexionsgeometrie basierenden Systemen vielfach bildgebende und bildauswertende Verfahren und entsprechend komplexe Komponenten implementiert werden müssen, kann bei der erfindungsgemäßen Anordnung in Transmissionsgeometrie die Kartuscheninformation beispielsweise mittels eines Löcher-Codes implementiert werden, der mit relativ einfachen Mitteln, wie beispielsweise einer oder mehrerer Fotodioden ausgelesen werden kann.

Nach einer ersten vorteilhaften Ausgestaltung der Erfindung ist der Strahlungsdetektor zur Detektion der vom Emitter erzeugbaren und vom Transmissionsmuster transmittierten Strahlung angeordnet. Hierbei ist insbesondere vorgesehen, dass die vom Emitter erzeugte Strahlung bereichsweise durch das an der Kurtusche vorgesehen Transmissionsmuster hindurchpropagiert und anschließend von dem zumindest einen Detektor detektiert werden kann. Die Code-Information ist hierbei in der Ausgestaltung des Transmissionsmusters hinterlegt. Das Transmissionsmuster weist vorzugsweise Bereiche unterschiedlichen Transmissionsgrades bezüglich der verwendeten Strahlung auf.

In einer besonders einfachen Ausgestaltung sind beispielsweise vollständig transparente und vollständig absorbierende bzw. reflektierende Teilbereiche des Transmissionsmusters mit Transmissionskoeffizienten im Bereich von 0 oder 1 vorgesehen. Weitere Ausgestaltungen des Transmissionsmusters mit nur teilweise transparenten bzw. transmittierenden Abschnitten, d.h. mit von 0 oder 1 verschiedenen Transmissionskoeffizienten, sind ohne weiteres denkbar. Vielmehr können auch spektral selektive Abschnitte vorgesehen sein, die unterschiedliche Absorptions- bzw. Transmissionskoeffizienten für unterschiedliche spektrale Bandbreiten aufweisen.

Nach einer weiteren vorteilhaften Ausgestaltung der Erfindung ist die optische Erkennungseinheit zum Auslesen eines als zweidimensionalen Transmissionsmusters vorliegenden Codes der Kartusche vorgesehen. Eine zweidimensionale Ausgestaltung des Transmissionsmusters ermöglicht eine Erhöhung der für den Code verwendbaren Datenmenge. Zum anderen muss das Transmissionsmuster nicht zwingend linear aufgebaut sein, sondern kann eine beliebige, für die Geometrie der Kartusche vorteilhafte zweidimensionale Form annehmen.

Nach einer weiteren bevorzugten Ausführungsform der Erfindung sind die Strahlungsemitter und/oder die Strahlungsdetektoren im Wesentlichen zweidimensional in der Struktur und/oder der Geometrie des Transmissionsmusters entsprechend angeordnet.

Von Vorteil ist hierbei, wenn die Detektoren und/oder Emitter jeweils einzelnen Flächenelementen des Transmissionsmusters der Kartusche zugeordnet sind. Eine Zuordnung kann hierbei zum einen durch die Positionierung oder Anordnung von Detektoren und Emittern innerhalb der Vorrichtung und zum anderen unter Verwendung von wellen- oder lichtleitenden Strukturen und Medien erfolgen, welche die vom Emitter erzeugte und/oder die vom Muster transmittierte Strahlung zu den Flächenelementen des Musters bzw. zu den Detektoren möglichst verlustfrei hinführen. Hierbei ist insbesondere von Vorteil, wenn für einzelne Flächenelemente des Transmissionsmusters jeweils ein Detektor vorgesehen ist.

Für den als Transmissionsmuster an der Kartusche zu hinterlegenden Code ist eine räumlich vorgegebene Bit-Struktur an der Kartusche von Vorteil.

Nach einer weiteren Ausführungsform der Vorrichtung ist vorgesehen, dass der zumindest eine Strahlungsemitter und der zumindest eine Strahlungsdetektor an gegenüberliegenden Seiten eines für die Kartusche vorgesehenen Aufnahmebereichs angeordnet sind. Vorzugsweise kann der für die Kartusche vorgesehene Aufnahmebereich zum Auswechseln der Kartuschen geöffnet und verschlossen werden, wobei beispielsweise die den Aufnahmebereich begrenzenden Seiten gegeneinander beweglich oder verschwenkbar ausgestaltet sein können oder z.B. zumindest eine der Seiten weggeklappt werden kann.

Durch die Anordnung von Strahlungsdetektor und Strahlungsemitter an gegenüberliegenden und möglicherweise gegeneinander verschwenkbaren bzw. beweglichen Seiten des Aufnahmebereichs wird die in Transmissionsgeometrie arbeitende Erkennungseinheit bereits verwirklicht. Vorzugsweise sind der zumindest eine Strahlungsdetektor und der zumindest eine Strahlungsemitter deckungsgleich gegenüberliegend angeordnet, sodass die in den Aufnahmebereich eingeführte Kartusche mit ihrem als Transmissionsmuster vorliegenden Code im Wesentlichen als Blende für die vom Emitter erzeugte Strahlung fungiert.

Nach einer bevorzugten Ausführungsform ist vorgesehen, dass der zumindest eine Strahlungsemitter und der zumindest eine Strahlungsdetektor an der gleichen Seite des für die Kartusche vorgesehenen Aufnahmebereichs angeordnet sind. In dieser Konfiguration sind weiterhin optische Führungsmittel oder Reflektoren vorgesehen, mittels derer die vom Emit-

ter erzeugte und/oder die vom Transmissionsmuster transmittierte Strahlung entweder zum Transmissionsmuster oder zum Detektor hin übertragen werden kann.

Insbesondere hat diese Art der Anordnung den Vorteil, dass sämtliche elektrisch anzusteuernden Komponenten, wie Strahlungsemitter und Strahlungsdetektor der Erkennungseinheit, auf einer gemeinsamen Seite des für die Kartusche vorgesehenen Aufnahmebereichs angeordnet werden können. Somit sind diese optischen Komponenten nicht mehr gegeneinander verstellbar, sondern bleiben in ihren Positionen fixiert. Zudem können sowohl die Strahlungsemitter als auch die Strahlungsdetektoren bei dieser Anordnung an der gleichen Seite des Aufnahmebereichs ohne aufwändige Verkabelung von einer gemeinsamen Steuereinheit betrieben werden.

Nach einer weiteren bevorzugten Ausführungsform der Erfindung ist vorgesehen, dass zur Übertragung der vom Emitter erzeugbaren optischen Strahlung hin zum Transmissionsmuster und/oder zur Übertragung der vom Transmissionsmuster transmittierten Strahlung hin zum Detektor optische Führungsmittel, wie etwa Wellen- oder Lichtleiter, vorgesehen sind. Mittels solch optischer Führungsmittel, die vorzugsweise einen deutlich höheren Brechungsindex als Luft aufweisen, ist es vor allem möglich, etwaigen Intensitätsverlusten bei der Strahlpropagation innerhalb des Systems wirksam zu begegnen. Zudem ermöglichen derartige optische Führungsmittel eine variable und den Einbauerfordernissen gerecht werdende Positionierung von Detektor und Emitter.

Weiterhin ist vorgesehen, dass bei einer Anordnung von Emitter und Detektor an der gleichen Seite des für die Kartusche vorgesehenen Aufnahmebereichs an der den Emitter und Detektoren gegenüberliegenden Seite des Aufnahmebereichs zumindest ein Reflektor angeordnet ist. Die vom Emitter erzeugte Strahlung kann innerhalb oder seitlich des Aufnahmebereichs frei propagieren, an dem hinter der Kartusche liegenden Reflektor reflektiert und somit auf die Kartusche gelenkt werden. Dort triff sie letztlich auf das Transmissionsmuster, sodass von diesem transmittierte und informationstragende Strahlungskomponenten von dem zumindest einen Detektor detektiert werden können.

Weiterhin ist nach der Erfindung vorgesehen, dass der zumindest eine Emitter außerhalb des für die Kartusche vorgesehenen Aufnahmebereichs der Vorrichtung zu liegen kommt, und dass zur Beaufschlagung der vom zumindest einen Detektor abgewandten Kartuschenseite mit Strahlung ein im Wesentlichen sichelartig, bogenartig oder L-förmig ausgebildeter Licht- oder Wellenleiter vorgesehen ist. Dieser Licht- oder Wellenleiter erfüllt hierbei im We-

sentlichen die Funktion des zuvor beschriebenen Reflektors, nämlich dahingehend, dass auch bei einer Anordnung von Emitter und Detektor nebeneinander das Erfassen des in Form eines optischen Transmissionsmusters vorliegenden Codes der Kartusche in Transmissionsgeometrie erfolgen kann.

Mittels eines Reflektors und/oder eines Licht- oder Wellenleiters ist es somit generell möglich, auch bei einer gleichseitigen, nebeneinander liegenden und nicht gegenüberliegenden Anordnung von Emitter und Detektor ein optisches Auslesen des Kartuschencodes in Transmissionsgeometrie zur Verfügung zu stellen.

Nach einer weiteren Ausführungsform der Erfindung ist der im Wesentlichen sichelartig, bogenartig oder L-förmig ausgebildete Licht- oder Wellenleiter zur Übertragung der vom Transmissionsmuster der Kartusche transmittierten Strahlung hin zum Detektor ausgebildet, der hier außerhalb des für die Kartusche vorgesehenen Aufnahmebereichs angeordnet ist. Hierbei ist insbesondere von Vorteil, wenn für jedes der Flächenelemente des Transmissionsmusters ein separater Strahlungsemitter vorgesehen ist. Insbesondere, wenn die einzelnen Strahlungsemitter in einer vorgegebenen zeitlichen Abfolge aktiviert werden, oder wenn die einzelnen Strahlungsemitter unterschiedliche Strahlungsintensitäten aufweisen, ist eine ortsaufgelöste Mustererkennung auch selbst unter Verwendung lediglich eines einzigen Detektors möglich.

Abhängig von den Bauteilkosten für Emitter und Detektoren, kann die Anzahl benötigter Detektoren und/oder Emitter unter Berücksichtigung des Anforderungsprofils und der Gesamtkosten des Systems optimiert werden. Es sind demnach insbesondere solche Konfigurationen mit im Wesentlichen nur einem Emitter und einer Vielzahl Detektoren oder auch mit nur einem Detektor und einer Vielzahl von Emittern denkbar.

Von Vorteil ist weiterhin, dass die über die Fläche des Transmissionsmusters transmittierte Strahlung mittels einer die Strahlung bündelnden und/oder zusammenführenden Lichtleiterstruktur dem zumindest einen Detektor zuführbar ist. In dieser Konfiguration kann die erfindungsgemäße Vorrichtung sogar mit nur einem einzigen Detektor für das von dem Transmissionsmuster der Kartusche transmittierten Licht betrieben werden. Zum ortsaufgelösten Auslesen des vorzugsweise zweidimensional ausgestalteten Transmissionsmusters kommen hierbei im Wesentlichen zwei Betriebsmodi für die Erkennungseinheit infrage.

Nach einem ersten Betriebsmodus ist vorgesehen, dass wenigstens zwei Emitter mit unterschiedlicher Strahlungsintensität vorgesehen sind, sodass allein anhand der detektierten transmittierten Intensität festgestellt werden kann, ob die Strahlung nur eines der zumindest zwei Emitter, die Strahlung beider Emitter oder ob gar keine Strahlung der Emitter durch die den einzelnen Emittern zugeordneten Flächenelementen des Transmissionsmusters hindurch propagieren. Davon ausgehend, dass der Code des Transmissionsmusters binär hinterlegt ist, das heißt, dass die einzelnen Flächenelemente des Transmissionsmusters entweder einen Transmissionsgrad von 0 oder 1 aufweisen und dass die den einzelnen Flächenelementen des Transmissionsmusters zugeordneten Emitter eine deutlich unterscheidbare Intensität aufweisen, kann mittels der die Strahlung bündelnden Lichtleiterstruktur und unter Verwendung nur eines Detektors das Transmissionsmuster der Kartusche hinreichend genau ausgelesen werden.

Kommen eine Vielzahl einzelner Emitter in Betracht, so ist beispielsweise eine mit ansteigenden Zweierpotenzen multiplizierte Intensität einzelner Emitter sinnvoll. Beträgt das Verhältnis der Strahlungsleistungen einzelner Emitter beispielsweise 2, 4, 8, 16 usw., so kann allein anhand einer Messung der Gesamtintensität der transmittierten Strahlung die Struktur des Transmissionsmusters bestimmt und somit der Code ausgelesen werden.

Der zweite Betriebsmodus kann dagegen mit Emittern gleicher Intensität operieren. Diese werden hierbei zeitlich versetzt zueinander aktiviert, sodass beispielsweise jeweils nur einer der Emitter Strahlung emittiert. Unter Kenntnis eines vorgegebenen zeitlichen Aktivierungsschemas für die einzelnen Emitter kann letztlich allein anhand der über die Zeit detektierten Strahlungsintensität das Transmissionsmuster und somit der Code der Kartusche ausgelesen und bestimmt werden.

Nach einer weiteren bevorzugten Ausführungsform ist eine Öffnungsstellung des Aufnahmebereichs für die in die Vorrichtung einsetzbare Kartusche mittels des zumindest einen Detektors und des zumindest einen Emitters detektierbar. Hierdurch kann in vorteilhafter Weise ein Sicherheitsmechanismus für die Brühvorrichtung implementiert werden, dass nämlich bei geöffnetem Aufnahmebereich, bei welchem die Kartusche ausgewechselt und das Gerät nicht betriebsbereit ist, eine etwaige Fehlbedienung zuverlässig ausgeschlossen werden kann.

Zur Detektion einer Öffnungsstellung des Aufnahmebereichs können reflektierende oder strahlungsführende Elemente vorgesehen sein, die dafür Sorge tragen, dass bei geschlos-

senem Aufnahmebereich eine Minimalintensität vom Detektor detektiert wird. Soll eine Kartusche ausgewechselt werden, wird der Aufnahmebereich in eine Öffnungsstellung überführt, was typischerweise mit einem Verschwenken oder Verschieben des reflektierenden oder strahlungsleitenden Elements einhergeht, sodass die vom Detektor detektierbare Strahlung unterhalb des vorgegebenen Minimalintensität absinkt. Wird eine Strahlungsintensität unterhalb des vorgegebenen Minimalschwellwertes gemessen, so kann die Brühfunktion der Vorrichtung aus Sicherheitsgründen dann deaktiviert werden, was vorzugsweise selbsttätig erfolgt.

Nach einem weiteren unabhängigen Aspekt betrifft die Erfindung ein Verfahren zur optischen Erkennung von Kartuschen, in welchen eine pulverartige Getränkesubstanz aufgenommen ist und die in Vorrichtungen zur Heißgetränkezubereitung einsetzbar sind. An den Kartuschen ist ein Code vorgesehen, der mit Strahlung von zumindest einem Strahlungsemitter beaufschlagt wird. Zum Auslesen des Codes und zum Erkennen der in der Vorrichtung eingesetzten Kartusche wird die vom Code transmittierte Strahlung mittels zumindest eines Strahlungsdetektors detektiert. Der an der Kartusche vorgesehene Code ist daher als Transmissionsmuster ausgebildet.

Nach einer bevorzugten Ausführungsform wird die von dem zweidimensional ausgebildeten Code transmittierte Strahlung ortsaufgelöst detektiert. Hierzu sind beispielsweise mehrere Strahlungsdetektoren vorgesehen, die den Transmissionsgrad einzelner diskreter Flächenelemente des Codes bestimmen können. Die von der Vielzahl von Detektoren detektierte Strahlungsleistung entspricht somit in direkter Art und Weise dem Transmissionsmuster des an der Kartusche vorgesehenen optischen Transmissionscodes.

Nach einer weiteren Ausführungsform ist vorgesehen, dass die an unterschiedlichen Flächenelementen des Transmissionsmuters transmittierte Strahlung mittels optischer Wellen- oder Lichtleiter überlagert bzw. zusammenführt und dem zumindest einen Detektor zugeführt wird. In diesem Detektionsmodus kann eine ortsaufgelöste Erkennung des Codes unter Verwendung einer Vielzahl von Emittern unterschiedlicher Intensität erfolgen. Alternativ oder ergänzend hierzu ist eine zeitlich versetzte Beaufschlagung unterschiedlicher Codeabschnitte mittels entsprechender Aktivierung der den Codeabschnitten zugeordneten Emittern möglich.

Hierbei ist insbesondere von Vorteil, wenn sich die Strahlungsleistung der einzelnen Emitter zum Beispiel um einen Faktor zwei unterscheidet. Anhand einer gemessenen Gesamtinten-

sität lässt sich dann jede Konstellation von binären Transmissionsmustern eindeutig zuordnen.

Nach einem weiteren unabhängigen Aspekt betrifft die Erfindung eine Kartusche zur Zubereitung für Heißgetränke, die eine pulverartige Getränkesubstanz enthält. Die Kartusche weist einen optisch auslesbaren Code zur maschinellen Erkennung der Kartusche auf, der als optisches Transmissionsmuster ausgebildet ist. Im Gegensatz zum Stand der Technik sind daher keine bildgebenden Verfahren für die Erfassung eines an der Kartusche angeordneten Codes erforderlich. Die Ausgestaltung des Codes in Form eines optischen Transmissionsmusters ermöglicht eine einfache und kostengünstige Implementierung einer optischen Erkennungseinheit für die Kartusche.

Von Vorteil ist hierbei, wenn der Code als zweidimensionales Transmissionsmuster ausgebildet ist. Dies erhöht zum einen die Informationsdichte des Codes und erlaubt zudem eine platzsparende und variable Gestaltung des Transmissionsmusters, welches beispielsweise flexibel an die Geometrie und an die Abmessungen der Kartusche angepasst werden kann. Von Vorteil ist hierbei, dass der Code an einem randseitigen Gehäuseabschnitt der Kartusche vorgesehen sein kann. Diese Anordnung des Codes ist vorteilhaft, da er somit außerhalb eines für die Getränkesubstanz vorgesehenen Aufnahmebereichs der Kartusche angeordnet ist, der für optische Transmissionsmessungen aufgrund des dort vorhandenen Getränkepulvers ungeeignet erscheint. Der randseitige Gehäuseabschnitt für den Code kann hierbei insbesondere als Randfortsatz ausgebildet sein, der gleichzeitig als Griff oder Griffflasche für die Kartusche dienen kann.

Nach einer besonders vorteilhaften Ausgestaltung der Erfindung weist der für den Code vorgesehene Gehäuseabschnitt vordefinierte Perforationen auf. Die Anordnung und Größe der einzelnen Löcher bzw. Perforationen ist hierbei an die Konfiguration der Strahlungsemitter bzw. Strahlungsdetektoren der Brühvorrichtung bzw. deren Erkennungseinheit angepasst. Bei einer in die Brühvorrichtung eingesetzten Kartusche kommen die gehäuseseitigen Perforationen der Kartusche deckungsgleich mit den an der Vorrichtung vorgesehenen Aperturen für die transmittierte und von den Emittern erzeugte Strahlung zu liegen.

Die in dem Gehäuseabschnitt vorgesehenen und vordefinierten Perforationen tragen hierbei im Wesentlichen keine Codeinformationen. Sie bilden vielmehr Basiselemente bzw. Informationsbits für die an der Kartusche anzubringende Codeinformation.

So ist insbesondere vorgesehen, dass die am Gehäuseabschnitt vordefinierten Perforationen mit zumindest einer Schicht überzogen sind, die in Form eines ortskodierten Transmissionsmusters die Codeinformation trägt.

Nach einer bevorzugten Ausführungsform ist diese die Perforationen des Gehäuses überziehende Schicht als perforierte Folie ausgebildet, wobei die Folienperforationen mit den Gehäuseperforationen im Wesentlichen deckungsgleich sind.

Nach einer alternativen Ausgestaltung kann die Codeinformation auch in Form von verschlossenen oder verfüllten Gehäuseperforationen ortskodiert vorliegen. Anstelle eines Folienüberzugs können zur Codeinformationsspeicherung auch einzelne der vordefinierten Gehäuseperforationen verfüllt oder anderweitig verschlossen werden.

Dieses auf einer Folie oder Verfüllung basierende Aufbringen einer Codeinformation an der Kartusche hat den Vorteil, dass für Kartuschen mit unterschiedlicher Getränkesubstanz ein gemeinsamer Gehäusetyp mit gleichen vordefinierten Perforationen verwenden werden kann. Eine kodierte Kennzeichnung der unterschiedlich befüllten Kartuschen erfolgt dann in einfacher Art und Weise lediglich durch Anbringen einer informationstragenden Schicht. Hierbei kann insbesondere vorgesehen werden, dass auch erst nach einem Anbringen einer unperforierten Schicht diese mittels Durchstoßen mit den Codeinformationen versehen wird.

Nach einer weiteren bevorzugten Ausführungsform ist die die Codeinformation tragende Schicht gleichzeitig als Verschluss für die Kartusche ausgebildet. Dem beispielsweise in Form einer Folie ausgebildeten Kartuschenverschluss kommt hierbei eine Doppelfunktion zu. Ein zusätzliches Aufbringen einer informationstragenden Schicht kann daher in vorteilhafter Weise entfallen.

Weiterhin ist vorgesehen, dass das Kartuschengehäuse als Kunststoffspritzteil ausgebildet ist. Solche Kunststoffspritzteile sind in hoher Stückzahl mit beliebiger Geometrie, insbesondere mit den vordefinierten Perforationen kostengünstig herstellbar.

Von Vorteil ist weiterhin die als Verschluss und/oder als Informationsträger dienende perforierte Folie als Metallfolie ausgebildet. Die Kombination von Kunststoffspritzteil und Metallfolie ermöglicht einen luftdichten und hermetischen Verschluss für die Kartusche, was sich positiv auf die Qualität und Haltbarkeit der in der Kartusche aufgenommenen Getränkesubstanz auswirkt.

Nach einem weiteren unabhängigen Aspekt betrifft die Erfindung ein Verfahren zur Herstellung der erfindungsgemäßen Kartusche. Hierbei wird ein Kartuschengehäuse, welches randseitige Perforationen aufweist, mit einer Getränkesubstanz gefüllt und anschließend mit einer die randseitigen Perforationen überdeckenden Schicht überzogen. Im Bereich der Gehäuseperforationen wird die Überzugsschicht dem an der Kartusche anzubringenden Code entsprechend durchstoßen. Folglich entsteht an einem randseitigen Gehäuseabschnitt der Kartusche ein Loch- oder Transmissionsmuster, welches optisch in Transmissionsgeometrie von einer Brühvorrichtung ausgelesen werden kann. Die optische Erkennung eines solchen Transmissionsmusters kann mit einfachen optischen Detektoren, wie etwa Fotodioden erfolgen.

Von Vorteil wird das Kartuschengehäuse mittels eines Kunststoffspritzprozesses hergestellt, der in kostenneutraler Art und Weise die Erzeugung der randseitigen Gehäuseperforationen ermöglicht. Zudem sind derartige Kunststoffspritzprozesse für eine kostengünstige Massenproduktion von Kartuschengehäusen gut geeignet.

Weiterhin ist vorgesehen, dass sowohl der für die Getränkesubstanz vorgesehene Bereich der Kartusche als auch der die Perforationen aufweisende Randbereich des Kartuschengehäuses mittels einer gemeinsamen Metallfolie verschlossen und/oder überzogen werden. Das Anbringen einer den Codeinformationen entsprechend vorperforierten Folie ist demnach nicht erforderlich. Es ist vielmehr vorgesehen, dass die gesamte Kartusche zumindest einseitig mit einer einzigen Verschlussfolie überzogen wird, welche anschließend in dem randseitigen Perforationsbereich des Gehäuses dem am Gehäuse anzubringenden Code entsprechend perforiert wird.

Ausführungsbeispiele

Weitere Ziele, Vorteile, Merkmale sowie Anwendungsmöglichkeiten der vorliegenden Erfindung ergeben sich anhand der nachfolgenden Beschreibung der Figuren. Dabei bilden sämtliche beschriebenen und/oder bildlich dargestellten Merkmale in sämtlichen sinnvollen Kombination den Gegenstand der vorliegenden Erfindung, auch unabhängig von den Patentansprüchen oder deren Rückbezügen.

Es zeigen:

Figur 1 eine erfindungsgemäße Kartusche in Aufsicht und im Querschnitt,

Figur 2 den perforierten Kartuschenrand im Querschnitt in verschiedenen Stufen des Herstellungsprozesses,

Figur 3 das an der Kartusche vorgesehene Transmissionsmuster in Draufsicht,

Figur 4 eine Ausführungsform der Erkennungseinheit mit einem Emitter und mehreren Detektoren,

Figur 5 eine Ausführungsform der Erkennungseinheit, bei welcher Emitter und Detektoren an der gleichen Seite des Aufnahmebereichs angeordnet sind,

Figur 6 ein der Figur 5 entsprechendes Ausführungsbeispiel mit Reflektor,

Figur 7 ein weiteres Ausführungsbeispiel mit einem Emitter und einer Vielzahl von Detektoren,

Figuren 8a bis 8d ein Ausführungsbeispiel mit einem strahlungsbündelnden Licht- oder Wellenleiter und einem Detektor,

Figur 9 ein weiteres der Figur 7 im Wesentlichen entsprechendes Ausführungsbeispiel,

Figur 10 eine Darstellung des Ausführungsbeispiels gemäß Figur 9 im Betriebsmodus und

Figur 11 das Ausführungsbeispiel gemäß der Figuren 9 und 10 mit geöffnetem Kartuschenaufnahmebereich.

In Figur 1 ist eine im Wesentlichen kreisförmig ausgebildete Kartusche 10 mit einem umlaufenden Kartuschenrand 12 gezeigt. Der Rand 12 ist hierbei als ein sich radial nach außen erstreckender Flansch ausgebildet, während der radial innen liegende Bereich der Kartusche 10 zur Aufnahme einer Getränkesubstanz 14 vorgesehen ist und dort im Querschnitt eine

entsprechende Vertiefung aufweist. Die Oberseite der Kartusche 10 ist mit einer Schicht 16, insbesondere mit einer Metallfolie 16 überzogen. Diese überdeckt sowohl den radial innen liegenden Bereich für die Getränkesubstanz 14 als auch den umlaufenden Kartuschenrand 12.

In Figur 2 sind die aufeinanderfolgenden Schritte zur Herstellung eines am Rand 12 der Kartusche 10 vorgesehenen optischen Transmissionsmusters gezeigt. Ausgehend von einem perforierten und im Querschnitt vergrößert dargestellten Randabschnitt 12 der Kartusche 10, der einzelnen Gehäuseperforationen 18, 20, 22 aufweist, wird in einem ersten Schritt der gesamte perforierte Gehäusebereich 12 mit einer Folie 16 überzogen.

Zum Einbringen von Codeinformationen und zum Erzeugen eines optischen Transmissionsmusters wird an den dem Kartuschencode 11 entsprechenden Stellen mittels eines Prägestifts oder Stempels 24 die Folie 16 durchstoßen. Hierbei werden einzelne Folienperforationen 26 gebildet, die, wie in Figur 2 unten dargestellt, mit den Gehäuseperforationen 18 und 22 deckungsgleich sind. Die Gehäuseperforation 20 hingegen bleibt von der Folie 16 überdeckt. Aufgrund dieses fertigungsrationellen Herstellungsverfahrens für Heißgetränkekartuschen kann auf eine aufwändige Kennzeichnung, wie etwa durch Bedrucken des Kartuschengehäuses mit einem Strichcode, in vorteilhafter Weise verzichtet werden. Eine Kennzeichnung der Kartusche kann nunmehr durch einfaches Einstechen einer Folie nach einem vorgegebenen ortscodierten Muster erfolgen.

Figur 3 zeigt eine bevorzugte Anordnung eines einen Code 11 tragenden Transmissionsmusters im Randbereich 12 einer Heißgetränkkartusche 10. Die einzelnen Perforationen 18, 26 können hierbei in einer beliebigen Geometrie angeordnet sein, vorausgesetzt, dass die Erkennungseinheit der Brühvorrichtung über entsprechend angeordnete Strahlungsemitter und Strahlungsdetektoren verfügt. Die geometrische Anordnung der einzelnen Gehäuse und Folienperforationen 18, 26 kann dabei regelmäßig oder unregelmäßig geradlinig oder beliebig gekrümmt entlang des Randes 12 verlaufen. Die beliebige geometrische Anordnung einzelner Perforationen des randseitigen Transmissionsmusters 11 ermöglichen eine flexible Anpassung des Musters 11 an die Gehäusegeometrie der Kartusche 10.

Bezüglich des an der Kartusche vorgesehenen Transmissionsmusters 11 ist die Erfindung keinesfalls auf binäre Transmissionsmuster mit wahlweise perforierten oder strahlungsabsorbierenden bzw. -reflektierenden Flächenelementen beschränkt. Vielmehr können natürlich auch teiltransparente bzw. teilabsorbierende Folien 16 Verwendung finden, die ihrerseits

über der Fläche des Transmissionsmusters entweder einen homogenen oder einen über die Fläche variierenden Transmissionsgrad aufweisen. Daneben ist es auch möglich, dass die Folie 16 Flächenelemente mit unterschiedlichen spektralen Absorptions- bzw. Transmissionseigenschaften aufweist, sodass die optische Erkennung des Transmissionsmusters nicht nur monochromatisch, sondern auch über einen großen Spektralbereich, beispielsweise von UV bis Infrarot, erfolgen kann.

Figur 4 zeigt eine Ausführungsform einer Erkennungseinheit der Brühvorrichtung, welche einen Strahlungsemitter 32 und mehrere Strahlungsdetektoren 28, 34, 36, 38 aufweist. Der Strahlungsemitter 32, der beispielsweise als lichtemittierende Diode (LED) ausgebildet ist, emittiert vorzugsweise Strahlung 30 im sichtbaren oder infraroten Spektralbereich. Der Strahlungsemitter 32 ist in der in Figur 4 gezeigten Konfiguration oberhalb eines Kartuschenbereichs 60 angeordnet, in welchen die Kartusche zur Getränkezubereitung platziert wird.

Die Kartusche ist in dieser Abbildung nicht explizit dargestellt. Gezeigt sind lediglich deren mit Folie 16 überzogener Kartuschenrand 12 im Querschnitt. Nach unten ist der Kartuschenbereich 60 vom Gehäuse 27 begrenzt, in welchem die einzelnen Strahlungsdetektoren 28, 34, 36, 38 angeordnet sind. Das Gehäuse 27 weist entsprechend den Perforationen 18 des Kartuschenrands 12 Öffnungen auf, sodass die vom Transmissionsmuster des Kartuschenrands 12 transmittierte Strahlung zu den den Perforationen 18 zugeordneten Detektoren 28, 34, 36, 38 propagieren kann.

Zur besseren optischen Kopplung der Perforationen 18 des Kartuschenrands 12 und den einzelnen Detektoren 28, 34, 36, 38 sind in den für das transmittierte Licht vorgesehenen Durchtrittsöffnungen des Gehäuses 27 einzelne licht- oder wellenleitende Elemente 40, 42, 44, 46 vorgesehen. Deren oben zu liegen kommende Lichteintrittsöffnung ist im Wesentlichen deckungsgleich zu den Gehäuseperforationen 18, 20, 22 des Kartuschenrands 12.

Aufgrund der Perforation 26 der Folie 16 können im dargestellten Beispiel lediglich die Detektoren 34 und 38 eine vom Transmissionsmuster transmittierte Strahlungsintensität detektieren.

Figur 5 zeigt eine weitere Ausführungsform der optischen Erkennungseinheit für die auswechselbare Kartusche. Hierbei sind die Strahlungsdetektoren 28, 34, 36, 38 und der Emitter 32 nicht an gegenüberliegenden Seiten des Aufnahmebereichs 60 angeordnet, sondern

befinden sich an der gleichen Seite, nämlich an der unteren Seite des Aufnahmebereichs 60. Um eine optische Transmissionsmessung des Transmissionsmusters zu ermöglichen, ist in dem Ausführungsbeispiel nach Figur 5 eine licht- oder strahlungsleitende Struktur 48 vorgesehen. Diese ist im Wesentlichen L-förmig, sichelartig oder bogenartig ausgebildet.

Die vom Emitter 32 emittierte Strahlung 30 wird seitlich in den Licht- oder Wellenleiter 48 eingekoppelt, welcher die eingekoppelte Strahlung schließlich von oben auf das Transmissionsmuster der Kartusche richtet. Gegenüber Figur 4 ist eine Konfiguration, bei welcher sowohl Strahlungsemitter als auch die Strahlungsdetektoren an der gleichen Seite des Aufnahmebereichs 60 angeordnet sind, von Vorteil, da sämtliche elektrische sowie lichterzeugende und lichtdetektierende Komponenten an einer Seite des verschwenkbar oder zumindest verstellbar ausgebildeten Kartuschenbereichs 60 angeordnet sind. Eine Ansteuereinheit bzw. elektrische Komponenten zur Auswertung der optischen Signale können somit räumlich zusammengeführt und somit sogar in einem gemeinsamen Modul integriert werden. Dies ist hinsichtlich des Platzbedarfs, der Wartungsfreundlichkeit der Vorrichtung sowie aus Kostengründen von Vorteil.

Figur 6 zeigt ein weiteres Ausführungsbeispiel für die Vorrichtung zur Erkennung der auswechselbaren Kartusche. Hier sind insgesamt zwei Emitter 32 vorgesehen, die seitlich des Aufnahmebereichs 60 für die Kartusche 10 angeordnet sind. An dem dem Gehäuse 27 gegenüberliegenden Abschnitt des Kartuschenbereichs 60 ist ein Reflektor 50, beispielsweise in Form eines Hohlspiegels, vorgesehen. Dieser erfüllt eine ähnliche Aufgabe wie der Licht- oder Wellenleiter 48 gemäß Figur 5. Das von den Emittern 32 emittierte Strahlungsfeld wird vom Reflektor 50 nach unten reflektiert, sodass die Perforationen 18, 26 der Kartusche in Transmissionsgeometrie von den Detektoren 28, 34, 36, 38 detektiert werden können.

In Figur 7 ist schließlich eine der Figur 5 ähnliche Konfiguration von Gehäuse 27, Aufnahmebereich 60 und Licht- oder Wellenleiter 48 dargestellt. Im Unterschied zum Ausführungsbeispiel gemäß Figur 5 sind hier jedoch mehrere Emitter 32, 52, 54, 56 innerhalb des Gehäuses 27 und unterhalb des Transmissionsmusters der Kartusche 10 angeordnet. Der Detektor 28 befindet sich seitlich des Aufnahmebereichs 60 für die Kartusche 10 und wird von der in den Lichtleiter 48 eingekoppelten und von der Kartusche transmittierten Strahlung gespeist.

Die Anordnung von Detektoren 28, 34, 36, 38 und Emittern 32, 52, 54, 56 sind in den Ausführungsbeispielen gemäß der Figuren 5 und 7 quasi vertauscht. Ebenso propagiert die er-

zeugte Strahlung in den licht- oder strahlungsleitenden Strukturen 40, 42, 44, 46, 48 in umgekehrte Richtungen. Das beispielsweise vom Emitter 52 emittierte Strahlungspaket propagiert durch den Lichtleiter 42 und durch das Transmissionsmuster des Kartuschenrandes 12 hindurch, wonach es in die lichtleitende Struktur 48 eingekoppelt und letztlich seitlich zum Detektor 28 geführt wird.

Gegenüber Figur 5 ist die Konfiguration nach Figur 7 insoweit von Vorteil, dass lediglich ein einziger - im Vergleich zu Emittern kostenintensiverer - Detektor 28 zur Erkennung des Transmissionsmusters erforderlich ist.

Zum ortsaufgelösten Auslesen des an der Kartusche 10 vorgesehenen Transmissionsmusters sind bei dem Ausführungsbeispiel gemäß Figur 7 im Wesentlichen zwei Betriebsmodi denkbar.

Zum einen kann vorgesehen werden, dass die einzelnen Emitter 32, 52, 54, 56 verschiedene Strahlungsleistungen aufweisen. Insbesondere, wenn sich die zur Verfügung stehenden Strahlungsleistungen zwischen benachbarten Emitter 32, 52, 54, 56 verdoppeln, ist eine eineindeutige Zuordnung jedweden binären Transmissionsmusters durch bloße Detektion der in den Lichtleiter 48 eingekoppelten und vom Muster transmittierten Gesamtintensität möglich. Unter einem binären Transmissionsmuster sind in diesem Zusammenhang diskrete Transmissionswerte entweder von 0 oder 1 zu verstehen.

Ein weiterer Betriebsmodus der Ausführungsform gemäß Figur 7 ist in den Figuren 8a bis 8d verdeutlicht. Auch hier ist ein einziger Detektor in Kombination mit einer Vielzahl strahlungsemittierender Elemente 32, 52, 54, 56 vorgesehen. Ähnlich wie der Licht- oder Strahlungsleiter 48 gemäß Figur 7 ist in den Figuren 8a bis 8d ein Licht- bzw. Strahlungskoppler 58 vorgesehen, in welchem die vom Gehäuserand 12 transmittierte Strahlung eingekoppelt und stets zum gleichen Detektor 28 geführt wird.

Die einzelnen Figuren 8a bis 8d zeigen jeweils Momentaufnahmen einer zeitlich versetzten Aktivierung einzelner Emitter 32, 52, 54, 56. In Figur 8a detektiert der Detektor 28 die vom Emitter 32 emittierte Strahlung. In Figur 8b propagiert die vom Emitter 52 erzeugte Strahlung, während in Figur 8c die Strahlung des Emitters 54 durch die wellenleitende Struktur 58 zum Detektor 28 hingeführt ist. Lediglich in Figur 8d ist die Strahlpropagation der vom Emitter 56 erzeugten Strahlung durch das am Kartuschenrand 12 vorgesehene Transmissionsmuster unterbrochen. In diesem Fall kommt keine ausreichende Strahlungsintensität am

Detektor an. Die mit dem Emitter 32, 52, 54, 56 und dem Detektor 28 gekoppelte Erkennungseinheit wird daher in den Fällen der Figuren 8a bis 8c eine logische 1 setzen, während der Fall gemäß Figur 8d eine logische 0 ergibt. Auf diese Art und Weise erhält man den binären Code 1,1,1,0.

Figur 9 zeigt ein im Wesentlichen der Figur 7 entsprechendes Ausführungsbeispiel in einer schematischen Darstellung. Hier sind insgesamt sechs Einzelemitter und ein einziger Detektor 28 vorgesehen. Der Aufnahmebereich 60 für die Kartusche ist hier nach unten vom Gehäuse 27 und nach oben von einem schwenkbaren Deckel 62 begrenzt. Der Lichtleiter 48 ist hierbei mechanisch an den Deckel 62 gekoppelt. Bei dem in den Figuren 9 und 10 geschlossenen Deckel 62 wird zumindest eine minimale Strahlungsleistung in den Wellen- oder Lichtleiter 48 eingekoppelt, sodass am Detektor 28 zumindest eine minimale Lichtintensität detektiert wird.

Wird der Deckel 62 etwa zur Entnahme oder zum Einsetzen einer Kartusche, wie in Figur 11 dargestellt, geöffnet, so verändert sich die Strahlungskopplung zwischen dem Licht- oder Wellenleiter 48 und dem Detektor 28 gravierend. Im Vergleich zu den Konfigurationen gemäß der Figuren 9 und 10 wird in der Öffnungsstellung des Deckels 62 eine ungleich geringere Strahlungsintensität am Detektor 28 ankommen, die typischerweise unterhalb eines Schwellenwerts für den Betrieb der Brühvorrichtung liegt.

Anhand dieser geringen am Detektor 28 vorliegenden Strahlungsintensität erkennt das System folglich selbsttätig, dass sich der Deckel 62 in einer Öffnungsstellung befindet, sodass eine Sicherheitsabschaltung der Brühvorrichtung erfolgen kann. Das aus Strahlungsemittern und Strahlungsdetektor bzw.- detektoren bestehende Erkennungssystem für die Kartusche stellt somit auch eine sicherheitsrelevante Deaktivierung der Brühfunktion der Brühvorrichtung zur Verfügung.

Patentansprüche

1. Vorrichtung zur Zubereitung für Heißgetränke mit einer optischen Erkennungseinheit für auswechselbare Kartuschen (10), in denen eine pulverartige oder flüssige Getränkesubstanz (14) aufgenommen ist, wobei die Erkennungseinheit zum Auslesen eines an den Kartuschen (10) vorgesehenen Codes (11) zumindest einen Strahlungsemitter (32, 52, 54, 56) und zumindest einen Strahlungsdetektor (28, 34, 36, 38) aufweist, dadurch gekennzeichnet, dass die optische Erkennungseinheit zum Auslesen des als optisches Transmissionsmuster vorliegenden Codes (11) ausgebildet ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass der Detektor (28, 34, 36, 38) zur Detektion der vom Emitter (32, 52, 54, 56) erzeugbaren und vom Transmissionsmuster transmittierten Strahlung (30) angeordnet ist.

3. Vorrichtung nach einem der Ansprüche 1 oder 2, dadurch gekennzeichnet, dass die optische Erkennungseinheit zum Auslesen eines als zweidimensionalen Transmissionsmuster vorliegenden Codes (11) vorgesehen ist.

4. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die Strahlungsemitter (32, 52, 54, 56) und/oder Strahlungsdetektoren (28, 34, 36, 38) im Wesentlichen zweidimensional der Struktur und/oder Geometrie des Transmissionsmusters (11) entsprechend angeordnet sind.

5. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass der zumindest eine Strahlungsemitter und der zumindest eine Strahlungsdetektor (28, 34, 36, 38) an gegenüberliegenden Seiten eines für die Kartusche (10) vorgesehenen Aufnahmebereichs (60) angeordnet sind.

6. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche 1 bis 4, dadurch gekennzeichnet, dass der zumindest eine Strahlungsemitter (32, 52, 54, 56) und der zumindest eine Strahlungsdetektor (28, 34, 36, 38) an der gleichen Seite des für die Kartusche (10) vorgesehenen Aufnahmebereichs (60) angeordnet sind.

7. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass zur Übertragung der vom Emitter (32, 52, 54, 56) erzeugbaren optischen Strahlung (30) zum Transmissionsmuster und/oder zur Übertragung der vom

Transmissionsmuster transmittierten Strahlung (30) zum Detektor optische Führungsmittel (40, 42, 44, 46, 48) vorgesehen sind.

8. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche 6 oder 7, dadurch gekennzeichnet, dass an der den Emittern (32, 52, 54, 56) und Detektoren (28, 34, 36, 38) gegenüberliegenden Seite des Aufnahmebereichs (60) zumindest ein Reflektor (50) angeordnet ist.

9. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche 6 bis 8, dadurch gekennzeichnet, dass der zumindest eine Emitter (32) außerhalb des für die Kartusche (10) vorgesehenen Aufnahmebereichs (60) zu liegen kommt und zur Beaufschlagung der vom zumindest einen Detektor (28, 34, 36, 38) abgewandten Kartuschenseite mit Strahlung (30) ein im Wesentlichen sichelartig, bogenartig oder L-förmig ausgebildeter Licht- oder Wellenleiter (48) vorgesehen ist.

10. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche 6 bis 8, dadurch gekennzeichnet, dass der zumindest eine Detektor (28) außerhalb des Aufnahmebereichs (60) angeordnet ist und zur Übertragung der vom Transmissionsmuster der Kartusche (11) transmittierten Strahlung (30) zum Detektor (28, 34, 36, 38) ein im Wesentlichen sichelartig, bogenartig oder L-förmig ausgebildeter Licht- oder Wellenleiter (48) an der dem Emitter (32) gegenüberliegenden Seite des Aufnahmebereichs (60) vorgesehen ist.

11. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die über die Fläche des Transmissionsmusters (11) transmittierte Strahlung (30) mittels einer die Strahlung bündelnden und/oder zusammenführenden Lichtleiterstruktur (58) dem zumindest einen Detektor (28, 34, 36, 38) zuführbar ist.

12. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass wenigstens zwei Emitter (32, 52, 54, 56) mit unterschiedlicher Strahlungsintensität vorgesehen sind.

13. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die Vorrichtung zu einem zeitlich versetzten Aktivieren einzelner Strahlungsemitter (32, 52, 54, 56) ausgebildet ist.

14. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass eine Öffnungsstellung des Aufnahmebereichs (60) mittels des zumindest einen Detektors (28, 34, 36, 38) und des zumindest einen Emitters (32, 52, 54, 56) detektierbar ist.

15. Verfahren zur optischen Erkennung von in Vorrichtungen zur Heißgetränkezubereitung einsetzbaren Kartuschen (10), in welchen eine pulverartige Getränkesubstanz (14) aufgenommen ist, wobei ein an den Kartuschen vorgesehener Code (11) mit von zumindest einem Strahlungsemitter (32, 52, 54, 56) erzeugter Strahlung (30) beaufschlagt wird, dadurch gekennzeichnet, dass die vom Code (11) transmittierte Strahlung (30) mittels zumindest eines Strahlungsdetektors (28, 34, 36, 38) detektiert wird.

16. Verfahren nach Anspruch 15, dadurch gekennzeichnet, dass die vom zweidimensional ausgebildeten Code (11) transmittierte Strahlung (30) ortsaufgelöst detektiert wird.

17. Verfahren nach Anspruch 15 oder 16, dadurch gekennzeichnet, dass die vom Code (11) transmittierte Strahlung (30) mittels optischer Wellen- oder Lichtleiter (48; 58) überlagert und dem zumindest einen Detektor (28, 34, 36, 38) zugeführt wird.

18. Verfahren nach Anspruch 17, dadurch gekennzeichnet, dass der Code ortsaufgelöst mit Strahlung (30) unterschiedlicher Intensität beaufschlagt wird und eine Erkennung der Kartusche (10) anhand der detektierten Gesamtstrahlungsintensität erfolgt.

19. Verfahren nach einem oder mehreren der vorhergehenden Ansprüche 15 bis 18, dadurch gekennzeichnet, dass unterschiedliche Abschnitte des Codes (11) in zeitlicher Abfolge mit Strahlung (30) beaufschlagt werden.

20. Kartusche zur Zubereitung für Heißgetränke, die eine pulverartige Getränkesubstanz enthält, mit einem optisch auslesbaren Code (11) zur maschinellen Erkennung der Kartusche (10), dadurch gekennzeichnet, dass der Code (11) als optisches Transmissionsmuster ausgebildet ist.

21. Kartusche nach Anspruch 20, dadurch gekennzeichnet, dass der Code (11) als zweidimensionales Transmissionsmuster ausgebildet ist.

22. Kartusche nach Anspruch 20 oder 21, dadurch gekennzeichnet, dass der Code (11) an einem randseitigen Gehäuseabschnitt (12) der Kartusche (10) vorgesehen ist.

23. Kartusche nach einem oder mehreren der Ansprüche 20 bis 22, dadurch gekennzeichnet, dass der für den Code (11) vorgesehene Gehäuseabschnitt (12) vordefinierte Perforationen (18, 20, 22) aufweist.

24. Kartusche nach Anspruch 23, dadurch gekennzeichnet, dass die einzelnen Perforationen (18, 20, 22) mit zumindest einer Schicht (16) überzogen sind, die in Form eines ortskodierten Transmissionsmusters die Codeinformation (11) trägt.

25. Kartusche nach Anspruch 24, dadurch gekennzeichnet, dass die Schicht als perforierte Folie (16) ausgebildet ist, wobei die Folienperforationen (26) mit den Gehäuseperforationen (18, 20, 22) im Wesentlichen deckungsgleich sind.

26. Kartusche nach einem oder mehreren der vorhergehenden Ansprüche 20 bis 25, dadurch gekennzeichnet, dass die Codeinformation (11) in Form von verschlossenen oder verfüllten Gehäuseperforationen (18, 20, 22) ortskodiert vorliegt.

27. Kartusche nach einem oder mehreren der vorhergehenden Ansprüche 24 bis 26, dadurch gekennzeichnet, dass die die Codeinformation (11) tragende Schicht (16) gleichzeitig als Verschluss der Kartusche (10) ausgebildet ist.

28. Kartusche nach einem oder mehreren der vorhergehenden Ansprüche 20 bis 27, dadurch gekennzeichnet, dass das Kartuschengehäuse (12) als Kunststoffspritzteil ausgebildet ist.

29. Kartusche nach einem oder mehreren der vorhergehenden Ansprüche 25 bis 28, dadurch gekennzeichnet, dass die perforierte Folie (16) als Metallfolie ausgebildet ist.

30. Verfahren zur Herstellung einer Kartusche nach einem oder mehreren der vorhergehenden Ansprüche 20 bis 29, dadurch gekennzeichnet, dass ein randseitige Perforationen (18, 20, 22) aufweisendes Kartuschengehäuse (12) mit der Getränkesubstanz (14) gefüllt und mittels einer die Perforationen (18, 20, 22) überdeckenden Schicht (16) überzogen wird, die im Bereich der Gehäuseperforationen (18, 20, 22) dem aufzubringenden Code (11) entsprechend durchstoßen wird.

31. Verfahren nach Anspruch 30, dadurch gekennzeichnet, dass das Kartuschengehäuse (12) mittels eines Kunststoffspritzprozesses hergestellt wird.

32. Verfahren nach einem der vorhergehenden Ansprüche 30 oder 31, dadurch gekennzeichnet, dass sowohl der für die Getränkesubstanz (14) vorgesehene Bereich als auch der die Perforationen (18, 20, 22) aufweisende Randbereich (12) des Kartuschengehäuses mittels einer Metallfolie (16) verschlossen und/oder überzogen werden.

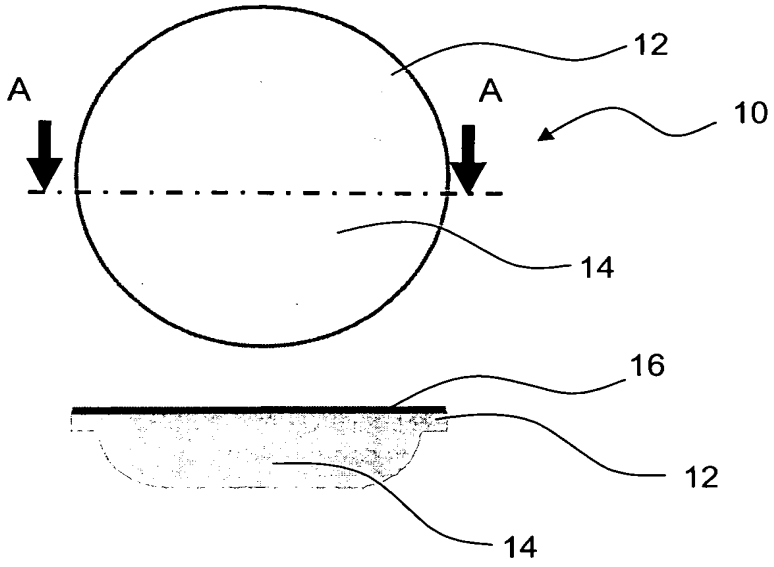


Fig. 1

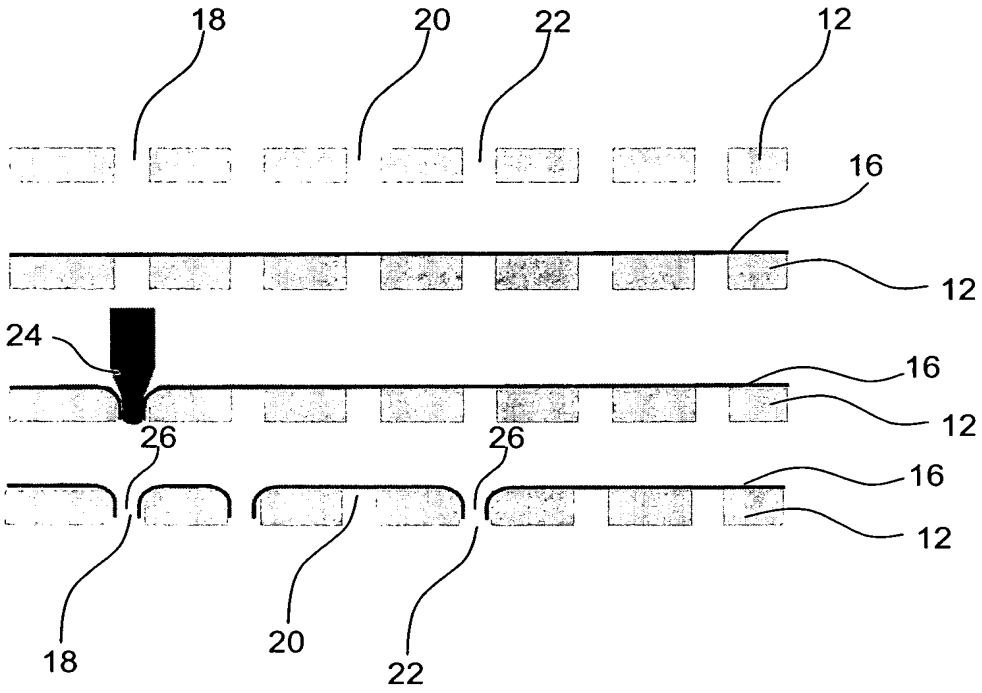


Fig. 2

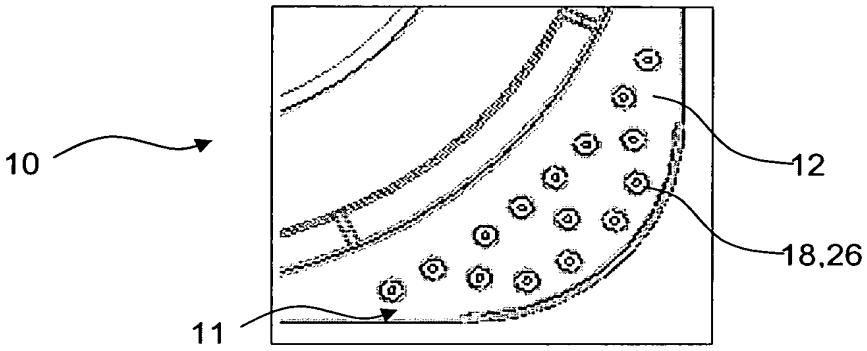


Fig. 3

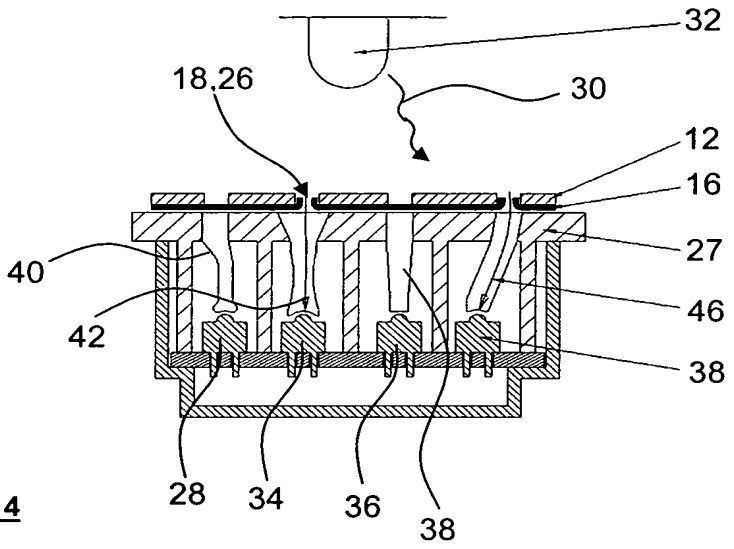

32
18,26
30
12
16
27
40
46
42
38
28
34
36
38

Fig. 4

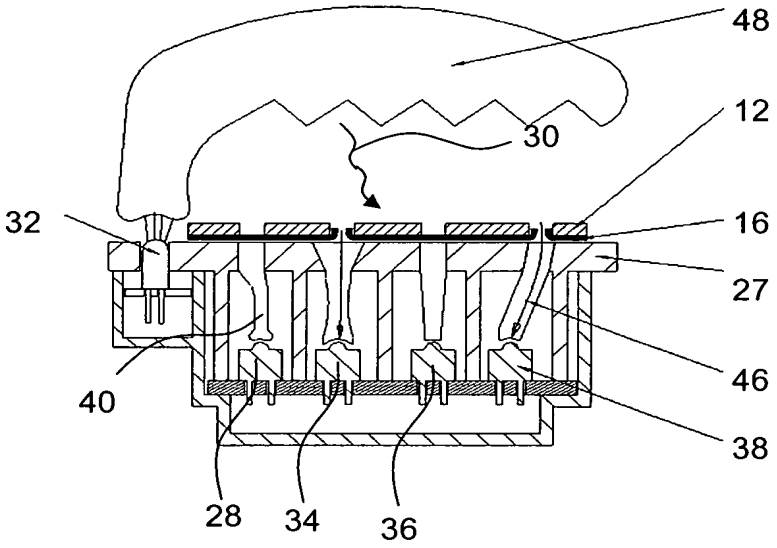

48
30
12
32
16
27
46
40
38
28
34
36

Fig. 5

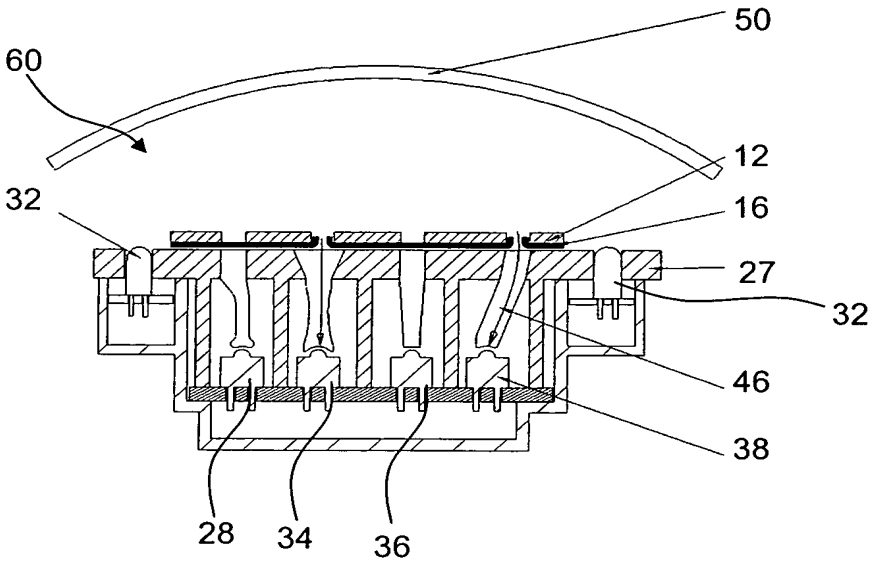

50
60
12
32
16
27
32
46
38
28
34
36

Fig. 6

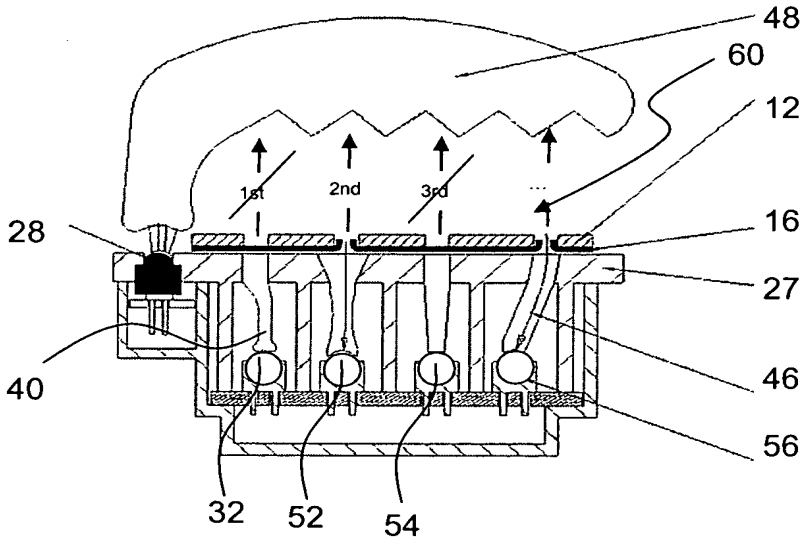

48
60
12
1st
2nd
3rd
...
28
16
27
40
46
56
32
52
54

Fig. 7

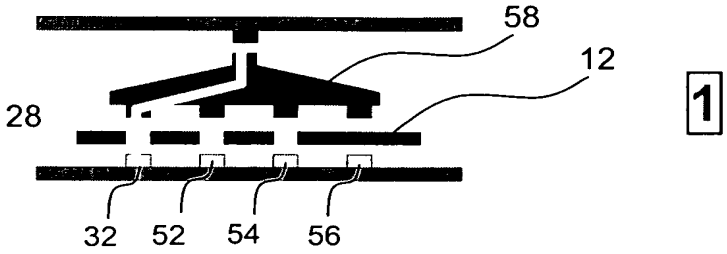


Fig. 8a

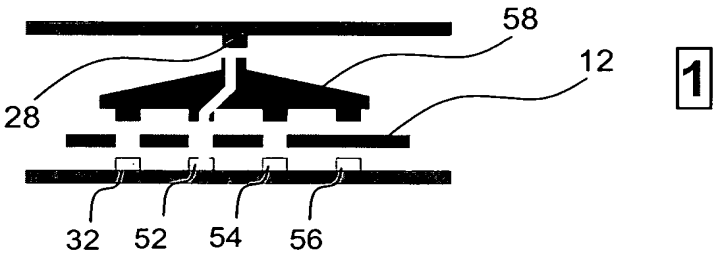


Fig. 8b

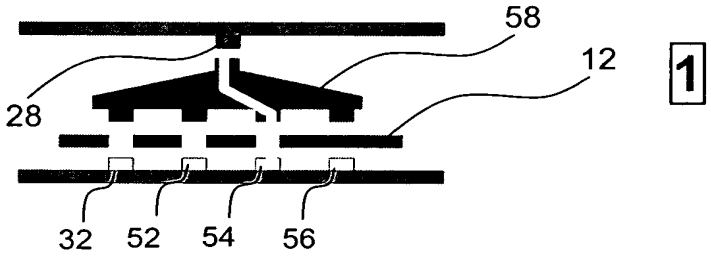


Fig. 8c

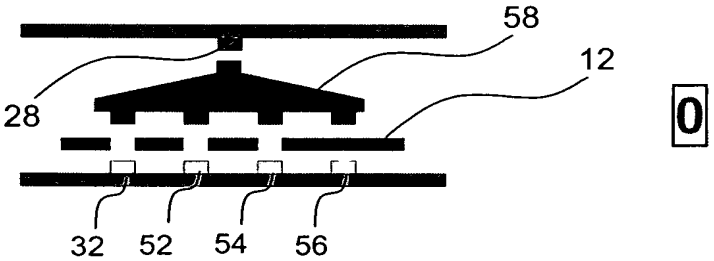


Fig. 8d

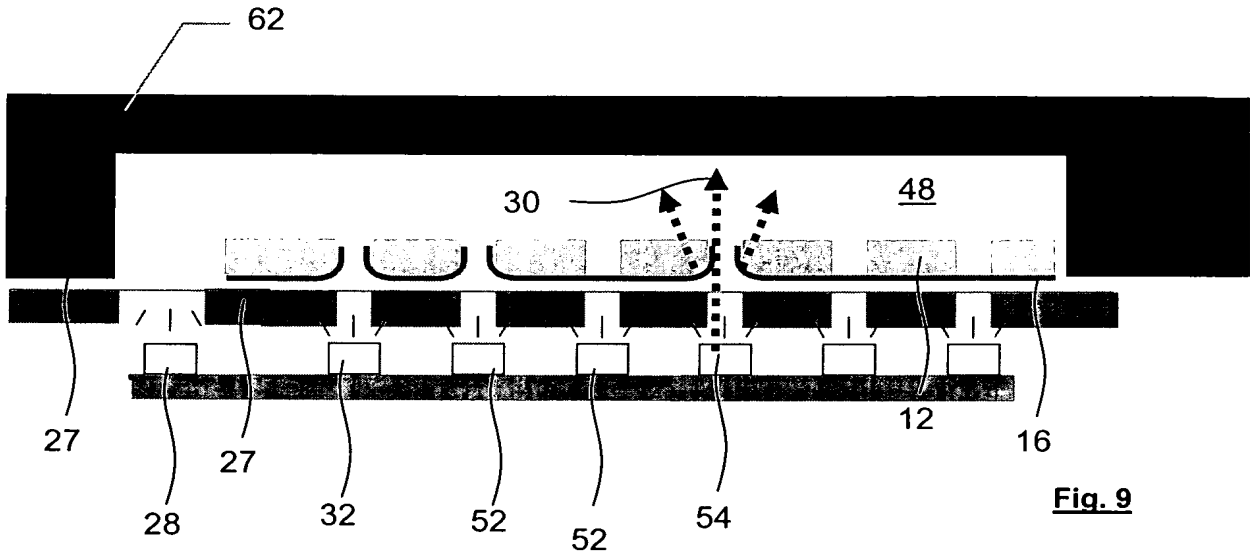


Fig. 9

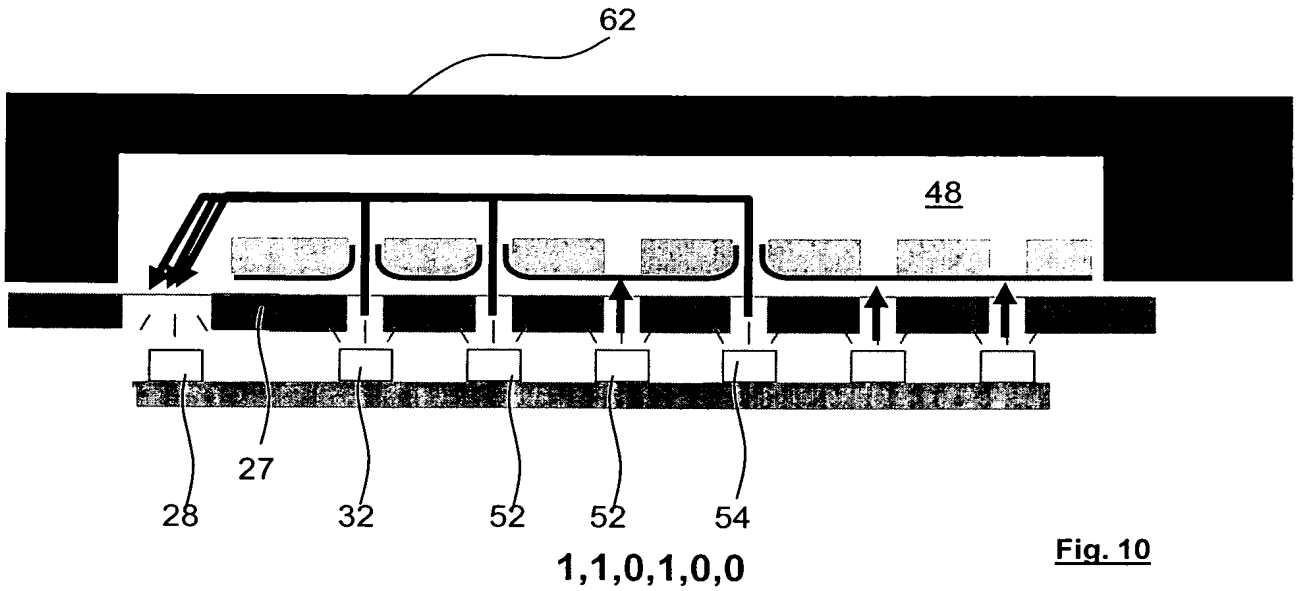


Fig. 10

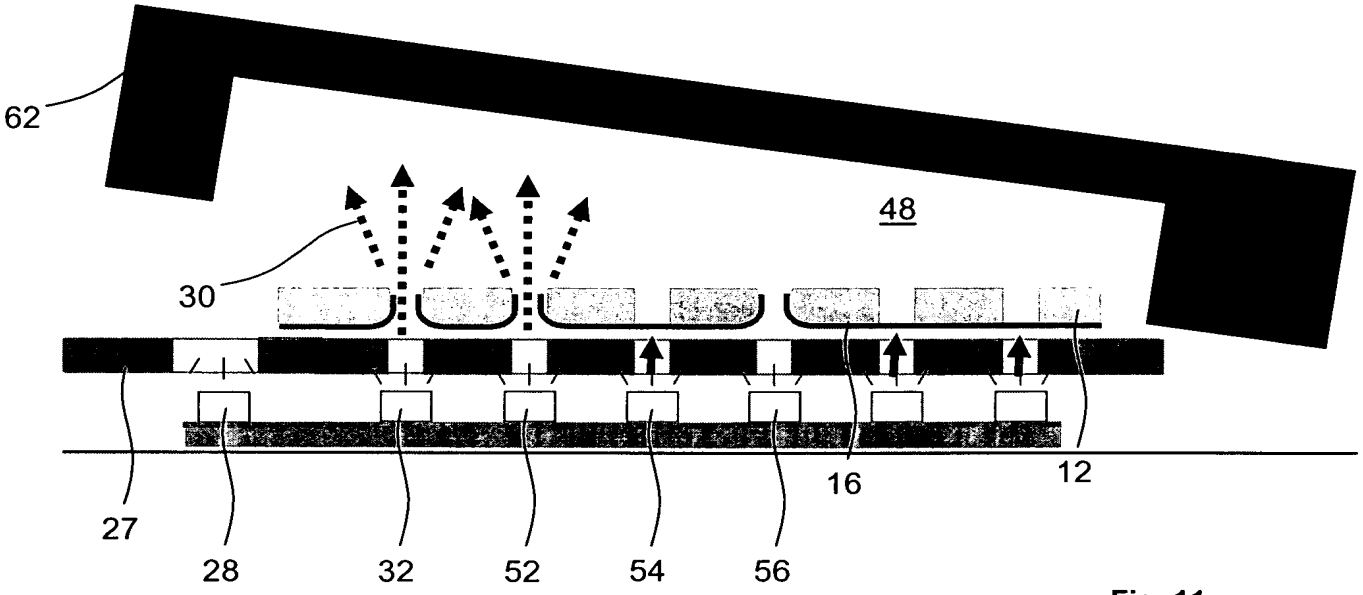


Fig. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2006/012529

A. CUASSIFICATION OF SUBJECT MATTER
INV . A47J31/40 B65D85/804

According to International Patent Classification (IPC) orto both national Classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (Classification System followed by Classification Symbols)
A47J B65D

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

Etectronic data basβ conεulted durlng the international search (name of data base and, where practlcal, search terms uεed)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Crtation of document, with indication, where appropnate, of the relevant passages	Relevant to Claim No
P,X	DE 20 2006 007056 U1 (KONINKL PHILIPS ELECTRONICS NV [NL]) 12 October 2006 (2006-10-12)	1-3,5,6, 8,15, 20-22,26
P,A	Paragraph [0039]; figures 7-9	3,4,16
P,X	WO 2006/032564 A (CIE MEDITERRANEENNE DES CAFES [FR]; BLANC JEAN-PIERRE [FR]; FERRIER CH) 30 March 2006 (2006-03-30) page 5, paragraphs 59-61,69-71; figures 1,3,4	1,2,5, 15,20,22
X	WO 02/28241 A (BOYD COFFEE CO [US]) 11 April 2002 (2002-04-11) cited in the application	20-23,26
A	page 7, lines 14-20 - page 7; figures 2h, 3	1-3,15, 16

-/--

[X] Further documents are listed in the continuation of Box C

[X] See patent family annex

* Special categoπes of cited documθnts

"A" document defining the general State of the art which ιs not considered to bθ of particular relevance

"E" earlier document bul published on orafter the international filmg date

"L" document which may throw doubts on pnonty claim(s) or which ιs citθd to establiεh the publication date of another citation or other special reason (as specified)

"O" document referrlng to an oral disclosure use exhibrtion or other means

"P" document published pnor to the international filiπg date but later than the prlority date claimed

"T" later document published after the international filing date or pnonty date and not in conflict with the application but cited to understand the pπnciple or theory underlymg the invention

"X" document of particular relevance the claimed invention cannot be considered novel or cannot be considered to involve an inventive step whe π the document ιs taken alone

"Y" document of particular relevance, the claimed invention cannot bθ considered to involve an mventive step when the document ιs ∞ mbined with one or more other such docu¬ments such combination bemg obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completlon of the international search	Date of mailing of the international search reporl
3 Apri l 2007	12/04/2007

Name and mailing address of the ISA/	Authoπzed officer
European Patent Office, P B 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel (+31-70) 340-2040, Tx 31 651 epo nl, Fax (+31-70) 340-3016	Novel 1i , Bruno

Form PCT/ISA/210 (εeoond shest) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2006/012529

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Gitation of document, with indicatiπ, where appropriate, of the relevant passages	Relevant to Claim No.
X	EP O 449 533 A (GEN FOODS KRAFT LTD [GB]) 2 October 1991 (1991-10-02) col umn 4 , lines 3-9	20,21
A	col umn 5 , lines 8,9,33-37	1,3,15, 16,23, 28,29

Form P0T/ISA/210 (contInuation of second shs βt) (April 2005)

K-FEE SYSTEM GMBH, EX2009, page 1192
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2006/012529

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202006007056 U1	12-10-2006	NONE	
WO 2006032564 A	30-03-2006	FR 2874164 A1	17-02-2006
WO 0228241 A	11-04-2002	AU 1148902 A	15-04-2002
EP 0449533 A	02-10-1991	CA 2039244 A1	01-10-1991
		JP 4224715 A	14-08-1992

K-FEE SYSTEM GMBH, EX2009, page 1193
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2006/012529

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
INV. A47J31/40 B65D85/804

Mach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC

B BECHERCHIERTE GEBIETE

Recherchierter Mmdestprufstoff (Klassifikationssystem und Klassifikationssymbole)
A47J B65D

Recherchierte, aber nicht zum Mmdestprufstoff gehörende Veröffentlichungen soweit diese unter die recherchierten Gebiete fallen

Wahrend der internationalen Recherche konsultierte elektronische Datenbank (Nams der Datenbank und evtl verwendete Suchbegπffe)
EPO-Internal

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr Anspruch Nr
P,X	DE 20 2006 007056 U1 (KONINKL PHILIPS ELECTRONICS NV [NL]) 12. Oktober 2006 (2006-10-12)	1-3,5,6, 8,15, 20-22,26
P,A	Absatz [0039]; Abbildungen 7-9	3,4,16
P,X	WO 2006/032564 A (CIE MEDITERRANEENNE DES CAFES [FR]; BLANC JEAN-PIERRE [FR]; FERRIER CH) 30. März 2006 (2006-03-30) Seite 5, Absätze 59-61,69-71; Abbildungen 1,3,4	1,2,5, 15,20,22
X	WO 02/28241 A (BOYD COFFEE CO [US]) 11. April 2002 (2002-04-11) in der Anmeldung erwähnt	20-23,26
A	Seite 7, Zeilen 14-20 - Seite 7; Abbildungen 2h,3	1-3,15, 16
	-/-	

[X] Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen [X] Siehe Anhang Patentfamilie

* Besondere Kategorien von angegebenen Veröffentlichungen
"A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist
"E" älteres Dokument, das Jedoch erst am oder nach dem internationalen Anmeldedatum veröffentlicht worden ist
"L" Veröffentlichung, die geeignet ist, einen Pπontatsanspruch zweifelhaft er¬ scheinen zu lassen, oder durch die das Veroffentlichungsdatum einer anderen im RechBichenbencht genannten Veröffentlichung belegt werden soll oder die aus einem anderen besonderen Grund angegeben ist (wie ausgeführt)
"O" Veröffentlichung, die sich auf eine mündliche Offenbarung, eine Benutzung eine Ausstellung oder andere Maßnahmen bezieht
"P" Veröffentlichung, die vor dem internationalen Anmeldedatum, aber nach dem beanspruchten Pπontatsdatum veröffentlicht worden ist
"T" Spätere Veröffentlichung, die nach dem internationalen Anmeldedatum oder dem Pnoπtatsdatum veröffentlicht worden ist und mit der Anmeldung nicht kollidiert, sondern nur zum Verständnis des der Erfindung zugrundeliegenden Prinzips oder der ihr zugrundeliegenden Theorie angegeben Ist
"X" Veröffentlichung von besonderer Bedeutung die beanspruchte Erfindung kann allein aufgrund dieser Veroffentlichung nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden
"Y" Veröffentlichung von besonderer Bedeutung, die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren anderen Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann naheliegend ist
"&" Veröffentlichung, die Mitglied dsrselben Patentfamilie ist

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
3. April 2007	12/04/2007
Name und Postanschrift der Internationalen Recherchenbehorde Europaisches Patentamt, P B 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel (+31-70) 340-2040, Tx 31 651 epo nl, Fax (+31-70) 340-3016	**Bevollmächtigter Bediensteter** Novell i , Bruno

Formblatt PCT/ISA/210 (Blatt 2) (Apr I 2005)

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2006/012529

C. (Fortsetzung) ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategone*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
X	EP 0 449 533 A (GEN FOODS KRAFT LTD [GB]) 2. Oktober 1991 (1991-10-02) Spalte 4, Zeilen 3-9	20,21
A	Spalte 5, Zeilen 8,9,33-37	1,3,15, 16,23, 28,29

Formblatt PCT/ISA/210 (Fortsetzung von Blatt 2) (April 2005)

INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichungen die zur selben Patentfamilie gehören

Internallo πales Aktenzeichen
PCT/EP2006/012529

Im Recherchenbeπcht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
DE 202006007056 U1	12-10-2006	KEINE	
WO 2006032564 A	30-03-2006	FR 2874164 A1	17-02-2006
WO 0228241 A	11-04-2002	AU 1148902 A	15-04-2002
EP 0449533 A	02-10-1991	CA 2039244 A1	01-10-1991
		JP 4224715 A	14-08-1992

K-FEE SYSTEM GMBH, EX2009, page 1196
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 764 015 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.03.2007 Bulletin 2007/12

(51) Int Cl.:
A47J 31/06 *(2006.01)*

(21) Application number: **06120604.1**

(22) Date of filing: **13.09.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **14.09.2005 IT BO20050559**

(71) Applicant: **Grimac S.r.l.**
40069 Zola Predosa (IT)

(72) Inventors:
- **Campari, Enrico Gianfranco**
40100, BOLOGNA (IT)
- **Fraboni, Beatrice**
40400, GRIZZANA MORANDI (IT)
- **Levi, Giuseppe**
40127, BOLOGNA (IT)
- **Odorici, Fabrizio**
40053, BAZZANO (IT)

(74) Representative: **Jorio, Paolo et al**
Studio Torta S.r.l.
Via Viotti, 9
10121 Torino (IT)

(54) Method for producing a coffee-based beverage and a coffee machine for implementing the method thereof

(57) The method comprises a step of introducing water into a reservoir tank (8) to a certain level, a step in which the water present in the reservoir tank (8) is taken to a temperature higher than 50°C, a step in which such temperature higher than 50°C is maintained for a time depending on the degree of hardness of the water, a step in which the temperature of the water circulating in a heat exchanger (14) is increased to a temperature from 70 to 90°C, a step of inserting a dose (17) of coffee in a chamber (16), and a step in which a pump (12) is controlled so that the water is channelled towards the chamber (16) from which the beverage is released.

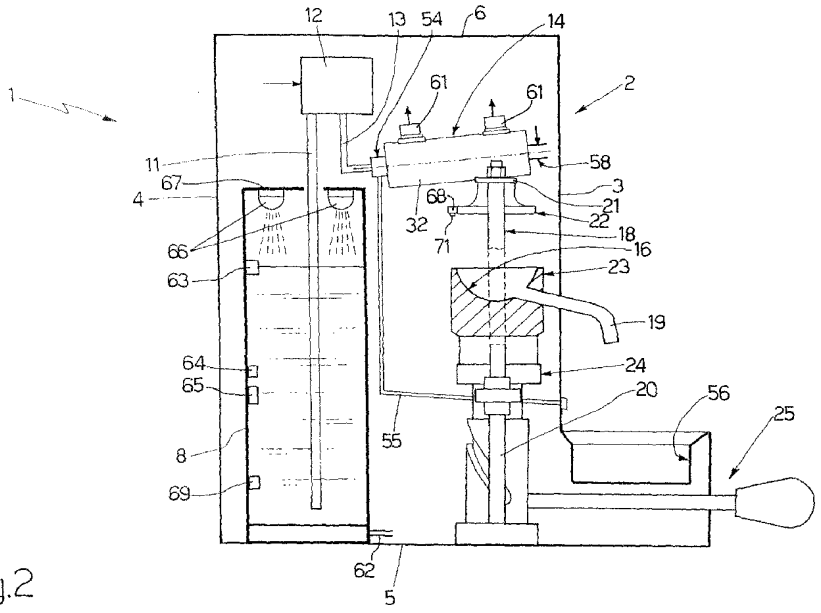


Fig.2

EP 1 764 015 A1

K-FEE SYSTEM GMBH, EX2009, page 1197
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

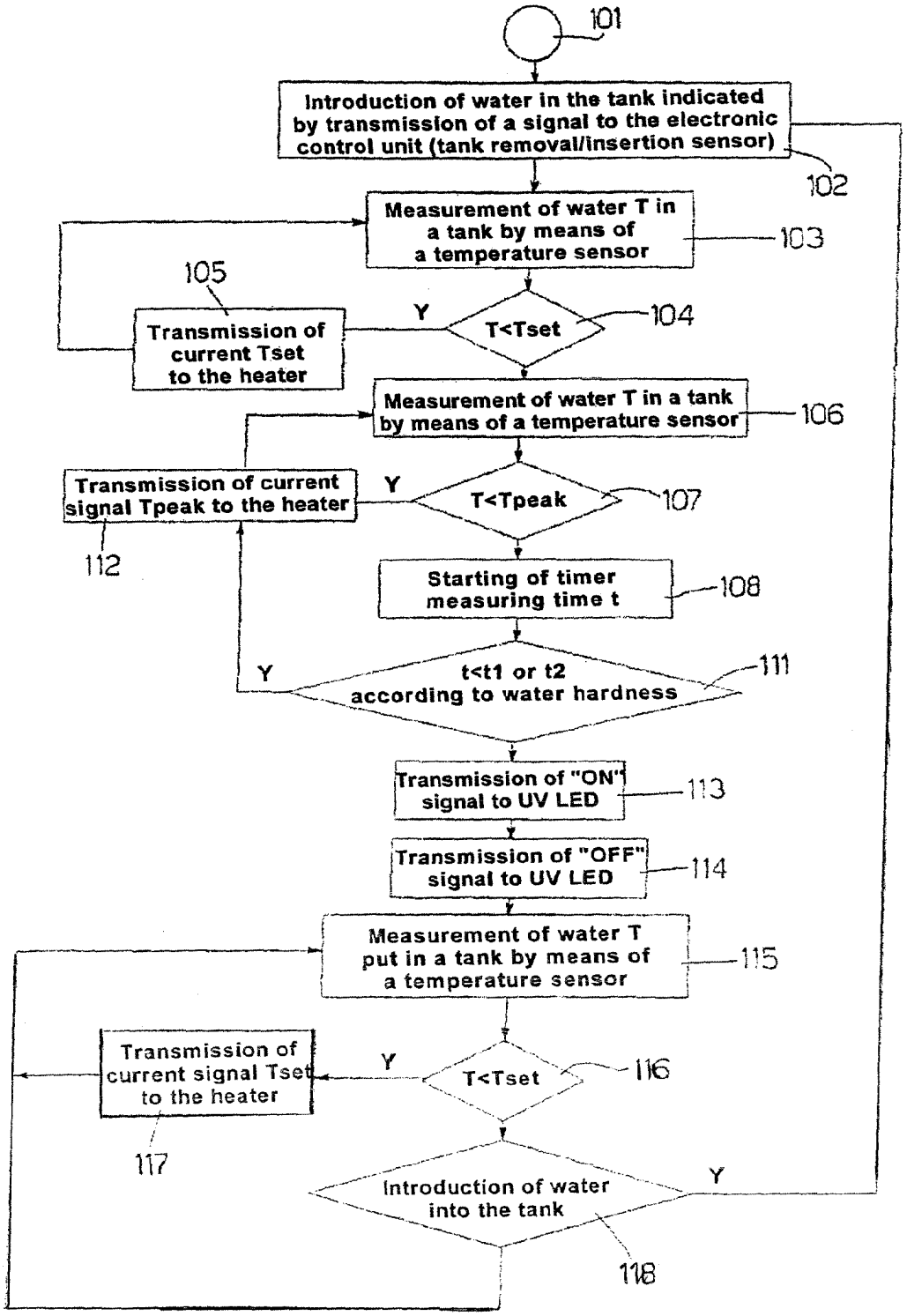


Fig.6

K-FEE SYSTEM GMBH, EX2009, page 1198
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Description

[0001] The present invention relates to a method for producing a coffee-based beverage.

[0002] The present invention also relates to a coffee machine which implements the aforesaid method.

[0003] As known, coffee machines, and in particular those for offices and homes, comprise a tank containing water, a heat exchanger, a pump adapted to take water from the reservoir tank and convey it through the heat exchanger to a chamber in which is present either a coffee wafer or a predetermined amount of coffee powder; such chamber being then provided with a nozzle through which liquid coffee is released. The heat exchanger consists of a metallic block presenting a first housing seat of an electrical resistor and a second housing seat in a body presenting a helical groove through which the water is heated and is channelled towards aforesaid chamber.

[0004] In the preparation of coffee, after powering the electrical resistor so that the heat exchanger is taken to a predetermined temperature, the water is channelled through the heat exchanger so as to take the water to a temperature of approximately 90°C. Such water flows through the coffee power so that it extracts the aromatic substances contained therein and the beverage is made. The quality of the beverage depends on a number of factors, including the quality of the coffee powder (grinding and preservation), the temperature of the water, the pressure at which the water flows through the coffee powder, and the hardness of the water which in essence is represented by the calcium content present in the water. We remark that a certain degree of water hardness is however required to make a high quality beverage and that consequently water which is non entirely calcium-free is required.

[0005] The preparation system of the beverage described above presents a plurality of drawbacks.

[0006] In particular, as concerns the temperature of the water reaching the heat exchanger, coffee machines are structured to operate in predetermined conditions and therefore the introduction of water at variable temperatures may negatively affect the extraction of aromatic substances present in the powdered coffee and consequently may negatively affect the quality of the beverage. A second drawback found in the aforesaid system consists in the ease at which lime is deposited within the heat exchanger which firstly causes the formation of scaling along the water channel and then in time fully obstructs said channel with consequent intervention at a service centre for maintenance. A third drawback found in the system described above consists in the formation in various points of the machine of bacteria colonies and mould which negatively affect the quality of the beverage and which may carry diseases. A last drawback found in coffee machines using wafers is that a previously used wafer is not recognised and a wafer may mistakenly be used several times.

[0007] It is the object of the present invention to make a method for producing a coffee-based beverage which allows to avoid the aforesaid drawbacks.

[0008] It is a further object of the present invention to make a coffee machine which implements the aforesaid method.

[0009] According to the present invention, it is obtained a method for producing a coffee-based beverage characterised in that it comprises:

- a step of introducing water into a reservoir tank up to a certain level;
- a step during which the water present in said reservoir tank is taken to a temperature higher than 50°C;
- a step during which such temperature higher than 50°C is maintained for a time depending on the degree of hardness of the water;
- a step in which the temperature is increased to a temperature higher than 70°C;
- a step of inserting a dose of coffee in a chamber; and
- a step during which the pump is controlled so that the water is channelled towards said chamber from which the beverage is released.

[0010] According to the present invention it is also made a coffee machine of the known type comprising:

- a water reservoir tank;
- a first water conduit which takes from said reservoir tank;
- a pump connected to said first conduit and from which a second conduit originates;
- a heat exchanger provided with an electrical resistor, connected to said second conduit and from which it is originated a channel adapted to convey the heated water towards a chamber where a dose of coffee is placed in use; and
- a nozzle which originates from said chamber and from which the coffee-based beverage is adapted to be released;

characterised in that said reservoir tank is provided with means adapted to increase the temperature of the water present in said reservoir tank.

[0011] The present invention will now be described with reference to the accompanying drawings which show a preferred embodiment thereof, and in which:

- figure 1 is a perspective view of a coffee machine made according to the dictates of the present invention;
- figure 2 is a block diagram with parts removed and with simplified outlines of the various components of the machine in figure 1;
- figure 3 is a magnified cross-section of a heat exchanger of the machine in figure 1;
- figure 4 is a plan view of a coffee wafer;
- figure 5 is a block diagram of an electronic control unit of the machine in figure 1; and

K-FEE SYSTEM GMBH, EX2009, page 1199
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

figure 6 is a block diagram showing some steps of operation of the machine in figure 1.

[0012] With reference to figures 1 and 2, it is indicated as a whole by 1 a coffee machine comprising a box structure 2 defined by a front wall 3, a rear wall 4, a base wall 5, an upper wall 6 and two side walls 7.

[0013] The machine 1 comprises:

a reservoir tank 8 installed within the structure 2 and containing water;
a first conduit 11 taking from the reservoir tank 8;
a pump 12 connected to the conduit 11 and from which a second conduit 13 originates;
a heat exchanger 14 connected to the second conduit 13 and from which it is originated a channel 15 adapted to convey the heated water to a chamber 16 where a coffee wafer 17 is placed in use (figure 4);
a frame 18 adapted to support at a determined level said heat exchanger 14; and
a nozzle 19 which originates from aforesaid chamber 16 and which is adapted to release liquid coffee.

[0014] The frame 18 comprises two vertical columns 20 which on one upper end support a plate 21 which in turn supports the heat exchanger 14. The chamber 16 is defined between two metallic bodies 22 and 23 of which body 22 is fastened to the heat exchanger 14 and body 23 is carried by a rod 24, by means of a displacement mechanism 25 of the known type, mobile between a lower position in which body 23 is at a distance from body 22 and an upper position in which body 23 is in contact with body 22, and a chamber 16 is defined between the same; the aforesaid nozzle 19 extending from the body 23.

[0015] The body 22 comprises an externally threaded upper segment 26 fastened in a threaded hole 27 made in the heat exchanger 14, a central segment 28, and a lower segment 31 on whose base surface a cavity is made which defines the chamber 16 with the corresponding cavity made on the upper surface of the body 23. The body 22 presents an axial through hole which forms the aforesaid channel 15 and which leads into the aforesaid cavity of segment 31.

[0016] With reference to figure 3, the heat exchanger 14 comprises an essentially cylindrical metallic body 32 presenting an axial through hole 33 accommodating an essentially cylindrical metallic body 34. The body 34 presents a first axial end portion 35 presenting in sequence a segment 36 externally threaded to the hole 33, an intermediate segment 37 presenting an annular groove within the hole 33, and a segment 38 which supports an annular seal 41. The body 34 presents a central portion 42 within the hole 33 and presenting a reduced segment 43 with external diameter smaller than the internal diameter of the hole 33 and a long segment 44 on whose external surface a helical groove 45 is made. The body 34 presents a second axial end portion 46 within hole 33 and supporting an annular seal 47. The central portion 42 defines within the hole 33 and between the seals 41 and 47 a space which is reached by water from conduit 13 through an axial hole 48 made in portion 35 and a diametrical hole 51 made in the central portion 42 at segment 43.

[0017] With reference to figure 3, the axial position of the body 34 along the hole 33 is defined by a screw 52 fastened along a threaded hole 53 made in the body 32 and presenting a shank portion which engages the annular groove defined by the segment 37. Figure 2 schematically shows a three-way union 54 in which one way is engaged along segment 36, one way is connected to conduit 13 and one way is connected to a further conduit 55 whose free end leads onto wall 3 immediately over a tank 56 underneath. Such conduit 55 channels the water possibly remained within the heat exchanger 14 towards the tank 56 while the machine 1 is not in use. This channelling is favoured by the inclined position with respect to a horizontal plane of the heat exchanger 14. In essence, the end of the hole 33 accommodating the portion 35 of the body 34 is at a lower level than the end accommodating the portion 46 and therefore the circulating water follows an upward course.

[0018] With reference to figure 3, in body 34 and more precisely in portions 42 and 46 an axial blank hole 57 is made which accommodates the electrical resistor 58. The hole 27 made in the body 32 is made near the portion of the hole 33 accommodating the portion 42 of the body 34 near the portion 46. The heat exchanger 14 is preferably provided with two sensors 61 adapted to measure the temperature, one installed in the body 32 at the segment 43 and the second installed in the body 43 at, but diametrically opposite to, the hole 27. The helical groove 45 presents a progressively decreasing depth from segment 43 to portion 46, i.e. in the direction of circulation of the water.

[0019] With reference to figure 2, the reservoir tank 8 is made of thermally insulating material and is provided within with its base wall of an electrical resistor 62. Within the reservoir tank 8 there are installed a sensor 63 positioned at a certain level and adapted to measure the exceeding of such level by the water, a sensor 64 adapted to measure the temperature of the water contained in the reservoir tank 8, a sensor 65 adapted to measure, for example by measuring the pH, the degree of hardness of the water and in essence the percentage of calcium present in the water, a sensor 69 adapted to measure whether the level of water in the reservoir tank 8 is under a predetermined level and therefore the introduction of water into the reservoir tank 8 is required, and at least one source 66 of ultraviolet light installed on an upper wall 67 of the reservoir tank and facing the water underneath. The body 22 supports a bar code reader 71 at its appendix 68. Figure 4 shows the wafer 17 which is provided with an identifying bar code 72 along its circular crown.

[0020] With reference to figure 1, the machine 1 is provided with a button 73 adapted to control the electrical

K-FEE SYSTEM GMBH, EX2009, page 1200
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

powering of an electronic control unit 74 and of the electrical resistor 58, a button 75 adapted to control the pump 12 by means of the control unit 74, an indicator light 76 adapted to indicate the electrical powering derived from the button 73, an indicator light 77 adapted to indicate the reaching of a predetermined temperature in the heat exchanger 14 measured by means of at least one of the sensors 61, and a light indicator 70 adapted to indicate that the water in the reservoir tank 8 is under a certain level.

[0021] With reference to figure 5, the control unit 74 is adapted to manage the various components of the machine 1 and in particular to control, by means of a block 78, the various actuators (pump 12, electrical resistors 58 and 62, sources 66, and indicators 70, 76 and 77) and to receive signals, by means of a block 81, from the various sensors 61, 63, 64, 65, 69 and from the reader 71. The control unit 74 comprises a counter block 79 and a memory block 82 in which there are stored the temperatures to which the water in reservoir tank 8 and in the heat exchanger 14 is taken, and in which there are stored the codes 72 of the previously used wafers 17. The control unit 74 finally comprises a block 83 for comparing the various quantities measured in the machine 1.

[0022] The surfaces of the reservoir tank 8, the internal surfaces of the structure 2 and the surfaces of the various components installed in the structure 2 are covered with a polymer-based antibacterial coating which prevents bacteria from depositing on such surfaces. For the components made in plastic instead of the coating, it may be more convenient to mix a predetermined quantity of antibacterial polymers to the plastic granules.

[0023] Figure 6 shows a water treatment cycle within the reservoir tank 8. A starting block 101 is followed by a block 102 in which water is introduced into the reservoir tank 8 until a certain level indicated by sensor 63 is reached. Block 102 is followed by block 103 in which sensor 64 measures the temperature T of the water present in the reservoir tank 8. Block 103 is followed by block 104 in which the temperature T measured by the sensor 64 is compared against a first predetermined temperature Tset which is assumed from 20 to 50°C. If the temperature of the water within the reservoir tank is lower than the aforesaid first predetermined temperature Tset, block 104 is followed by a block 105, otherwise it is followed by a block 106.

[0024] In block 105, the resistor 62 is powered and then from block 105 the method goes back to block 103. In block 106, the temperature T of the water in the reservoir tank 8 is measured again by sensor 64. Block 106 is followed by a block 107 in which the temperature T measured by the sensor 64 is compared against the second predetermined temperature Tpeak which is assumed higher than 50°C and in particular between 70 and 90°C. If the temperature T measured by the sensor 64 is lower than the aforesaid second predetermined temperature Tpeak, block 107 is followed by a block 112, otherwise block 107 is followed by a block 108. In block 112, the resistor 62 is powered and then from block 112, the method goes back to block 106.

[0025] In block 108, the counter block 79 which measures the time t is activated and the degree of hardness of the water present in the reservoir tank 8 is measured by means of the sensor 65. In the memory block 78, a table is stored in which a time td is associated to each degree of hardness of the water. Block 108 is followed by block 11 in which the time measured by counter block 79 is compared against the time td related to the measured degree of hardness. If the time t measured by the counter block 79 is lower than the time td, block 11 is followed by block 112, otherwise block 11 is followed by block 113. In block 113, the sources 66 are controlled for a predetermined time. Block 113 is followed by block 114 in which the sources 66 are deactivated. Source 114 is followed by a block 115 in which the temperature of the water present in the reservoir tank 8 is measured by means of the sensor 64.

[0026] Block 115 is followed by block 116 in which the temperature T measured by the sensor 64 is compared against the aforesaid first predetermined temperature Tset, which as mentioned is assumed from 20 to 50°C. If the temperature T of the water in the reservoir tank 8 is lower than the aforesaid first predetermined temperature Tset, block 116 is followed by block 117, otherwise it is followed by a block 118. In block 117, the resistor is powered and then from block 117 the method goes back to block 115. In block 118, it is measured whether the level of the water in the reservoir tank 8 by sensor 69 is under a certain level. When the level of the water is lower than a certain predetermined level in block 118, block 102 follows, otherwise block 118 is followed by block 115.

[0027] The method according to the present invention comprises:

a step of introducing water into the reservoir tank 8 up to a certain level measured by the sensor 63;
a step during which the water in the reservoir tank 8 is taken to a first temperature from 20 to 50°C;
a step during which the water temperature present in the reservoir tank 8 is taken to a second temperature higher than 50°C and preferably to a temperature between 70 and 90°C;
a step of activating the sources 66;
a step during which such temperature higher than 50°C is maintained for a time depending on the degree of hardness of the water;
a step during which the temperature of the water within the reservoir tank 8 is maintained at the aforesaid first predetermined temperature;
a step during which, by powering the electrical resistor 58, the temperature of the water circulating in the heat exchanger 14 is increased to a temperature from 70 to 90°C;
a step of inserting a wafer 17 into chamber 16;
a step of checking the wafer 17 so as to stop the operation of the pump 12 if the wafer 17 was previ-

K-FEE SYSTEM GMBH, EX2009, page 1201
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ously used; and
a step during which the pump 12 is operated so that the water, by crossing the heat exchanger, is taken from aforesaid first temperature to a temperature determined by the electrical resistor 58 and then channelled towards the chamber 16 from which the beverage is released.

[0028] It may be observed that the method described above firstly envisages the sanitation of the water present in the reservoir tank 8 before the real preparation of the beverage. The sanitation firstly consists in taking the temperature of the water within the reservoir tank 8 to a fixed value regardless of ambient temperature and of the temperature of the water introduced into the reservoir tank, and then in taking the temperature of the water present in the reservoir tank 8 to such a value and for such a time that some lime is deposited on the bottom of the reservoir tank 8, and finally in maintaining the temperature of the water present in the reservoir tank 8 constant and in activating the ultraviolet ray sources 66. It must be stressed that the steps envisaging sanitation are performed whenever water is added into the reservoir tank 8. Furthermore, the fact contributing to the sanitation is that the various surfaces of the machine 1 are coated with a layer of antibacterial material and that previously used wafers 17 are recognised and rejected. The method also allows to measure and then indicate the minimum and maximum level of the water in the reservoir tank 8.

[0029] In use, after connecting the machine 1 to the electrical mains, the resistor 58 is powered and starts by Joule effect to increase the temperature of the heat exchanger 14. When the temperature measured by the sensors 61 exceeds a predetermined threshold value and preferably 70°C, the indicator 77 lights up. It is now possible to operate the pump 12 which takes water from the reservoir tank 8 and channels it to the heat exchanger 14. Naturally, a wafer is firstly inserted in the chamber 16 and such chamber 16 is closed by means of the mechanism 25. Now the water flows along the helical groove 45 and then through the channel 15 into chamber 16 from where it is released through the nozzle 19. Once the pump 12 is deactivated, the water present in the heat exchanger 14 flows through conduit 55 towards the tank 56 due to the angular position of the heat exchanger with respect to a horizontal plane.

[0030] According to the above, it will be apparent that numerous advantages may be obtained by means of the construction from the present invention.

[0031] In particular, it is made a method and a machine in which the entire preparation process of the beverage is effectively sanitised. The sanitation process also allows to decrease the presence of calcium sent to the heat exchanger 14 and therefore preserves the latter and all the conduits and elements concerned by the flow of water from scaling and possible obstructions. Furthermore, it is made a coffee machine in which the electrical resistor 58 is accommodated directly in the body 34 on whose external surface water is channelled. Consequently, the heating of the water is more efficient, faster and above all requires less power, also considering that the water reaches the heat exchanger 14 already at a certain temperature. It must also be stressed that the body 32 of the heat exchanger 14 is of much smaller dimensions than that of the exchanger currently mounted in marketed machines. Consequently, both the dimensions and the cost of the heat exchanger 14 in the machine 1 object of the present invention are reduced. Furthermore, the inclined position of the heat exchanger 14, with the entrance of the water at a lower level than the output level, allows the flow of water present in the heat exchanger 14 towards a drain so that such water does not stagnate in the heat exchanger 14 and favour the deposit of lime along the groove 45 after using the water for preparing the beverage.

[0032] Finally, it is apparent that changes and variants may be made to the method and to the coffee machine 1 here described and illustrated without however departing from the protective scope of the present invention.

[0033] In particular, there may be arranged a sensor 63 for detecting the insertion in the structure 2 of the reservoir tank 8. In essence, the reservoir tank 8 may be removed, filled with water and reintroduced into the structure 2.

Claims

1. A method for producing a coffee-based beverage, **characterised in that** it it comprises:

   a step of introducing water into a reservoir tank (8) to a certain level;
   a step during which the water present in said reservoir tank (8) is taken to a temperature higher than 50°C;
   a step during which such temperature exceeding 50°C is maintained for a time depending on the degree of hardness of the water;
   a step in which the temperature of the water is increased to a value higher than 70°C;
   a step of inserting a dose (17) of coffee in a chamber (16); and
   a step during which the pump (12) is controlled so that the water is channelled towards said chamber (16) from which the beverage is released.

2. A method according to claim 1, **characterised in that** it comprises a step following said step in which said temperature higher than 50°C is maintained for a time depending on the degree of hardness of the water, during which the temperature of the water present in said reservoir tank (8) is maintained at a predetermined value from 20 to 50°C.

K-FEE SYSTEM GMBH, EX2009, page 1202
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

3. A method according to claim 1 and/or 2, **characterised in that** it comprises a step following said step of introducing water into said reservoir tank (8), during which the temperature of the water present in the reservoir tank (8) is taken to a temperature from 20 to 50°C.

4. A method according to at least one of the preceding claims, **characterised in that** it comprises a step in which it is activated at least one ultraviolet ray source (66) directed towards the water present in said reservoir tank (8).

5. A method according to at least one of the preceding claims, **characterised in that** it comprises a step of measuring the temperature of water present in said reservoir tank (8).

6. A method according to at least one of the preceding claims, **characterised in that** it comprises a step of measuring the minimum and maximum level of water present in said reservoir tank (8).

7. A method according to at least one of the preceding claims, **characterised in that** it comprises a step of measuring the degree of hardness of the water present in said reservoir tank (8).

8. A method according to at least one of the preceding claims, **characterised in that** it comprises a step of reading and storing a code (72) associated to a determined wafer (17), containing said dose of coffee, during the insertion of the latter in said chamber (16) and of stopping the preparation of the beverage in the event of a previously stored code (72).

9. A coffee machine of the type comprising:

a water reservoir tank (8);
a first water conduit (11) which takes from said reservoir tank (8);
a pump (12) connected to said first conduit (11) and from which a second conduit (13) originates;
a heat exchanger (14) provided with an electrical resistor (58), connected to said second conduit (13) and from which it is originated a channel (15) adapted to convey the heated water towards a chamber (16) where in use is placed a dose (17) of coffee; and
a nozzle (19) which originates from said chamber (16) and from which the coffee-based beverage is adapted to be released;

characterised in that said reservoir tank (8) is provided with means (62) adapted to increase the temperature of the water present in said reservoir tank (8).

10. A machine according to claim 9 **characterised in that** said reservoir tank (8) is provided with sensors (63 and 69) for detecting the maximum and minimum level of the water present in said reservoir tank (8).

11. A machine according to claim 9 and/or 10 **characterised in that** it comprises at least one active source (66) of ultraviolet rays directed towards the water present in said reservoir tank (8).

12. A machine according to at least one of the claims from 9 to 11, **characterised in that** it comprises a sensor (64) adapted to measure the temperature of the water present in said reservoir tank (8).

13. A machine according to at least one of the claims from 9 to 12, **characterised in that** it comprises a sensor (65) adapted to measure the degree of hardness of the water present in said reservoir tank (8).

14. A machine according to at least one of the claims from 9 to 13, **characterised in that** it comprises means (71) for reading a code (72) associated to a certain wafer (17) containing said dose of coffee.

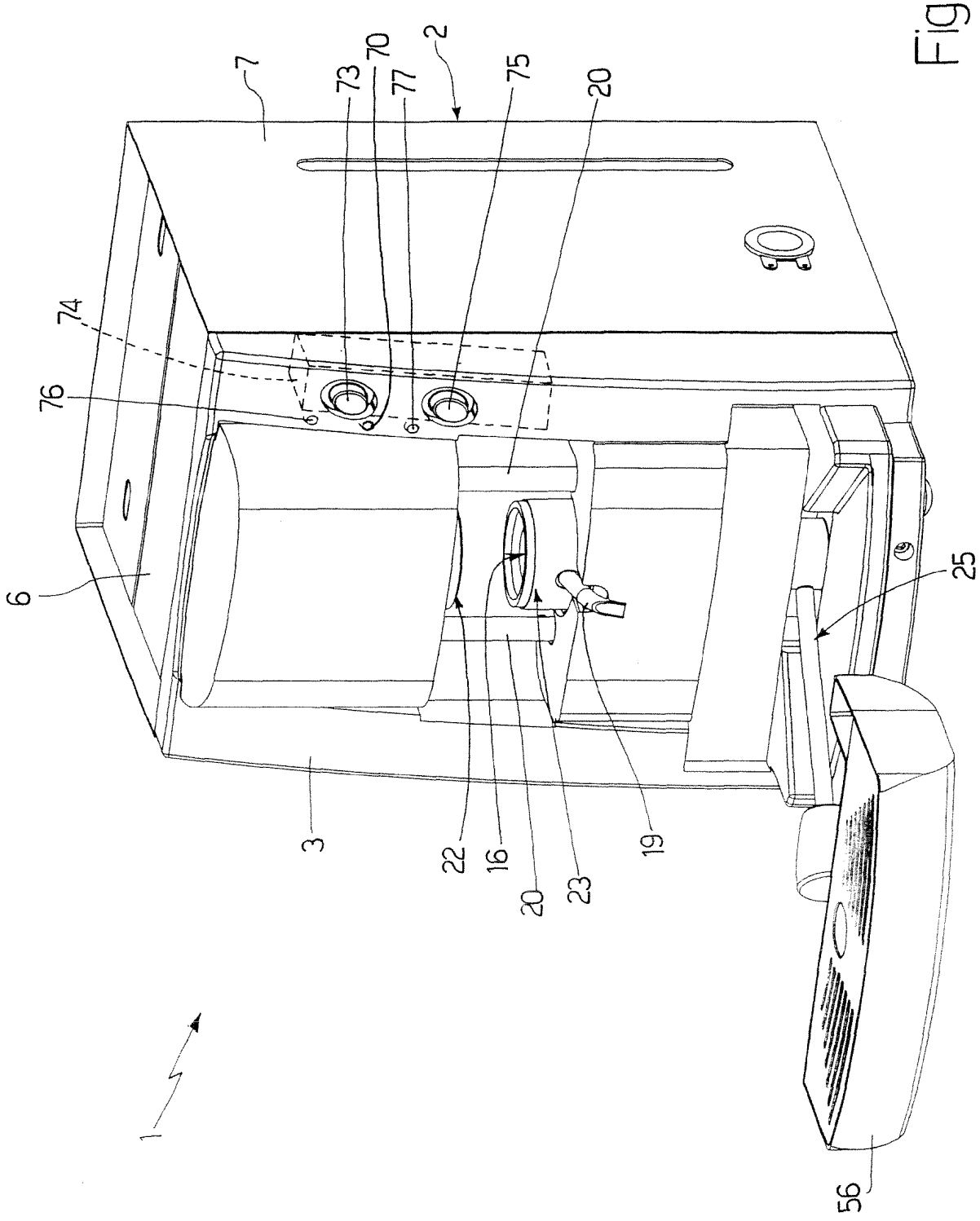
15. A machine according to claim 14 **characterised in that** it comprises an electronic control unit (74) adapted to manage the various components of the machine itself and comprising a block (78) for controlling the various actuators installed, a block (81) which receives the signals from the installed measuring sensors, a counter block (79), a memory block (82) in which there are stored the temperature values to which the water in said reservoir tank (8) and in said heat exchanger (14) must be taken and in which there are stored said codes (72) of said previously used wafers (17), and a block (83) for comparing the various measured quantities.

16. A machine according to at least one of the claims from 9 to 15, **characterised in that** at least part of the surfaces of the installed components are coated with a layer of antibacterial polymers which prevent bacteria from depositing on such surfaces.

17. Coffee-based wafer **characterised in that** it comprises one portion in which an identification code is shown.

K-FEE SYSTEM GMBH, EX2009, page 1203
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Fig.1



K-FEE SYSTEM GMBH, EX2009, page 1204
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

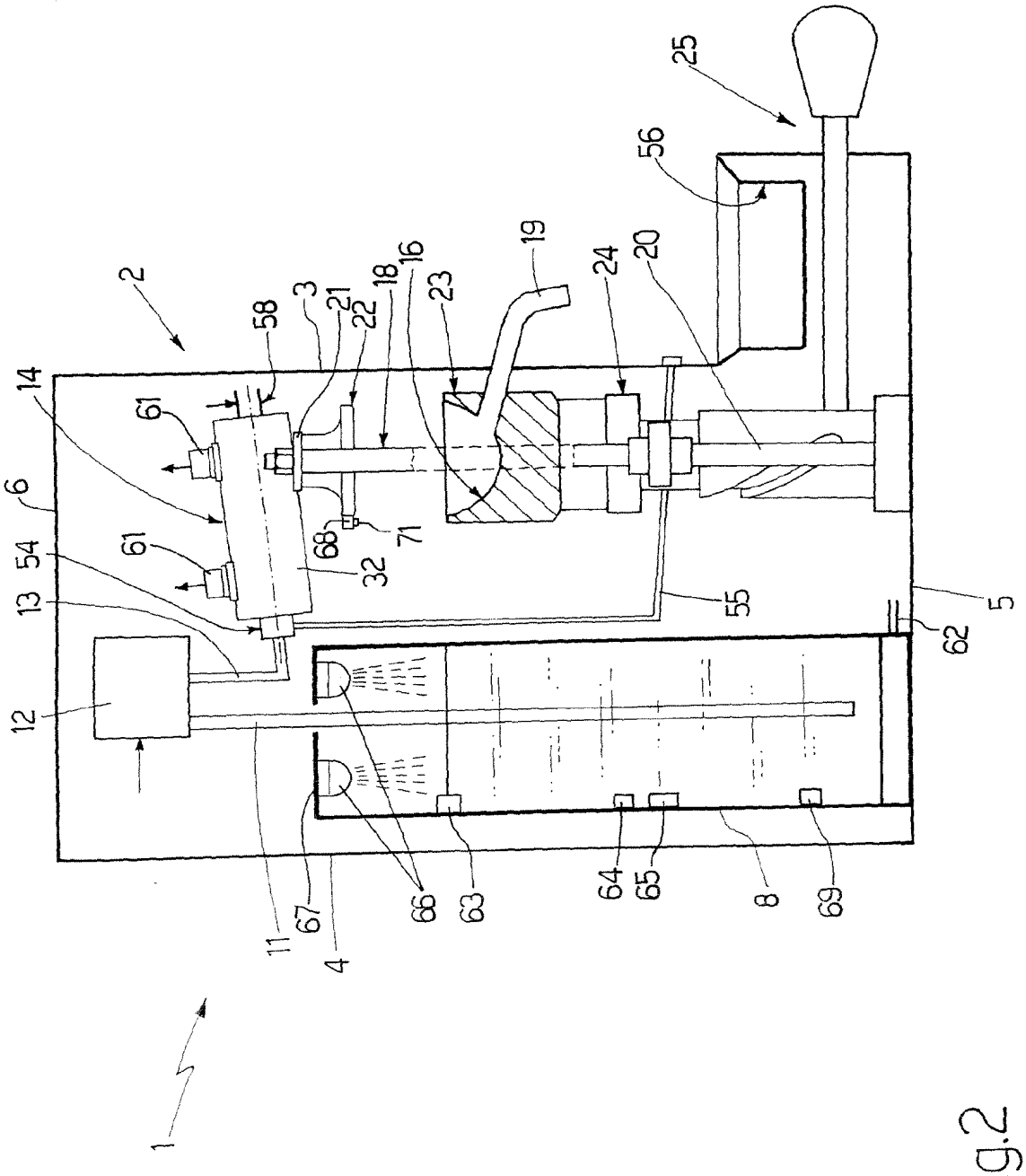


Fig.2

K-FEE SYSTEM GMBH, EX2009, page 1205
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

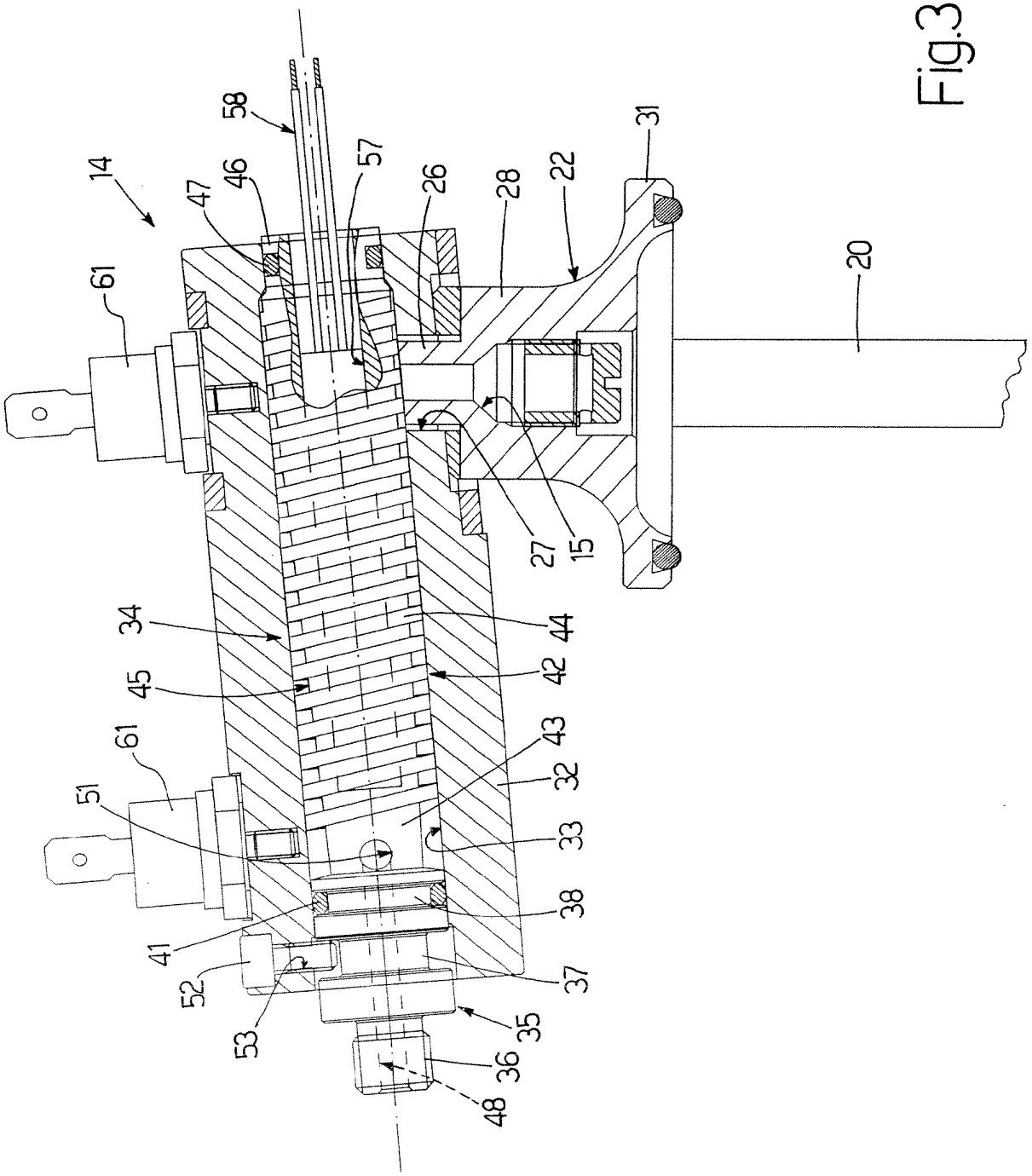


Fig.3

K-FEE SYSTEM GMBH, EX2009, page 1206
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

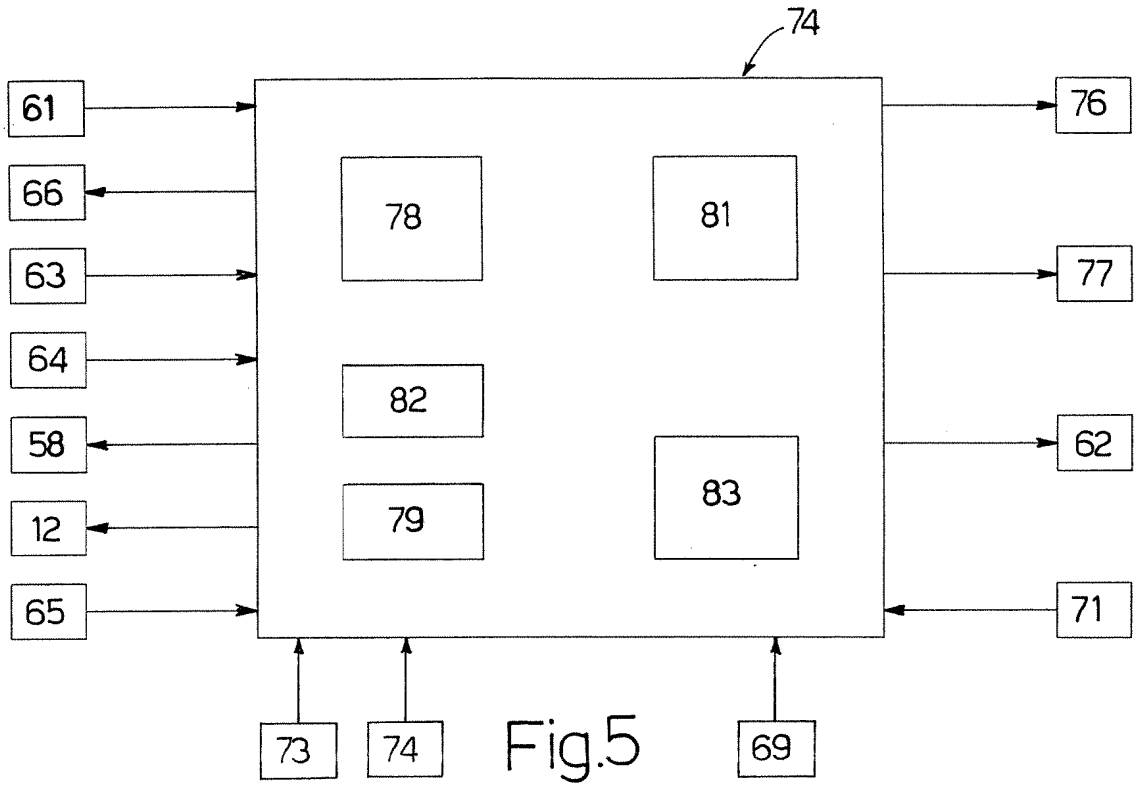


Fig.5

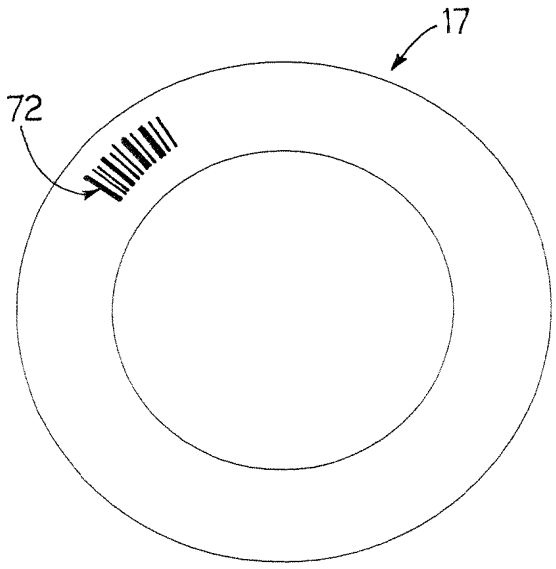


Fig.4

K-FEE SYSTEM GMBH, EX2009, page 1207
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

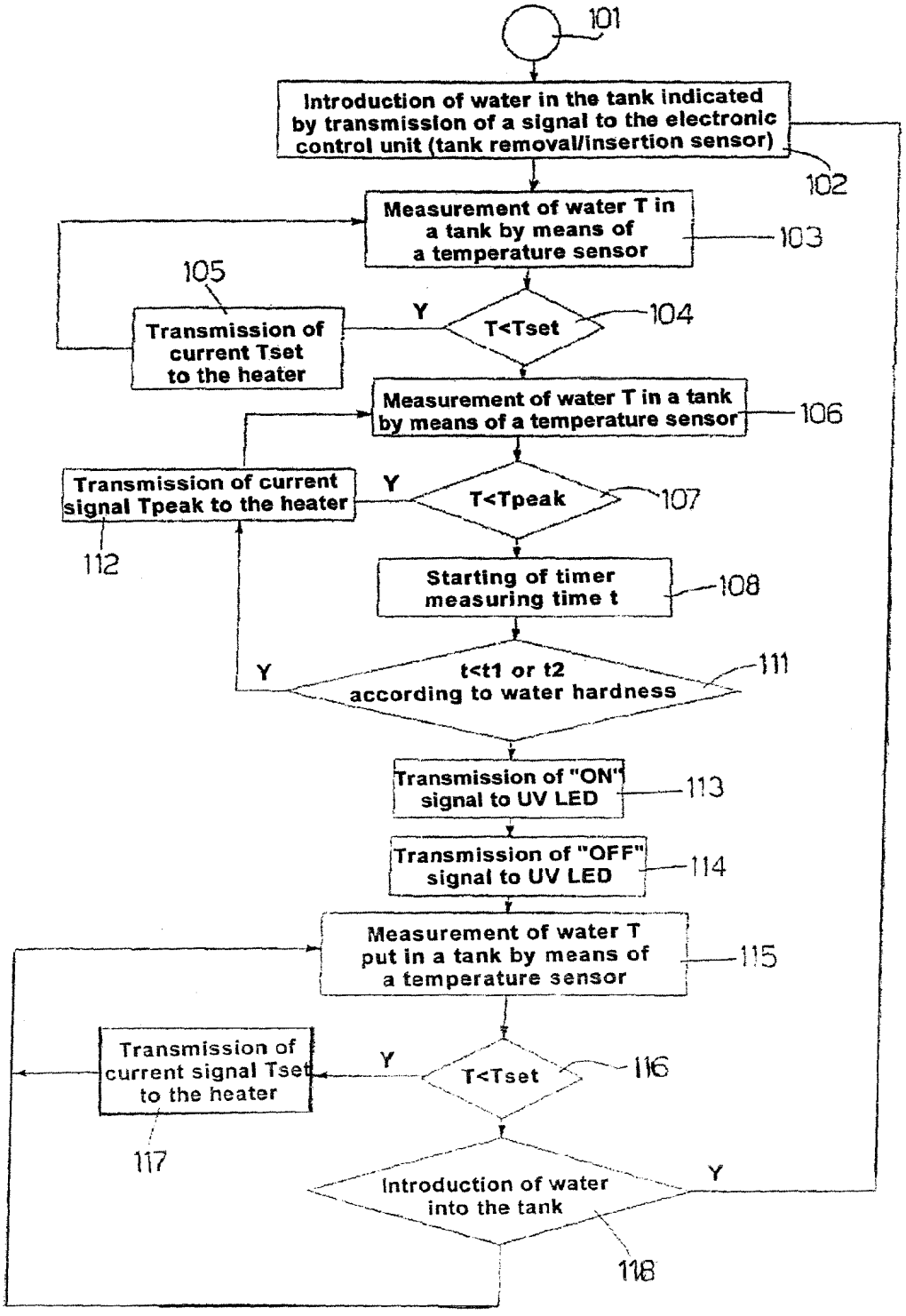


Fig.6

K-FEE SYSTEM GMBH, EX2009, page 1208
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 12 0604

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 198 57 165 A1 (BRAUN GMBH) 21 June 2000 (2000-06-21) * column 4, line 44 - column 6, line 1; figure 1 *	9,16	INV. A47J31/06
Y		10-12, 14,15	
A		1-8,13	

Y	NL 8 401 201 A (VERHEIJEN B.V. TE HEERHUGOWAARD) 1 November 1985 (1985-11-01) * page 3, line 24 - page 5, line 20; figures 1,2 *	10,12	

Y	US 5 889 684 A (BEN-DAVID ET AL) 30 March 1999 (1999-03-30) * column 3, line 31 - column 4, line 21; figure 1 *	11	

X	US 2004/089158 A1 (MAHLICH GOTTHARD) 13 May 2004 (2004-05-13)	17	TECHNICAL FIELDS SEARCHED (IPC)
Y	* paragraph [0029] - paragraph [0037]; figures 1-4 *	12,14,15	A47J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 December 2006	Lehe, Jörn

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

K-FEE SYSTEM GMBH, EX2009, page 1209
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 12 0604

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-12-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 19857165 A1	21-06-2000	NONE	
NL 8401201 A	01-11-1985	NONE	
US 5889684 A	30-03-1999	NONE	
US 2004089158 A1	13-05-2004	AR 033451 A1	17-12-2003
		AT 318535 T	15-03-2006
		CA 2442389 A1	10-10-2002
		DE 10116239 A1	17-10-2002
		WO 02078498 A1	10-10-2002
		EP 1379153 A1	14-01-2004
		ES 2254687 T3	16-06-2006
		JP 2004525829 T	26-08-2004
		NO 20034325 A	05-11-2003
		TW 222603 B	21-10-2004
		ZA 200307553 A	31-08-2004

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

K-FEE SYSTEM GMBH, EX2009, page 1210
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 944 264 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
21.04.2010 Bulletin 2010/16

(21) Application number: **08075219.9**

(22) Date of filing: **11.02.2005**

(51) Int Cl.:
B67D 1/00 *(2006.01)* ***B65D 81/32*** *(2006.01)*
B65D 75/58 *(2006.01)* ***B65B 9/04*** *(2006.01)*
B65B 61/06 *(2006.01)*

(54) Dispensing of a substance

Abgabe einer Substanz

Délivrance d'un substrat

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR

(30) Priority: **18.02.2004 EP 04075524**
21.04.2004 EP 04076206

(43) Date of publication of application:
16.07.2008 Bulletin 2008/29

(60) Divisional application:
09176849.9 / 2 154 101

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
05707418.9 / 1 716 069

(73) Proprietor: **MDS Global Holding Ltd.**
Sliema SLM 3150 (MT)

(72) Inventors:
- **Evers, Lucas Alphonsus Maria**
  3707 CL Zeist (NL)
- **Sterngold, Edouard**
  NW8 9RF London (GB)

(74) Representative: **Houben, Christiaan Hein Willem Frans**
Exter Polak & Charlouis B.V.
P.O. Box 3241
2280 GE Rijswijk (NL)

(56) References cited:
EP-A- 0 310 306
WO-A-01/07325
DE-A1- 10 211 593
US-A- 3 874 143
US-A- 4 220 259
US-A- 4 890 744
US-A- 4 915 261
US-A- 5 215 221
US-A- 5 477 660

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 944 264 B1

Printed by Jouve, 75001 PARIS (FR)

K-FEE SYSTEM GMBH, EX2009, page 1211
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Description

[0001] The present invention relates to dispensing of a substance from a container by means of a dispensing apparatus.

[0002] This is for example known from EP 278 773, where a beverage dispensing apparatus is shown. The dispensing apparatus is adapted to empty a bag containing a flavouring constituent for the preparation of a carbonated beverage. The bag is inserted into a receiving and actuating unit, which has means to compress the bag and expel the content out of it into a discharge nozzle. The discharge nozzle is also connected to a feed conduit for feeding carbonated water. The feed conduit is provided with a closing valve, which can be opened by operating a lever by pressing a serving cup against it. The flavouring constituent and the carbonated water are thus mixed in the discharge nozzle before they are dispensed in the serving cup. When different bags with different flavours are inserted subsequently in the receiving unit, a cross contamination between different flavours can occur. Next to the part for serving carbonated drinks the known dispensing apparatus has also separate spigots for hot water and cold water.

[0003] The present invention proposes to dispense a substance from a container filled with a single portion of a substance. The container comprises a preformed deformable body, preferably made of sheet material, defining a filling cavity which body has an opening and an integral planar circumferential rim surrounding said opening, which opening is closed by a cover sheet which is sealed to the circumferential rim by means of a circumferential sealing seam.

[0004] Such a container as such is known. For example EP 299 571 shows a container for a small quantity of milk, cream or the like. The container has a bottom and a wall of rigid plastic defining a filling cavity. Further, the container is provided with a channel, which is in communication with the filling cavity. A cover sheet covers the filing cavity and the channel. The cover sheet has a pulling tab by means of which it can be pulled away at the channel for forming an opening through which the content of the container can be dispensed.

[0005] Another of such a container containing a fluid substance is disclosed in DE 199 62 436 A1. In this document, on which the preamble of claim 1 is based, is described that the container has a breakable seal between the cavity and the channel which seal breaks upon pressurizing the content of the filling cavity.

[0006] According to the invention the substance, e.g. syrup for a soft drink is dispensed directly from the container into a serving container, e.g. a cup or a bottle. Also the water is dispensed into the serving container such that mixing takes place in the serving container thereby preventing the contamination of the dispensing apparatus with the substance.

[0007] The invention proposes to open the container with the substance by making use of the deformability of the cover. The container is held in receiving means and the cover sheet is engaged with a support surface provided with a recess. The support surface supports the cover sheet except at the position of the recess. The recess is positioned at least over a part of the circumferential sealing seam. Then the container body is compressed whereby the substance is pressurized and the cover bulges out into the recess such that the sealing seam is broken at the location where the bulge is formed resulting in the container being open. This way of opening the container requires no cutting means or other means adapted to open the container that could get contaminated with the substance, which is advantageous in view of hygiene.

[0008] Preferably the container is manufactured by a vacuum or thermo forming process. A flat sheet, preferably of plastic, preferably polystyrene, or aluminium, is placed in a vacuum or thermo forming apparatus with a forming die and multiple container bodies are formed simultaneously in the sheet by vacuum forming the filling cavities into the die. Then the sheet with the filling cavity is placed in a filling machine and filled with substance. The sheet with the container bodies is covered with a cover sheet preferably of covering foil that is sealed over it resulting in the containers being closed. Finally, the sheet with the closed containers is placed in a punch machine, where the perimeter of the circumferential rim of the body is formed by punching out waste material between the containers.

[0009] Preferably, the sheet of covering foil is manufactured of aluminium or another material, preferably a multilayer material. Alternatively, the cover sheet can be of material, e.g. from polystyrene or polyethylene, which can in a possible embodiment be manufactured by thermoforming as a preformed cover.

[0010] In an advantageous embodiment the covering sheet is provided with identification means. The identification means correspond to the substance contained in the container so as to allow automatic identification of the container. This container can be placed in a dispensing apparatus comprising identification recognition means for automatically identifying the container and the substance therein.

[0011] The invention will become more apparent from the following description with reference to the drawing, in which:

Fig. 1 shows a view in perspective of a preferred embodiment of a container according to the invention,
Fig. 2a shows a front view of the container of Fig. 1,
Fig. 2b shows a top view of the container of Fig. 1,
Fig. 2c shows a side view of the container of Fig. 1,
Fig. 3 shows a view in perspective of the container of Fig. 1 in a compressed state,
Fig. 4a shows a front view of the container of Fig. 3,
Fig. 4b shows a top view of the container of Fig. 3,
Fig. 4c shows a side view of the container of Fig. 3,

K-FEE SYSTEM GMBH, EX2009, page 1212
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Fig. 5 shows a perspective front view of an embodiment of a drink dispensing apparatus with receiving means for the container of Fig. 1,
Fig. 6 shows a perspective front view of another embodiment of a drink dispensing apparatus with receiving means for the container of Fig. 1,
Fig. 7 is a schematic cross section of the dispensing apparatus of Fig. 6,
Fig. 8 shows a perspective front view of the dispensing apparatus of Fig. 6 with an opened lid of the receiving means,
Fig. 9 shows how the container of Fig. 1 is inserted in the dispensing apparatus of Fig. 6,
Fig. 10 shows the container of Fig. 1 is in the full inserted state in the dispensing apparatus of Fig. 6,
Fig. 11 shows how the compressed container of Fig. 3 is removed from the dispensing apparatus of Fig. 6,
Fig. 12 shows an alternative embodiment of a container,
Fig. 13 shows another alternative embodiment of a container,
Fig. 14a shows a further embodiment of a container with a dispensing channel with a closed end,
Fig. 14b shows a detail of the container of Fig. 14a,
Fig. 14c shows the dispensing channel of the container of Fig. 14a after the channel has been opened,
Fig. 15 shows a top view of an alternative embodiment of a container,
Fig. 15a shows part of the top of another alternative embodiment of a container,
Fig. 15b shows part of the top of still another embodiment of a container,
Fig. 15c shows an alternative embodiment of a covering lid for a dispensing apparatus which can be used with containers of Figs. 15, 15a and 15b,
Fig. 15d shows how the container of Fig. 15a or 15b is compressed and its content is mixed with a mixing fluid,
Fig. 15e shows part of a further embodiment of a container,
Fig. 15f shows a part of an embodiment of a container with a recessed dispensing part,
Fig. 15g shows a part of another embodiment of a container with a recessed dispensing part,
Fig. 16 shows a perspective view of an embodiment of a container with two filling cavities,
Fig. 17 shows a cross section of a container with two filling cavities with different heights,
Fig. 18 shows a top view of the container of Fig. 16,
Fig. 19 shows a top view of a container with two filling cavities with each a different cross section,
Fig. 20 shows a cross section of an embodiment of the receiving means provided with heating elements,
Fig.21a shows a cross section of an embodiment of the receiving means with a certain piston form before compression of the container,
Fig. 21b shows the cross section of the receiving means of Fig. 21 a after compression of the container,
Fig.22a shows a cross section of an embodiment of the receiving means with another piston form before compression of the container,
Fig. 22b shows the cross section of the receiving means of Fig. 22a after compression of the container,
Fig. 23a shows a perspective view of the dispensing apparatus of Fig. 6 with a bottle placed in it,
Fig. 23b shows a front view of the dispensing apparatus of Fig. 23a,
Fig. 24 shows a cross section of an embodiment of the receiving means with yet another piston form before compression of the container,
Figs. 25a and 25b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a first state,
Figs. 26a and 26b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a second state,
Figs. 27a and 27b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a third state,
Figs. 28a and 28b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a fourth state,
Figs. 29a and 29b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a fifth state,
Figs. 30a and 30b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a sixth state,
Figs. 31a and 31b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a seventh state,
Fig. 32 shows a perspective view of a preferred embodiment of a container that can be used with the receiving means of Figs. 25-31,
Fig. 33 shows a top view of an alternative embodiment of a container,
Figs. 34a-d show a preferred embodiment of a bottle that can be used in the dispensing apparatus of the invention,
Figs. 35a-e show steps of the connecting of a CO_2 bottle with a connecting arrangement, and
Fig. 36 shows in more detail a part of Fig. 35d,
Fig. 37 shows a view in perspective of an embodiment of a container with an obstruction in the dispensing channel,
Fig. 38 shows a top view of a part of another embodiment of a container with an obstruction in the dispensing channel,
Fig. 39 shows a top view of a part of an embodiment of a container with multiple seals in the dispensing channel,
Fig. 40 shows a cross sectional view of an embodiment of a container with a countersunk cover sheet,
Fig. 41 shows a cross sectional view of the container

K-FEE SYSTEM GMBH, EX2009, page 1213
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

of Fig. 40 in combination with a covering lid of a dispensing apparatus,

Fig. 42 shows an alternative embodiment of a container according to the invention with a preformed cover,

Fig. 43 shows a cross sectional view of still another alternative embodiment of a container according to the invention comprising two preformed shells,

Fig. 44 shows a sectional view along the line A-A in Fig. 43, and

Fig. 45 shows a cross section of an embodiment of the receiving means with a bar code reader.

[0012] Figs. 1, 2a-2c show a container 1 for containing a substance. The container 1 comprises a deformable body preferably made of plastic sheet material. The body can also be made of another material, e.g. aluminium or laminated cardboard paper. Preferably the body has a bottom 3 and a side wall 4 extending from the bottom 3, which define a filling cavity. On the side opposite the bottom 3 a planar circumferential rim 5 is integral with the side wall 4 and extends outwardly therefrom. The circumferential rim 5 surrounds an opening 6. A cover sheet 7 of foil material is sealed to the circumferential rim 5 by means of a circumferential sealing seam 10 and closes the opening 6. The foil material can be a multilayer material.

[0013] In Fig. 2b is shown a top view of the container 1 without the cover sheet. The circumferential rim 5 has an extending tab 8 with a dispensing channel 9 formed by a depression in the tab 8. Further, the circumferential rim has a gripping tab 11 diametrically opposite the extending tab 8. The cover sheet 7 is also sealed to the extending tab 8 and preferably also to the gripping tab 11.

[0014] The dispensing channel 9 has an open end 9a at the edge of the extending tab 8. The extending tab 8 with the channel 9 is covered by the cover sheet 7. As can be seen in figs. 2b and 2c, the dispensing channel 9 is separate of the filling cavity, that is, it does not join the filling cavity. When the filling cavity is filled with substance and the covering sheet is applied to the container, zone 10b of sealing seam 10 near the dispensing channel 9 forms a barrier for the substance between the cavity and the dispensing channel 9.

[0015] Preferably, the zone 10b of the circumferential sealing seam 10 at the location of the dispensing channel 9 is weakened. This can be done by giving the sealing seam 10 a smaller width near the dispensing channel 9 than at the rest of the circumference (see Fig. 2b). Another possibility is to heat the sealing seam 10 locally near the dispensing channel 9 during or preceding the opening of the container, such that the sealing seam is weakened locally.

[0016] When in use the container body can be compressed, thereby pressurizing the content of the container 1. By the increasing pressure on the inside of the container 1, the sealing seam 10 breaks at said zone 10b and a passage is formed between the cover sheet 7 and the area of the tab surface that connects the filling cavity with the dispensing channel, so as to allow substance to pass through the passage from the cavity into the channel 9. This is illustrated with arrows 9a in Fig. 2b.

[0017] Figs. 6-8 show a drink dispensing apparatus 61 with housing 62. On top of the housing 62 is placed a water tank 63, for feeding water. In another embodiment it is also possible to provide the apparatus with an internal water storage tank. It is also possible to connect the apparatus to a water supply line. From the housing 62 is extending a platform 65 for placing a cup 64 or another serving container on which is to be filled with a drink. Above the cup 64 are arranged three dispensing pipes 66a, 66b and 66c, through which can be dispensed cold water, warm water and carbonated water respectively. At the lower side under the platform 65 a platform 70 is arranged. The platform 70 can be formed as a grid with a collecting receptacle 71 underneath for collecting spilled water. The collecting receptacle 71 can be removable so that it can be cleaned. In a further embodiment an evaporator can be arranged in the collection receptacle to evaporate spilled fluid, such that the receptacle does not have to be emptied too often.

[0018] It is also possible to place bottles and the like in the apparatus. The bottle can be placed on the platform 70. In Fig. 23a and 23b the dispensing apparatus 61 is shown with a specially designed bottle 230 in it. The bottle 230 has a top part 231, which is adapted to fit in a sealing manner under the receiving means 67 such that dispensed substrate and water cannot be spilled during dispension. To that end the receiving means 67 can be provided with sealing means like a sealing gasket or the like.

[0019] In Figs. 34a-d a further embodiment of a bottle 430 for the dispensing apparatus 61 is shown. In this embodiment the bottle 430 has a plug-like closing member 431. Around the bottle neck a rotatable ring 433 is arranged. In the ring 433 are provided two slots 434 that extend in a helical manner through the ring 433. On the ring 433 is provided a gripping fin 436.

[0020] The closing member 431 is coupled to the ring 433 by a bracket 432 with two legs 432a en 432b. Each leg 432a, 432b has a protrusion 435 that extends inwardly and are each inserted in one of the slots 434. In each of the legs 432a and 432b of the bracket 432 is provided a guiding slot 437 comprising an upper straight slot portion 437a and a lower curved portion 437b. On the bottle neck are on diametrically opposite sides provided guiding pins 438 which each are received in one of the guiding slots 437.

[0021] In use the bottle is closed by the closing member 431 as is shown in Fig. 34a. A person can open the bottle 430 by gripping the gripping fin 436 and rotating the ring 433. By this rotation the helical form of the slots 434 force the protrusions 435 on the bracket legs 432a and 432b upwards as can be seen in Fig. 34b. The covering member 431 is thus lifted from the bottle 430 guided by the guiding pins 438 in the straight portions 437a of the guiding slots 437.

K-FEE SYSTEM GMBH, EX2009, page 1214
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

[0022] At a certain point the bracket 432 is lifted such a distance that the curved portions 437b of the guiding slots 437 reach the guiding pins 438. By rotating the ring 433 further the bracket 432 will start to tilt due to the cooperation of the guiding pins 438 and the curved portions 437b of the guiding slots as can be seen from Fig. 34c. The closing member 431 is tilted away from the bottle 430 until the end position is reached, i.e. the position in which the curved portions 437b of the guiding slots 437 engage the guiding pins 438 as is shown in Fig. 34d. In the state shown in Fig. 34d the user can place the bottle in the dispensing apparatus to fill it or can poor drinks from the bottle 430.

[0023] For closing of the bottle 430 the ring 433 is rotated in the opposite direction and the opposite sequence as described with reference to Figs. 34a-d is followed.

[0024] The dispensing apparatus comprises receiving means 67 for receiving a container 1 as is described hereabove, filled with a single portion of a substance, e.g. coffee concentrate or syrup for a soft drink.

[0025] In Fig. 7 is shown a schematic cross section of the apparatus 61. The water from the tank 63 can be directed by means of a control system 75 through feed lines 74a to a cooling system 73, a heating system 72 and a carbonating system 87, which are connected with the three dispensing pipes 66a, 66b and 66c respectively by feed lines 74b. The carbonating system 87 preferably comprises a bottle filled with CO_2 which will be described below.

[0026] It is also possible to have four lines 51-54 that are all connected to one central dispensing pipe 50 as is shown in Fig. 5. The dispensing pipe 50 is directed such that the water is ejected in the beam of substance that is dispensed from the container 1, such that a good mixing between the two is secured. The four lines 51-54 are for feeding hot water, cooled water, water with an ambient temperature and carbonated water to the dispensing pipe 50.

[0027] In Fig. 35a is shown how a CO_2 bottle 360 is positioned under a valve arrangement 351.

[0028] The CO_2 bottle 360 is provided with a closing valve 361. The closing valve 361 has a housing 366 with an outlet 362 which is closed of by a preferably spring loaded closing member 363 that has to be pushed down such that the outlet 362 is opened. On the upper side of the valve housing 366 is provided a circumferential flange 367 with two straight edges 367a.

[0029] The connecting arrangement 351 comprises a substantially cylindrical housing 352. Within the housing 352 a connecting means 354 is slideably arranged. The connecting means 354 can slide between a released position and a connected position within the housing 352. In Figs. 35a-c the connecting means 354 is in the released position in Figs. 35d, 35e and 36 the connecting means 354 is in the connected position.

[0030] The connecting means 354 has an outlet 355 to which a pipe or a hose can be connected. The connecting means 354 fits on the closing valve 361 on the CO_2 bottle 350 and comprises a protruding member (not shown) which is suitable for pushing down the closing member 363 and opening the valve 361. The protruding member is circumvented by a sealing ring (not shown) so as to prevent the escape of CO_2 gas from the bottle 360 during use.

[0031] The cylindrical housing 352 of the connecting arrangement 351 has an opening 356 at the lower end which has a form complementary with the flange 367 of the valve 361. In use the cylindrical housing 352 is placed over the flange 367 and the valve as is shown in Fig. 35b. Next, the bottle 360 is rotated over 90° as is shown in Fig. 35c. The lower end of the connecting means 354 is provided with two lips 357 (see also Fig. 36) which fit over the straight edges of the flange 367. These lips 357 are in Fig. 35c just above the straight edges of the flange 367. Next the connecting means is moved downwards by pushing a lever 358 down as is shown in Figs. 35d and 36. The lever 358 rotates about an axis 359 which is provided with a cam 370. The cam 370 engages the top surface 354a of the connecting means 354. The rotation of the cam 370 results in the connecting means 354 being pushed down to the connected position (see Fig. 35e). In this connected position the lips 357 are positioned over the straight edges 367a. This prevents that the bottle is rotated with respect to the connecting means 354 during use, which could lead to damaging of sealing means and/or the leakage of CO_2 gas.

[0032] The receiving means 67 of the dispensing apparatus have a compression chamber 68 with a variable volume. The compression chamber 68 is delimited by a piston 69 with a screw spindle 69a that is driven by a linear electric motor 69b. The piston is adapted to engage the bottom 3 of the container 1. In other possible embodiments (not shown) the drive means can comprise pneumatic means, hydraulic means or can be adapted to be hand driven.

[0033] The piston can have a form adapted to deform the container in a specific form. In Fig. 7 is schematically shown that the piston 69 has a flat front face 69c with a diameter that corresponds substantially with the inner diameter of the compression chamber 68. In Fig. 21a is shown another piston 210 with a rear portion 210b with a constant diameter that substantially corresponds to the inner diameter of the compression chamber 68, and with a substantially cone shaped front portion 210a with a front face 210c which has substantially the same diameter as the bottom 3 of the container 1. The cone shaped portion 210a has a surface 210d with a convex curved form. This form of the piston 210 allows the container 1 to deform and wrinkle in the area between the surface 210d of the cone shaped portion 210a and the wall 68a of the compression chamber 68, as can be seen in Fig. 21b.

[0034] In Fig. 22a is shown a piston 220 with a cone shaped portion 220a with a linear decreasing surface 220d. The front face 220c has a smaller diameter than the diameter of the bottom 3 of the container 1. The form

K-FEE SYSTEM GMBH, EX2009, page 1215
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

of the piston 220 allows the container 1 to deform and fold in the area between the surface 220d of the cone shaped portion 220a and the wall 68a of the compression chamber 68, as can be seen in Fig. 22b.

[0035] The pistons 210 and 220 can advantageously be used to compress the container 1 such that almost all substance in the filling cavity is dispensed. This means that there are only small losses which is advantageous from an economic view point.

[0036] In Fig. 24 a piston 240 is shown with a scraping edge 241. The scraping edge 241 prevents that during compression of the container no container material gets stuck between the inner surface 68a of the compression chamber 68 and the piston 240, which could cause jamming of the piston.

[0037] The receiving means 67 have a covering lid 80 which hinged and can be opened (see Fig. 8) and closed (see Fig. 6). Further, the receiving means 67 have a front plate 81. The front plate 81 is provided with a recess 82 with a depth substantially corresponding to the thickness of the circumferential rim 5 with the extending tab 8 and the gripping tab 11 of the container 1. The bottom of the recess 82 forms a stop face engaging the back side of the circumferential rim 5. Further, there is provided in the recess 82 a deeper recess 83 in which the dispensing channel 9 of the container 1 can be received. This deeper recess 83 has the advantage that the container 1 can only be placed in one manner in the receiving means, thereby securing a proper functioning and use of the apparatus.

[0038] The covering lid 80 is provided with a recess 84 which, when a container 1 is received in the receiving means, is placed over the zone 10b of the circumferential rim 10 near the dispensing channel 9.

[0039] In Fig. 9 is shown how a container 1 is placed in the receiving means 67. The perimeter of the recess 82 preferably fits around the perimeter of the circumferential rim 5 of the container 1 with the tabs 8 and 11 as is best seen in Fig. 10. In this way the container 1 can be placed only in a correct manner in the receiving means 67 and it is the dispensing channel 9 of the container 1 is always directed downwards such that the substance is always correctly dispensed in the cup 64 or another serving container positioned in the dispensing apparatus 61.

[0040] Then the covering lid 80 is closed such that the recess 84, is positioned over the zone 10b of the circumferential sealing seam 10 near the dispensing channel 9. The inside of the covering lid 80 forms a support surface which supports the cover sheet 7. At the position of the recess 84 the circumferential sealing seam 10 is of course not supported. Upon compression of the container body, whereby the substance is pressurized, the cover sheet 7 bulges out locally into the recess 84 such that the sealing seam 10 is broken at the zone 10b where the bulge is formed resulting in the container 1 being open as is described hereabove.

[0041] By further compression of the container body all the substance is dispensed into the cup 64 or another container. Then cold, warm or carbonated water can be added through the pipes 66a-66c. This can be done automatically as will be described further below. Then the covering lid 80 can be opened (Fig. 11) and the container 1 can be removed from the receiving means 67. Preferably there is provided a waste container 110 arranged under the receiving means 67, which can be opened by sliding it forward. The empty container 1 can fall into the waste container 110 after which the latter can be closed again.

[0042] In Fig. 11, but also in figs. 3, 4a-4c the container 1 is shown after compression. The bulge is indicated with reference numeral 7a. In figs. 4b and 4c is for clarity again indicated by arrows how the substance flows through the bulge 7a from the filling cavity into the dispensing channel 9.

[0043] Preferably the dispensing apparatus 61 comprises identification recognition means for automatically identifying the container 1 and the substance therein. To this end also the container 1 preferably comprises identification means. Preferably the identification means are applied to the cover sheet 7 of the container 1. The identification means could be visual identification means, e.g. a bar code or the like. Also electronic identification means are possible, more specifically comprising a resonance circuit or a transponder. The identification means applied to the container correspond to a specific substance contained in the container.

[0044] The identification recognition means could be a sensor 79 that is provided at the front plate 81 of the receiving means 67 as is shown in Fig. 7. Preferably a sensor 85, e.g. an optical sensor, a mechanical or an electronic sensor is provided on the covering lid 80 (see Fig. 8), such that when the covering lid 80 is closed the recognition means can detect if there is a container 1 present in the receiving means 67 and can recognize which container 1 containing a specific substance is in the receiving means 67. The sensor 79 or 85 transfers the information from the identification means to the control system 75 (see Fig. 7) which for instance is provided with an electronic memory in which the recipes for several drinks can be stored. Another possibility is that the identification means on the container 1 contain the information for the recipe which is then transferred to the control system 75.

[0045] For example, if a container 1 with concentrated coffee substance is placed in the receiving means 67 the dispensing apparatus 61 will automatically know that there has to be added a certain predetermined amount of hot water to the cup 64.

[0046] Preferably the dispensing apparatus 61 has a control panel or control buttons 78 with which a consumer can dispense water of his choice (hot, cooled, carbonated, ambient) in the cup without placing a container 1 in the receiving means 67.

[0047] Preferably the dispensing apparatus has a display 76 connected to the control system 75. On the dis-

K-FEE SYSTEM GMBH, EX2009, page 1216
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

play 76 the drink can be displayed of which the corresponding container with the substance is placed in the receiving means 67. Also a start button can be provided by operation of which the dispensing of the substance and the water starts. In this way the consumer is allowed a last check on the display 75 if he has placed the right container 1 in the receiving means 67.

[0048] The identification means could also correspond to the amount of substance in the container. There can be containers with different amounts of the same substance. Thus it is possible to have a container for the preparation of one glass of a drink, but it is also possible to have a container for the preparation of a whole bottle of that same drink. The dispensing apparatus can determine by means of the identification means and the identification recognition means what amount of water has to be added to the substance to get the right concentration for the drink.

[0049] With regard to this aspect the apparatus is preferably able not only to recognize the container that is placed in the receiving means, but also to recognize the serving container. For example a sensor is arranged which can detect whether there is placed a bottle 230 in the apparatus 61. This sensor can be connected to the control system 75. The control system 75 can determine whether a bottle 230 is placed in the dispensing apparatus 61 if a container 1 for the preparation of a bottle is placed in the receiving means 67. If not, the control system will block the dispensing of water. In this way the spilling of fluid can be prevented in case a too small serving container is placed in the dispensing apparatus. In a preferred embodiment the top part 231 of the bottle 230 (see Fig. 23) can be provided with identification means, e.g. a certain form which fits exactly in a corresponding receiving member in the dispensing apparatus. In this manner the dispensing apparatus only works with this bottle and can be guaranteed that no spilling of the drinks can take place.

[0050] With the present apparatus 61 in combination with the container 1 the substance is directly dispensed from the container 1 in a serving container like the cup 64, a glass, a jug, a decanter, a bottle or the like. The substance is treated by mixing it in the serving container with a certain amount of water. The advantage of this is that the dispensing apparatus is not contaminated with the substance. Therefore, there cannot occur a cross-contamination between substances if different drinks are prepared subsequently. The water can be added to the substance afterward, but it is also possible to dispense water into the serving container before the substance is dispensed into it. Also a simultaneous dispensing of substance and water is possible.

[0051] In a further embodiment of the dispensing apparatus a heating element is provided as is shown in Fig. 20. In the figure is shown a container 1 with part of the body arranged in the compression chamber 68 of the receiving means 67. The covering lid 80 is closed and supports the covering sheet 7 of the container 1. At the recess 84 in the covering lid 80 is arranged a heating element 200, which is biased against the covering sheet 7 on the extending tab 8 of the container 1 by a spring element 201 between the dispensing channel 9 and the filling cavity. Emerging from the front plate 81 of the receiving means 67 under the compression chamber 68 is arranged another heating element 202 that is biased against the backside of the extending tab 8 by a spring element 203. The heating elements 200 and 202 are used to heat the covering sheet 7 and the extending tab 8 at the zone 10b of the sealing seam 10 near the dispensing channel 9 of the container 1 before the container is compressed. In this way the sealing seam 10 is weakened at the zone 10b and will break at that zone 10b when the container body is compressed. It is also possible that one of the heating elements 200 and 202 is omitted.

[0052] In Figs. 25-31 is shown a receiving means 567 of a preferred embodiment of the dispensing apparatus. For clarity the covering lid 80 is not shown in these figures. For the same reason also the covering sheet of the container 1 is omitted in these figures.

[0053] Figs. 25a-31b show receiving means 567 which comprise a housing 590 with a substantially cylindrical bore 591. In the bore 591 a compression cylinder 580 is slidably arranged. In the compression cylinder 580 a piston 569 is slidably moveable. Thus a compression chamber 568 is formed and delimited by the inner surface of the compression cylinder and the piston 569. The compression chamber 568 has a maximum length that is determined by a most rearward position of the piston 569 in the compression cylinder 580 as is shown in Fig. 25b. Said maximum length is such that the apparatus is able to receive containers 1 of different heights, thus different volumes. Containers 1 with different volumes can be filled with the same substance with the same concentration, while the apparatus is still able to dispense drinks in different amounts. This results in a considerable advantage, because substance for a specific drink only has to be provided in one concentration rate to the manufacturer of the containers. The filling procedure of the containers is simplified, because, if after one another containers for different doses have to be filled, only the metering of the filling device has to be adapted, which in practice is an easy to perform operation. There is no need to interchange parts in the filling machine, since cross contamination between differently concentrated substances of the same flavour through the filling machine cannot occur, if containers for one and the same drink are filled.

[0054] The piston 569 is coupled to a screw spindle 569a that is driven by an electric motor 569b. At a rear side the housing 590 has a back plate 583. The screw spindle 569a and part of the motor 569b extend through an opening 584 in the back plate 583.

[0055] The cylinder 580 is provided with a pair of guiding bores 540, 541 which extend parallel to the axis through the cylinder 580 over its entire length. A pair of guiding rods 530 and 531 is arranged slidably within the guiding bores 540 and 541. The guiding rods 530 and

K-FEE SYSTEM GMBH, EX2009, page 1217
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

531 each have an end portion 530a and 531 a respectively, which is attached to the back plate 583 of the housing 590.

[0056] Between a rear end of the compression cylinder 580 and the back plate 583 of the housing 590 a pair of compression springs 585 and 586 is arranged around the guiding rods 530 and 531. The compression springs 585, 586 force the compression cylinder 580 to a front position within the housing 590 as is shown in Figs. 25 and 26. In the front position, the front face 581 of the compression cylinder 580 is in the same plane as the front face 591 of the housing 590. The front face 581 of the compression cylinder 580 is provided with a recess 582 which has a similar function as the recess in the embodiment of the receiving means 67 shown in Figs. 8-10, but with a different outer circumferential shape and without being provided with a deeper recess for receiving a dispensing channel of the container. The form of the recess 582 is best seen in Figs. 29a and 30a where the container 1 is removed.

[0057] Advantageously the circumferential rim 5 of the container 1 is provided with a pair of positioning projections 601 (see Fig. 32) which fit into the guiding bores 540, 541 as can be seen in Fig. 25a. In this way the container 1 can be placed in the receiving means only in one way.

[0058] The bore 591 in the housing 590 has in a front part an opening 592 towards the bottom side. A receptacle 510 is arranged directly under the opening 592 for receiving empty containers 1 as will be described later.

[0059] The working of the embodiment shown in Figs. 25-31 will be explained in the following.

[0060] In Figs. 25a and 25b the receiving means are in a first state in which a full container 1 is placed in the receiving means 567. The compression cylinder 580 is in a front position within the housing 590. The circumferential rim 5 of the container is arranged within the recess 582 and the projections 601 are arranged within the guiding bores. The piston 569 is in a rear position within the compression cylinder 580.

[0061] Next, the container 1 is compressed by moving the piston towards a front position in the cylinder 580 as is shown in Figs. 26a and 26b. The container 1 is of course supported by a covering lid which is not shown in these figures.

[0062] After compression of the container 1 the piston 569 is retracted towards the rear position within the compression cylinder 580. Then the rear side of the piston abuts a rear abutment face arranged on the cylinder 580. By retracting the piston 569 further, the cylinder 580 moves along with the piston 569 as is shown in Figs. 27a and 27b.

[0063] By moving the piston 569 even further rearwardly the cylinder 580 is moved rearwardly towards a position in which the guiding rods 530, 531 within the guiding bores 540, 541 will abut the positioning projections 601 on the circumferential rim 5 of the container 1. By retracting the piston 569 and the cylinder 580 even further the stationary guiding rods 530, 531 will eject the positioning projections 601 from the guiding bores 540, 541. Thus the container 1 is ejected from the receiving means 567 as is shown in Figs. 28a and 28b. The guiding rods 530, 531 thus have the function of ejection means. Also, the positioning projections 601 on the container 1 have a function for ejection of the container as is apparent from the above.

[0064] The container will fall down through the opening 592 into the receptacle 510 as is shown in Figs. 29a and 29b. It should be noted that the ejection of the container 1 takes place while the covering lid (not shown) of the receiving means 567 is still closed.

[0065] Next, the piston 569 is moved forwardly again. The springs 585 and 586 force the cylinder 580 forwardly (see Figs. 30a and 30b) towards its front position (see Figs. 31a and 31b). In the state shown in Figs. 31 a and 31 b the receiving means 567 are ready to receive a new filled container 1.

[0066] The positioning projections 601 on the circumferential rim 5 (see Fig. 32) can be formed in the rim during the thermo forming process used to manufacture the container 1. This has the advantage that the position of the projections 601 with respect to the cavity and the rest of the container 1 can be formed accurately, such that its proper functioning as positioning means can be assured.

[0067] The projection 601 can be used to establish whether the container is placed in the receiving means 567. To this end a sensor can be arranged within one or both of the guiding bores 540, 541. As can be seen from the embodiment of the container 1 shown in Fig. 33 the circumferential rim 5 can have more than two, in this specific example four, projections 602. The projections 601 can be used for identifying the container 1, and more specifically the content of the container 1. By providing the receiving means with four guiding bores in which the positioning projections 602 fit preferably tightly and by providing the guiding bores with sensors the projections could be used as identification means. To this end an identification code could be composed by varying the number of projections 602 and the length of the projections, which can be determined by the sensors. The sensors used can be optical sensors, but also any other suitable type of sensor.

[0068] In Fig. 32 can be seen that the container body has a substantially cylindrical side wall 4 with a flat wall portion 41. This flat wall portion 41 can be used to provide a label with a bar code on it, such that the bar code can be read properly from a flat surface by a bar code reader (not shown). The bar code is used as identification means as described hereabove. The bar code can be oriented such that it is read in the axial direction of the container body. The label with the bar code can be applied to the flat portion 41 by a per se known in-mold labeling method.

[0069] It is also possible to provide the bar code on the bottom of the container 1. In that case the container 1 does not need to have a flat wall portion 41 as is described

K-FEE SYSTEM GMBH, EX2009, page 1218
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

above with reference to Fig. 32. The bar code is preferably written on the bottom by a printing device, e.g. a suitable ink jet printer, directly after the container 1 has been filled and the cover sheet has been sealed to it. This has the advantage that information regarding the exact date of filling of the container 1 can be contained in the bar code. Also information about storage life can then be contained in the bar code. It is possible to use this storage life information on the container 1 such that the dispensing apparatus 61 will warn the customer or will even refuse to open the container 1 if the storage life has been exceeded. As a consequence a high quality of the drinks served by the apparatus 61 can be guaranteed.

[0070] As can be seen in Fig. 45, when the container with the bar code applied on the bottom is placed into the receiving means 67, 567 of the dispensing apparatus 61 a bar code reader 450 can scan the bar code when the piston 69, 569 is in a retracted position. The bar code reader 450 is placed above the receiving means and can scan through an opening 452 in the wall of the compression chamber 68, 568. The range that can be read by the bar code reader 450 is as an example defined by the dotted lines 451.

[0071] During insertion of the container 1 the bar code moves with respect to the bar code reader 450. This makes it possible to use as a bar code reader a simple static laser scan apparatus, which is advantageous compared to more advanced and thus in comparison expensive bar code readers, like e.g. a CCD device or a laser scanner with rotating mirrors. Another advantage of the simple laser scanner is that it can scan the bar code on the bottom of the container 1 from a greater angle than e.g. a CCD device. The laser scanner can scan from a maximum angle θ of 50° with respect to the perpendicular 453 on the bottom surface of container 1 (see Fig. 45), whereas a CCD device can only scan from a maximum angle θ of 30° with respect to the mentioned perpendicular. Consequently the use of a simple laser scanner allows for a more compact design of the receiving means 67, 567.

[0072] In the above description the container 1 has a smooth side wall. It is however also possible to have a corrugated side wall as is shown in Fig. 12 or stepped as is shown in Fig. 13. This allows an easier compression of the respective containers 121 and 131.

[0073] Another embodiment of a container is shown in Fig. 14a. The container corresponds substantially with the container 1 shown in figs. 1-2. Therefore the corresponding elements are designated with the same reference numerals and will not be further described here.

[0074] The difference with the container from Fig. 1 is that the extending tab 8 has a dispensing channel 9 formed in it that does not end at the edge of the extending tab 8. The dispensing channel 9 thus has a closed end 9b. The extending tab 8 is provided with a transverse line of rupture 128. The line of rupture 128 crosses the dispensing channel 9 substantially perpendicular. The line of rupture 128 can be formed during production of the container 1 by applying a cross cut 130 at the underside of the extending tab 8. The cross cut 130 is shown in more detail in Fig. 14b. The cut 130 extends partly through the thickness of the tab 8. The covering sheet 7 can be provided with a prescore at the location corresponding to the line of rupture 128.

[0075] In use a consumer can separate the end part 8b of the extending tab 8 from the rest by pulling it upwards, as is illustrated in Fig. 14a by the arrows 129. The extending tab 8 will break at the rupture line 128 and the part 8b with the piece of covering sheet applied thereto will be separated which leaves the dispensing channel 9 with an opened end 9a, as is shown in Fig. 14c. The container 1 can then be placed into the dispensing apparatus 67 for further use. The advantage of this container 1 is that the dispensing channel 9 is sealed from the environment until the moment of actual use, whereby the risk of contamination with dirt or the like is eliminated. A hygienic container is thus provided which is well adapted for the use with food products.

[0076] Another embodiment of the container is shown in Fig. 15 in a top view. The circumferential rim 5 has a flat extending tab which is covered by the cover sheet. In the figure the cover sheet is not shown, to make the sealing seams visible. The cover sheet is sealed to the extending tab 8 by at two substantially parallel sealing seams 135 which extend outwardly from the circumferential sealing 10 seam to the edge of the extending tab 8. When in use the circumferential seal 10 breaks at the zone 10b and the substance will flow from the filling cavity through the dispensing passage formed by the tab surface and the covering sheet, between the two sealing seams 135 as is indicated by the arrows. At the edge of the extending tab 8 there can be provided an extra seal 136, but this end could also be open, i.e. not sealed to the tab 8, as is shown in Fig. 15a. In an especially advantageous embodiment of the container shown in Fig. 33 the weakened zone 10b has a middle portion 10c pointing in the direction of the cavity of the container as is best shown in Fig. 15b. This has the effect that the seal will break first at the middle portion 10c and then will develop towards the sealing seams 135 where the breaking of the seal will stop.

[0077] Preferably, the covering lid 80 of the dispensing apparatus has a recess 84a with an elongated form (see Fig. 15c) which is adapted to cooperate with the passage between the seals 135 of the container shown in Fig. 15, Fig. 15a or Fig. 15b. In use the covering sheet of the container of Figs. 15-15b, which is compressed in an apparatus with a covering lid 80 as is shown in Fig. 15c, will bulge out in the form of a channel 150 as is shown in Fig. 15d. Result of this is that a film jet 151 of substance is expelled from the container. Preferably a film jet 152 of water is expelled from a flat nozzle head 153 that is provided on the central dispensing pipe 50 of the dispensing apparatus. A good mixing of substance and water takes place due to the large contact surface between the water film jet 152 and the substance film jet 151.

K-FEE SYSTEM GMBH, EX2009, page 1219
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Another advantage is that a well defined jet of substance is provided without splashing and thus possible contamination of the dispensing apparatus. A further advantage of the thus formed passage 150 between the seals 135 is that if after compression of the container 1 the pressure is relieved, the residue of substance in said passage 150 will be retracted due to an underpressure in the cavity of the container 1, which underpressure also results in sucking the covering sheet of the container 1 onto the rim 8. These effects, which can be characterized by the term "inhaling" effect, result in that after compression of the container 1 no substance is spilled anymore from the container 1, such that no contamination of the dispensing apparatus takes place.

[0078] A substance in general adheres the strongest to a material layer with the greatest thickness. This would cause the flow of substance exiting from the dispensing passage to be bent towards the thickest layer, in this case the tab 8. Fig. 15e shows a still further preferred embodiment of the container 1 of Fig. 15a, 15b, wherein the extending tab 8 has an end part 158 that becomes thinner towards the edge 159 of the tab 8. Preferably the tab 8 at the edge 159 where the dispensing passage ends has substantially the same thickness as the cover sheet. This feature results in that the flow of substance is exiting the dispensing passage straight downwards without being bent off. An advantage is that a well defined and well directed flow of substance is provided without possible contamination of the dispensing apparatus. The end part 158 can be formed to the tab 8 during thermoforming the container 1 in a sheet of plastic material. It is also possible to form the end part 158 whilst punching out waist material between the formed containers 1 in the sheet of plastic material they are formed from as will be described below.

[0079] In Fig. 15a and Fig. 15b is shown that the dispensing passage ends on a straight edge of the tab 8. It is however also possible that the edge of the extending tab of the rim 5 is provided with a recess and that passage ends at the recess. As is shown in Fig. 15f the recess 154 has a curved form, wherein the curve lies in the plane of the tab 8. In an alternative embodiment the passage ends in a V shaped recess 155 as is shown in Fig. 15g. The recesses 154 and 155 provides for the flow of substance gradually coming off the edge of the extending tab 8. This decreases the total effect of adhesion between the substance and the material of the extending tab 8. This feature results in that the flow of substance is exiting the dispensing passage more straight downwards without being bent off, which advantageously results in a well defined and well directed flow of substance without possible contamination of the dispensing apparatus. A further advantage of the recess 154, 155 is that inwardly formed edge does not easily gets damaged during use, transport or other circumstances. A damaged edge would disturb the flow of substance and would provoke deflection of the flow and thereby contamination of the dispensing apparatus.

[0080] In Fig. 37 is shown an embodiment of a container wherein the dispensing channel is provided with an obstruction 371 in this case a dot shaped seal between the cover sheet and the rim upper surface between the seals 135 defining the dispensing channel. In Fig. 38 another embodiment of the container is shown wherein a V-shaped obstruction 380 is provided with the point of the V directed to the cavity. Of course also other shaped obstructions can be provided in the dispensing channel. The obstruction 371, 380 provides for an advantageous influence on the flow of substance within the dispensing channel such that the flow when exiting the channel does not contaminate the dispensing apparatus.

[0081] In another embodiment shown in Fig. 39 there are provided one or more weak seals between the seals 135 behind the weakened portion 10b. In the shown embodiment there are provided two weak seals 390 and 391 behind the weak seal 10. During compression of the container first the weakened portion 10b of the circumferential seal 10 breaks and opens up a first part of the dispensing channel. Next the pressure is exerted on the first weak seal 390 in the dispensing channel which will break and open up a second part of the dispensing channel whereby pressure will be exerted on the second weak seal 391. When the second weak seal breaks the dispensing channel is fully open to the outside. The weak seals 390 and 391 provide for a gradually and thus better controlled opening of the container 1. The initial dispensed flow of substance is advantageously better controlled. In a further embodiment the portion 10b is stronger than the first weak seal 390 which in turn is stronger than the second weak seal 391.

[0082] Fig. 16 shows still another embodiment of a container. In the figure only the container body is shown. The elements of the container 161 that correspond to the elements of container 1 of Fig. 1 are indicated with the same reference numerals to which 160 is added. These elements will not be described here. The difference with the embodiment from Fig. 1 is that this embodiment has two filling cavities. The two filling cavities can contain different substances which have to be mixed. This can be useful in preparing certain drinks or food products, e.g. yogurt with syrup, coffee with cream but also a non food application where e.g. epoxy has to be prepared is possible.

[0083] The filling cavities can have the same volume as is shown in Fig. 16 and Fig. 18, but it is also possible that the filling cavities have a different volume as is shown in Fig. 17 and Fig. 19.

[0084] In Fig. 17 a container 170 is shown that has filling cavities with the same cross section, but with a different height. When this container 170 is compressed by a dispensing apparatus 67, the piston will first engage the bottom 173a corresponding to the filling cavity with the largest height and later the bottom 173b of the filling cavity with the smaller height. This is for example practical if yogurt has to be served with syrup or a sauce on top.

K-FEE SYSTEM GMBH, EX2009, page 1220
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

[0085] In Fig. 19 a container 191 is shown that has filling cavities with different cross sections.

[0086] Of course it is also possible to have a container with filling cavities with a different height and with a different cross section.

[0087] In all embodiments of Figs. 16-19 the substances from the two filling cavities are dispensed through one dispensing channel 169, 189, 199.

[0088] The containers filled with substance hereabove described are preferably manufactured by a method, wherein the containers are formed from a sheet of plastic material. First a flat sheet of plastic material is placed in a vacuum forming or thermo forming apparatus with a forming die. By vacuum forming the filling cavities into the die, multiple container bodies are formed simultaneously in the sheet. Possibly also dispensing channels 9 of the containers 1 are depressed by the vacuum forming machine in an extension tab, which is subsequently to be formed in the punch machine. The sheet with the filling cavity is placed in a filling machine and filled with substance. Subsequently a sheet 7 of covering foil is sealed over the sheet with the container bodies. Finally, the sheet with the closed containers is placed in a punch machine, where the perimeter of the circumferential rim of the body is formed by punching out waste material between the containers 1.

[0089] In the above described manner it is also possible to manufacture two different types of containers simultaneously from one sheet. This is advantageous when two containers are to be used together. A possible application is that one container is like the container 1 already described, whereas the other container contains an additional food product. As an example one can think of a container with substance for soup that is placed in the receiving means 67 of the dispensing apparatus 61, and a second container filled with croutons that have to be added to the soup by the consumer after the apparatus 61 has prepared the soup.

[0090] When filling a container 1 with a substance, a certain so called head space is necessary above the final level of the substance in the container 1. The head space is the distance between the final substance level after filling and the cover on the upper side of the container 1. The head space secures that the filling machine will not spill too much substance, e.g. by splashing. It has already been mentioned that for different portions of a certain drink (e.g. one glass or a whole bottle of a soft drink) containers 1 with differently sized bodies with equally concentrated substance can be inserted in the dispensing apparatus according to the invention. The containers described above preferably have a body with a diameter of substantially 40mm. For containers with a smaller volume of substance it is, instead of using a container body with a decreased length and an equal diameter of about 40mm, more favourable to use a container body with a smaller diameter e.g. 20 or 30mm and a greater length, such that enough head space can remain above the final substance level in the container 1. The circumferential rim of course remains with the same outer form and dimensions, such that the container with the body with the smaller diameter can be placed in the receiving means of the dispensing apparatus without any problem just like the larger body container 1.

[0091] The container can have a cover which is not a flat sheet of e.g. foil material, but which is preformed. In Fig. 40 a cover 400 is shown which is preformed such that a covering surface 403 is positioned within the cavity. In Fig. 40 is shown that the covering surface 403 lies countersunk within the cavity of the container 1. The cover 400 further has a planar circumferential rim 401 which contacts the circumferential rim 5 of the container 1 and is sealed to it. Because of the countersunk cover surface 403, the head space between the fluid level 402 of the substance in the container 1 and the layer 400 is reduced. The smaller head space above the fluid level means a reduced volume of air above the substance, which is advantageous in view of the storage life of the substance contained within the container 1.

[0092] In Fig. 41 is shown a container as in Fig. 40 with a cover lid 80 (see Fig. 8) of the dispensing apparatus positioned over it. The covering lid 80 is shaped such that it complementary with the countersunk form of the cover 400 of the container. The covering lid 80 has a recess 84 for allowing the cover 400 of the container 1 to bulge out upon pressurization of the content of it.

[0093] The container can also have a preformed cover with a covering surface which is situated above the rim 5 of the container 1. In Fig. 42 an example is shown, wherein the cover is designated with reference numeral 420. The cover 420 has a covering surface 421 that extends in a plane above the plane of the rim 5 of the container 1. The cover 420 has a rim 422 which is complementary to the rim 5 of the container and attached to it with a sealing seam.

[0094] In a further preferred embodiment shown in Fig. 43 and Fig. 44 the container body and the cover are substantially equally shaped and manufactured of the same material. Such a container 1 has a body which comprises two preformed shells 730. In the terminology of the containers described above one of the shells 730 would form the body, whereas the other shell 730 would form the cover. The shells are preferably made of plastic material, more preferably of polyethylene, and are manufactured by a thermoforming process. The shells 730 each define a part of a filling cavity 731 for containing substance. The shells 730 each have a circumferential rim 732. The circumferential rims 732 of the respective shells 730 are attached to each other by means of a circumferential sealing seam 736. The sealed together circumferential rims 732 at a portion of the circumference form a dispensing part 734. In a possible embodiment which is shown in Fig. 43 and Fig. 44, the circumferential rims 732 of the shells 730 at a portion of the circumference each have a dispensing part half 733, wherein the dispensing part halves 733 are sealed together so as to form the dispensing part 734 of the container. The dispensing part

K-FEE SYSTEM GMBH, EX2009, page 1221
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

halves 733 are sealed together by at least two outwardly directed sealing seams 735 which extend at a distance from one another from the circumferential sealing seam 736 to the edge 737 of the dispensing part 735. This embodiment can be shaped in analogy with the dispensing part of the container 1 shown in Fig. 15a-15g. In another embodiment the dispensing part 733 is provided with a preformed dispensing channel, which is closed off from the filling cavity by a sealing seam in analogy with the embodiment of the extending tab 8 of the container 1 shown in Fig. 2.

[0095] In the above description the use for dispensing food products is mentioned. The container can be filled with concentrate for coffee, tea, chocolate, soup, dairy products like milk or yogurt drinks, fruit and vegetable juices, soft drinks and sport drinks.

[0096] The use of dispensing a substance from a container in the manner, as is described hereabove is however not only delimited to applications with food products. It is also possible to use this principle in non-food applications, e.g. in medical applications for dispensing a dose of a medicament.

[0097] The dispensing apparatus has to be cleaned after a certain period of time. To this end a cleaning fluid can be lead through the dispensing apparatus. For instance it is possible that on the dispensing apparatus 61 of Fig. 7 instead of a water tank 63 a tank or other container with a cleaning fluid is placed. In order to let the cleaning fluid flow through the apparatus 61 a dummy container with the shape of a container 1 can be placed in the receiving means 67. The dummy container can be provided with a bar code or other identification means which can be read by the sensor 79. The control system 75 then runs a cleaning program whereby the flow of cleaning fluid is lead through the fluid lines 74a, 74b and 66. The body of the dummy container can have such a short length that it will not be compressed by the compression means. In another possible embodiment the dummy container might be filled with a check fluid which colors the resulting mix if there is still cleaning fluid dispensed by the apparatus. Compression of the dummy container dispenses the check fluid.

Claims

1. Container (1) containing a drink preparation substance, said container comprising a preformed deformable body defining a filling cavity filled with the substance, which body has an opening and an integral planar circumferential rim (5) surrounding said opening (6), which opening (6) is closed by a cover sheet (7) which is sealed to the circumferential rim (5) by means of a circumferential sealing seam (10), wherein the circumferential rim (5) has a dispensing part (8) which is covered by the cover sheet (7), wherein a dispensing passage for the drink preparation substance is formed between the dispensing part (8) and the cover sheet (7), and wherein at the location of the dispensing passage is provided a weakened sealing seam portion (10b), such that upon pressurizing the content of the container (1) by exerting a compression force on the filled container body, the weakened sealing seam portion (10b) breaks and the drink preparation substance flows out of the container through the dispensing passage, **characterized in that** the dispensing part (8) is flat and the dispensing passage for the substance is defined by the cover sheet (7) sealed to the flat dispensing part (8) by at least two outwardly directed sealing seams (135), which outwardly directed sealing seams (135) extend at a distance from one another from the circumferential sealing seam (10) to the edge of the dispensing part (8).

2. Container according to claim 1, wherein the weakened sealing seam portion (10b) has a pointed portion (10c) of which the point is directed towards the filling cavity such that upon compression of the container (1) the sealing seam portion (10b) starts to break at the pointed portion (10c).

3. Container according to any one of the preceding claims, wherein the outwardly directed sealing seams (135) are substantially parallel.

4. Container according to any one of the preceding claims, wherein the dispensing part (8) is shaped as an extending tab.

5. Container according to any of the preceding claims, wherein the dispensing part (8) has a part (158) near its edge (159) with a decreasing thickness towards the edge (159).

6. Container according to claim 5, wherein the thickness of the dispensing part (8) at the edge (159) is substantially equal to the thickness of the cover sheet (7)

7. Container according to any one of the preceding claims, wherein the edge of the dispensing part (8) between the two outwardly directed sealing seams (135) is provided with a recess (154; 155).

8. Container according to claim 7, wherein the edge of the dispensing part at the recess (154) has a curved form.

9. Container according to claim 8, wherein the edge of the dispensing part at the recess (155) has a V-shape.

10. Container according to any one of the preceding claims, wherein the dispensing passage defined between the outwardly directed sealing seams (135) is

K-FEE SYSTEM GMBH, EX2009, page 1222
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

provided with one or more obstructions (371; 380) for the flow of substance exiting the container (1).

11. Container according to any one of the preceding claims, wherein the dispensing passage is provided with one or more further weak seals (390; 391).

12. Container according to any one of the preceding claims, wherein the end of the dispensing passage at the edge of the dispensing part (8) is open.

13. Container according to any one of the preceding claims, wherein the end of the channel at the edge of the extending tab is sealed.

14. Container according to any one of the preceding claims, wherein a gripping tab is provided at the circumferential rim.

15. Container according to claim 14, wherein the gripping tab is situated diametrically opposite the extending tab.

16. Container according to any one of the preceding claims, wherein the container wall is formed of a plastic material, preferably polystyrene.

17. Container according to any one of the preceding claims, wherein the container wall is formed of a metal.

18. Container according to any one of the preceding claims, wherein the cover sheet is made of foil material.

19. Container according to any one of the preceding claims, wherein the cover sheet is made of a multilayer material.

20. Container according to any one of the preceding claims, wherein the cover sheet is preformed.

21. Container according to any one of the preceding claims, wherein the container body is formed by vacuum forming and/or thermo forming.

22. Container according to any one of the preceding claims, wherein the deformable body comprises a bottom and a side wall extending upwardly from the bottom.

23. Container according to any one of the preceding claims, wherein the container body is corrugated so as to facilitate compression of the container.

24. Container according to any one of the preceding claims, wherein the circumferential rim (5) is provided with one or more positioning protrusions (601; 602) formed by a depression in the rim for positioning the container (1) in a dispensing apparatus.

25. Combination of a container according to any one of the preceding claims and a dispensing apparatus comprising compression means for compressing the container body.

26. Combination according to claim 25, wherein the dispensing apparatus comprises receiving means for holding the container and a supporting surface for supporting the cover sheet of the container, wherein the supporting surface is provided with a recess at the location of the dispensing passage of the container, such that upon pressurization of the substance in the container by means of the compressing means, the cover seal is allowed to bulge out into the recess such that the weakened sealing seam portion (10b) is broken and the substance can flow through the dispensing passage.

27. Method for manufacturing containers containing a drink preparation substance, wherein

- a flat sheet is placed in a vacuum or thermo forming apparatus with a forming die, and multiple container bodies are formed simultaneously in the sheet by vacuum forming the filling cavities into the die, which filling cavities have an opening (6) at the upper side,
- the sheet with the filling cavities is placed in a filling machine and said cavities are filled with the drink preparation substance through the opening,
- a covering sheet is sealed over the sheet with the container bodies, wherein

  - a circumferential sealing seam surrounding a large part of the opening is formed,
  - at least two outwardly directed sealing seams (135) are formed extending from the circumferential sealing seam at a distance from one another, and
  - a weakened sealing seam portion (10b) is formed between the two outwardly extending sealing seams (135),

- the sheet with the closed containers is placed in a punch machine, where the perimeter of the circumferential rim of the body is formed by punching out waste material between the containers, whereby a circumferential rim (5) surrounding said opening (6) is formed as well as a dispensing part (8) at the region of the flat sheet where the two outwardly extending sealing seams (135) are formed and an edge of the dispensing part (8) is formed which intersects the outwardly extending sealing seams (135).

K-FEE SYSTEM GMBH, EX2009, page 1223
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

28. Method according to claim 27, wherein by the vacuum or thermo forming machine positioning protrusions are depressed in the circumferential rim, which is subsequently to be formed in the punch machine.

Patentansprüche

1. Behälter (1), welcher eine Substanz zur Getränkezubereitung enthält, wobei dieser Behälter einen vorgeformten verformbaren Körper umfasst, der einen mit der Substanz gefüllten Füllhohlraum begrenzt, der Körper eine Öffnung und eine integrierte, die Öffnung (6) umgebende ebene Umfangsumrandung (5) aufweist, die Öffnung (6) durch ein Deckelblatt (7) verschlossen ist, welches mittels eines Umfangsdichtsaumes (10) dicht mit der Umfangsumrandung (5) verbunden ist, wobei die Umfangsumrandung (5) einen Abgabeteil (8) aufweist, welcher durch das Deckelblatt (7) abgedeckt ist, wobei zwischen dem Abgabeteil (8) und dem Deckelblatt (7) ein Abgabedurchlass für die Substanz zur Getränkezubereitung geformt ist und wobei an der Position des Abgabedurchlasses eine Dichtsaum-Schwachstelle (10b) vorgesehen ist, so dass die Dichtsaum-Schwachstelle (10b) bricht, wenn der Inhalt des Behälters (1) durch Ausüben einer Druckkraft auf den gefüllten Behälterkörper unter Druck gesetzt wird und die Substanz zur Getränkezubereitung durch den Abgabedurchlass aus dem Behälter ausfließt, **dadurch gekennzeichnet, dass** der Abgabeteil (8) eben ist und der Abgabedurchlass für die Substanz gebildet wird durch das Deckelblatt (7), welches mit dem ebenen Abgabeteil (8) durch mindestens zwei nach aussen gerichtete Dichtsäume (135) dicht verbunden ist und diese nach aussen gerichteten Dichtsäume (135) sich in einem Abstand voneinander vom Umfangsdichtsaum (10) zur Kante des Abgabeteiles (8) hin erstrecken.

2. Behälter nach Anspruch 1, bei welchem die Dichtsaum-Schwachstelle (10b) einen spitz ausgeführten Abschnitt (10c) aufweist, dessen Spitze zum Füllhohlraum hin gerichtet ist, so dass beim Pressen des Behälters (1) der Dichtsaumabschnitt (10b) am spitz ausgeführten Abschnitt (10c) zu brechen beginnt.

3. Behälter nach einem der bisherigen Ansprüche, bei welchem die nach aussen gerichteten Dichtsäume (135) im Wesentlichen parallel verlaufen.

4. Behälter nach einem der bisherigen Ansprüche, bei welchem der Abgabeteil (8) als eine herausragende Zunge ausgebildet ist.

5. Behälter nach einem der bisherigen Ansprüche, bei welchem der Abgabeteil (8) in der Nähe seiner Kante (159) einen Bereich (158) mit zur Kante (159) hin abnehmender Dicke aufweist.

6. Behälter nach Anspruch 5, bei welchem die Dicke des Abgabeteiles (8) an der Kante (159) im Wesentlichen gleich der Dicke des Deckelblattes (7) ist.

7. Behälter nach einem der bisherigen Ansprüche, bei welchem die Kante des Abgabeteiles (8) zwischen den beiden nach außen gerichteten Dichtsäumen (135) mit einer Aussparung (154; 155) versehen ist.

8. Behälter nach Anspruch 7, bei welchem die Kante des Abgabeteiles (8) an der Aussparung (154) eine gekrümmte Form aufweist.

9. Behälter nach Anspruch 8, bei welchem die Kante des Abgabeteiles (8) an der Aussparung (155) eine V-Form aufweist.

10. Behälter nach einem der bisherigen Ansprüche, bei welchem der von den beiden nach außen gerichteten Dichtungssäumen (135) begrenzte Abgabedurchlass mit einem oder mehreren Hindernissen (371; 380) für den Fluss der aus dem Behälter (1) austretenden Substanz versehen ist.

11. Behälter nach einem der bisherigen Ansprüche, bei welchem der Abgabedurchlass mit einem oder mehreren weiteren Schwachstellen-Abdichtungen (390; 391) versehen ist.

12. Behälter nach einem der bisherigen Ansprüche, bei welchem das Ende des Abgabedurchlasses an der Kante des Abgabeteiles (8) offen ist.

13. Behälter nach einem der bisherigen Ansprüche, bei welchem das Ende des Kanales an der Kante der herausragenden Zunge abgedichtet ist.

14. Behälter nach einem der bisherigen Ansprüche, bei welchem an der Umfangsumrandung eine Griffzunge vorgesehen ist.

15. Behälter nach Anspruch 14, bei welchem die Crriffzunge diametral gegenüber der herausragenden Zunge angeordnet ist.

16. Behälter nach einem der bisherigen Ansprüche, bei welchem die Behälterwandung aus einem Kunststoffmaterial, vorzugsweise aus Polystyrol, geformt ist.

17. Behälter nach einem der bisherigen Ansprüche, bei welchem die Behälterwandung aus einem Metall geformt ist.

18. Behälter nach einem der bisherigen Ansprüche, bei welchem das Deckelblatt aus einem Folienmaterial

K-FEE SYSTEM GMBH, EX2009, page 1224
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

gefertigt ist.

19. Behälter nach einem der bisherigen Ansprüche, bei welchem das Deckelblatt aus einem Mehrlagenmaterial gefertigt ist.

20. Behälter nach einem der bisherigen Ansprüche, bei welchem das Deckelblatt vorgeformt ist.

21. Behälter nach einem der bisherigen Ansprüche, bei welchem der Behälterkörper durch Vakuumformung und/oder Thermoformung geformt ist.

22. Behälter nach einem der bisherigen Ansprüche, bei welchem der verformbare Körper einen Boden sowie eine sich vom Boden nach oben erstreckende Seitenwand umfasst.

23. Behälter nach einem der bisherigen Ansprüche, bei welchem der Behälterkörper gewellt ist, um das Pressen des Behälters zu erleichtern.

24. Behälter nach einem der bisherigen Ansprüche, bei welchem die Umfangsumrandung (5) mit einem oder mehreren Positionierungsvorsprüngen (601; 602) versehen ist, welche durch eine Vertiefung in der Umrandung gebildet werden, um den Behälter (1) in der Abgabevorrichtung zu positionieren.

25. Kombination eines Behälters nach einem der bisherigen Ansprüche und einer Abgabevorrichtung, welche eine Presseinrichtung zum Pressen des Behälterkörpers umfasst.

26. Kombination nach Anspruch 25, bei welcher die Abgabevorrichtung eine Aufnahmeeinrichtung zum Halten des Behälters und eine Auflagefläche zur Auflage des Deckelblattes des Behälters umfasst, wobei die Auflagefläche an der Position des Abgabedurchlasses des Behälters mit einer Vertiefung versehen ist, so dass, sobald die Substanz im Behälter durch die Presseinrichtung unter Druck gesetzt wird, sich die Deckeldichtung in die Vertiefung hinein ausbeulen kann, so dass die Dichtsaum-Schwachstelle (10b) gebrochen wird und die Substanz durch den Abgabedurchlass fließen kann.

27. Verfahren zur Herstellung von Behältern, welche eine Substanz zur Getränkezubereitung enthalten, bei welchem

- eine ebene Platte in einer Vakuum- oder Thermoformungsvorrichtung mit einem Formungswerkzeug platziert wird und in der Platte mehrere Behälterkörper gleichzeitig durch Vakuumformung der Füllhohlräume in das Formungswerkzeug hinein geformt werden, wobei die Füllhohlräume an der Oberseite eine Öffnung (6) aufweisen,
- die Platte mit den Füllhohlräumen in einer Füllmaschine platziert und die genannten Hohlräume durch die Öffnung hindurch mit der Substanz gefiillt werden,
- ein Deckelblatt auf der Platte mit den Behälterkörpern dicht verbunden wird, wobei

  - ein Umfangsdichtsaum geformt wird, welcher einen großen Teil der Öffnung umgibt,
  - mindestens zwei nach außen gerichtete Dichtsäume (135) ausgehend vom Umfangsdichtsaum in einem Abstand voneinander geformt werden und
  - eine Dichtsaum-Schwachstelle (10b) zwischen den beiden nach außen gerichteten Dichtsäumen (135) geformt wird,

- die Platte mit den verschlossenen Behältern in einer Stanzmaschine platziert wird, wobei der Außenumfang der Umfangsumrandung des Körpers durch Ausstanzen des Abfallmaterials zwischen den Behältern geformt wird, wodurch sowohl eine die Öffnung (6) umgebende Umfangsumrandung (5) als auch ein Abgabeteil (8) im Bereich der Platte, wo sich die beiden Dichtsäume (135) nach außen erstrecken, geformt werden und eine Kante des Abgabeteiles (8) ausgebildet wird, welche die sich nach außen erstreckenden Dichtsäume (135) schneidet.

28. Verfahren nach Anspruch 27, bei welchem durch die Vakuum- und Thermoformungsmaschine Positionierungsvorsprünge in die anschließend in der Stanzmaschine zu formende Umfangsumrandung eingedrückt werden.

Revendications

1. Récipient (1) contenant une substance de préparation à boire, ledit récipient comprenant un corps déformable préformé définissant une cavité de remplissage remplie par la substance, lequel corps possède une ouverture et une collerette circonférentielle plane (5) entourant ladite ouverture (6), laquelle ouverture (6) est fermée par une feuille de couverture (7) qui est scellée sur la collerette circonférentielle (5) au moyen d'une jonction d'étanchéité circonférentielle (10), où la collerette circonférentielle (5) possède une partie de distribution (8) qui est couverte par la feuille de couverture (7), ou un passage de distribution pour la substance de préparation à boire est formé entre la partie de distribution (8) et la feuille de couverture (7), et où à l'emplacement du passage de distribution il est prévu une partie de jonction d'étanchéité affaiblie (10b), de sorte que lors de la compression du contenu du récipient (1) en exerçant

K-FEE SYSTEM GMBH, EX2009, page 1225
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

une force de compression sur le corps de récipient rempli, la partie de jonction d'étanchéité affaiblie (10b) casse et la substance de préparation à boire s'écoule hors du récipient à travers le passage de distribution, **caractérisé en ce que** la partie de distribution (8) est plane et le passage de distribution pour la substance est défini par la feuille de couverture (7) scellée à la partie de distribution plane (8) par au moins deux jonctions d'étanchéité dirigées vers l'extérieur (135), lesquelles jonctions d'étanchéité dirigées vers l'extérieur (135) s'étendent à une distance l'une de l'autre de la jonction d'étanchéité circonférentielle (10) vers le bord de la partie de distribution (8).

2. Récipient selon la revendication 1, où la partie de jonction d'étanchéité affaiblie (10b) possède une partie pointue (10c) dont la pointe est dirigée vers la cavité de remplissage de sorte que lors de la compression du récipient (1) la partie de jonction d'étanchéité (10b) commence à se casser à la partie pointue (10c).

3. Récipient selon l'une quelconque des revendications précédentes, où les jonctions d'étanchéité dirigées vers l'extérieur (135) sont sensiblement parallèles.

4. Récipient selon l'une quelconque des revendications précédentes, où la partie de distribution (8) est de la forme d'une languette en saillie.

5. Récipient selon l'une quelconque des revendications précédentes, où la partie de distribution (8) possède une partie (158) à proximité de son bord (159) avec une épaisseur décroissante vers le bord (159).

6. Récipient selon la revendication 5, où l'épaisseur de la partie de distribution (8) au niveau du bord (159) est sensiblement égale à l'épaisseur de la feuille de couverture (7).

7. Récipient selon l'une quelconque des revendications précédentes, où le bord de la partie de distribution (8) entre les deux jonctions d'étanchéité dirigées vers l'extérieur (135) est muni d'un évidement (154 ; 155).

8. Récipient selon la revendication 7, où le bord de la partie de distribution au niveau de l'évidement (154) a une forme incurvée.

9. Récipient selon la revendication 8, où le bord de la partie de distribution au niveau de l'évidement (155) a une forme en V.

10. Récipient selon l'une quelconque des revendications précédentes, où le passage de distribution défini entre les jonctions d'étanchéité dirigées vers l'extérieur (135) est muni d'une ou de plusieurs obstructions (371 ; 380) pour l'écoulement de la substance sortant du récipient (1).

11. Récipient selon l'une quelconque des revendications précédentes, où le passage de distribution est muni d'une ou de plusieurs autres jonctions affaiblies (390 ; 391).

12. Récipient selon l'une quelconque des revendications précédentes, où l'extrémité du passage de distribution au bord de la partie de distribution (8) est ouverte.

13. Récipient selon l'une quelconque des revendications précédentes, où l'extrémité du canal au niveau du bord de la languette en saillie est fermée de manière étanche.

14. Récipient selon l'une quelconque des revendications précédentes, où une languette de préhension est prévue au niveau de la collerette circonférentielle.

15. Récipient selon la revendication 14, où la languette de préhension est située de manière diamétralement opposée à la languette en saillie.

16. Récipient selon l'une quelconque des revendications précédentes, où la paroi du récipient est formée d'un matériau plastique, de préférence le polystyrène.

17. Récipient selon l'une quelconque des revendications précédentes, où la paroi du récipient est formée d'un métal.

18. Récipient selon l'une quelconque des revendications précédentes, où la feuille de couverture est faite d'un matériau en feuille.

19. Récipient selon l'une quelconque des revendications précédentes, où la feuille de couverture est faite d'un matériau multicouche.

20. Récipient selon l'une quelconque des revendications précédentes, où la feuille de couverture est préformée.

21. Récipient selon l'une quelconque des revendications précédentes, où le corps du récipient est formé par formage sous vide et/ou thermoformage.

22. Récipient selon l'une quelconque des revendications précédentes, où le corps déformable comprend un fond et une paroi latérale s'étendant vers le haut à partir du fond.

K-FEE SYSTEM GMBH, EX2009, page 1226
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

23. Récipient selon l'une quelconque des revendications précédentes, où le corps du récipient est ondulé de manière à faciliter la compression du récipient.

24. Récipient selon l'une quelconque des revendications précédentes, où la collerette circonférentielle (5) est munie d'une ou de plusieurs saillies de positionnement (601 ; 602) formées par une dépression dans la collerette pour positionner le récipient (1) dans un appareil de distribution.

25. Combinaison d'un récipient selon l'une quelconque des revendications précédentes et d'un appareil de distribution comprenant des moyens de compression pour comprimer le corps du récipient.

26. Combinaison selon la revendication 25, où l'appareil de distribution comprend des moyens de réception pour maintenir le récipient et une surface de support pour supporter la feuille de couverture du récipient, où la surface de support est munie d'un évidement à l'emplacement du passage de distribution du récipient, de sorte que lors de la compression de la substance dans le récipient au moyen des moyens de compression, le joint d'étanchéité de couverture peut gonfler dans l'évidement de sorte que la partie de jonction d'étanchéité affaiblie (10b) casse et que la substance puisse s'écouler à travers le passage de distribution.

27. Procédé de fabrication de récipients contenant une substance de préparation à boire, où
une feuille plane est placée dans un appareil de formage sous vide ou de thermoformage avec un moule de formage, et de multiples corps de récipient sont formés simultanément dans la feuille par formage sous vide des cavités de remplissage dans le moule, lesquelles cavités de remplissage possèdent une ouverture (6) du côté supérieur,
la feuille avec les cavités de remplissage est placée dans une machine de remplissage et lesdites cavités sont remplies par la substance de préparation à boire à travers l'ouverture,
une feuille de couverture est scellée sur la feuille avec les corps de récipient, où une jonction d'étanchéité circonférentielle entourant une grande partie de l'ouverture est formée,
au moins deux jonctions d'étanchéité dirigées vers l'extérieur (135) sont formées en s'étendant à partir de la jonction d'étanchéité circonférentielle à une distance l'une de l'autre, et
une partie de jonction d'étanchéité affaiblie (10b) est formée entre les deux jonctions d'étanchéité s'étendant vers l'extérieur (135),
la feuille avec les récipients fermés est placée dans une presse à poinçonner, où le périmètre de la collerette circonférentielle du corps est formé par poinçonnage d'un matériau de rebut entre les récipients, grâce à quoi une collerette circonférentielle (5) entourant ladite ouverture (6) est formée ainsi qu'une partie de distribution (8) dans la région de la feuille plane où les deux jonctions d'étanchéité s'étendant vers l'extérieur (135) sont formées et un bord de la partie de distribution (8) est formé qui croise les jonctions d'étanchéité s'étendant vers l'extérieur (135).

28. Procédé selon la revendication 27, où par le positionnement de la machine de formage sous vide ou thermoformage des saillies sont imprimées dans la collerette circonférentielle, qui doit ensuite être formée dans la presse à poinçonner.

K-FEE SYSTEM GMBH, EX2009, page 1227
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

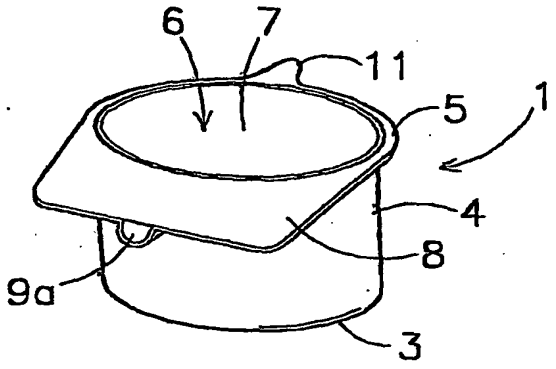


Fig 1

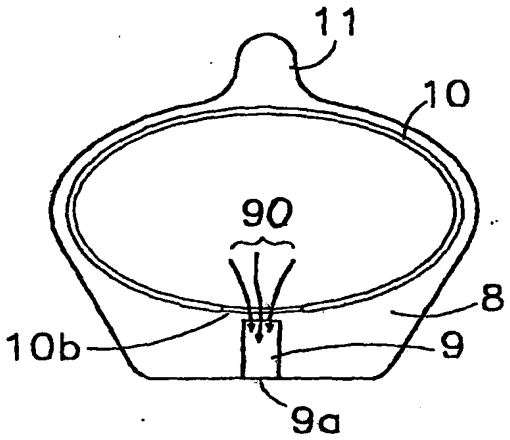


Fig 2b

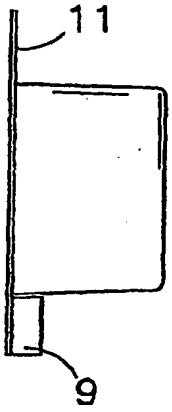


Fig 2c

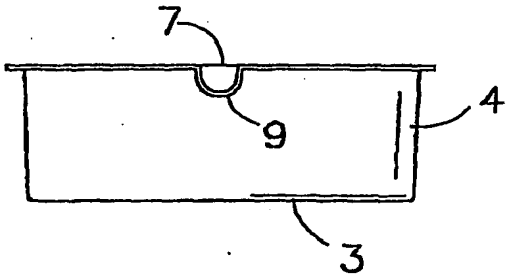


Fig 2a

K-FEE SYSTEM GMBH, EX2009, page 1228
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

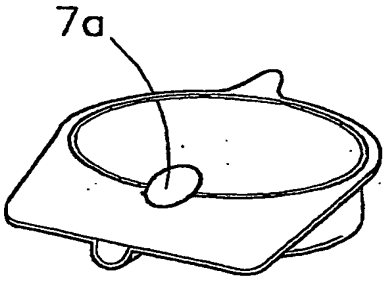


Fig 3

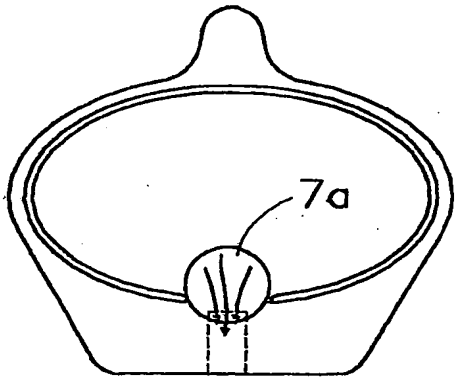


Fig 4b

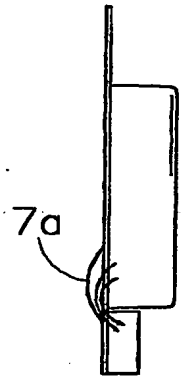


Fig 4c

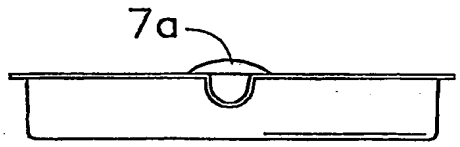


Fig 4a

K-FEE SYSTEM GMBH, EX2009, page 1229
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

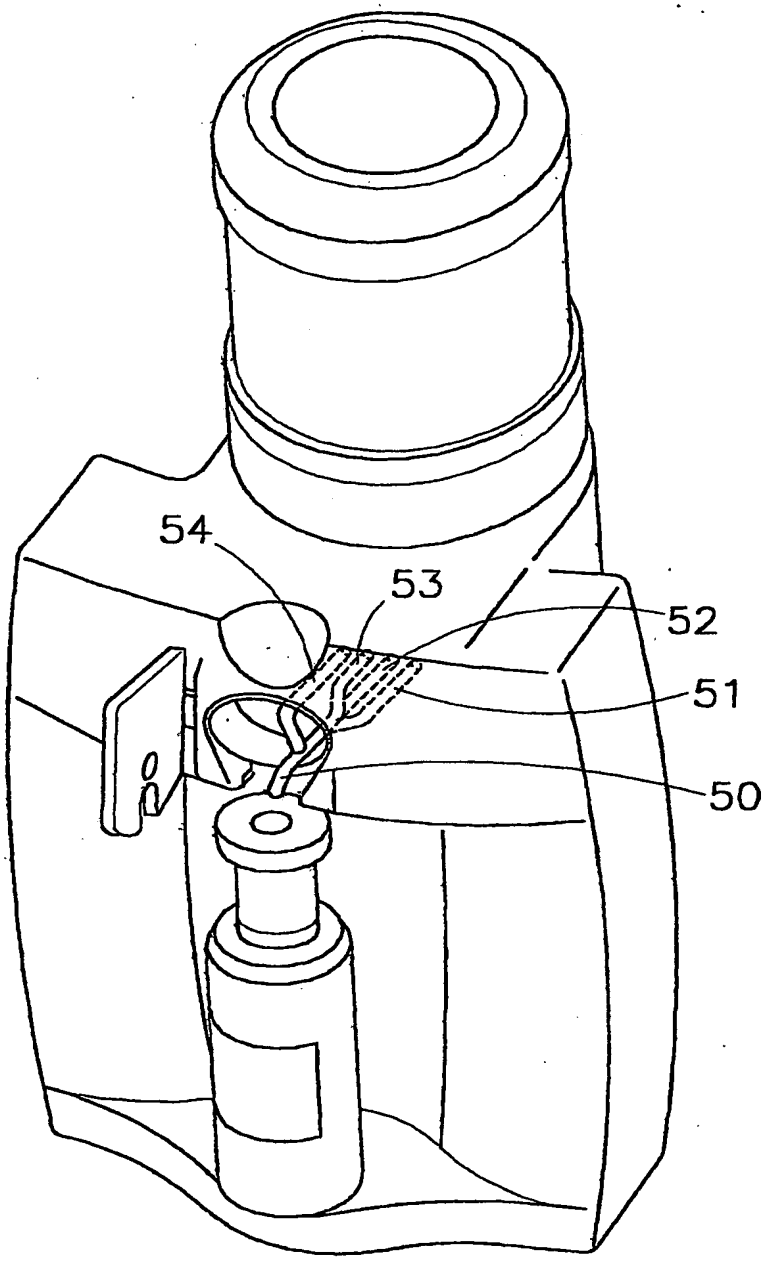


Fig 5

K-FEE SYSTEM GMBH, EX2009, page 1230
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

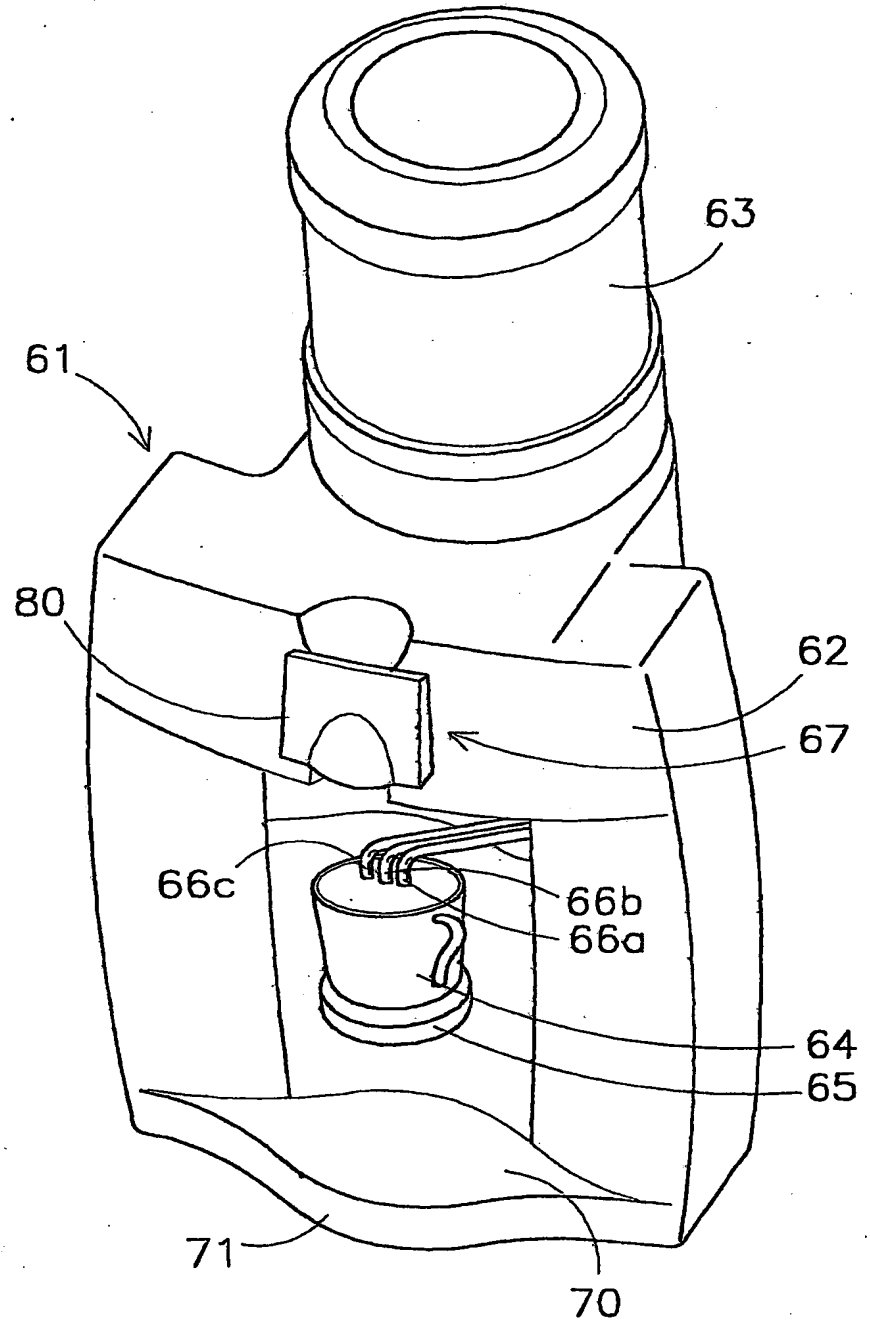


Fig 6

K-FEE SYSTEM GMBH, EX2009, page 1231
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

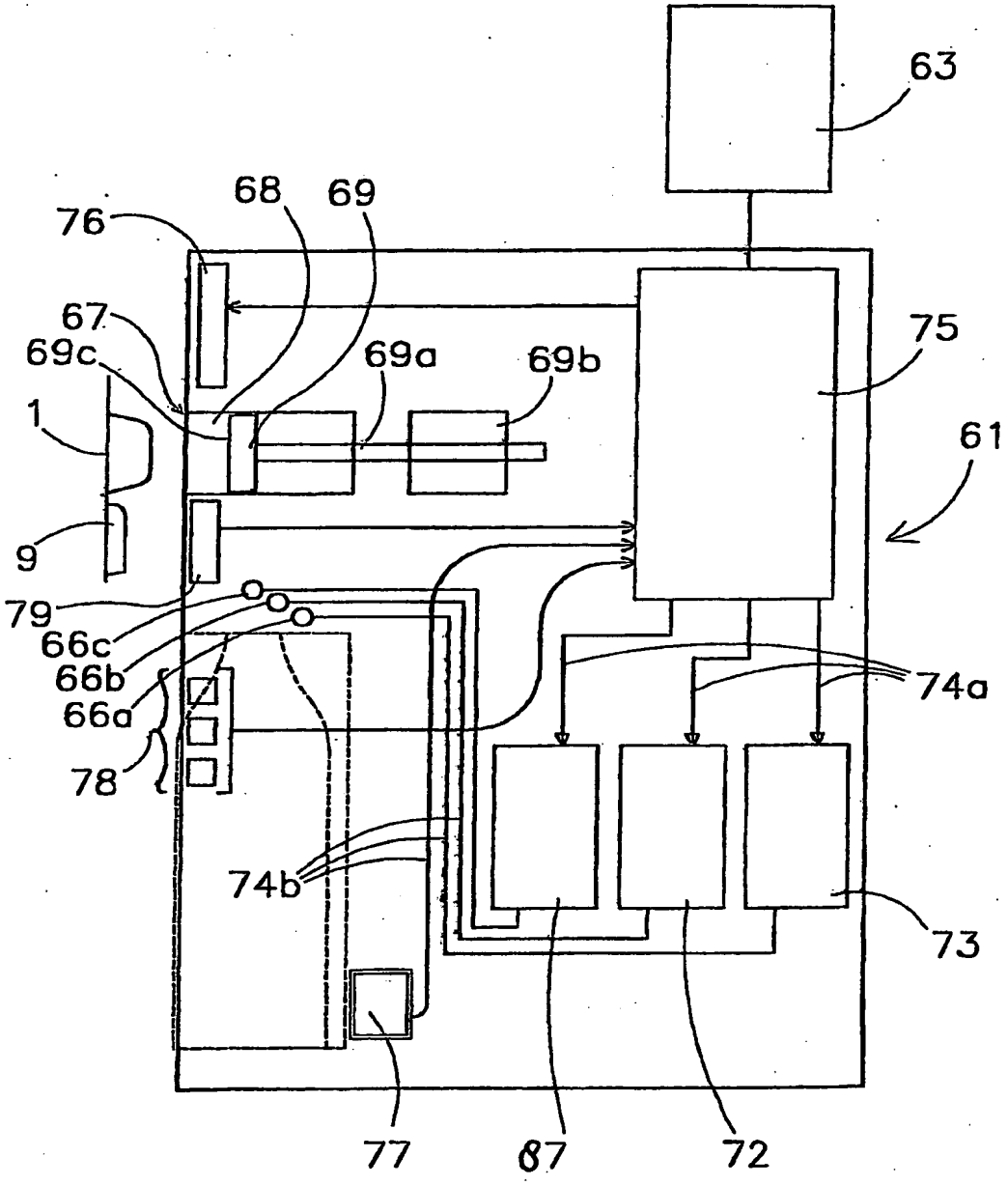


Fig 7

K-FEE SYSTEM GMBH, EX2009, page 1232
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

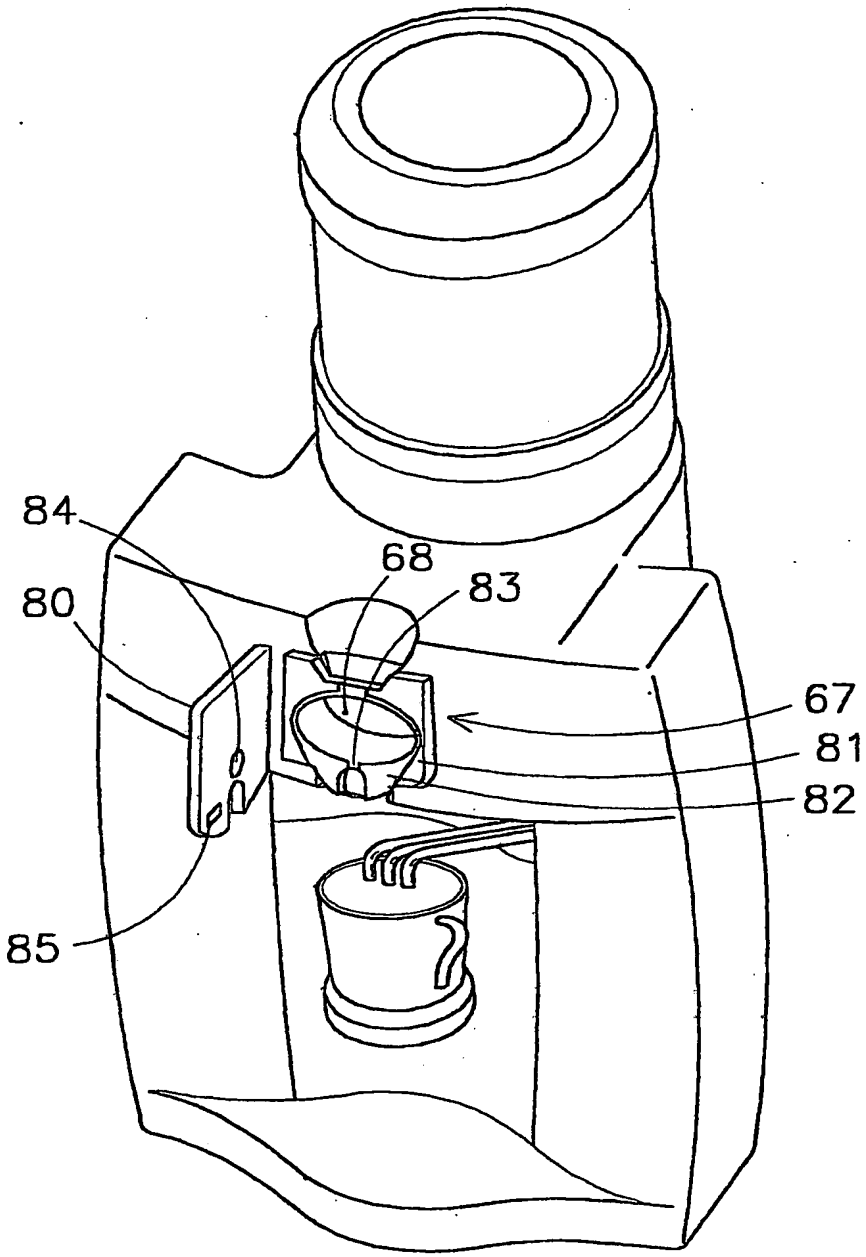


Fig 8

K-FEE SYSTEM GMBH, EX2009, page 1233
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

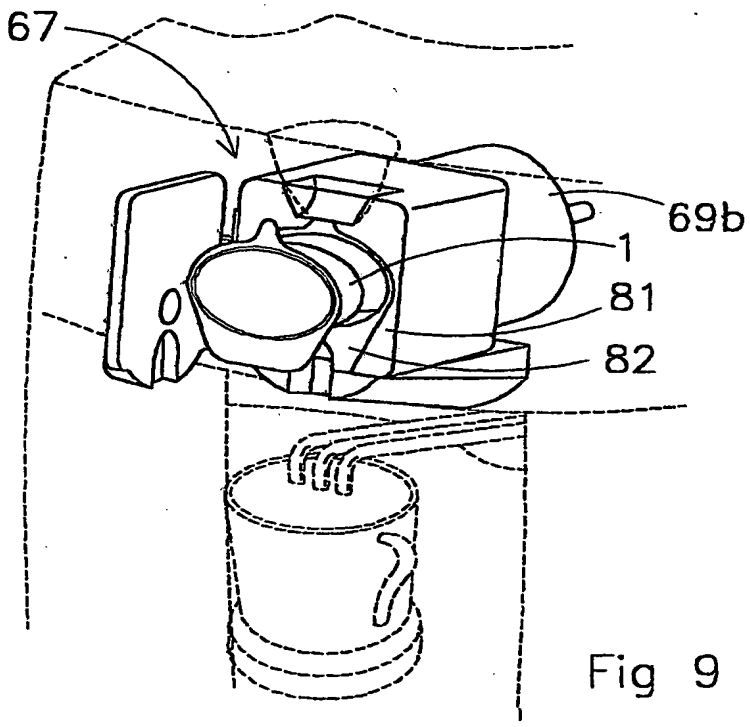


Fig 9

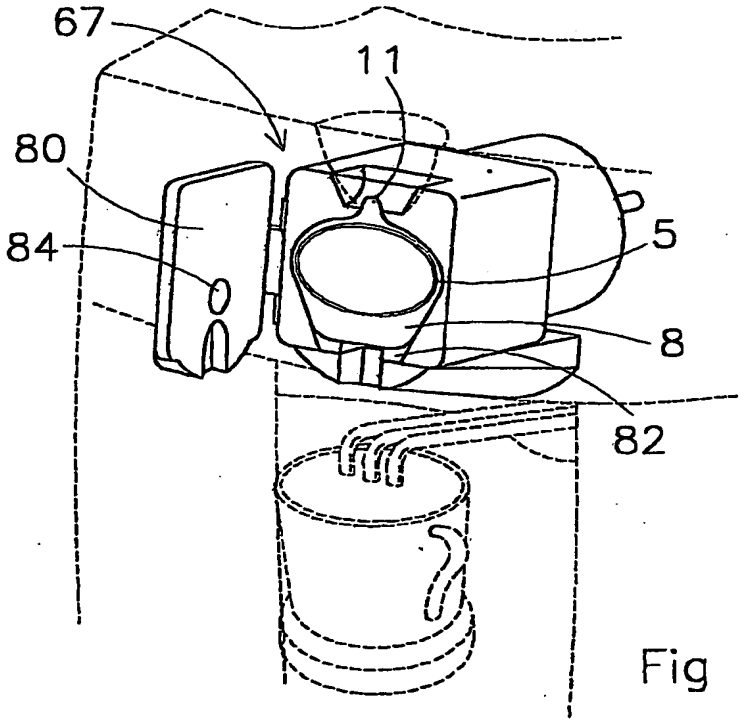


Fig 10

K-FEE SYSTEM GMBH, EX2009, page 1234
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

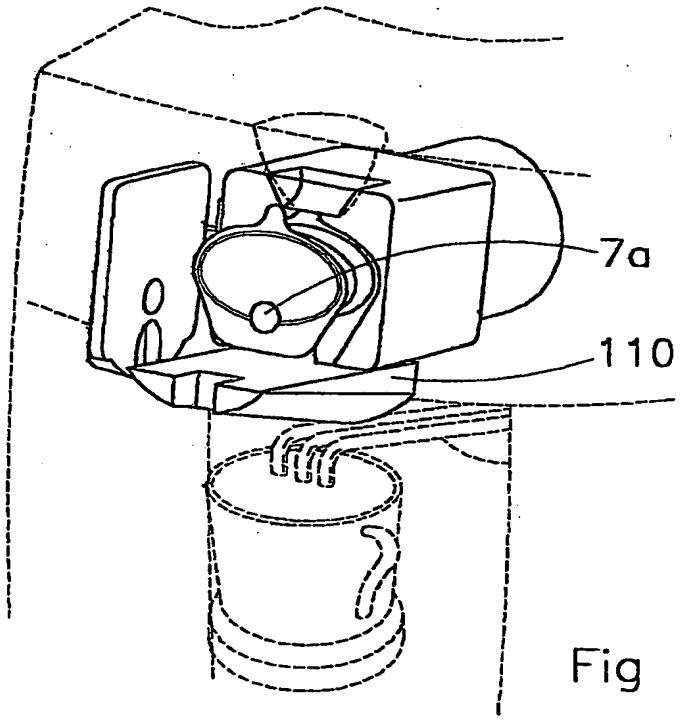


Fig 11

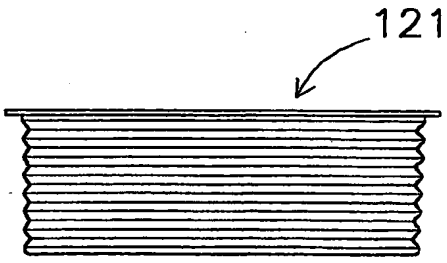


Fig 12

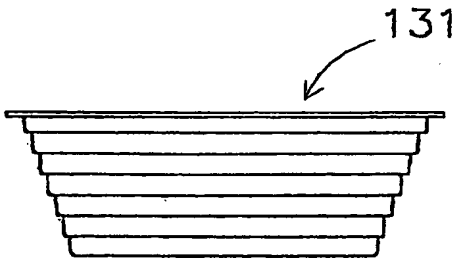


Fig 13

K-FEE SYSTEM GMBH, EX2009, page 1235
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

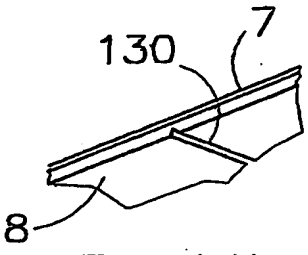


Fig 14b

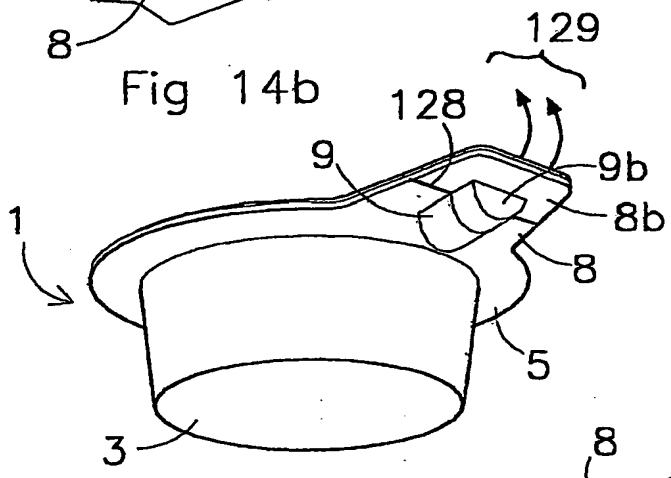


Fig 14a

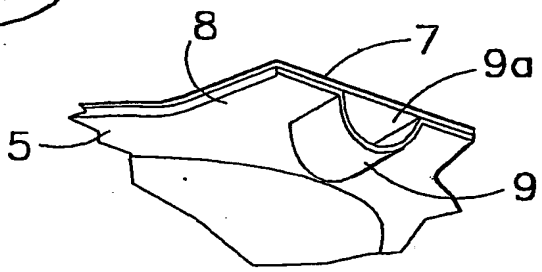


Fig 14c

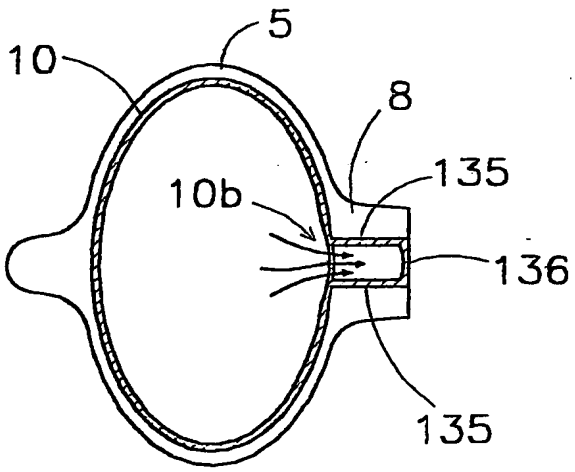


Fig 15

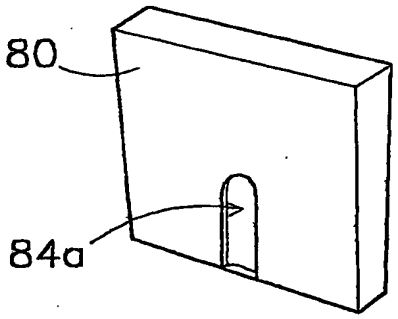


Fig 15c

K-FEE SYSTEM GMBH, EX2009, page 1236
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

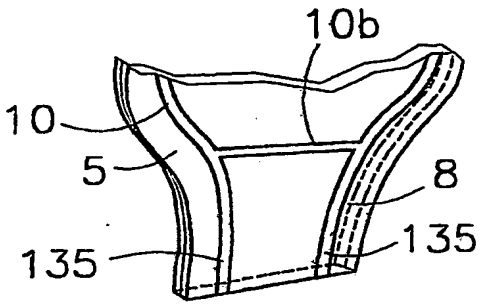


Fig 15a

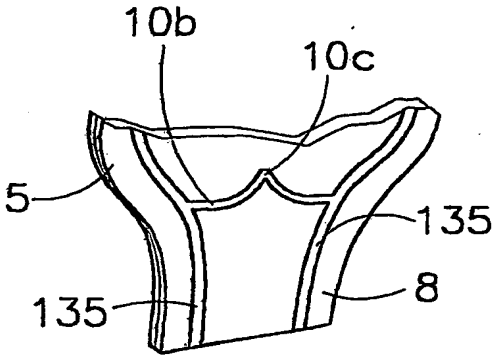


Fig 15b

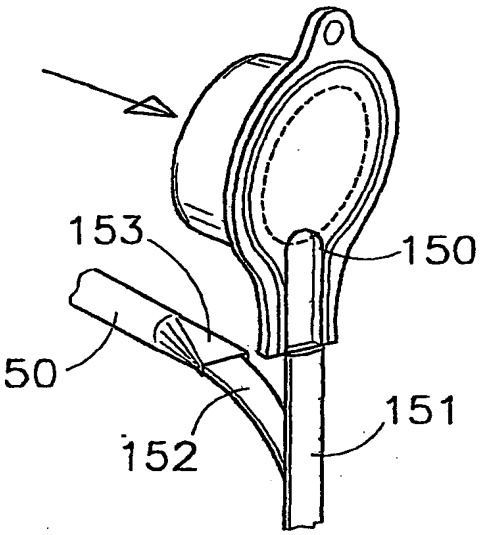


Fig 15d

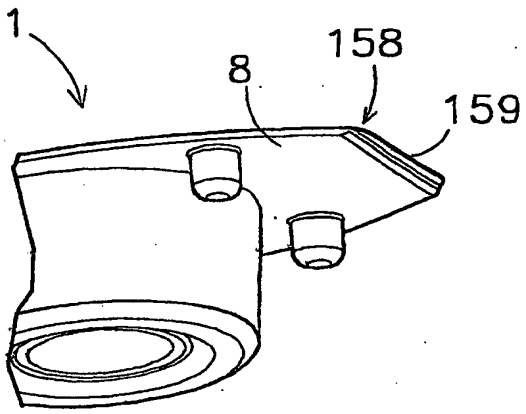


Fig 15e

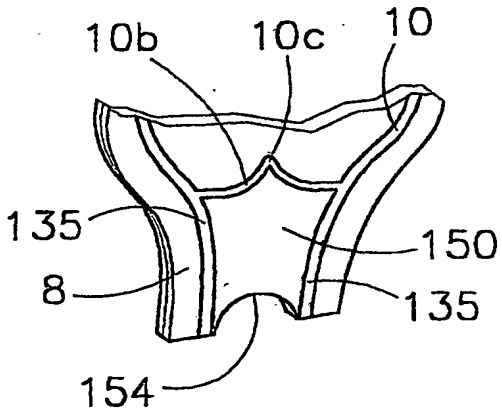


Fig 15f

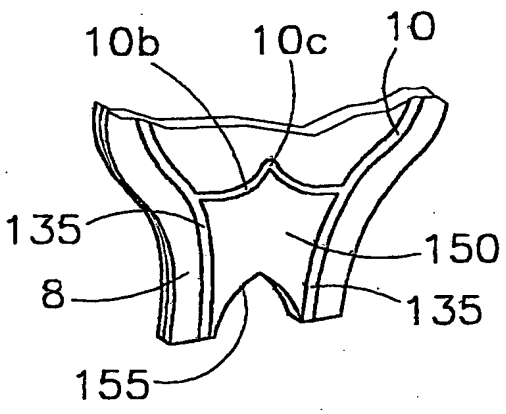


Fig 15g

K-FEE SYSTEM GMBH, EX2009, page 1237
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

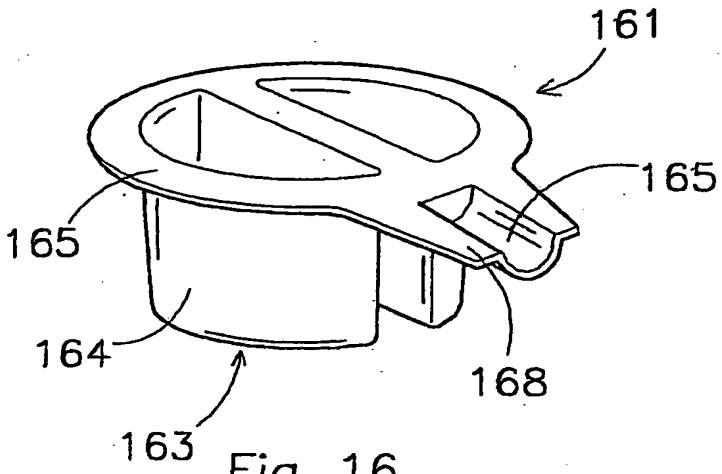


Fig 16

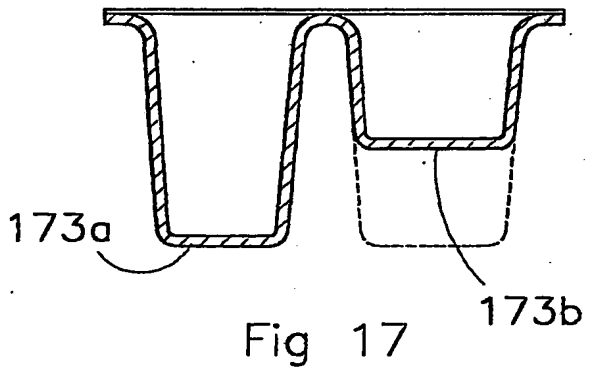


Fig 17

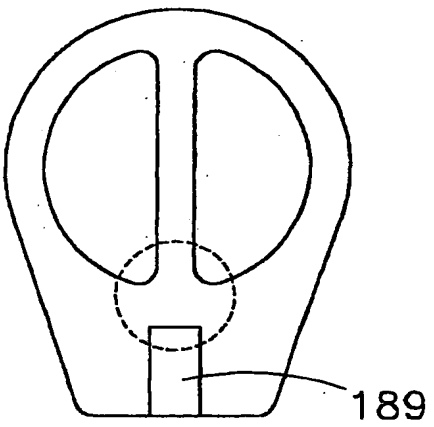


Fig 18

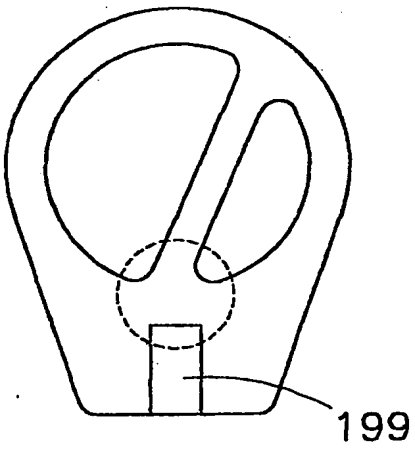


Fig 19

K-FEE SYSTEM GMBH, EX2009, page 1238
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

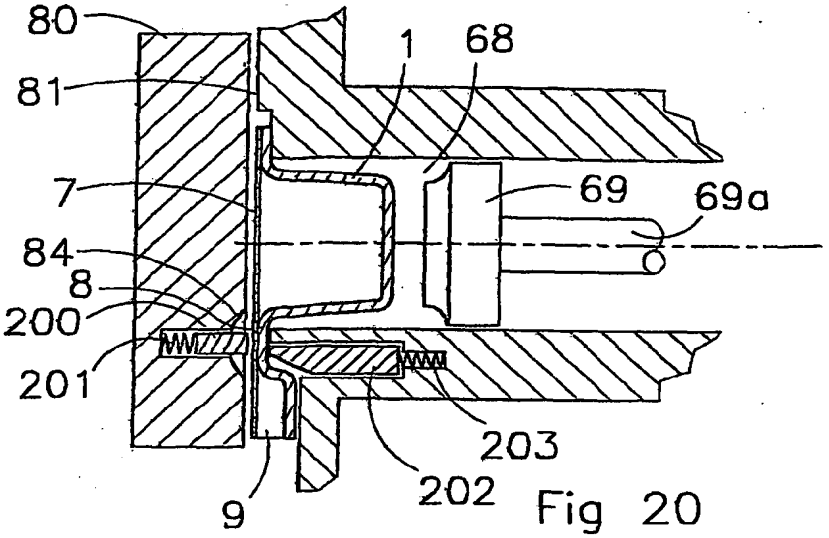


Fig 20

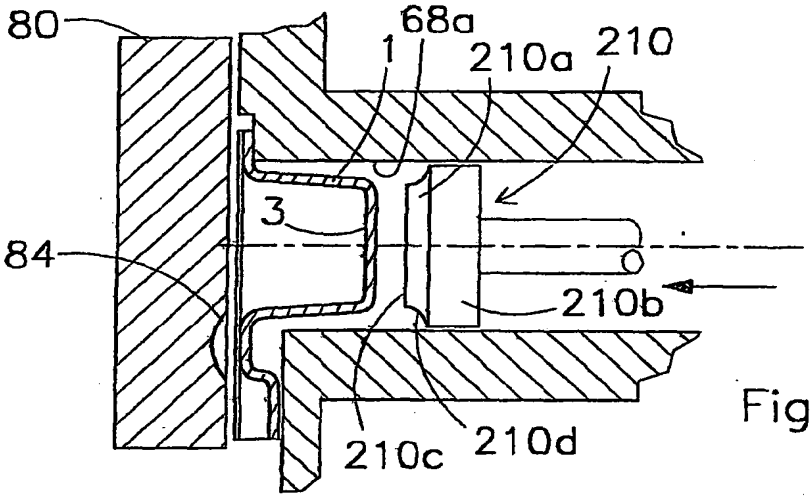


Fig 21a

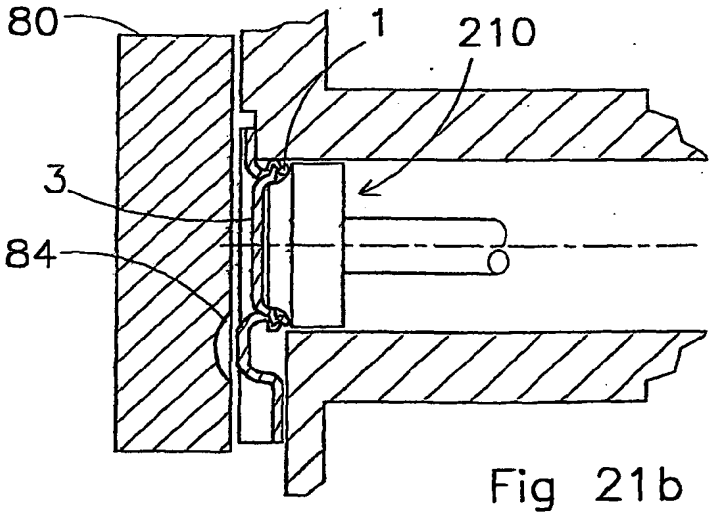


Fig 21b

K-FEE SYSTEM GMBH, EX2009, page 1239
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

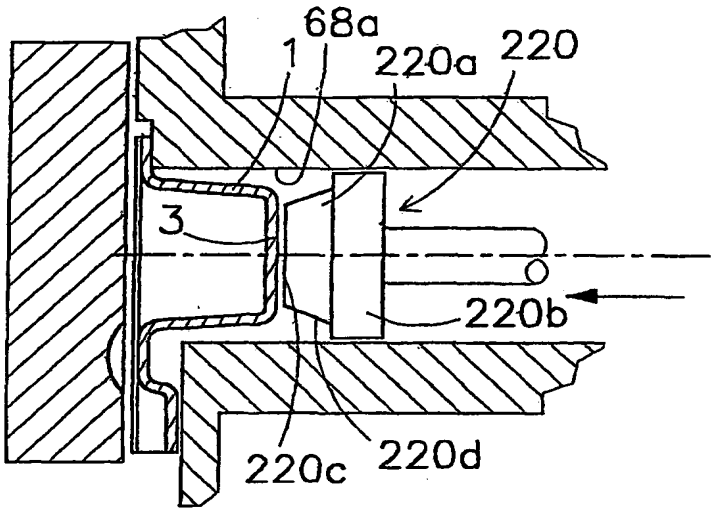


Fig 22a

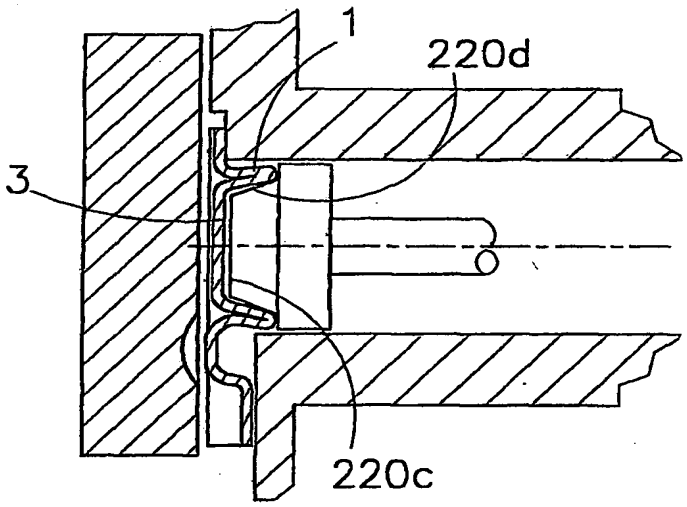


Fig 22b

K-FEE SYSTEM GMBH, EX2009, page 1240
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

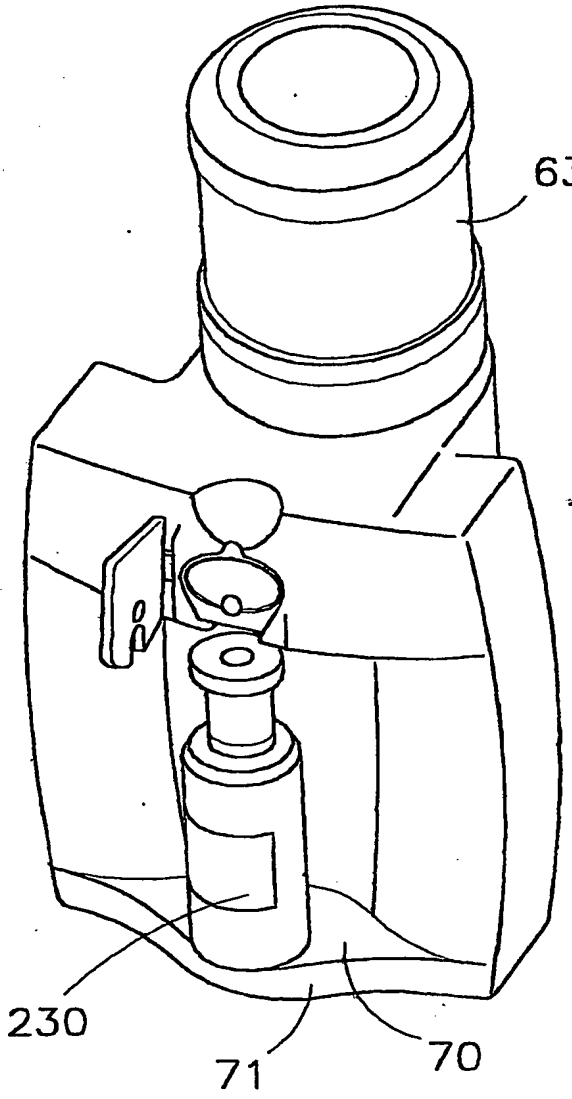


Fig 23a

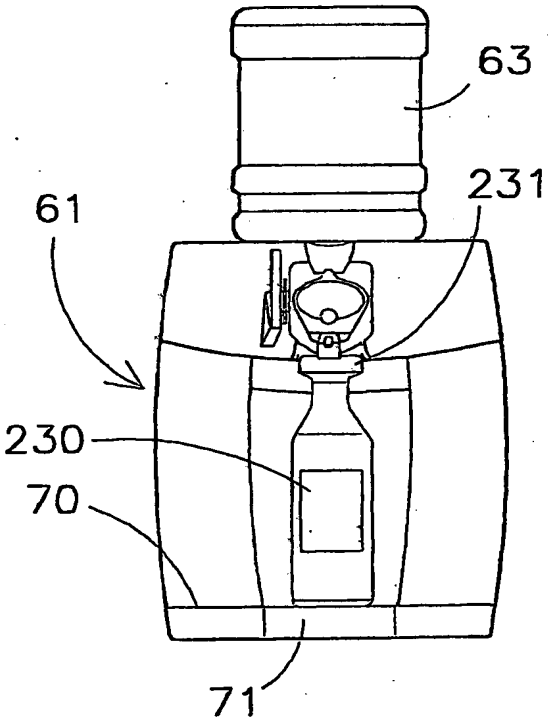


Fig 23b

K-FEE SYSTEM GMBH, EX2009, page 1241
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

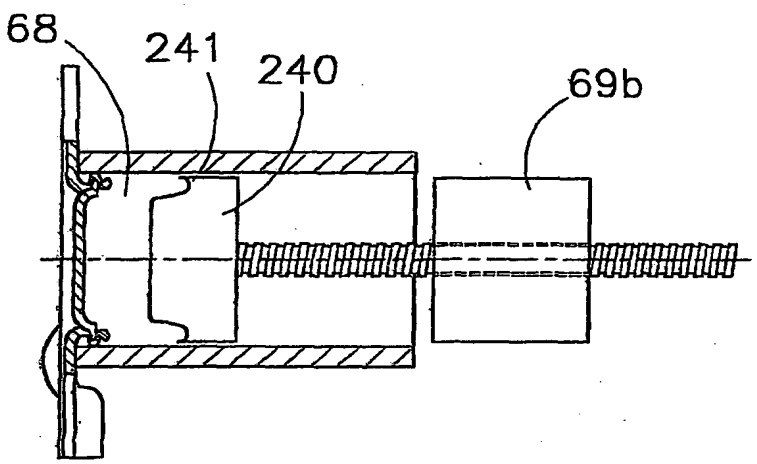


Fig 24

K-FEE SYSTEM GMBH, EX2009, page 1242
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

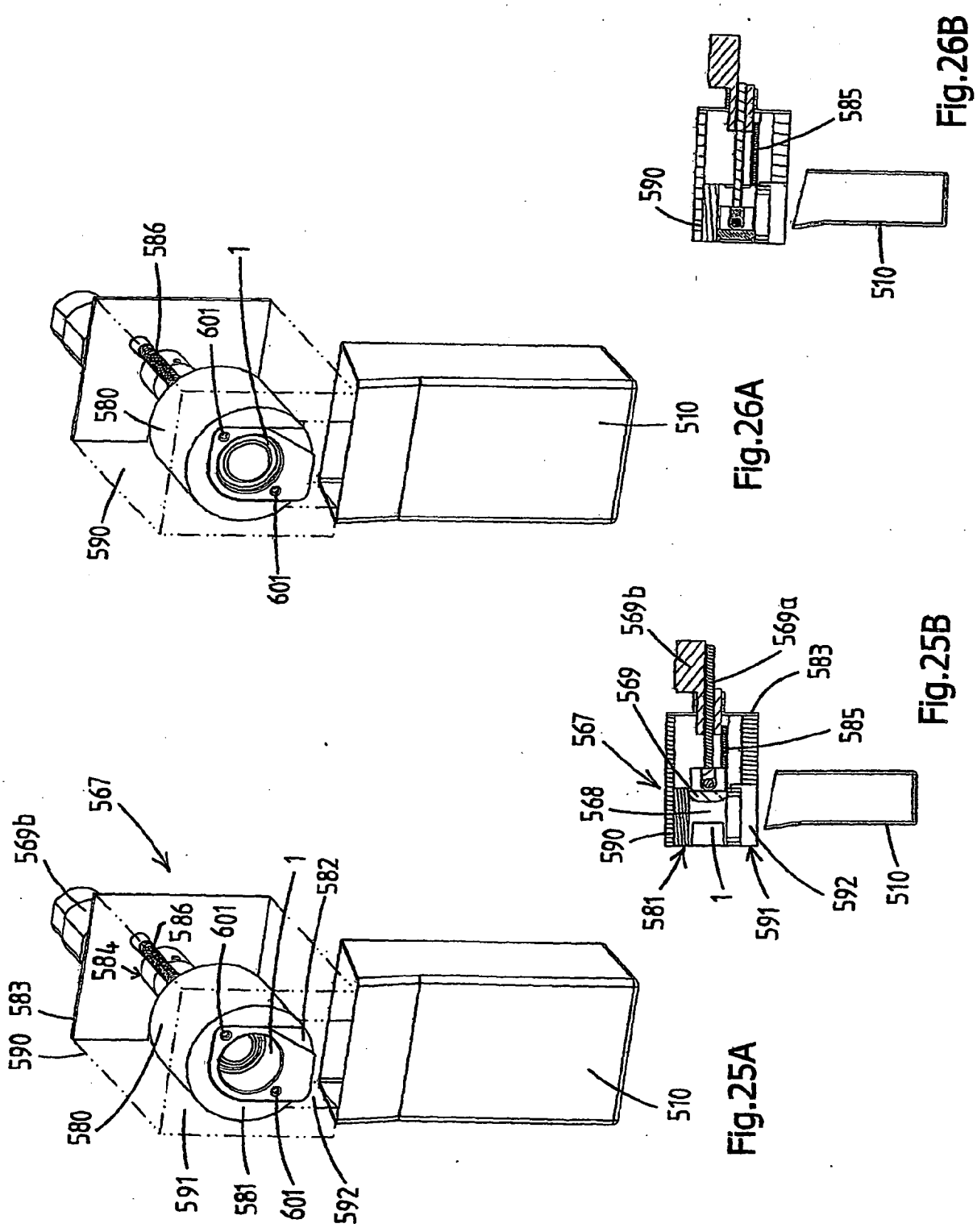


Fig.26A

Fig.26B

Fig.25B

Fig.25A

K-FEE SYSTEM GMBH, EX2009, page 1243
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

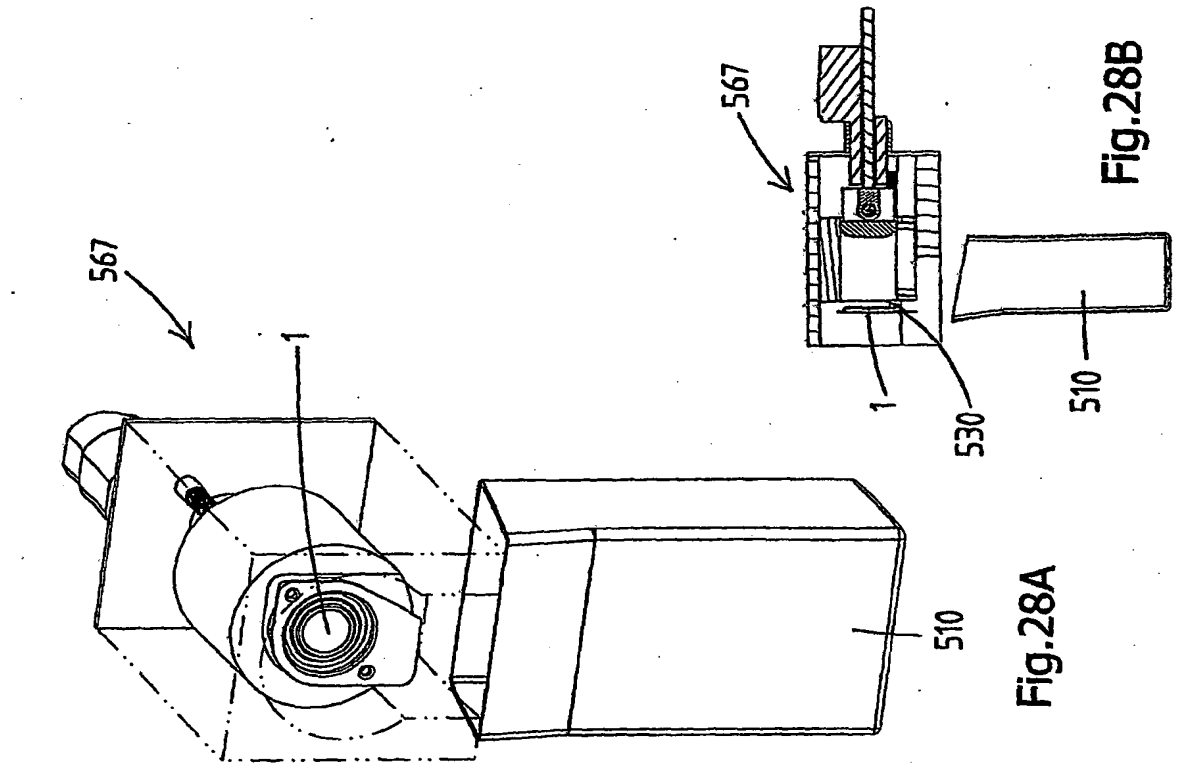


Fig.28A

Fig.28B

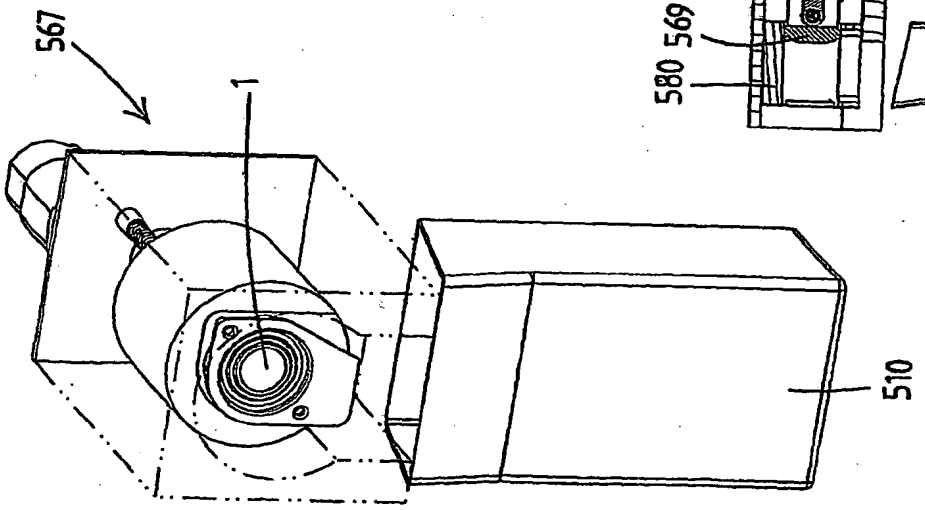


Fig.27A

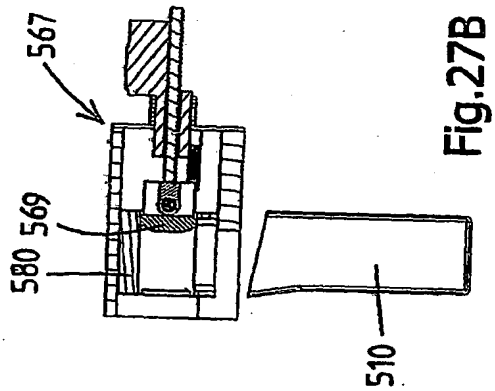


Fig.27B

K-FEE SYSTEM GMBH, EX2009, page 1244
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

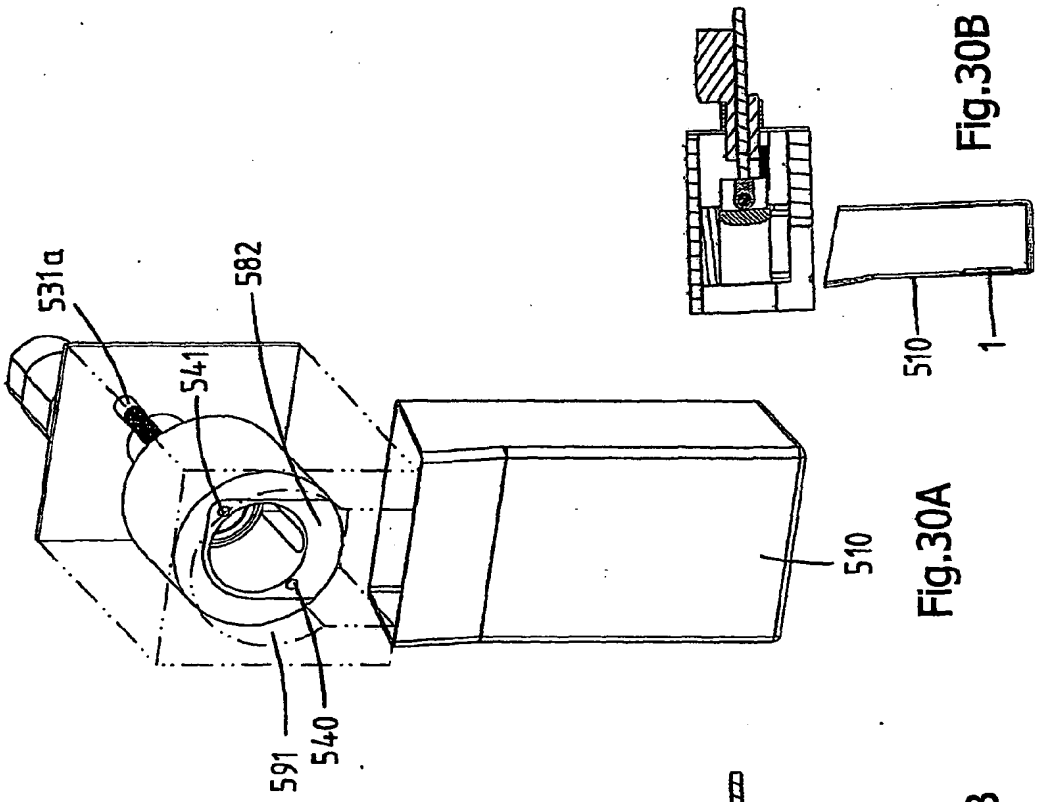


Fig.30A

Fig.30B

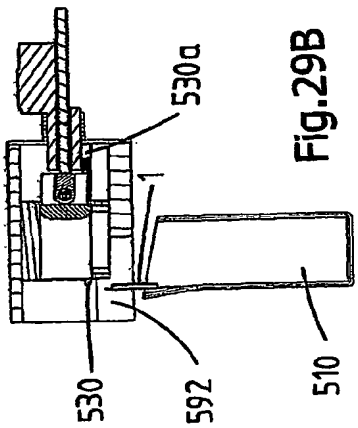


Fig.29B

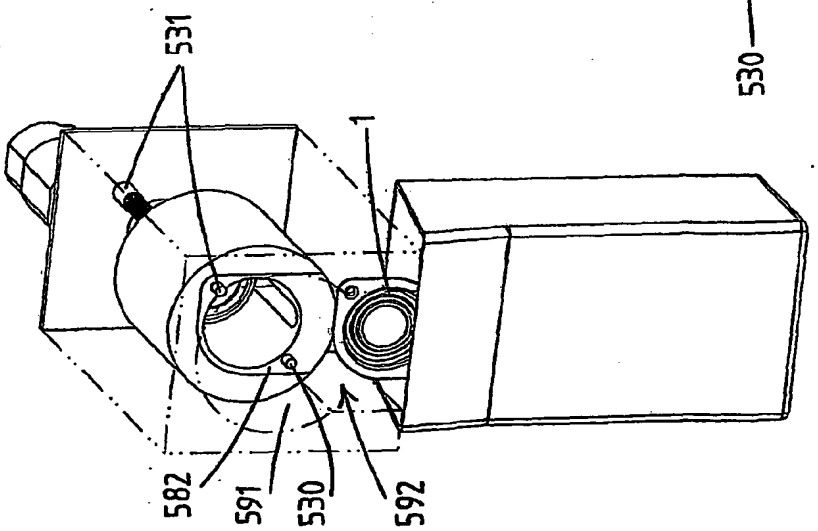


Fig.29A

K-FEE SYSTEM GMBH, EX2009, page 1245
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

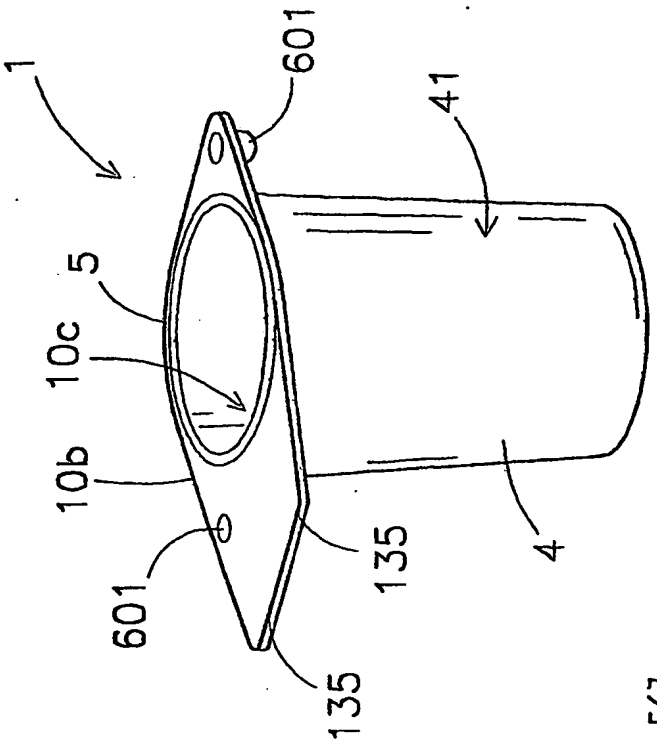


Fig 32

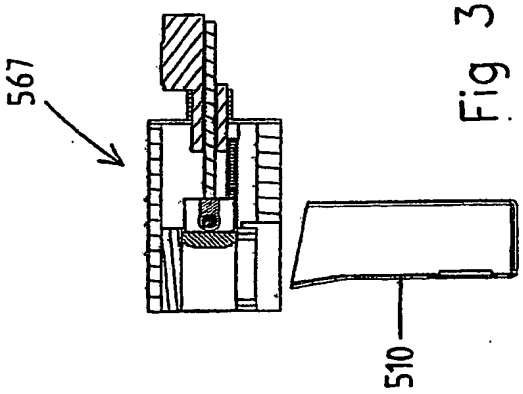


Fig 31b

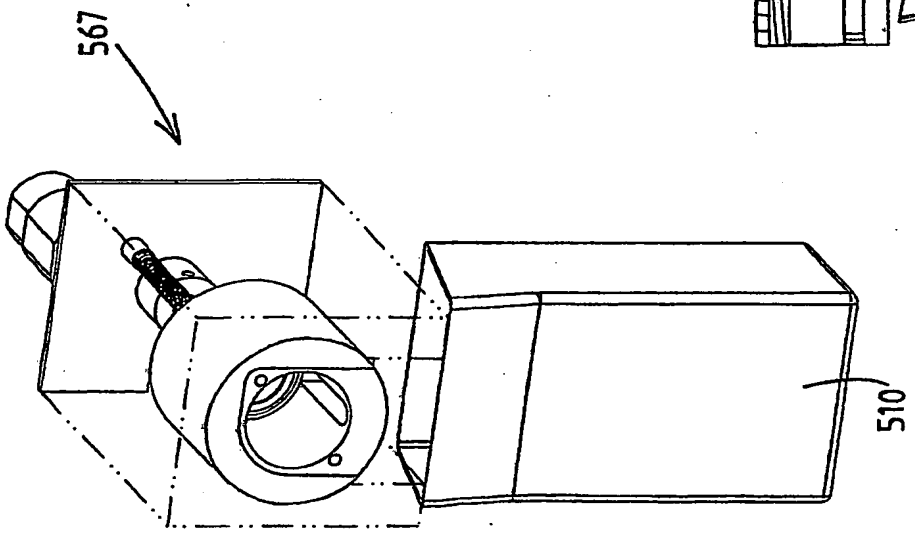


Fig 31a

K-FEE SYSTEM GMBH, EX2009, page 1246
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

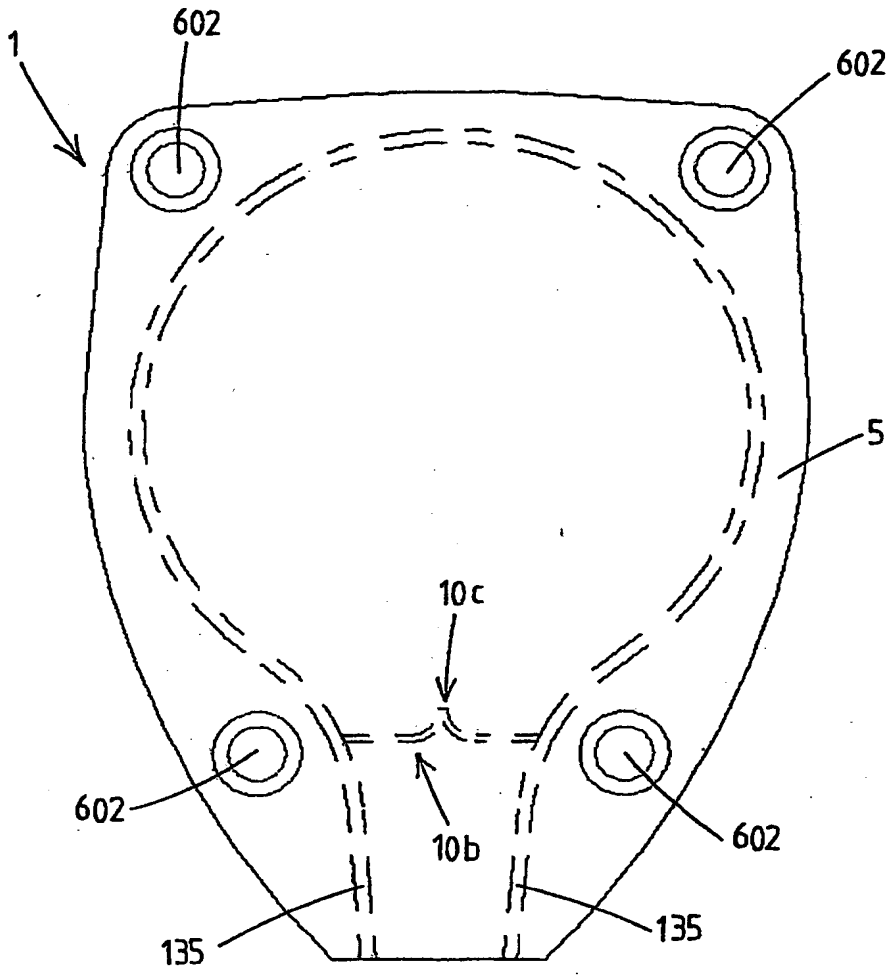


Fig 33

K-FEE SYSTEM GMBH, EX2009, page 1247
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

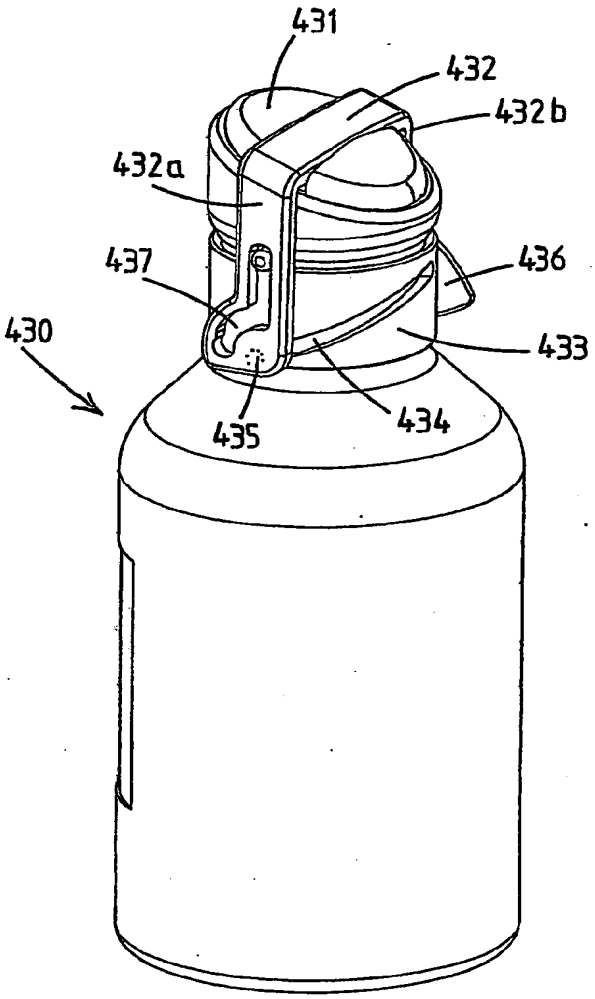


Fig 34a

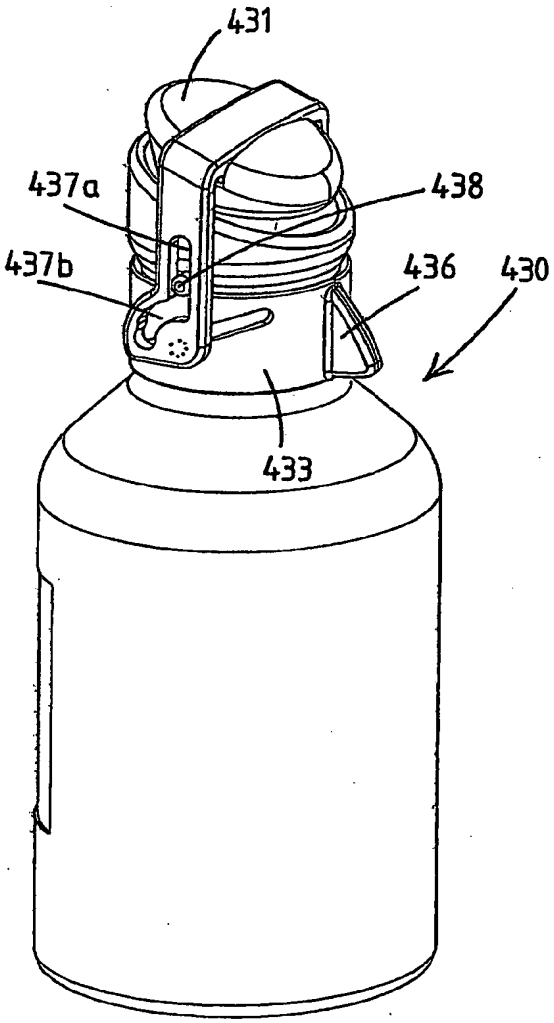


Fig 34b

K-FEE SYSTEM GMBH, EX2009, page 1248
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

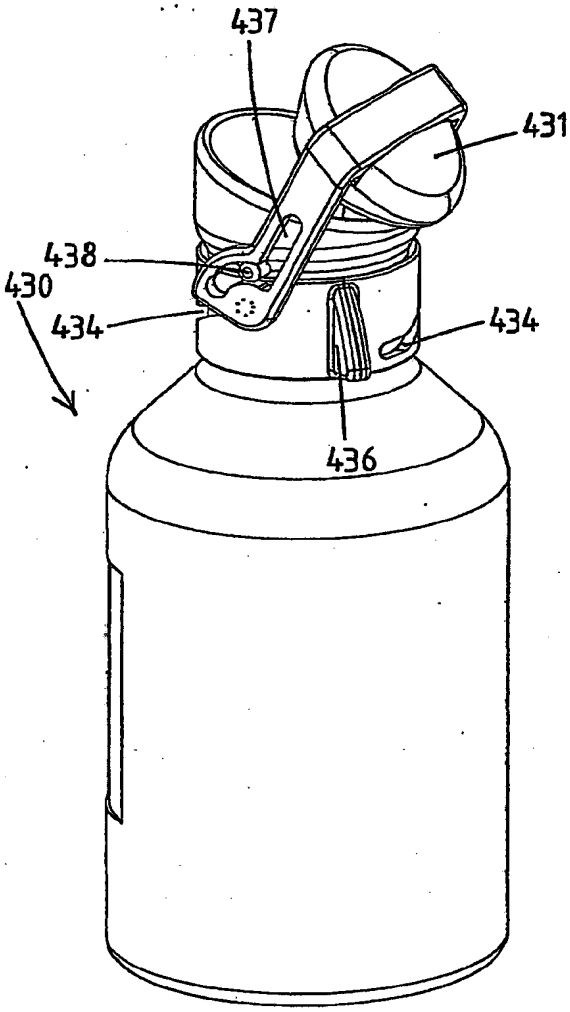


Fig 34c

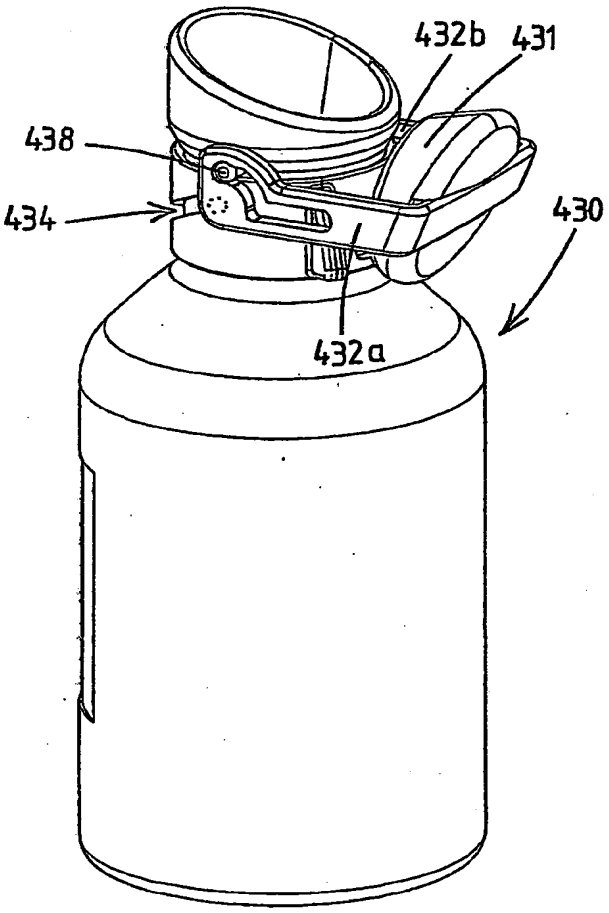
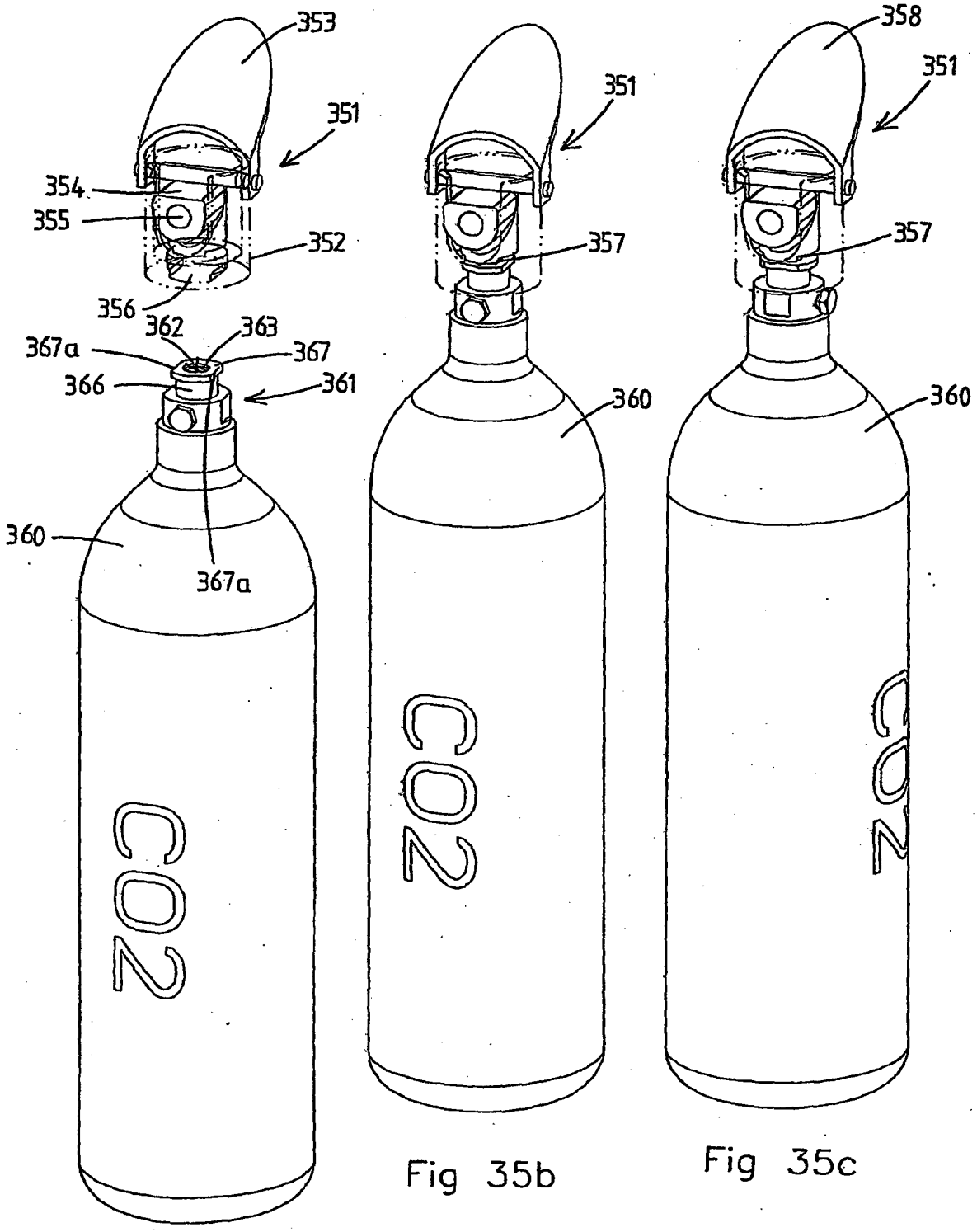


Fig 34d

K-FEE SYSTEM GMBH, EX2009, page 1249
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923



K-FEE SYSTEM GMBH, EX2009, page 1250
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

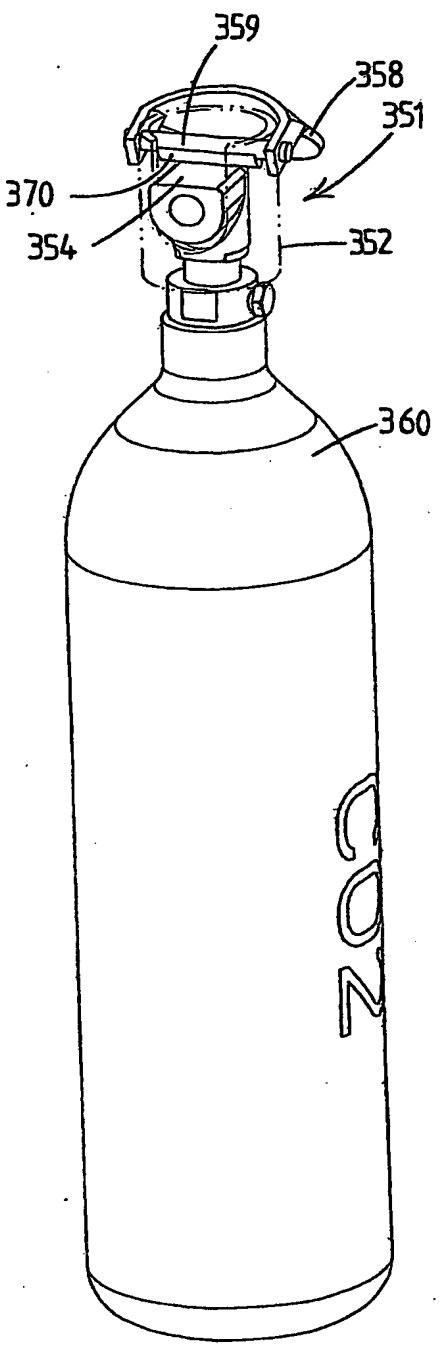


Fig 35d

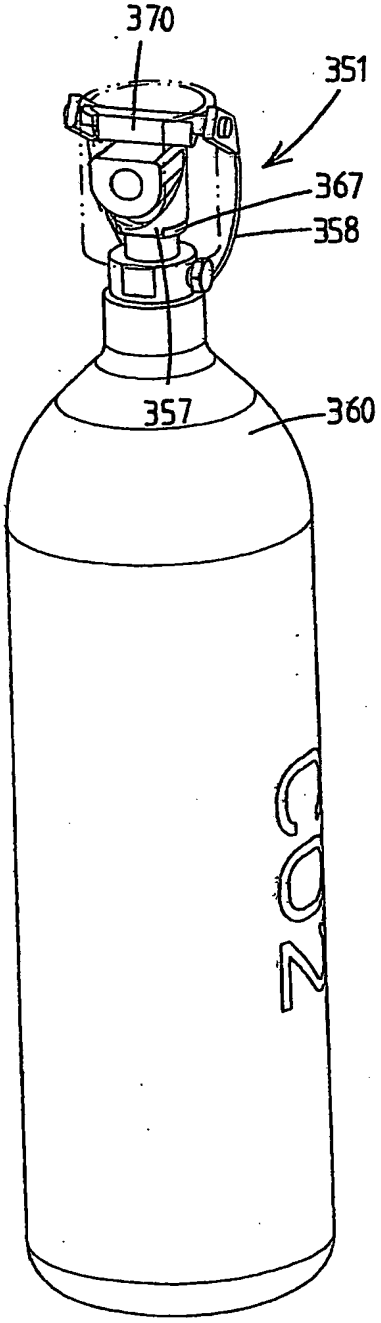


Fig 35e

K-FEE SYSTEM GMBH, EX2009, page 1251
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

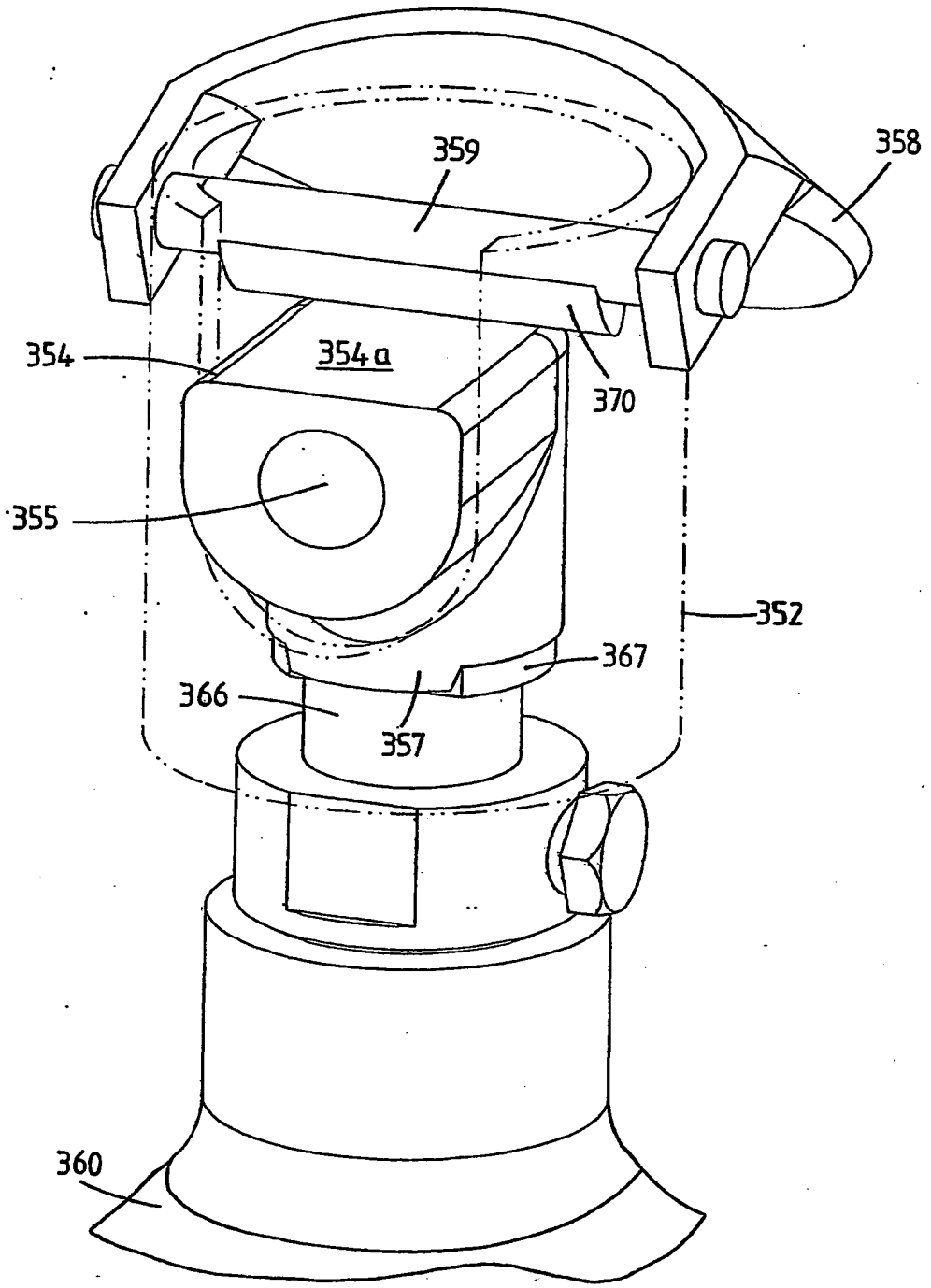


Fig 36

K-FEE SYSTEM GMBH, EX2009, page 1252
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

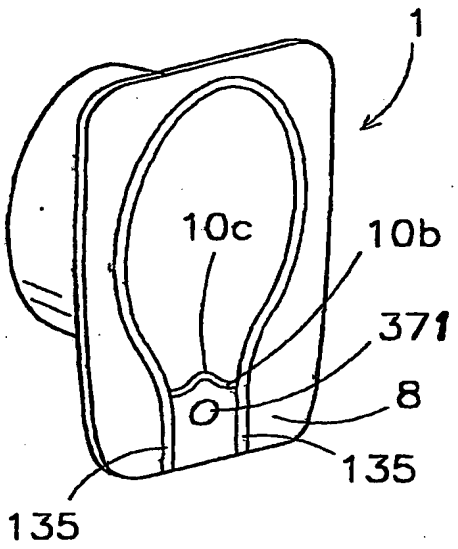


Fig 37

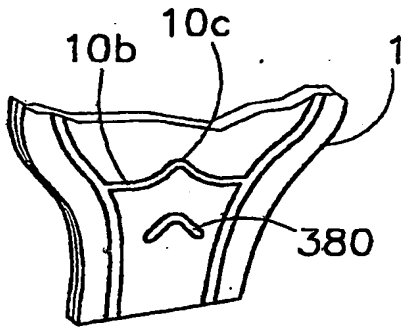


Fig 38

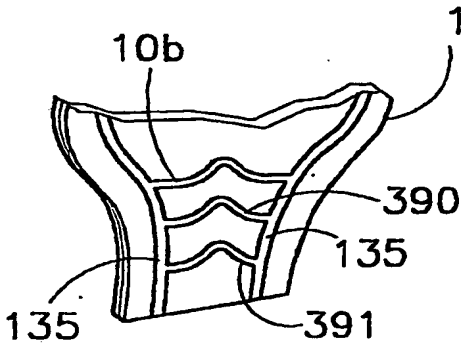


Fig 39

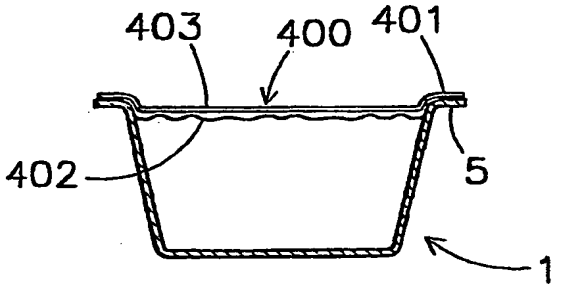


Fig 40

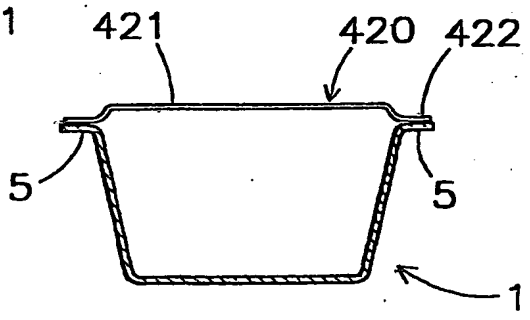


Fig 42

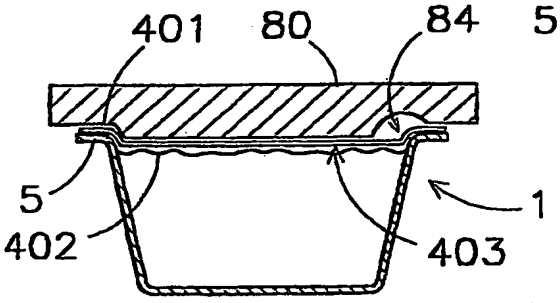


Fig 41

K-FEE SYSTEM GMBH, EX2009, page 1253
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

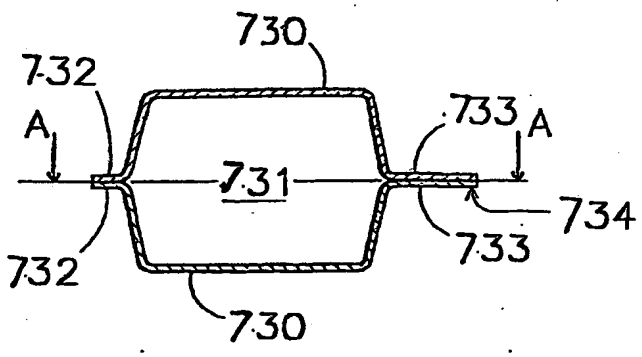


Fig 43

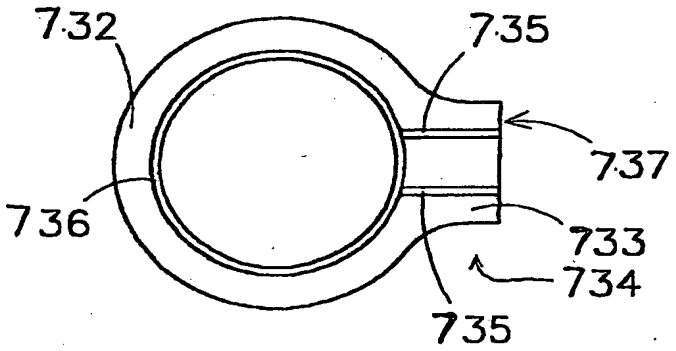


Fig 44

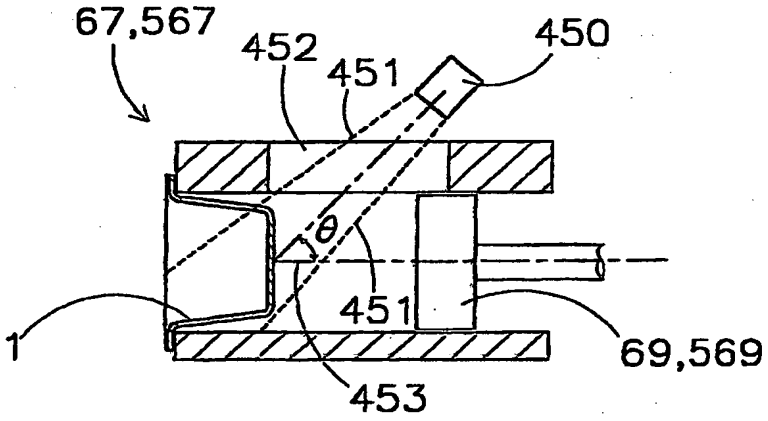


Fig 45

K-FEE SYSTEM GMBH, EX2009, page 1254
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

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

- EP 278773 A **[0002]**
- EP 299571 A **[0004]**
- DE 19962436 A1 **[0005]**

K-FEE SYSTEM GMBH, EX2009, page 1255
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19)日本国特許庁（ＪＰ）　(12) **公開特許公報**（Ａ）　(11)特許出願公開番号

特開2002－360493

(P2002－360493A)

(43)公開日 平成14年12月17日(2002.12.17)

(51)Int.Cl[7]	識別記号	ＦＩ		テーマコード（参考）
Ａ４７Ｌ 15/24		Ａ４７Ｌ 15/24		３Ｂ０８２
15/42		15/42	Ｚ	５Ｂ０７２
Ｇ０６Ｋ 7/00		Ｇ０６Ｋ 7/00	Ｕ	

審査請求　未請求　請求項の数 5ＯＬ（全 9 数）

(21)出願番号　特願2001－174078(P2001－174078)

(22)出願日　平成13年6月8日(2001.6.8)

(71)出願人　390010319
株式会社石野製作所
石川県金沢市増泉5丁目10番48号

(72)発明者　石野　邑一
石川県金沢市増泉5丁目10番48号　株式会社石野製作所内

(72)発明者　石野　成紀
石川県金沢市増泉5丁目10番48号　株式会社石野製作所内

(74)代理人　100099357
弁理士　日高　一樹　（外３名）

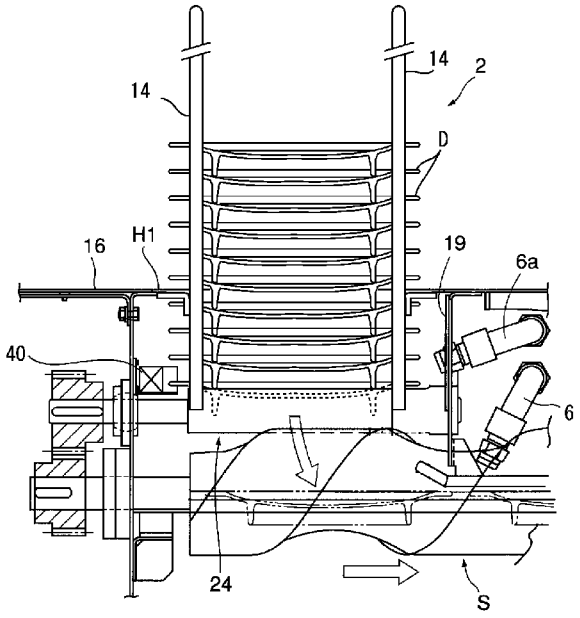
最終頁に続く

(54)【発明の名称】　循環搬送装置における飲食物載置用容器の洗浄装置

(57)【要約】

【課題】　飲食客に提供された飲食物に関する情報を、制御を複雑化することなく簡単に管理するための機能を有する飲食物載置用容器の洗浄装置を提供すること。

【解決手段】　循環搬送装置により循環搬送させることにより飲食客に提供する飲食物を載置する飲食物載置用容器を洗浄する機能を備えた飲食物載置用容器Ｄの洗浄装置であって、前記飲食物載置用容器Ｄには、載置される飲食物を特定可能な情報が記録された識別標識が付与されており、前記飲食物載置用容器Ｄの洗浄装置に、前記識別標識を読取り可能な読取り手段４０と、該読取り手段４０により読み取られた識別標識を出力する出力手段と、を設けた。



K-FEE SYSTEM GMBH, EX2009, page 1256
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

1

【特許請求の範囲】

【請求項１】　循環搬送装置により循環搬送させることにより飲食客に提供する飲食物を載置する飲食物載置用容器を洗浄する機能を備えた飲食物載置用容器の洗浄装置であって、

前記飲食物載置用容器には、載置される飲食物を特定可能な情報が記録された識別標識が付与されており、前記飲食物載置用容器の洗浄装置は、前記識別標識を読取り可能な読取り手段と、該読取り手段により読み取られた読み取りデータを出力する出力手段と、を備えることを特徴とする循環搬送装置における飲食物載置用容器の洗浄装置。

【請求項２】　前記飲食物載置用容器の洗浄装置は、飲食物載置用容器を洗浄部に順次送り出す送出し手段を備えるとともに、該送り出し手段の近傍に前記読取り手段が設けられており、前記送出し手段による前記飲食物載置用容器の送り出しに伴って前記読取り手段による前記識別標識の読み取りが順次行われるように構成されている請求項１に記載の循環搬送装置における飲食物載置用容器の洗浄装置。

【請求項３】　前記飲食物載置用容器の洗浄装置は、洗浄された飲食物載置用容器を順次排出する排出手段を備えるとともに、該排出手段の近傍に前記読取り手段が設けられており、前記排出手段による前記飲食物載置用容器の排出に伴って前記読取り手段による前記識別標識の読み取りが順次行われるように構成されている請求項１または２に記載の循環搬送装置における飲食物載置用容器の洗浄装置。

【請求項４】　前記飲食物載置用容器の洗浄装置は、前記送出し手段により送り出す飲食物載置用容器または前記排出手段により排出される飲食物載置用容器を積層状態に貯留出来るように構成されており、前記読取り手段は、積層された飲食物載置用容器の識別標識を読み取るように設けられている請求項２または３に記載の循環搬送装置における飲食物載置用容器の洗浄装置。

【請求項５】　前記識別標識が、載置される飲食物を特定可能な情報が記録された情報記録シンボルである請求項１～４のいずれかに記載の循環搬送装置における飲食物載置用容器の洗浄装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、循環搬送装置により寿司等の飲食物を搬送する際に使用される飲食物載置用容器を洗浄する飲食物載置用容器の洗浄装置に係わり、特に飲食客に提供された飲食物を管理する管理システムにおいて使用する飲食物載置用容器の洗浄装置に関する。

【０００２】

【従来の技術】従来、例えば寿司等の飲食物を、循環搬送させることにより人手を煩わすことなく飲食客に提供する循環搬送装置は周知である。

2

【０００３】近年においては、この循環搬送装置により飲食客に提供された飲食物の数量や売り上げ金額等を管理するために、飲食物を載置する飲食物載置用容器に、載置する飲食物を特定する情報（飲食物の種類、価格等）が記録されたバーコードやタグ等を付与し、これらバーコードやタグ等に記録された情報を読取り装置により読み取り、読み取った情報に基づいて飲食客に提供された飲食物の数量や売り上げ総金額等を管理する管理システムが開発されており、これら管理システムは例えば特開平１１－８９６９３号公報等に開示されている。

【０００４】

【発明が解決しようとする課題】しかしながら、上記公報のように、飲食物載置用容器に記録された情報を循環搬送中において読み取るように構成されている管理システムにおいては、飲食客に提供された飲食物の数量や売り上げ金額等を管理出来るばかりか、提供されている飲食物に関する情報をリアルタイムに把握すること等も可能であるが、所定の飲食物載置用容器の情報が循環中に重複して読み取られたり、飲食客や調理人等が一旦取り出した後に再度投入される場合等を考慮する必要があることから、制御が複雑化して装置が大がかりになり、システム全体のコストが嵩むといった問題を有していた。

【０００５】また、飲食客に提供された飲食物の情報を、例えば飲食後の精算時においてハンディターミナル等により店員が読み取る場合にあっては読み取りに人手を要することになるため手間がかかるといった問題があった。

【０００６】そこで出願人は、飲食客に提供された飲食物載置用容器が確実に収集される箇所において飲食物載置用容器に記録された情報を読み取るようにすれば、制御を複雑化することなく飲食客に提供した飲食物の数量や売り上げ金額等を大まかに把握できることから、従来周知である飲食物載置用容器の洗浄装置にて洗浄する際において飲食物載置用容器から情報を読み出す点に着眼したが、このような洗浄装置は存在しなかった。

【０００７】本発明は、このような問題点に着目してなされたもので、飲食客に提供された飲食物に関する情報を、制御を複雑化することなく簡単に管理するための機能を有する飲食物載置用容器の洗浄装置を提供することを目的とする。

【０００８】

【課題を解決するための手段】上記した問題を解決するために、本発明の飲食物載置用容器の洗浄装置は、循環搬送装置により循環搬送させることにより飲食客に提供する飲食物を載置する飲食物載置用容器を洗浄する機能を備えた飲食物載置用容器の洗浄装置であって、前記飲食物載置用容器には、載置される飲食物を特定可能な情報が記録された識別標識が付与されており、前記飲食物載置用容器の洗浄装置は、前記識別標識を読取り可能な

K-FEE SYSTEM GMBH, EX2009, page 1257
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

読取り手段と、該読取り手段により読み取られた読み取りデータを出力する出力手段と、を備えることを特徴とする。この特徴によれば、飲食物載置用容器を洗浄する際において識別標識の読み取りが行われるので、使用済みとなって回収された飲食物載置用容器から読み取られて出力手段により出力される飲食物を特定する情報が記録された読み取りデータに基づいて飲食物の管理を行うことが出来ることになるため、従来のように循環搬送中において識別標識を読取る場合よりも簡単な制御で飲食物の管理を行うことが出来る。

【０００９】本発明の飲食物載置用容器の洗浄装置は、飲食物載置用容器を洗浄部に順次送り出す送出し手段を備えるとともに、該送り出し手段の近傍に前記読取り手段が設けられており、前記送出し手段による前記飲食物載置用容器の送り出しに伴って前記読取り手段による前記識別標識の読み取りが順次行われるように構成されていることが好ましい。このようにすれば、飲食物載置用容器に付与された識別標識の読み取りを確実に行うことが出来る。

【００１０】本発明の飲食物載置用容器の洗浄装置は、洗浄された飲食物載置用容器を順次排出する排出手段を備えるとともに、該排出手段の近傍に前記読取り手段が設けられており、前記排出手段による前記飲食物載置用容器の排出に伴って前記読取り手段による前記識別標識の読み取りが順次行われるように構成されていることが好ましい。このようにすれば、飲食物載置用容器に付与された識別標識の読み取りを確実に行うことが出来るばかりか、識別標識に汚れ等が付着した状態で読み取りが行われることによる読み取りエラー等が発生しにくい。

【００１１】本発明の飲食物載置用容器の洗浄装置は、前記送出し手段により送り出す飲食物載置用容器または前記排出手段により排出される飲食物載置用容器を積層状態に貯留出来るように構成されており、前記読取り手段は、積層された飲食物載置用容器の識別標識を読み取るように設けられていることが好ましい。このようにすれば、飲食物載置用容器の識別標識の読み取りを所定の位置で確実に行うことが出来る。

【００１２】本発明の飲食物載置用容器の洗浄装置は、前記識別標識が、載置される飲食物を特定可能な情報が記録された情報記録シンボルであることが好ましい。このようにすれば、迅速、かつ正確に飲食物載置用容器に載置される飲食物を特定する情報を読み取ることが出来る。

【００１３】

【発明の実施の形態】以下、本発明の実施例を図面に基づいて説明する。図１、２には、本発明の適用された飲食物載置用容器としての寿司皿の洗浄装置の要部が示されており、１は寿司皿の洗浄装置（以下洗浄装置と称する）であって、この洗浄装置１は、密閉された略直方体の筐体Ｂの内部に収容されており、内部には寿司皿Ｄを一方から他方に搬送する搬送部Ｓが配設されている。

【００１４】筐体Ｂの一方には寿司皿Ｄを１枚ずつ図示しない分離装置により分離して間歇的に搬送部の一端上面に供給する供給部２が設けられ、搬送部Ｓの下流側には後述する洗浄装置が配置されている。更に洗浄装置の下流側には、洗浄後に搬送部Ｓによって移送される寿司皿Ｄを排出する排出部３が配設されている。

【００１５】更に詳しくは、図４に示すように、供給部２は、筐体Ｂの天板１６に形成された投入口Ｈ１内周端縁の下面周囲には、略Ｌ字形に折曲形成されたブラケット１５が４箇所にビスなどにより略均等に取付けられ、これらブラケット１５には、案内片としての４本の棒状部材（例えばステンレス製の磨き丸棒）で構成されたガイドバー１４が例えば溶接等で等配状態に上方に延びるように立設固定され、これらガイドバー１４の内側には供給された複数の寿司皿Ｄを積載できるようになっており、この際にガイドバー１４の内周によって寿司皿Ｄの外周が支持されるよう構成されている。

【００１６】また、４本のガイドバー１４の途中には、供給された複数の寿司皿Ｄを積載状態に支持するとともに、１枚ずつ分離して搬送部上に落下させて送り出す周知の円柱状の分離部材２４ａ、２４ｂから成る分離装置２４（送出し手段）が配置されるとともに、４本のガイドバー１４の外周面所定箇所には、後述するエアー排出用の隙間が形成されている。

【００１７】図１及び図３、図４（ａ）に示されるように、洗浄装置１内における分離装置２４の近傍には、後述する寿司皿Ｄの周側面に印刷された識別標識としてのバーコード（図６参照）に記録された情報を読み取る読取り手段である走査読み取りユニット４０が、互いに離間する分離部材２４ａ、２４ｂ（図１参照）に両側部が支持される寿司皿Ｄの側方に位置するように、筐体Ｂの所定箇所に固設されている。走査読み取りユニット４０は、読み取り部が寿司皿Ｄの周縁の一部に沿うように円弧状に形成されており、分離部材２４ａ、２４ｂにより支持される寿司皿Ｄの周側面に印刷されたバーコードに記録された情報を読み取るようになっている。

【００１８】搬送部Ｓには、搬送方向の両側に寿司皿Ｄ上部の浮き上がりを押さえる押さえロッドＲ１と、この押さえロッドＲ１の下方に並設され寿司皿Ｄの下面を支持する寿司皿受けロッドＲ２とから成る案内レール２５が搬送路の両側に並設され、両ロッドＲ１、Ｒ２の外側には一対の搬送スクリューＳ１、Ｓ２が並設して設置されている。

【００１９】一対の搬送スクリューＳ１、Ｓ２には、互いに反対向のリード溝が刻設され、これらリード溝に寿司皿Ｄの両縁部下面を係合支持し、搬送スクリューＳ１、Ｓ２の反対方向の回転により寿司皿Ｄを洗浄する洗浄部ないし、洗浄後の寿司皿Ｄを排出する排出部３に向けて移動させるようになっている。

【００２０】洗浄部には、洗浄液噴射ノズル６ａ、６ｂ、回転ブラシ８、すすぎ液噴射ノズル７ａ、７ｂ、７ｃ及びエアー噴射ノズル９ａ、９ｂが搬送方向に向けて順次配設されている。

【００２１】回転ブラシ８の両側に配設される洗浄液噴射ノズル６ａ、６ｂ及び７ａ、７ｂ、７ｃの搬送方向両外側は、仕切板１９、２０によって洗浄部内が仕切られ、その仕切板１９、２０には、両ロッドＲ１、Ｒ２及び一対の搬送スクリューＳ１、Ｓ２ないし寿司皿Ｄを通過させるための図示しない開口が形成されている。

【００２２】搬送方向下流側の仕切板２０と排出部３との間には、エアー噴射ノズル９ａ、９ｂが、その噴射口１０が搬送される寿司皿Ｄの搬送方向を向くように、搬送路を挟んで上下にそれぞれ配設されている。

【００２３】また、排出部３には、洗浄後にエアー噴射ノズル９ａ、９ｂによって乾燥、水切りされ、一対の搬送スクリューＳ１、Ｓ２によって搬送されてきた寿司皿Ｄを排出すべく、図５に示されるように、案内筒としての排出案内筒５が、筐体Ｂの天板１６に形成された開口Ｈ２の下面に、ブラケット３１を介して搬送部Ｓに向けて延びるように取付けられている。

【００２４】更に排出部３の排出案内筒５の直下には、寿司皿Ｄを上方に押し上げる排出手段としての押上げ装置１２が配設され、排出案内筒５の途中には、押上げ装置１２により押上げられた寿司皿Ｄを１枚ずつ順次支持する支持部が配設されている。

【００２５】支持部は、寿司皿Ｄの周囲を支持する支持爪Ｊが排出案内筒５周囲の３箇所にに配設され、これら支持爪Ｊは、図１、２及び図５に示されるように外周に形成された３箇所の開口部としての切欠き溝３０ａを介して排出案内筒５の内側に突設している。

【００２６】これら支持爪Ｊは、上方に向けて回動が自由であり下方に移動不能に枢着されており、押上げ装置１２により支持爪Ｊを押し上げて通過した寿司皿Ｄを、押上げ装置１２の下降により支持し、順次下方から寿司皿Ｄを積載できるようになっている。

【００２７】各寿司皿Ｄには、各価格（本実施例では５００円、３００円、２００円、１２０円）に対応する絵柄が印刷されており、その周側面には、図６（ａ）に示されるように、その寿司皿Ｄに載置される飲食物を特定する情報としての価格と、その寿司皿Ｄに固有に付与されたシリアルナンバーと、が記録されたバーコードが付与されている。このバーコードを読み取ることでその寿司皿Ｄに載置される寿司の価格を特定できるようになっており、調理人は、寿司皿Ｄの絵柄を見て、その価格に対応する種類（ネタ）の寿司を載置し、図９に示されるような循環搬送路５０に寿司皿Ｄを投入することにより寿司が搬送されて飲食客に提供されるようになっている。

【００２８】なお、本実施例における寿司皿Ｄの周側面には、図６（ｂ）に示されるように、その寿司皿Ｄ固有のシリアルナンバーと、その寿司皿Ｄの価格と、が記録される所定長さのバーコードが連続的に複数付与されているため、円形の寿司皿Ｄがどのような向きで載置されても、１つの走査読み取りユニット４０によりシリアルナンバーと価格とが非接触にて読み取ることが出来るようになっている。

【００２９】また、本実施例においては、飲食者に提供された寿司皿Ｄの前記各価格別の数量を管理コンピュータ４６（図７参照）により集計して売り上げ総金額を算出することにより、飲食者に提供された寿司の管理を行うことが出来るようになっているため、読み取られた価格のみが管理用のデータとして使用され、シリアルナンバーは使用しないものとしているが、このようにシリアルナンバーも予め付与しておくことは、例えば飲食者に提供された寿司の種類（ネタ）等の管理を行う必要が生じた場合において使用することから好ましい。

【００３０】詳しくはこの場合、各シリアルナンバーに対応した寿司（ネタ）の種類を予め適宜データベースに登録しておくとともに、バーコードから読み取った所定のシリアルナンバーを前記データベースに予め登録されたシリアルナンバーと比較して、その寿司皿Ｄに載置されていた寿司（ネタ）の種類を特定出来るようにすることで、飲食客に提供された寿司の数量等を種類（ネタ）別に管理することが出来る。

【００３１】次に、本実施例における洗浄装置の構造を図７のブロック図に基づいて説明する。洗浄装置１の内部には、寿司皿Ｄの洗浄に関わる各種装置（例えば搬送スクリューＳ１、Ｓ２や押上げ装置１２の駆動等）の制御を行う制御装置４２が設けられている。制御装置４２には、各種装置の作動状態やエラー状況等を報知するための表示装置４３と、各種制御プログラム等を入力可能な入力装置４４と、所定の情報を紙媒体等に出力可能な出力装置４５等が接続されているとともに、前述した走査読み取りユニット４０が、該走査読み取りユニット４０により読み取られた読み取りデータを所定のデータに変換する変換部４１を介して接続されている。

【００３２】また、制御装置４２は、清浄装置１の外部に設けられた管理装置４６に通信部４７を介して接続されており、走査読み取りユニット４０により読み取られて変換された価格データの管理装置４６への出力や、管理装置４６から送信されるデータの受信等の送受信を通信部４７（出力手段）を介して行うようになっている。

【００３３】なお、本実施例における走査読み取りユニット４０は、後述するように寿司皿Ｄの洗浄部への送り出しに伴って順次バーコードの読み取りを行うように、寿司皿Ｄの洗浄に関わる各種装置の制御を行う制御装置４２を介して管理コンピュータ４６に接続されているが、制御装置４２を介すことなく管理コンピュータ４６に直接接続されていてもよい。

K-FEE SYSTEM GMBH, EX2009, page 1259
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

【００３４】次に洗浄装置１の作用につき説明する。

【００３５】飲食者の飲食後に精算がなされた後、店員やコンベア等により回収された寿司皿Ｄは、洗浄装置１にて洗浄するため洗浄装置１の供給部２に供給されることになる。供給部２に寿司皿Ｄが１枚もない状態において投入口Ｈ１に投入された寿司皿Ｄは、４本のガイドバー１４に案内されて落下し、支持部である分離装置２４上に支持され、その後投入される寿司皿Ｄは図３に示されるように積層状態に支持されて貯留されていく。

【００３６】そして図示しない手動スイッチにより搬送スクリューＳ１、Ｓ２等の各種装置の駆動に伴い、走査読み取りユニット４０が作動して、その時点で分離装置２４に支持されている最下段の寿司皿Ｄのバーコードの読み取りが行われる。読み取られたバーコードデータ（読み取りデータ）は、データ変換部４１にてデータ列に変換されて制御装置４２に出力された後、制御装置４２から出力手段としての通信部４７を介して管理コンピュータ４６に出力される。

【００３７】出力されたデータを受信した管理コンピュータ４６は、データ列に変換された価格データ及びシリアルナンバーデータのうちの価格データから特定される価格の寿司が飲食者に提供されたものとして、その価格に対応する数量の加算処理を実行し、提供された寿司皿Ｄの数量を価格別に集計するとともに、売り上げ総金額を算出する。管理コンピュータ４６では、図８に示されるような表示装置に表示される売り上げ管理画面上に、集計された寿司皿Ｄの数量及び金額を価格別に、また、総売り上げ数量、及び総売り上げ金額が表示されるようになっている。よって、寿司皿Ｄの洗浄にともなって、その時点における寿司の売れ行きや売り上げ金額等を、洗浄装置１から出力される価格データに基づいて大まかに管理することが出来、このような情報に基づいて、１日の売り上げや次の日の仕入れ等の管理を行うことが可能となる。

【００３８】そして図１～図４に示されるように、供給部２の４本のガイドバー１４に案内されて積載支持された複数の寿司皿Ｄが分離装置２４により１枚ずつ分離され、４本のガイドバー１４の下方に案内されて搬送部Ｓに順次投下される度に、前述したように分離装置２４に支持される最下段の寿司皿Ｄのバーコードから走査読み取りユニット４０による読み取りが順次実行され、管理コンピュータ４６において売り上げデータの加算処理が実行される。

【００３９】搬送部Ｓに投下された寿司皿Ｄは、両ロッドＲ１、Ｒ２に上下が挟持された状態で一対の搬送スクリューＳ１、Ｓ２により洗浄部に移動され、この洗浄部では、寿司皿Ｄが移動する過程で洗浄液噴射ノズル６ａ、６ｂから洗浄液を噴射し、回転ブラシ８ａ、８ｂにより寿司皿Ｄ上下面のブラッシングにより払拭したのち、更に搬送過程で寿司皿Ｄ上下面を、すすぎ液噴射ノズル７ａ、７ｂ、７ｃから噴射されるすすぎ液（水）により洗い流す。

【００４０】次に、仕切板１９を通過した寿司皿Ｄの上下面は、エアー噴射ノズル９ａ、９ｂの噴射口から噴射されるエアーの吹き付けによって、水切りされて乾燥されたのち、排出部３に移動される。

【００４１】排出部３に寿司皿Ｄが移動されると、押上げ装置１２が作動して、その寿司皿Ｄを上昇し、排出案内筒５周囲の３箇所に配設された支持爪Ｊにより支持される。

【００４２】ここで、洗浄液により洗浄された寿司皿Ｄに向けてその上下面に、エアー噴射ノズル９ａ、９ｂの噴射口から多量のエアーが吹き付けられると、筐体Ｂ内のエアーの圧力が上昇し、筐体Ｂの前後に配設される供給部２のガイドバー１４ないし排出部３の排出案内筒５を通して外部に排気される。

【００４３】このように、本実施例における寿司皿洗浄装置によれば、寿司皿Ｄを、投入口Ｈ１の上方において積層状態に支持するとともに、筐体Ｂの内部所定箇所まで案内する案内片としての４本のガイドバー１４が、筐体Ｂの内部から投入口Ｈ１の上方まで延びるように、かつ、投入口Ｈ１の内周縁周りに設けられているので、これらガイドバー１４により寿司皿Ｄが筐体Ｂ内部に確実に案内されるばかりか、寿司皿Ｄに残滓や爪楊枝等が残っていてもガイドバー１４間によって大きく形成される隙間より落下して詰まることがないため、トラブルが発生しにくくなる。

【００４４】このように本実施例における洗浄装置１は、寿司皿Ｄの周縁に設けられたバーコードを読み取る走査読み取りユニット４０が設けられており、寿司皿Ｄを洗浄する際において寿司皿Ｄに付与された寿司（ネタ）を特定可能な情報（価格データ）の読み取りが行われるようになっているので、使用済みとなって回収された寿司皿Ｄから読み取られて管理コンピュータ４６に出力される価格データに基づいて飲食物の管理を行うことが出来ることになるため、従来のように循環搬送装置５０による搬送中において、寿司皿Ｄに付与されたバーコード等の識別標識を読取る場合よりも簡単な制御で飲食物の管理を行うことが出来る。

【００４５】また、走査読み取りユニット４０による寿司皿Ｄに付与されたバーコードの読み取りが、洗浄のために投入口に投入されて分離装置２４により積層状態に支持されることにより貯留された複数の寿司皿Ｄが、１枚ずつ分離されて搬送部Ｓに送り出される度に順次行われるようになっているため、バーコードの読み取りを確実に行うことが出来る。

【００４６】なお、本発明にあっては、寿司皿Ｄに付与されたバーコードの読み取りは、洗浄装置１の供給部２にて行うものに限定されるものではなく、洗浄装置１の任意の箇所で行うようにしてもよい。例えば、走査読み

K-FEE SYSTEM GMBH, EX2009, page 1260
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

取りユニット４０を、図５中仮想線で示されるように押上げ装置１２の上方である排出部３等に設け、洗浄が終了して積層状態に貯留された寿司皿Ｄのバーコードの読み取りが行われるようにしてもよい。この場合、寿司皿Ｄの洗浄が終了した時点で読み取りが行われるため、バーコードの表面に飯粒等のゴミが付着されていること等による読み取りエラーが発生しにくくなる。

【００４７】なお、本実施例においては、寿司皿Ｄに載置される寿司の種類や価格等を特定可能な情報の読み取りを迅速、かつ正確に行うために、これら情報をバーコード化して寿司皿Ｄの周縁に印刷し、このバーコードを走査読み取りユニット４０にて読み取るようになっていたが、各寿司皿Ｄに載置される寿司を特定可能な情報が記録される識別標識は、情報記録シンボルであるバーコードに限定されるものではなく、例えば寿司皿Ｄに印刷される絵柄や色等とし、これらを読み取り装置にて読み取ることにより前記情報を読み取ることが出来るようにしてもよいし、あるいは前記情報を記憶可能なＲＯＭ（タグ）としてもよく、この場合、ＲＯＭに記憶されているデータを電磁波等を用いて非接触により送信可能な送信ユニットを寿司皿Ｄに設けるとともに、このデータを受信可能な受信装置を洗浄装置の所定箇所に設け、受信したデータに基づいて売り上げ等を管理できるようにすればよい。

【００４８】以上、本発明の実施例を図面により説明してきたが、具体的な構成はこれら実施例に限られるものではなく、本発明の要旨を逸脱しない範囲における変更や追加があっても本発明に含まれる。

【００４９】

【発明の効果】本発明は以下の効果を奏する。

【００５０】（ａ）請求項１項の発明によれば、飲食物載置用容器を洗浄する際において識別標識の読み取りが行われるので、使用済みとなって回収された飲食物載置用容器から読み取られて出力手段により出力される飲食物を特定する情報が記録された読み取りデータに基づいて飲食物の管理を行うことが出来ることになるため、従来のように循環搬送中において識別標識を読取る場合よりも簡単な制御で飲食物の管理を行うことが出来る。

【００５１】（ｂ）請求項２項の発明によれば、飲食物載置用容器に付与された識別標識の読み取りを確実に行うことが出来る。

【００５２】（ｃ）請求項３項の発明によれば、飲食物載置用容器に付与された識別標識の読み取りを確実に行うことが出来るばかりか、識別標識に汚れ等が付着した状態で読み取りが行われることによる読み取りエラー等が発生しにくい。

【００５３】（ｄ）請求項４項の発明によれば、飲食物載置用容器の識別標識の読み取りを所定の位置で確実に行うことが出来る。

【００５４】（ｅ）請求項５項の発明によれば、迅速、かつ正確に飲食物載置用容器に載置される飲食物を特定する情報を読み取ることが出来る。

【図面の簡単な説明】

【図１】本発明の適用された寿司皿の洗浄装置の平面図である。

【図２】図１のＡ－Ａ断面図である。

【図３】図１における食器投入口の拡大断面図である。

【図４】（ａ）は寿司皿投入口の平面図、（ｂ）は（ａ）のＣ－Ｃ拡大断面図である。

【図５】図２のＢ－Ｂ断面図である。

【図６】本実施例に使用される寿司皿を示す一部破断正面図である。

【図７】洗浄装置の構成を示すブロック図である。

【図８】管理コンピュータの表示装置に表示される画面の一例を示す図である。

【図９】本実施例において使用される循環搬送装置の要部を示す斜視図である。

【符号の説明】

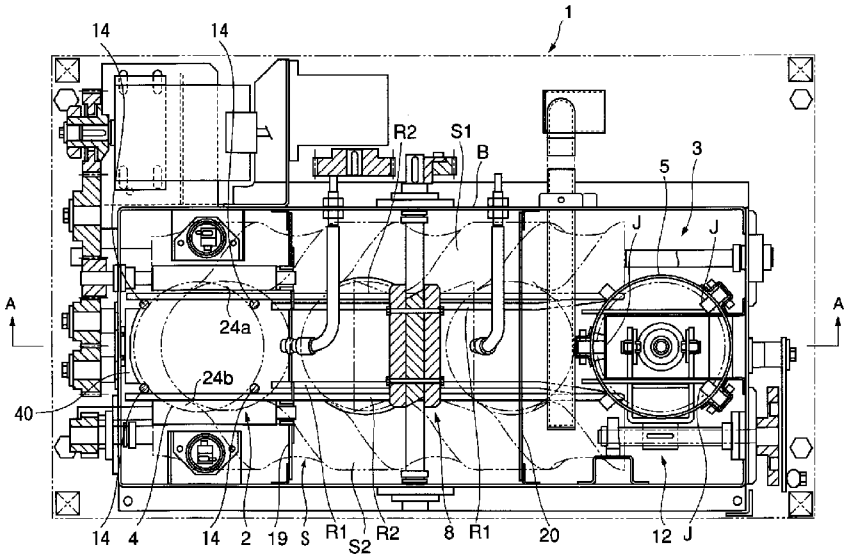
１	洗浄装置
２	供給部
３	排出部
５	排出案内筒
６ａ、６ｂ	洗浄液噴射ノズル
７ａ、７ｂ、７ｃ	洗浄液噴射ノズル
８、８ａ、８ｂ	回転ブラシ
９ａ、９ｂ	エアー噴射ノズル
１０	噴射口
１２	押上げ装置（排出手段）
１４	ガイドバー（案内片）
１５	ブラケット
１６	天板
１９、２０	仕切板
２４	分離装置（送出し手段）
２４ａ、２４ｂ	分離部材
２５	案内レール
３０ａ	切欠き溝
３１	ブラケット
４０	走査読み取りユニット（読取り手段）
４１	データ変換部
４２	制御装置
４３	表示装置
４４	入力装置
４５	出力装置
４６	管理コンピュータ
４７	通信部（出力手段）
Ｂ	筐体
Ｄ	寿司皿
Ｈ１	投入口
Ｈ２	開口

K-FEE SYSTEM GMBH, EX2009, page 1261
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

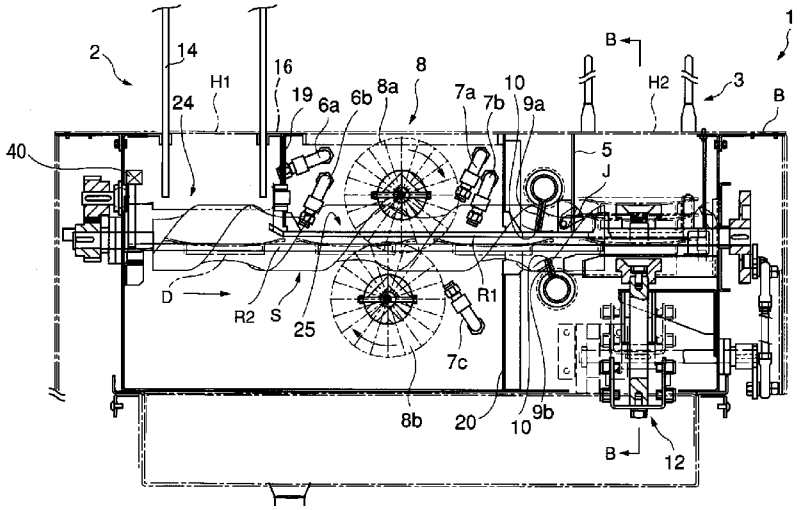
11　　12

J	支持爪	＊S	搬送部
Ｒ１、Ｒ２	ロッド	＊　Ｓ１、Ｓ２	搬送スクリュー

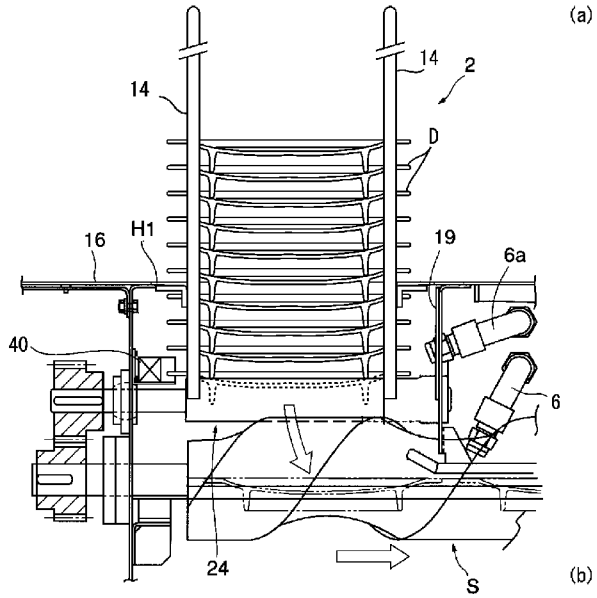
【図１】



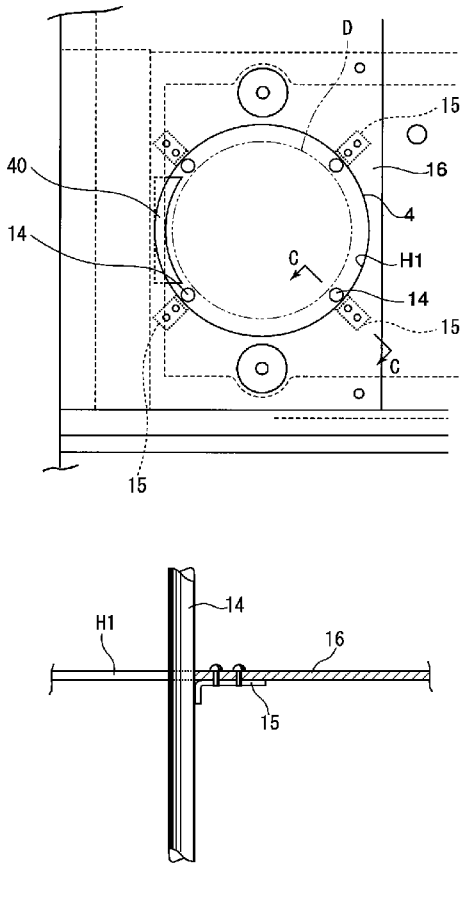
【図２】



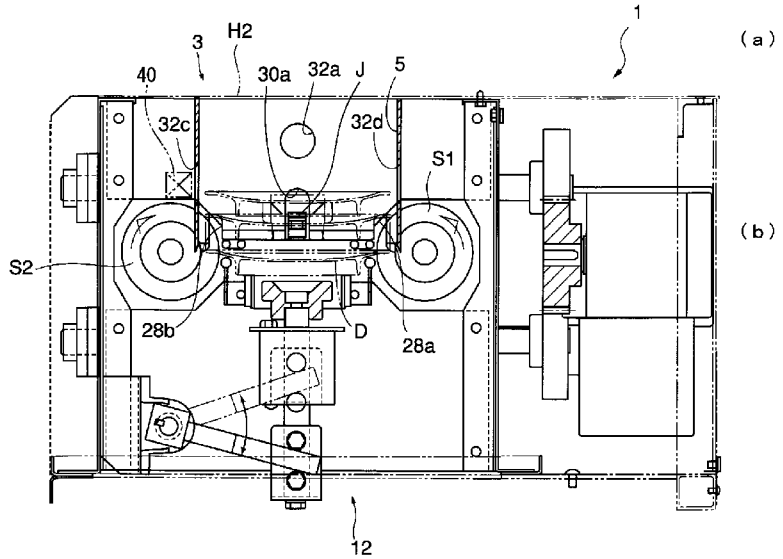
【図３】



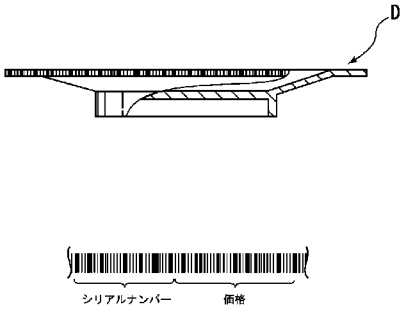
【図４】



【図５】

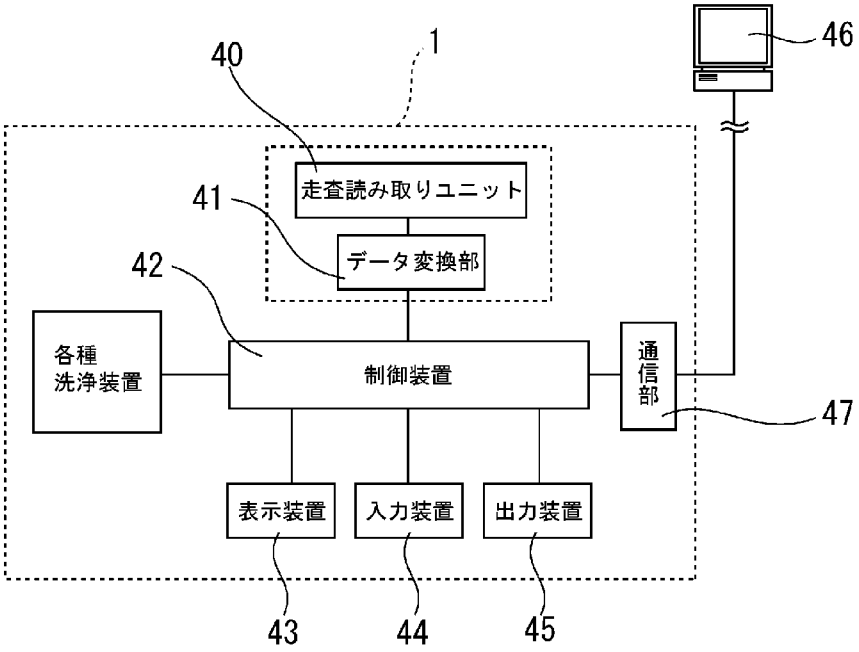


【図６】



K-FEE SYSTEM GMBH, EX2009, page 1263
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

【図７】

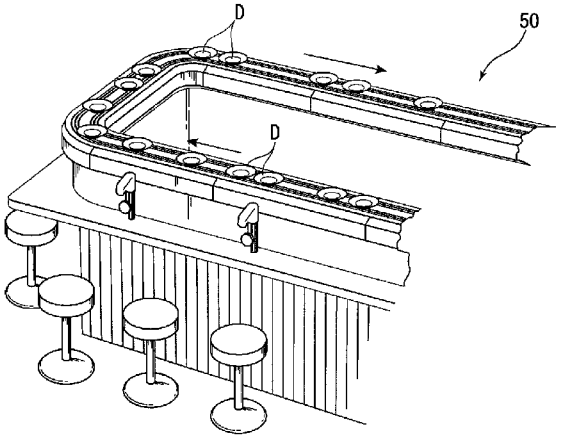


【図８】

売り上げ管理画面

皿種別	ネタ種類	数量	金額
500円皿	ウニ　イクラ 大トロ　金目鯛	41	20,500
300円皿	ハマチ　中トロ カレイ　アナゴ	59	17,700
200円皿	タコ　イカ マグロ　えんがわ	231	46,200
120円皿	タマゴ　納豆	311	37,320
合計		xxxx	xxxxxx

【図９】



フロントページの続き

(72)発明者　吉田　利浩
石川県金沢市増泉５丁目10番48号　株式会社石野製作所内

Ｆターム(参考)　3B082 AA01 AA03
5B072 BB00 CC24

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 512 956 B1

(12) # EUROPÄISCHE PATENTSCHRIFT

(45) Veröffentlichungstag und Bekanntmachung des Hinweises auf die Patenterteilung:
12.11.2014 Patentblatt 2014/46

(21) Anmeldenummer: **10812855.4**

(22) Anmeldetag: **15.12.2010**

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

(86) Internationale Anmeldenummer:
PCT/EP2010/007642

(87) Internationale Veröffentlichungsnummer:
WO 2011/082781 (14.07.2011 Gazette 2011/28)

(54) **PORTIONSKAPSEL UND VERWENDUNG EINER PORTIONSKAPSEL**

PORTION CAPSULE AND USE OF A PORTION CAPSULE

DOSETTE ET UTILISATION D'UNE DOSETTE

(84) Benannte Vertragsstaaten:
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

(30) Priorität: **16.12.2009 US 284389 P**
16.12.2009 DE 102009058646

(43) Veröffentlichungstag der Anmeldung:
24.10.2012 Patentblatt 2012/43

(73) Patentinhaber: **K-fee System GmbH**
51469 Bergisch Gladbach (DE)

(72) Erfinder: **KRÜGER, Marc**
51467 Bergisch-Gladbach (DE)

(74) Vertreter: **Loock, Jan Pieter et al**
Kutzenberger Wolff & Partner
Theodor-Heuss-Ring 23
50668 Köln (DE)

(56) Entgegenhaltungen:
EP-A1- 0 524 464
FR-A1- 2 556 323
US-A- 5 108 768

Anmerkung: Innerhalb von neun Monaten nach Bekanntmachung des Hinweises auf die Erteilung des europäischen Patents im Europäischen Patentblatt kann jedermann nach Maßgabe der Ausführungsordnung beim Europäischen Patentamt gegen dieses Patent Einspruch einlegen. Der Einspruch gilt erst als eingelegt, wenn die Einspruchsgebühr entrichtet worden ist. (Art. 99(1) Europäisches Patentübereinkommen).

Printed by Jouve, 75001 PARIS (FR)

EP 2 512 956 B1

Beschreibung

Stand der Technik

[0001] Die vorliegende Erfindung betrifft eine Portionskapsel zur Herstellung eines Getränks aufweisend ein im Wesentlichen kegelstumpfförmiges oder zylindrisches Basiselement, welches einen Hohlraum zur Aufnahme eines Getränkerohmaterials aufweist, und eine den Hohlraum verschließende Membran.

[0002] Solche Portionskapseln sind allgemein bekannt. Beispielsweise ist aus der Druckschrift FR 2 556 323 A1 eine ein kegelstumpfförmiges oder zylindrisches Basiselement aufweisende Portionskapsel bekannt, welche zur Herstellung eines Getränkes verwendet wird, wobei ein Hohlraums innerhalb der Portionskapsel mit einem Getränkerohmaterial, insbesondere einem Kaffeepulver befüllt ist und mittels einer Membran verschlossen ist. Die Portionskapsel wird zur Herstellung eines Kaffegetränks in einer Brühkammer angeordnet, in welcher die Membran perforiert und eine Extraktionsflüssigkeit, insbesondere heißes Wasser in den Hohlraum eingeleitet wird. Das Getränkerohmaterial wird von der Extraktionsflüssigkeit durchströmt, so dass ein Getränkeextrakt, insbesondere ein Kaffeegetränk gebildet wird. In der Brühkammer wird ferner ein Bodenbereich der Portionskapsel perforiert, so dass das Getränkeextrakt die Portionskapsel verlassen und gegebenenfalls in ein Getränkegefäß, wie beispielsweise eine Kaffeetasse gelangen kann.

[0003] Nachteilig an dieser Portionskapsel ist, dass die Portionskapsel eine vergleichsweise geringe mechanische Stabilität aufweist. Die Extraktionsflüssigkeit wird während des Extraktionsvorgangs mit Überdruck in die Brühkammer eingespritzt, so dass die Portionskapsel während des Extraktionsvorgangs einem vergleichsweise großen Druck ausgesetzt wird. Es besteht daher die Gefahr, dass die Portionskapsel insbesondere in einem Wandbereich zwischen der Membran und dem Bodenbereich seitlich einknickt und dadurch das Getränkerohmaterial in der Brühkammer nicht gleichmäßig durchströmt wird und/oder die Extraktionsflüssigkeit die Portionskapsel in der Brühkammer seitlich umströmt. Der Geschmack des zu extrahierenden Getränks wird dadurch erheblich beeinträchtigt.

[0004] Die Druckschrift US 2002/0020659 offenbart weiterhin eine Portionskapsel, die einen mit einer Membran verschlossenen Hohlraum aufweist, dessen Wandungsbereich eine Mehrzahl an Rillen aufweist.

Offenbarung der Erfindung

[0005] Es ist daher die Aufgabe der vorliegenden Erfindung, eine Portionskapsel bereitzustellen, welche die Nachteile des Standes der Technik nicht aufweist und darüberhinaus vergleichsweise einfach und kostengünstig herstellbar ist.

[0006] Die Aufgabe wird gelöst mit einer Portionskapsel zur Herstellung eines Getränks gemäß Anspruch 1.

[0007] Die erfindungsgemäße Portionskapsel hat gegenüber der Portionskapsel gemäß des Standes der Technik den Vorteil, dass der Wandungsbereich des Basiselements durch die Mehrzahl von Rillen versteift ist. Dies hat zum einen den Vorteil, dass die Portionskapsel eine höhere mechanische Stabilität aufweist und somit eine Deformation und insbesondere ein seitliches Einknicken der Portionskapsel verhindert wird. Vorzugsweise ist somit ein gleichmäßiges Durchströmen des Getränkerohmaterials in der Brühkammer zu gewährleisten, wodurch die Qualität und die Zuverlässigkeit des Extraktionsvorgangs erheblich zu steigern ist. Insbesondere führt die Erhöhung der mechanischen Stabilität durch die Verwendung der Mehrzahl von Rillen dazu, dass die Materialstärke des Basiselements insgesamt reduziert werden kann. Die Produktion der Portionskapsel wird somit erheblich kostengünstiger und umweltfreundlicher. Andererseits wird in der Brühkammer durch die Mehrzahl der Rillen eine Anhaftung des Wandungsbereichs an die Brühkammerwandung reduziert bzw. vermieden, wodurch das Auswerfen oder Entnehmen der Portionskapsel aus der Brühkammer begünstigt wird. Ein weiterer Vorteil der Mehrzahl von Rillen ist, dass innerhalb des Hohlraums die Strömung der Extraktionsflüssigkeit entlang des Basisbereichs durch die Rillenstruktur im Wandungsbereich verwirbelt wird. Eine im Vergleich zum Stand der Technik stärkere Verwirbelung der Extraktionsflüssigkeit im Hohlraum hat gegenüber dem Stand der Technik den Vorteil, dass sich keine ungewollten und zufälligen Hauptflüssigkeitsströme durch das Bett des Getränkerohmaterials bilden, sondern stattdessen das Getränkerohmaterial in seinem gesamten Volumen durchströmt wird. Der Extraktionsvorgang wird somit wesentlicher effizienter und ist präziser zu steuern bzw. reproduzierbarer. Alternativ ist denkbar, dass die Kapselwandung eine größere Materialstärke als der Bodenbereich aufweist, so dass das Aufstechen der Portionskapsel im Bodenbereich vereinfacht wird. Das Getränkerohmaterial umfasst insbesondere Kaffeepulver (vorzugsweise gemahlenden Röstkaffee), Schokoladenpulver, Milchpulver, Tee oder dergleichen. Alternativ ist denkbar, dass das Getränkerohmaterial ein Getränkeextrakt, wie beispielsweise Instant-Kaffee umfasst.

[0008] Die Rillen im Sinne der vorliegenden Erfindung sind insbesondere Ausbuchtungen oder Einbuchtungen, welche vorzugsweise eine lineare Haupterstreckung aufweisen. Besonders bevorzugt sind die Rillen als Stege und/oder Nuten ausgebildet. Die Rillen sind dabei optional auf einer dem Hohlraum zugewandten Innenseite und/oder auf einer dem Hohlraum abgewandten Außenseite des Basiselements ausgebildet. Erfindungsgemäß ist es vorgesehen, dass die Rillen sich jeweils im Wesentlichen in einer zur Membran parallelen Ebene erstrecken, wobei die Rillen vorzugsweise jeweils um das Basiselement umlaufend vorgesehen sind, beispielsweise in Form von das Basiselement parallel zur Membran umlaufenden und im Wesentlichen in sich geschlossen ausgebildeten Ringen.

K-FEE SYSTEM GMBH, EX2009, page 1266
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

[0009] Gemäß eines weiteren Gegenstands oder einer bevorzugten Weiterbildung der vorliegenden Erfindung ist vorgesehen, dass die Membran zumindest auf einer dem Hohlraum abgewandten Außenseite aufgeraut ausgebildet ist. In vorteilhafter Weise wird somit eine Anhaftung der Membran an einer der Membran zugewandten Brühkammerwandung reduziert bzw. unterbunden, so dass ein Auswerfen bzw. Entnehmen der Portionskapsel aus der Brühkammer nach dem Extraktionsvorgang erleichtert wird. Insbesondere bei einer Brühkammer mit einem automatischen Auswurfmechanismus besteht die Gefahr, dass das Auswerfen der Portionskapsel nicht zuverlässig funktioniert, da nach dem Extraktionsvorgang eine Portionskapselwandung bzw. die Membran der Portionskapsel an einer Brühkammerwandung anhaftet. Ursächlich hierfür können beispielsweise elektrostatische Anziehungskräfte zwischen der Portionskapselwandung und der Brühkammerwandung und/oder entsprechende Oberflächenspannungen einer Flüssigkeit zwischen der Portionskapselwandung und der Brühkammerwandung sein. Diese Effekte werden durch eine Strukturierung der Portionskapselwandung, beispielsweise durch das Aufrauen der Membran und/oder durch die Anordnung von Rillen auf dem Wandungsbereich, erheblich reduziert, so dass im Vergleich zum Stand der Technik ein zuverlässiger automatischer Auswurf der Portionskapsel aus der Brühkammer gewährleistet wird. Die Strukturierung der Membran erfolgt vorzugsweise dadurch, dass die Membran auf der Außenseite mit einer aufgerauten Schutzfolie versehen ist. Alternativ ist denkbar, die Membran beispielsweise mittels Lasereinstrahlung aufzurauen.

[0010] Gemäß eines weiteren Gegenstands oder einer bevorzugten Weiterbildung der vorliegenden Erfindung ist vorgesehen, dass ein Wandungsbereich des Basiselements einen Absatz aufweist. In vorteilhafter Weise ermöglicht der Absatz ein Stapeln einer Vielzahl von Portionskapseln beispielsweise vor dem Befüllen der Portionskapsel. Zeitlich vor der Befüllung der Portionskapseln mit dem Getränkerohmaterial weist die Portionskapsel weder Getränkerohmaterial, noch eine Membran auf. Die leeren Portionskapseln und insbesondere die Basiselemente sind daher ineinander zu stapeln, wodurch eine vergleichsweise bauraumkompakte Anordnung einer Vielzahl von leeren Portionskapseln ermöglicht wird. Dies senkt insbesondere Transport- und Lagerkosten. Die erfindungsgemäße Portionskapsel weist nun einen als Stapelrand ausgebildeten Absatz auf, wodurch zwei ineinander gestapelte Portionskapseln zueinander auf Abstand gehalten werden. Die eine Portionskapsel liegt dabei mit dem Absatz auf der anderen Portionskapsel auf. Die Portionskapsel umfasst vorzugsweise einen Flansch, an welchem die Membran befestigt wird, wobei der Absatz jeweils insbesondere an den Flansch angrenzend ausgebildet ist. In vorteilhafter Weise liegt nun der Absatz der einen Portionskapsel auf dem Flansch der anderen Portionskapsel auf. In vorteilhafter Weise sind die beiden Flansche der zwei ineinander gestapelten Portionskapseln entsprechend der Absatzhöhe voneinander entfernt. In vorteilhafter Weise ist zum Entfernen der beiden ineinander gestapelten Portionskapseln voneinander jeder Flansch vergleichsweise einfach, insbesondere maschinell zu ergreifen. Ferner wird durch die Beabstandung der beiden ineinander gestapelten Portionskapseln die Bildung eines Unterdrucks zwischen den Portionskapsel verhindert, so dass die leeren Portionskapseln zuverlässig und einfach wieder voneinander getrennt werden können. Portionskapsel nach Anspruch 7, dadurch gekennzeichnet, dass die Portionskapsel einen Flansch aufweist, an welchem die Membran befestigt ist, wobei der Absatz an den Flansch angrenzend ausgebildet ist. Vorzugsweise umfasst das Basiselement im Bereich des Absatzes in einer Ebene parallel zur Membran einen vergrößerten Durchmesser. Besonders bevorzugt ist vorgesehen, dass das Basiselement sich im Bereich des Absatzes in Richtung der Membran verjüngt. In vorteilhafter Weise wird somit wirksam verhindert, dass die Absätze zweier ineinander gestapelter leerer Portionskapseln ineinander rutschen. Die Beabstandung der beiden Portionskapseln voneinander wird somit auch bei großen axialen Kräften sicher gewährleistet. Dies ist beispielsweise beim Stapeln einer vergleichsweise hohen Anzahl von leeren Portionskapseln von großer Bedeutung. Die Verjüngung des Absatzes in Richtung Membran hat zudem den Vorteil, dass die Portionskapsel durch einen in den Zwischenbereich zwischen den Flansch und den Absatz eingreifenden Halte- oder Greifarm gehalten werden kann, beispielsweise in der Brühkammer, beim Befüllen der Brühkammer oder während der Herstellung der Portionskapsel, wobei der Halteoder Greifarm hierbei automatisch zwischen Flansch und Absatz zentriert wird. Der Absatz hat somit eine selbstzentrierende Wirkung.

[0011] Gemäß eines weiteren Gegenstands oder einer bevorzugten Weiterbildung der vorliegenden Erfindung ist vorgesehen, dass die Portionskapsel einen Flansch aufweist, an welchem die Membran befestigt ist, wobei ein Verhältnis vom Außendurchmesser des an den Flansch angrenzenden Wandungsbereichs des Basiselements zum Außendurchmesser des Flansches zwischen 0,79 und 0,95 aufweist. In vorteilhafter Weise ist der Flansch im Vergleich zum an den Flansch angrenzenden Wandungsbereich daher vergleichsweise groß ausgebildet, so dass einerseits eine ausreichend große Haftungsfläche auf dem Flansch zur stabilen Befestigung der Membran an dem Flansch erzielt wird und bei der Herstellung der Portionskapsel, beispielsweise in einem Tiefziehverfahren, eine vergleichsweise einfache Zentrierung des Hohlraums im Flanschbereich erzielt wird. Insbesondere werden somit die Anforderungen an die benötigten Herstellungstoleranzen reduziert, so dass die Herstellungskosten insgesamt gesenkt werden können. Andererseits ist der Flansch im Vergleich zum Wandbereich ausreichend klein ausgebildet, so dass der Hebelarm zwischen dem Flansch und dem Wandbereich klein ist. In vorteilhafter Weise führt dies dazu, dass eine Kraftwirkung auf den Flansch nicht zu einer ungewollten Deformation des Wandungsbereichs führt. Bevorzugt liegt das Verhältnis vom Außendurchmesser des an den Flansch angrenzenden Wandungsbereichs des Basiselements zum Außendurchmesser des Flansches zwischen 0,85 und 0,89 und umfasst insbesondere im Wesentlichen 0,87. In vorteilhafter Weise wird somit ein optimaler

K-FEE SYSTEM GMBH, EX2009, page 1267
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Kompromiss zwischen großen Herstellungstoleranzen einerseits und niedrigem Materialeinsatz andererseits erzielt. Darüberhinaus wird ein optimaler Kompromiss zwischen einer guten Haftung zwischen Flansch und Membran einerseits und einem kurzen mechanischen Hebelarm zwischen dem Flansch und dem Wandungsbereich erreicht. Besonders bevorzugt ist vorgesehen, dass der Außendurchmesser des an den Flansch angrenzenden Wandungsbereichs des Basiselements im Wesentlichen 39 Millimeter und/oder der Außendurchmesser des Flansches im Wesentlichen 45 Millimeter umfasst.

[0012] Gemäß eines weiteren Gegenstands oder einer bevorzugten Weiterbildung der vorliegenden Erfindung ist vorgesehen, dass das Basiselement einen sich im Wesentlichen parallel zur Membran erstreckenden Bodenbereich und einen sich im Wesentlichen zwischen der Membran und dem Bodenbereich erstreckenden Wandungsbereich aufweist, wobei das Basiselement im Bodenbereich eine größere Materialstärke als im Wandungsbereich umfasst. In vorteilhafter Weise ist das Basiselement im Bodenbereich somit steifer als im Wandungsbereich ausgebildet. Dies hat den Vorteil, dass das Aufstechen des Bodenbereichs in der Brühkammer deutlich vereinfacht wird, da der Bodenbereich beim Aufstechen nicht oder nur geringfügig in Richtung Hohlraum nachgibt. In einer bevorzugten Weiterbildung der vorliegenden Erfindung ist vorgesehen, dass innerhalb des Hohlraums ein Filterelement angeordnet ist, welches den Hohlraum in einen ersten Bereich zur Aufnahme des Getränkerohmaterials und in einen zweiten Bereich zur Aufnahme eines Getränkeextrakts unterteilt, wobei das Filterelement auf einer einem Bodenbereich des Basiselements zugewandten Seite mit dem Bodenbereich verschweißt ist. Dieser Schweißkontakt wird insbesondere mittels einer Ultraschallschweißung hergestellt. In vorteilhafter Weise wird die Herstellung des Schweißkontakts durch die größere Materialstärke im Bodenbereich vereinfacht, da in diesem Fall im Bodenbereich genügend Material zur Herstellung des Schweißkontakts zur Verfügung steht.

[0013] Gemäß eines weiteren Gegenstands oder einer bevorzugten Weiterbildung der vorliegenden Erfindung ist vorgesehen, dass innerhalb des Hohlraums ein Filterelement angeordnet ist, welches den Hohlraum in einen ersten Bereich zur Aufnahme des Getränkerohmaterials und in einen zweiten Bereich zur Aufnahme eines Getränkeextrakts unterteilt, wobei das Filterelement auf einer einem Bodenbereich des Basiselements zugewandten Seite ein Schmelzelement aufweist. In vorteilhafter Weise ist das Filterelement im Bereich der dem Bodenbereich zugewandten Seite mit dem Bodenbereich mittels einer Ultraschallschweißnaht verschweißt. Bei der Herstellung der Ultraschweißnaht wird mittels Ultraschall das Schmelzelement aufgeschmolzen, so dass eine Schweißverbindung mit dem Bodenbereich hergestellt wird. Die Schweißverbindung ist demnach vergleichsweise einfach herzustellen. Alternativ zum Ultraschallschweißen ist auch die Verwendung aller anderen bekannten Schweißverfahren denkbar, wie beispielsweise ein Reibschweißverfahren.

[0014] Gemäß eines weiteren Gegenstands oder einer bevorzugten Weiterbildung der vorliegenden Erfindung ist vorgesehen, dass innerhalb des Hohlraums ein Filterelement angeordnet ist, welches den Hohlraum in einen ersten Bereich zur Aufnahme des Getränkerohmaterials und in einen zweiten Bereich zur Aufnahme eines Getränkeextrakts unterteilt, wobei das Filterelement wenigstens eine Haltefläche zum Greifen des Filterelements aufweist. In vorteilhafter Weise ist das Filterelement im Bereich der Haltefläche automatisiert zu greifen, so dass insbesondere eine automatisierte Montage des Filterelements innerhalb des Basiselements ermöglicht wird. Die Herstellungskosten für die Portionskapsel können somit gesenkt werden.

[0015] Gemäß einer bevorzugten Weiterbildung ist vorgesehen, dass das Filterelement eine Mehrzahl von Filteröffnungen aufweist, wobei die Filteröffnungen außerhalb der Haltefläche angeordnet sind und wobei besonders bevorzugt ist die Haltefläche in einem Zentralbereich des Filterelements ausgebildet. In vorteilhafter Weise ist somit ein Greifen des Filterelements mit einem Saugkopf möglich, welcher das Filterelement im Bereich der Haltefläche durch Unterdruck hält, ohne dass der Unterdruck durch ein Nachströmen von Luft durch die Filteröffnungen kompensiert wird. Der Saugkopf ist vorzugsweise an einem in alle Raumrichtungen bewegbaren Montage-Roboterarm befestigt.

[0016] Gemäß eines weiteren Gegenstands oder einer bevorzugten Weiterbildung der vorliegenden Erfindung ist vorgesehen, dass innerhalb des Hohlraums ein Filterelement angeordnet ist, welches den Hohlraum in einen ersten Bereich zur Aufnahme des Getränkerohmaterials und in einen zweiten Bereich zur Aufnahme eines Getränkeextrakts unterteilt, wobei die Portionskapsel ein Verhältnis eines ersten Abstands zwischen der Membran und dem Filterelement zu einem zweiten Abstand zwischen einem Bodenbereich des Basiselements und dem Filterelement zwischen 3,5 und 4,5 aufweist. Vorzugsweise beträgt das Verhältnis vom ersten Abstand zum zweiten Abstand zwischen 3,8 und 4,2 und vorzugsweise im Wesentlichen 4. Besonders bevorzugt umfasst der erste Abstand im Wesentlichen 20 Millimeter und der zweite Abstand im Wesentlichen 5 Millimeter. In vorteilhafter Weise wird somit ein optimales Verhältnis zwischen dem Volumen des ersten Bereichs und dem Volumen des zweiten Bereichs erzielt, um eine bestimmte Menge von Getränkerohmaterial angeordnet im ersten Bereich zu extrahieren und während des Extraktionsvorgangs in Wechselwirkung mit einer bestimmten Menge Luft, welche sich im zweiten Bereich befindet, zu bringen. Besonders vorteilhaft wird auf diese Weise insbesondere ein Kaffeegetränk mit einem optimalen Aroma und einer optimalen Crema erzeugt. Gleichzeitig ist die Portionskapsel möglichst bauraumkompakt und somit kostengünstig herstellbar.

[0017] Gemäß eines weiteren Gegenstands oder einer bevorzugten Weiterbildung der vorliegenden Erfindung ist vorgesehen, dass innerhalb des Hohlraums ein Filterelement angeordnet ist, welches den Hohlraum in einen ersten

K-FEE SYSTEM GMBH, EX2009, page 1268
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Bereich zur Aufnahme des Getränkerohmaterials und in einen zweiten Bereich zur Aufnahme eines Getränkeextrakts unterteilt, wobei das Filterelement eine umlaufende Dichtlippe zum Abdichten des ersten Bereichs gegenüber dem zweiten Bereich aufweist, welche sich formschlüssig an den Wandungsbereich des Basiselement anschmiegt und sich senkrecht zur Membran wenigstens über die gesamte Höhe des Filterelements erstreckt. In vorteilhafter Weise wird der zweite Bereich gegenüber dem ersten Bereich durch die Dichtlippe abgedichtet, so dass keine Extraktionsflüssigkeit an den Filteröffnungen vorbei vom ersten Bereich in den zweiten Bereich gelangt. Dies ist erforderlich, damit kein Getränkerohmaterial in den zweiten Bereich und von dort in das Getränke gelangt. Die Dichtlippe ist derart selbstdichtend ausgebildet, dass eine Erhöhung des Drucks im ersten Bereich ein verstärktes Andrücken der Dichtlippe an den Wandungsbereich verursacht, d.h. die Dichtwirkung steigt mit dem abzudichtenden Druck. In vorteilhafter Weise ist dieser Effekt besonders stark, wenn die Dichtlippe die mit den Filteröffnungen versehende Filterfläche des Filterelements in Richtung der Membran überragt. Die Dichtlippe ist in einer Ebene parallel zur Membran insbesondere kreisförmig ausgebildet ist, wobei sich der Durchmesser der Dichtlippe in Richtung des Bodenbereichs des Basiselements vorzugsweise verjüngt.

[0018] Ein weiterer Gegenstand der vorliegenden Erfindung ist die Verwendung einer erfindungsgemäßen Portionskapsel zur Herstellung eines Heißgetränks.

[0019] Ausführungsbeispiele der Erfindung sind in den Figuren dargestellt und in der nachfolgenden Beschreibung näher erläutert. Die Figuren sind lediglich beispielhaft beschrieben und schränken den allgemeinen Erfindungsgedanken nicht ein.

Figuren 1, 2 und 3 zeigen schematische seitliche Schnittbildansichten einer Portionskapsel gemäß einer ersten, zweiten und dritten Ausführungsform der vorliegenden Erfindung.

Figur 4 zeigt eine schematische Perspektivansicht einer Portionskapsel gemäß einer vierten Ausführungsform der vorliegenende Erfindung.

Figur 5 zeigt eine schematische Aufsicht eines Filterelements einer Portionskapsel gemäß einer fünften Ausführungsform der vorliegenende Erfindung.

Figur 6 zeigt eine schematische Perspektivansicht einer Mehrzahl von gestapelten Portionskapseln gemäß einer sechsten Ausführungsform der vorliegenden Erfindung.

[0020] In den verschiedenen Figuren sind gleiche Teile stets mit den gleichen Bezugszeichen versehen und werden daher in der Regel auch jeweils nur einmal benannt bzw. erwähnt.

[0021] In Figur 1 ist eine schematische seitliche Schnittbildansichten einer Portionskapsel 1 gemäß einer ersten Ausführungsform der vorliegenden Erfindung dargestellt, wobei die Portionskapsel 1 ein im Wesentlichen kegelstumpfförmiges Basiselement 2 aufweist, welches topfähnlich ausgeformt ist und einen Hohlraum 3 umschließt. Der Hohlraum 3 wird von einer Membran 4 verschlossen. Das Basiselement 2 umfasst insbesondere ein weiches, halbstarres oder starres Kunststoffmaterial, welches vorzugsweise tiefgezogen wurde. Die Membran 4 umfasst vorzugsweise eine dünne Kunststoff- oder Aluminiumfolie. Das Basiselement 2 weist im Bereich der Membran 4 einen umlaufenden Befestigungsflansch 7 auf, wobei die Membran 4 mit dem Befestigungsflansch 7 stoffschlüssig verbunden, insbesondere verschweißt oder verklebt ist. Innerhalb des Basiselements 2 ist ein Filterelement 5 angeordnet, welches aus einem thermoplastischen Kunststoff, beispielsweise Polypropylen hergestellt ist. Das Filterelement 5 unterteilt den Hohlraum 3 in einen ersten Bereich 8 und in einen zweiten Bereich 9. Der erste Bereich 8 ist zur Aufnahme eines Getränkerohmaterials vorgesehen, welche in den Figuren aus Gründen der Übersichtlichkeit nicht illustriert ist. Beispielsweise wird der erste Bereich 8 mit einem Kaffeepulver gefüllt, bevor der Hohlraum 3 durch die Membran 4 verschlossen wird. Das Kaffeepulver wird beim Einfüllen in den ersten Bereich 8 vorzugsweise stark verdichtet. Der zweite Bereich 9 dient zur Aufnahme und insbesondere zum Sammeln eines nicht abgebildeten Getränkeextrakts während des Extraktionsvorgangs der Portionskapsel 1. Die Portionskapsel 1 ist dazu vorgesehen, in eine Brühkammer 10 einer nicht gezeigten Kaffeemaschine eingesetzt zu werden, in welcher dem ersten Bereich 8 eine Extraktionsflüssigkeit (beispielsweise heißes Wasser) vorzugsweise unter hohem Druck zugeführt wird. Diese Extraktionsflüssigkeit wechselwirkt mit dem Getränkerohmaterial, so dass sich ein Getränkeextrakt bildet. Das Filterelement 5 weist auf einer Filterfläche 5' eine Mehrzahl von in Figuren 1, 2 und 3 nicht abgebildeten Filteröffnungen 13 auf und fungiert somit als Sieb für das Getränkeextrakt. Das Getränkeextrakt gelangt dabei durch die Filteröffnungen 13 in den zweiten Bereich 9. Der zweite Bereich 9 wird von einem Bodenbereich 11 des Basiselements 2 begrenzt, welcher in der Brühkammer 10 beispielsweise von einem Bodenaufstechdorn 21 der Kaffeemaschine durchstochen wird, um eine Ausgangsöffnung für das Getränkeextrakt herzustellen. Alternativ ist denkbar, dass sich im Bodenbereich 11 unter dem Druck der Extraktionsflüssigkeit automatisch eine Ausgangsöffnung bildet und/oder dass im Bodenbereich 11 bereits eine Ausgangsöffnung oder ein Ausgangsventil integriert ist. Der Querschnitt der Filteröffnungen 13 ist derart ausgewählt, dass im Wesentlichen keine Partikel des Getränkerohmaterials von dem

K-FEE SYSTEM GMBH, EX2009, page 1269
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ersten zum zweiten Bereich 8, 9 gelangen. Damit das Filterelement 5 keine Verlagerung relativ zum Basiselement 2 durchführt, weist die Portionskapsel 1 optional eine Ultraschall-Schweißverbindung 6 zum Basiselement 2 auf. Die Membran 4 ist auf einer dem Hohlraum 3 abgewandten Seite aufgeraut ausgebildet, damit nach dem Extraktionsvorgang eine Anhaftung zwischen der Membran 4 und einer Wandung der Brühkammer 10 verhindert bzw. reduziert wird und somit ein fehlerfreies automatisches Auswerfen der Portionskapsel 1 aus der Brühkammer 10 erzielt wird. Darüberhinaus weist das Basiselement 2 einen Wandungsbereich 12 auf, welche sich im Wesentlichen zwischen dem Flansch 7 und dem Bodenbereich 11 erstreckt. In den Wandungsbereich 12 ist eine Mehrzahl von Rillen 15 eingebracht, welche in den Wandungsbereich 12 eingebrachte und in Form von dem Hohlraum 3 zugewandte im Wesentlichen umlaufende Nuten ausgebildet sind. Die Rillen 15 könnten in Umfangsrichtung auch teilweise unterbrochen ausgebildet sein. Die Rillen 15 sind ferner derart ausgebildet, dass der Wandungsbereich 12 durch die Mehrzahl der Rillen 15 verstärkt bzw. versteift wird. Darüberhinaus wird durch die Mehrzahl der Rillen 15, welche insbesondere über den Wandungsbereich 12 verteilt angeordnet sind, eine Anhaftung zwischen dem Wandungsbereich 12 und der Wandung der Brühkammer 10 nach dem Extraktionsvorgang verhindert, wodurch ein automatisches Auswerfen der Portionskapsel 1 aus der Brühkammer 10 erleichtert wird. Die in Figur 1 illustrierte Portionskapsel 1 umfasst ferner einen umlaufenden Absatz 16, welcher in einem Zwischenbereich zwischen dem Wandungsbereich 12 und dem Flansch 7 ausgebildet ist und welcher gegenüber dem Wandungsbereich 12 einen vergrößerten Durchmesser (parallel zur Membran 4) aufweist. Der Kontur des Absatzes 16 ist vorzugsweise derart ausgebildet, dass der Durchmesser des Absatzes 16 in Richtung des Flanschs 7, wie in Figur 1 illustriert, konstant bleibt oder sich, wie in Figur 3 dargestellt, in Richtung des Flanschs 7 wieder verringert. Der Bodenbereich 11 weist im Vergleich zum Wandungsbereich 12 eine erhöhte Materialstärke auf, um beispielsweise das Aufstechen des Bodenbereichs 11 und die Herstellung der Ultraschall-Schweißverbindung 6 zu begünstigen. Das Filterelement 5 weist auf der dem Bodenbereich 11 zugewandten Seite ein Schmelzelement 17 auf, welches während eines Ultraschall-Schweißvorgangs zur Herstellung der Ultraschall-Schweißverbindung 6 zumindest teilweise auf den Bodenbereich 11 aufgeschmolzen wird. Das Filterelement 5 weist beispielhaft eine Verstärkungsstruktur 5' auf, welche die Filterfläche 5' auf der dem zweiten Bereich 9 zugewandten Seite unterstützt. Das Filterelement 5 weist ferner eine umlaufende Dichtlippe 18 auf, welche in der Nähe des Bodenbereichs 11 mit dem übrigen Filterelement 5 verbunden ist und von dort in Richtung des Flansches 7 absteht. Die Dichtlippe 18 ist zumindest teilweise flexibel ausgebildet und überragt in Richtung 7 des Flansches 7 die Filterfläche 5'. Das freie Ende der Dichtlippe 15 ist in eine in den Wandungsbereich 12 eingebrachte Nut 15 eingeklickt und schmiegt sich an den Wandungsbereich 12 formschlüssig an, so dass eine zusätzliche Abdichtung zwischen dem ersten und dem zweiten Bereich 8, 9 erzielt wird, welche ein Umströmen des Filterelements 5 verhindert. Die Dichtlippe 18 ist dabei derart ausgebildet, dass sie eine dem ersten Bereich 8 zugewandte Druckfläche 18' aufweist. Eine Erhöhung des Drucks im ersten Bereich, beispielsweise durch Einströmen der Extraktionsflüssigkeit in den Hohlraum 3 führt nun zu einer Kraftwirkung auf die Druckfläche 18' in Richtung des Wandungsbereichs 12, so dass die Dichtwirkung zwischen dem Wandungsbereich 12 und der Dichtlippe 18 in Abhängigkeit des Drucks im ersten Bereich 8 erhöht wird. Ein erster Abstand entlang einer zur Membran 4 senkrechten Linie zwischen der Membran 4 und der der Membran 4 zugewandten Filterfläche 5' umfasst vorzugsweise im Wesentlichen 20 Millimeter, während ein zweite Abstand entlang einer zur Membran 4 senkrecht Linie zwischen der der Membran 4 zugewandten Filterfläche 5' und dem Bodenbereich 11 umfasst vorzugsweise im Wesentlichen 5 Millimeter.

[0022] In Figur 2 ist eine schematische seitliche Schnittbildansichten einer Portionskapsel 1 gemäß einer zweiten Ausführungsform der vorliegenden Erfindung dargestellt, wobei die zweite Ausführungsform im Wesentlichen der in Figur 1 illustrierten ersten Ausführungsform gleicht, wobei die Portionskapsel 1 gemäß der zweiten Ausführungsform keinen Absatz 7, keine Dichtlippe 18 und keine im Bodenbereich 11 im Vergleich zum Wandungsbereich 12 vergrößerte Materialstärke aufweist. Ferner sind die Rillen 15 als auf der dem Hohlraum 3 abgewandten Seite des Wandungsbereichs 12 ausgebildete Nuten ausgebildet.

[0023] In Figur 3 ist eine schematische seitliche Schnittbildansichten einer Portionskapsel 1 gemäß einer dritten Ausführungsform der vorliegenden Erfindung dargestellt, wobei die dritte Ausführungsform im Wesentlichen der in Figur 1 illustrierten ersten Ausführungsform gleicht, wobei die Portionskapsel 1 gemäß der dritten Ausführungsform lediglich zwei Rillen 16 im Wandungsbereich 12 aufweist, wobei eine der Rillen 15 gleichzeitig zum Einclipsen des Filterelements 5 dient.

[0024] In Figur 4 ist eine schematische Perspektivansicht einer Portionskapsel 1 gemäß einer vierten Ausführungsform der vorliegenende Erfindung dargestellt, wobei die vierte Ausführungsform im Wesentlichen der in Figur 2 illustrierten zweiten Ausführungsform gleicht, wobei im Wandungsbereich 12 drei Rillen 16 ausgebildet sind.

[0025] In Figur 5 ist eine schematische Aufsicht eines Filterelements 5 einer Portionskapsel 1 gemäß einer fünften Ausführungsform der vorliegenende Erfindung dargestellt, wobei die fünfte Ausführungsform im Wesentlichen der in Figur 2 illustrierten zweiten Ausführungsform gleicht, wobei in Figur 5 die Filterfläche 5' aus der Perspektive der Membran 4 abgebildet ist. Die Filteröffnungen 13 sind dabei derart angeordnet, dass im Zentralbereich der Filterfläche 5' keine Filteröffnungen 13 angeordnet sind. Die Filterfläche 5' ist im Zentralbereich darüberhinaus plan ausgebildet. Im Zentralbereich weist das Filterelement 5 daher eine Haltefläche 14 auf, welche zum Greifen des Filterelements 5 mittels eines Unterdruck-Saugkopfs vorgesehen ist. In Figur 6 ist eine schematische Perspektivansicht einer Mehrzahl von gestapelten

K-FEE SYSTEM GMBH, EX2009, page 1270
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Portionskapseln 1 gemäß einer sechsten Ausführungsform der vorliegenden Erfindung dargestellt, wobei die sechste Ausführungsform im Wesentlichen der in Figur 4 illustrierten vierten Ausführungsform gleicht, wobei die Portionskapsel 1 gemäß der sechsten Ausführungsform ferner einen Absatz 16 aufweist, noch nicht mit einem Getränkerohmaterial befüllt ist, noch kein Filterelement 5 aufweist und noch nicht mit einer Membran 4 verschlossen ist. In Figur 11 sind insgesamt sechs derartig leere Portionskapseln 1 abgebildet, wobei fünf der Portionskapseln 1 bereits ineinander gestapelt sind. Hierbei liegt immer eine Portionskapsel 1 mit ihrem Absatz 16 auf dem Flansch 7 einer darunterliegenden Portionskapsel 1 auf In der Figur 6 werden diese fünf bereits ineinander gestapelten Portionskapseln 1 entlang einer Stapelrichtung 101 in eine sechste Portionskapsel 1 gestapelt.

Patentansprüche

1. Portionskapsel (1) zur Herstellung eines Getränks aufweisend ein im Wesentlichen kegelstumpfförmiges oder zylindrisches Basiselement (2), welches einen Hohlraum (3) zur Aufnahme eines Getränkerohmaterials aufweist, und eine den Hohlraum (3) verschließende Membran (4), wobei ein Wandungsbereich (12) des Basiselements (2) eine Mehrzahl von Rillen (15) aufweist, **dadurch gekennzeichnet, dass** die Rillen (10) sich jeweils im Wesentlichen in einer zur Membran (4) parallelen Ebene erstrecken, wobei die Rillen (15) vorzugsweise jeweils um das Basiselement (2) im Wesentlichen umlaufend ausgebildet sind und der Wandungsbereich des Basiselements (2) durch die Mehrzahl von Rillen versteibt ist.

2. Portionskapsel (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Rillen (15) jeweils eine Nut und/oder Ausbuchtung umfassen, welche vorzugsweise auf einer dem Hohlraum (3) zugewandten Innenseite und/oder auf einer dem Hohlraum (3) abgewandten Außenseiten des Basiselements (2) ausgebildet sind.

3. Portionskapsel (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Rillen (15) derart ausgebildet sind, dass mittels der Rillen (15) der Wandungsbereich (12) versteift wird und/oder dass mittels der Rillen (15) eine Verwirbelung einer den Hohlraum (3) durchströmenden Extraktionsflüssigkeit erzeugt wird.

4. Portionskapsel (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Membran (4) zumindest auf einer dem Hohlraum (3) abgewandten Außenseite aufgeraut ausgebildet ist, wobei die Membran (4) auf der Außenseite mit einer aufgerauten Schutzfolie versehen ist.

5. Portionskapsel (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** ein Wandungsbereich (12) des Basiselements (2) einen Absatz (16) aufweist, wobei die Portionskapsel (1) einen Flansch (7) aufweist, an welchem die Membran (4) befestigt ist, wobei der Absatz (16) an den Flansch (7) angrenzend ausgebildet ist, wobei das Basiselement (2) im Bereich des Absatzes (16) in einer Ebene parallel zur Membran (4) einen vergrößerten Durchmesser aufweist, wobei das Basiselement (2) sich im Bereich des Absatzes (16) in Richtung der Membran (4) verjüngt.

6. Portionskapsel (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Portionskapsel (1) einen Flansch (7) aufweist, an welchem die Membran (4) befestigt ist, wobei ein Verhältnis vom Durchmesser des an den Flansch (7) angrenzenden Wandungsbereichs des Basiselements (2) zum Durchmesser des Flansches (7) zwischen 0,79 und 0,95 aufweist.

7. Portionskapsel (1) nach Anspruch 6, **dadurch gekennzeichnet, dass** das Verhältnis vom Durchmesser des an den Flansch (7) angrenzenden Wandungsbereichs (12) des Basiselements (2) zum Durchmesser des Flansches (7) zwischen 0,85 und 0,89 liegt und insbesondere im Wesentlichen 0,87 umfasst.

8. Portionskapsel (1) nach einem der Ansprüche 6 oder 7, **dadurch gekennzeichnet, dass** der Durchmesser des an den Flansch (7) angrenzenden Wandungsbereichs (12) des Basiselements (2) im Wesentlichen 39 Millimeter und/oder der Durchmesser des Flansches (7) im Wesentlichen 45 Millimeter umfasst.

9. Portionskapsel (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Basiselement (2) einen sich im Wesentlichen parallel zur Membran (4) erstreckenden Bodenbereich (11) und einen sich im Wesentlichen zwischen der Membran (4) und dem Bodenbereich (11) erstreckenden Wandungsbereich (12) aufweist, wobei das Basiselement (2) im Bodenbereich (11) eine größere Materialstärke als im Wandungsbereich (12) umfasst.

10. Portionskapsel (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** innerhalb des

K-FEE SYSTEM GMBH, EX2009, page 1271
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Hohlraums (3) ein Filterelement (5) angeordnet ist, welches den Hohlraum (3) in einen ersten Bereich (8) zur Aufnahme des Getränkerohmaterials und in einen zweiten Bereich (9) zur Aufnahme eines Getränkeextrakts unterteilt, wobei das Filterelement (5) auf einer einem Bodenbereich (11) des Basiselements (2) zugewandten Seite ein Schmelzelement (17) aufweist.

11. Portionskapsel (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** innerhalb des Hohlraums (3) ein Filterelement (5) angeordnet ist, welches den Hohlraum (3) in einen ersten Bereich (8) zur Aufnahme des Getränkerohmaterials und in einen zweiten Bereich (9) zur Aufnahme eines Getränkeextrakts unterteilt, wobei das Filterelement (5) wenigstens eine Haltefläche (14) zum Greifen des Filterelements (5) aufweist.

12. Portionskapsel (1) nach Anspruch 11, **dadurch gekennzeichnet, dass** das Filterelement (5) eine Mehrzahl von Filteröffnungen (13) aufweist, wobei die Filteröffnungen (13) außerhalb der Haltefläche (14) angeordnet sind, wobei die Haltefläche in einem Zentralbereich des Filterelements (5) ausgebildet ist.

13. Portionskapsel (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** innerhalb des Hohlraums (3) ein Filterelement (5) angeordnet ist, welches den Hohlraum (3) in einen ersten Bereich (8) zur Aufnahme des Getränkerohmaterials und in einen zweiten Bereich (9) zur Aufnahme eines Getränkeextrakts unterteilt, wobei die Portionskapsel (1) ein Verhältnis eines ersten Abstands zwischen der Membran und dem Filterelement (5) zu einem zweiten Abstand zwischen einem Bodenbereich des Basiselements und dem Filterelement zwischen 3,5 und 4,5 aufweist, wobei das Verhältnis vom ersten Abstand zum zweiten Abstand zwischen 3,8 und 4,2 und vorzugsweise im Wesentlichen 4 beträgt, wobei der erste Abstand im Wesentlichen 20 Millimeter und der zweite Abstand im Wesentlichen 5 Millimeter umfasst.

14. Portionskapsel (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** innerhalb des Hohlraums (3) ein Filterelement (5) angeordnet ist, welches den Hohlraum (3) in einen ersten Bereich (8) zur Aufnahme des Getränkerohmaterials und in einen zweiten Bereich (9) zur Aufnahme eines Getränkeextrakts unterteilt, wobei das Filterelement (5) eine umlaufende Dichtlippe (18) zum Abdichten des ersten Bereichs (8) gegenüber dem zweiten Bereich (9) aufweist, welche sich formschlüssig an den Wandungsbereich (12) des Basiselements (2) anschmiegt und sich senkrecht zur Membran (4) wenigstens über die gesamte Höhe des Filterelements (5) erstreckt, wobei die Dichtlippe (18) in einer Ebene parallel zur Membran (4) kreisförmig ausgebildet ist, wobei sich der Durchmesser der Dichtlippe (18) in Richtung des Bodenbereichs des Basiselements (2) verjüngt, wobei die Dichtlippe (18) eine dem ersten Bereich (8) zugewandte Druckfläche (18') aufweist, welche insbesondere derart ausgebildet ist, dass ein Überdruck im ersten Bereich (8) zu einer Erhöhung eines Dichtungsdrucks zwischen der Dichtlippe (18) und dem Wandungsbereich (12) führt.

15. Verwendung einer Portionskapsel (1) nach einem der vorhergehenden Ansprüche zur Herstellung eines Heißgetränks.

Claims

1. Single-portion capsule (1) for preparing a beverage comprising a substantially frusto-conical or cylindrical base member (2) having a cavity (3) for receiving a beverage raw material, and a membrane (4) enclosing the cavity (3), wherein a wall portion (12) of the base element (2) has a large number of grooves (15), **characterised in that** the grooves (10) extend substantially in each case in a plane parallel to the membrane (4), wherein the grooves (15) are preferably formed in each case essentially circumferentially to the base member (2) and the wall area of the base element (2) is reinforced by the large number of grooves.

2. Single-portion capsule (1) according to any one of the preceding claims, **characterised in that** the grooves (15) each comprise a notch and/or recess, which are preferably formed on an internal face looking towards the cavity (3) and/or on an external face looking away from the cavity (3) of the base member (2).

3. Single-portion capsule (1) according to any one of the preceding claims, **characterised in that** the grooves (15) are designed in such a way that by means of the grooves (15) the wall area (12) is reinforced and/or that by means of grooves (15) a turbulence of the extraction liquid flowing through the cavity (3) is generated.

4. Single-portion capsule (1) according to any one of the preceding claims, **characterised in that** the membrane (4) is roughened at least on an external face turned away from the cavity (3), wherein the membrane (4) on the outer

K-FEE SYSTEM GMBH, EX2009, page 1272
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

surface is provided with a roughened protective foil.

5. Single-portion capsule (1) according to any one of the preceding claims, **characterised in that** a wall area (12) of the base element (2) has a shoulder (16), wherein the single-portion capsule (1) has a flange (7) to which the membrane (4) is fixed, wherein the shoulder (16) is formed adjacent to the flange (7), such that the base element (2) in the area of the shoulder (16) has an enlarged diameter in a plane parallel to the membrane (4), wherein the base member (2) in the area of the shoulder (16) tapers in the direction of the membrane (4).

6. Single-portion capsule (1) according to any one of the preceding claims, **characterised in that** the single-portion capsule (1) has a flange (7) to which the membrane (4) is fixed, wherein the ratio of the diameter of the wall portion of the base member (2) adjacent to the flange (7) to diameter of the flange (7) is between 0.79 and 0.95.

7. Single-portion capsule (1) according to claim 6, **characterised in that** the ratio of the diameter of the wall portion (12) of the base member (2) adjacent to the flange (7) to the diameter of the flange (7) is between 0.85 and 0.89 and most preferably 0.87.

8. Single-portion capsule (1) according to one of claims 6 or 7, **characterised in that** the diameter of the wall portion (12) of the base member (2) adjacent to the flange (7) is essentially 39 millimetres and/or the diameter of the flange (7) is essentially 45 millimetres.

9. Single-portion capsule (1) according to any one of the preceding claims, **characterised in that** the base element (2) has a bottom portion (11) extending essentially in parallel to the membrane (4) and a wall portion (12) extending essentially between said diaphragm (4) and the bottom portion (11), wherein the base member (2) has a greater material thickness in the bottom area (11) than in the wall (12).

10. Single-portion capsule (1) according to any one of the preceding claims, **characterised in that** within the cavity (3) a filter element (5) is installed, which divides the cavity (3) into a first area (8) for receiving the beverage raw material and a second area (9) for receiving a beverage extract, wherein the filter element (5) on a face looking at a bottom portion (11) of the base member (2) has a fuse element (17).

11. Single-portion capsule (1) according to any one of the preceding claims, **characterised in that** within the cavity (3) a filter element (5) is installed, which divides the cavity (3) into a first area (8) for receiving the beverage raw material and a second area (9) for receiving a beverage extract, wherein the filter element (5) has at least one retaining surface (14) for gripping the filter element (5).

12. Single-portion capsule (1) according to claim 11, **characterised in that** the filter element (5) has a large number of filter openings (13), wherein the filter openings (13) are installed outside the support surface (14), wherein the support surface is formed in a central area of the filter element (5).

13. Single-portion capsule (1) according to any one of the preceding claims, **characterised in that** within the cavity (3) a filter element (5) is installed, which divides the cavity (3) into a first area (8) for receiving the beverage raw material and a second area (9) to accommodate a beverage extract, wherein the single-portion capsule (1) has a ratio of a first distance between the membrane and the filter element (5) to a second distance between a bottom portion of the base member and the filter element of between 3.5 and 4.5, wherein the ratio of the first distance and the second distance is between 3.8 and 4.2 and preferably 4, such that the first distance is preferably 20 mm and the second distance is preferably 5 mm.

14. Single-portion capsule (1) according to any one of the preceding claims, **characterised in that** within the cavity (3) a filter element (5) is installed, which divides the cavity (3) into a first area (8) for receiving the beverage raw material and a second area (9) for receiving a beverage extract, wherein the filter element (5) has a circumferential sealing lip (18) for sealing the first area (8) relative to the second area (9), which is form-fit to the wall portion (12) of the base member (2) and extends perpendicular to the membrane (4) at least over the entire height of the filter element (5), wherein the sealing lip (18) is of circular design in a plane parallel to the membrane (4), wherein the diameter of the sealing lip (18) tapers in the direction of the bottom portion of the base member (2), such that the sealing lip (18) has a pressure surface (18) facing the first area (8) which is formed in particular **in that** an excess pressure in the first area (8) results in an increase of a sealing pressure between the sealing lip (18) and the wall area (12).

K-FEE SYSTEM GMBH, EX2009, page 1273
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

15. Use of a single-portion capsule (1) according to any one of the preceding claims for the preparation of a hot beverage.

Revendications

1. Capsule à dose (1) pour la fabrication d'une boisson, présentant un élément de base (2) sensiblement en forme de tronc conique ou cylindrique (2), qui présente une cavité (3) destinée à recevoir une matière première de boisson et une membrane (4) obturant la cavité (4), une partie paroi (12) de l'élément de base (2) présentant une pluralité de rainures (15), **caractérisée en ce que** les rainures (10) s'étendent sensiblement dans un plan parallèle à la membrane (4), les rainures (15) étant réalisées de préférence de manière à entourer sensiblement l'élément de base (2) et la partie paroi de l'élément de base (2) étant rigidifiée par la pluralité de rainures (15).

2. Capsule à dose (1) selon une des revendications précédentes, **caractérisée en ce que** les rainures (15) comportent respectivement une gorge et/ou un trou qui sont pratiqués de préférence sur une face intérieure tournée vers la cavité (3) et/ou sur une face extérieure détournée de la cavité (3) de l'élément de base (2).

3. Capsule à dose (1) selon une des revendications précédentes, **caractérisée en ce que** les rainures (15) sont réalisées de manière à ce que la partie paroi (12) soit rigidifiée au moyen des rainures (15) et/ou qu'un tourbillon d'un liquide d'extraction s'écoulant (3) à travers la cavité (3) soit généré.

4. Capsule à dose (1) selon une des revendications précédentes, **caractérisée en ce que** la membrane (4) est rugueuse du moins sur une face extérieure détournée de la cavité (3), la membrane (4) étant pourvue sur sa face extérieure d'un film protecteur rugueux.

5. Capsule à dose (1) selon une des revendications précédentes, **caractérisée en ce qu'**une partie paroi (12) de l'élément de base (2) présente un talon (16), la capsule à dose (1) présentant une bride (7) sur laquelle la membrane (4) est fixée, le talon (16) étant réalisé adjacent à la bride (7), l'élément de base (2) présentant un diamètre accru au niveau du talon (16), dans un plan parallèle à la membrane (4), l'élément de base (2) se rétrécissant au niveau du talon (16) en direction de la membrane (4).

6. Capsule à dose (1) selon une des revendications précédentes, **caractérisée en ce que** la capsule à dose (1) présente une bride (7) sur laquelle la membrane (4) est fixée, un rapport entre le diamètre de la partie paroi adjacente à la bride (7) de l'élément de base (2) et le diamètre de la bride (7) se situant entre 0,79 et 0,95.

7. Capsule à dose (1) selon la revendication 6, **caractérisée en ce que** le diamètre de la partie paroi (12) adjacente à la bride (7) de l'élément de base (2) et le diamètre de la bride (7) se situe entre 0,85 et 0,89 et est sensiblement de 0,87.

8. Capsule à dose (1) selon une des revendications 6 ou 7, **caractérisée en ce que** le diamètre de la partie paroi adjacente (12) à la bride (7) de l'élément de base (2) est sensiblement de 39 millimètres et/ou que le diamètre de la bride (7) est sensiblement de 45 millimètres.

9. Capsule à dose (1) selon une des revendications précédentes, **caractérisée en ce que** l'élément de base (2) présente une partie fond (11) s'étendant sensiblement à la parallèle de la membrane (4) et une partie paroi (12) s'étendant sensiblement entre la membrane (4) et la partie fond (11), l'élément de base (2) ayant dans sa partie fond (11) une épaisseur de matériau supérieure à celle de la partie paroi (12).

10. Capsule à dose (1) selon une des revendications précédentes, **caractérisée en ce que**, à l'intérieur de la cavité (3), est disposé un élément de filtration (5) qui divise la cavité (3) en une première partie (8) destinée à recevoir la matière première de boisson et une seconde partie (9) destinée à recevoir un extrait de boisson, l'élément de filtration (5) présentant un élément de fusion (17) sur la face tournée vers une partie fond (11) de l'élément de base (2).

11. Capsule à dose (1) selon une des revendications précédentes, **caractérisée en ce que**, à l'intérieur de la cavité (3), est disposé un élément de filtration (5) qui divise la cavité (3) en une première partie (8) destinée à recevoir la matière première de boisson et une seconde partie destinée à recevoir un extrait de boisson, l'élément de filtration (5) présentant au moins une surface de retenue (14) pour tenir l'élément de filtration (5).

12. Capsule à dose (1) selon la revendication 11, **caractérisée en ce que** l'élément de filtration (5) présente une pluralité

K-FEE SYSTEM GMBH, EX2009, page 1274
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

d'orifices de filtration (13), les orifices de filtration (13) étant disposés en dehors de la surface de retenue (14), la surface de retenue étant réalisée dans une partie centrale de l'élément de filtration (5).

13. Capsule à dose (1) selon une des revendications précédentes, **caractérisée en ce que**, à l'intérieur de la cavité (3), est disposé un élément de filtration (5) qui divise la cavité (3) en une première partie (8) destinée à recevoir la matière première de boisson et une seconde partie (9) destinée à recevoir un extrait de boisson, la capsule à dose (1) présentant un rapport entre une première distance séparant la membrane de l'élément de filtration (5) et une seconde distance séparant une partie fond de l'élément de base et l'élément de filtration (5) situé entre 3,5 et 4,5, le rapport entre la première distance et la seconde distance se situant entre 3,8 et 4,2 et de préférence sensiblement à 4, la première distance étant sensiblement de 20 millimètres et la seconde distance sensiblement de 5 millimètres.

14. Capsule à dose (1) selon une des revendications précédentes, **caractérisée en ce que**, à l'intérieur de la cavité (3), est disposé un élément de filtration (5) qui divise la cavité (3) en une première partie (8) destinée à recevoir la matière première de boisson et une seconde partie (9) destinée à recevoir un extrait de boisson, l'élément de filtration (5) présentant une lèvre d'étanchéité périphérique (18) pour isoler la première partie (8) de la seconde partie (9), lèvre qui suit en correspondance géométrique une partie paroi (12) de l'élément de base (2) et s'étend perpendiculairement à la membrane (4) au moins sur toute la hauteur de l'élément de filtration (5), la lèvre d'étanchéité (18) étant réalisée en forme de cercle dans un plan parallèle à la membrane (4), le diamètre de la lèvre d'étanchéité (18) diminuant en direction de la partie fond de l'élément de base (2), la lèvre d'étanchéité (18) présentant une surface de compression (18') tournée vers la première partie (8) et qui est en particulier réalisée de manière à ce qu'une surpression dans la première partie (8) entraîne une augmentation d'une pression d'étanchéité entre la lèvre d'étanchéité (18) et la partie paroi (12).

15. Utilisation d'une capsule à dose (1) selon une des revendications précédentes pour préparer une boisson chaude.

K-FEE SYSTEM GMBH, EX2009, page 1275
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Fig. 1

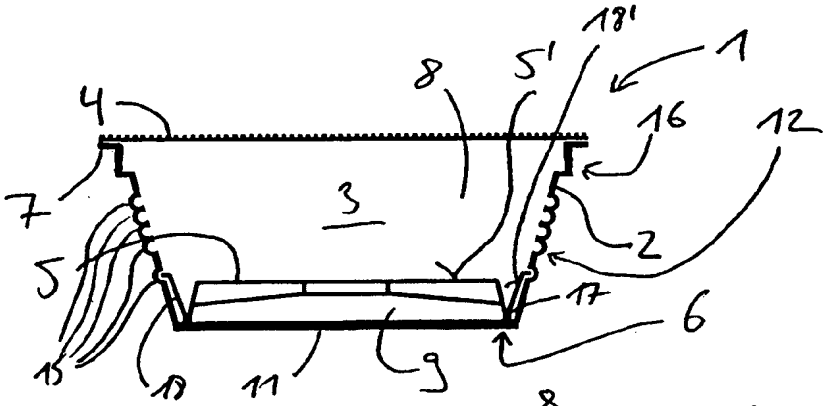


Fig. 2

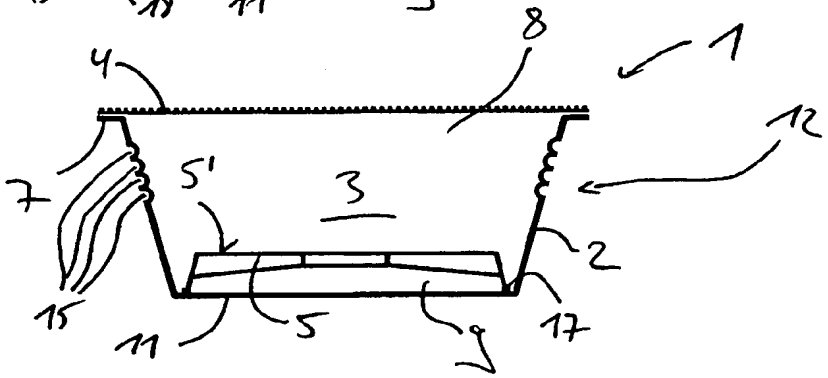


Fig. 3

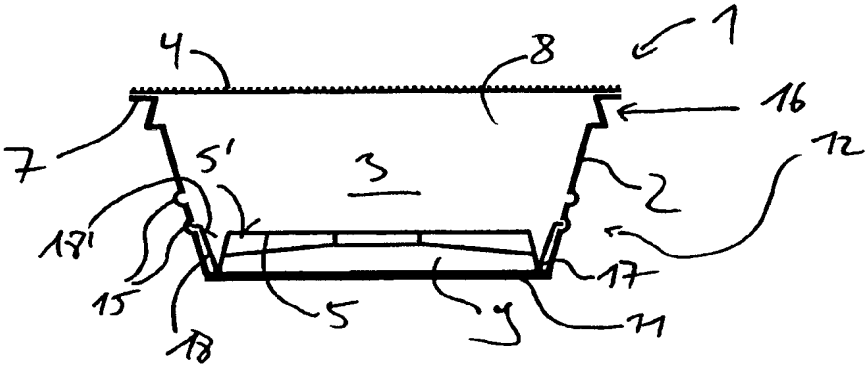
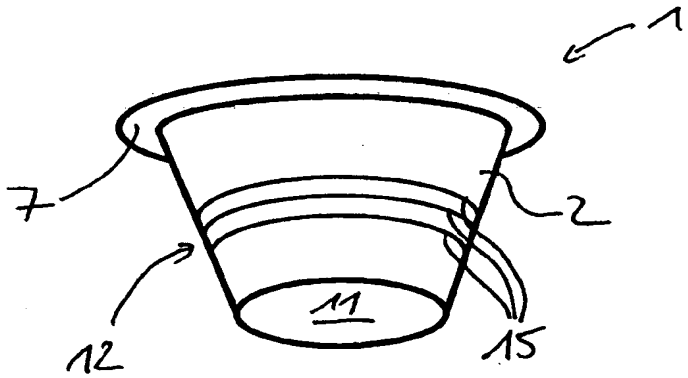


Fig. 4



K-FEE SYSTEM GMBH, EX2009, page 1276
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Fig. 5

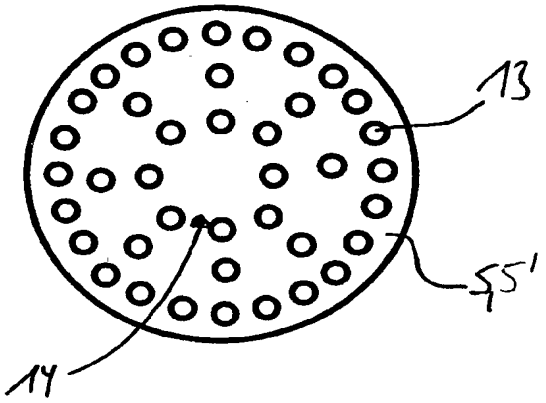
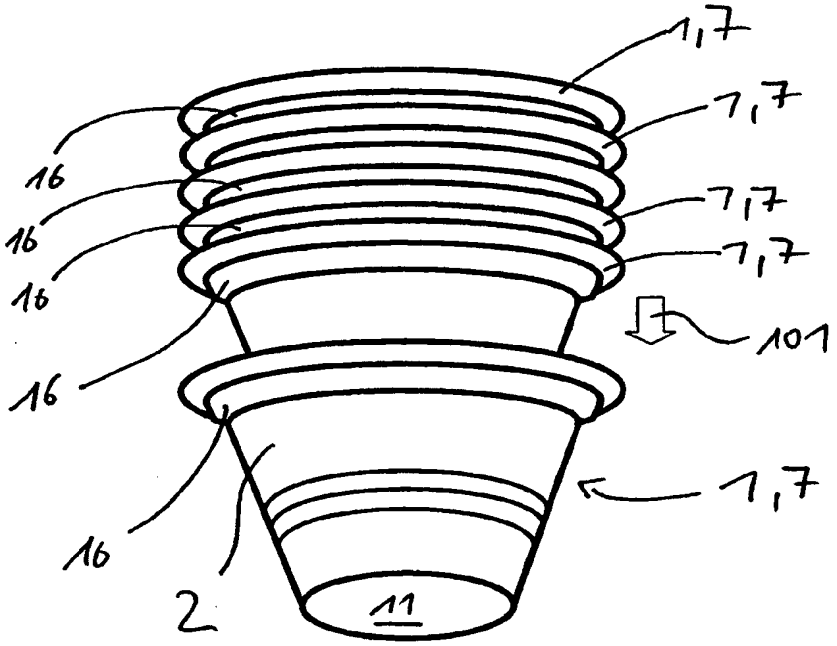


Fig. 6



K-FEE SYSTEM GMBH, EX2009, page 1277
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

IN DER BESCHREIBUNG AUFGEFÜHRTE DOKUMENTE

Diese Liste der vom Anmelder aufgeführten Dokumente wurde ausschließlich zur Information des Lesers aufgenommen und ist nicht Bestandteil des europäischen Patentdokumentes. Sie wurde mit größter Sorgfalt zusammengestellt; das EPA übernimmt jedoch keinerlei Haftung für etwaige Fehler oder Auslassungen.

In der Beschreibung aufgeführte Patentdokumente

- FR 2556323 A1 **[0002]**
- US 20020020659 A **[0004]**

K-FEE SYSTEM GMBH, EX2009, page 1278
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 528 485 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
01.07.2015 Bulletin 2015/27

(21) Application number: **11701403.5**

(22) Date of filing: **28.01.2011**

(51) Int Cl.:
A47J 31/22 *(2006.01)* ***B65D 85/804*** *(2006.01)*

(86) International application number:
PCT/EP2011/051244

(87) International publication number:
WO 2011/092301 (04.08.2011 Gazette 2011/31)

(54) CAPSULE AND SYSTEM FOR PREPARING A BEVERAGE BY CENTRIFUGATION IN A BEVERAGE PRODUCTION DEVICE

KAPSEL UND SYSTEM ZUR ZUBEREITUNG EINES GETRÄNKS MITTELS ZENTRIFUGATION IN EINER GETRÄNKHERSTELLUNGSVORRICHTUNG

CAPSULE ET SYSTÈME POUR PRÉPARER UNE BOISSON GRÂCE UNE CENTRIFUGEUSE DANS UN DISPOSITIF DE PRODUCTION DE BOISSONS

(84) Designated Contracting States:
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

(30) Priority: **29.01.2010 EP 10152158**

(43) Date of publication of application:
05.12.2012 Bulletin 2012/49

(73) Proprietor: **Nestec S.A.**
1800 Vevey (CH)

(72) Inventors:
- **ABEGGLEN, Daniel**
  1439 Rances (CH)
- **PERENTES, Alexandre**
  1012 Lausanne (CH)
- **MAGRI, Carlo**
  1870 Monthey (CH)
- **GERBAULET, Arnaud**
  25160 Oye et Pallet (FR)

(74) Representative: **Borne, Patrice Daniel**
Nestec S.A.
CT-IAM
Avenue Nestlé 55
1800 Vevey (CH)

(56) References cited:
EP-A1- 1 654 966
WO-A1-2009/106598
WO-A1-2010/066705
WO-A2-2007/137974
US-A- 5 402 707

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Printed by Jouve, 75001 PARIS (FR)

EP 2 528 485 B1

K-FEE SYSTEM GMBH, EX2009, page 1279
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Description

Field of the invention

[0001] The present invention relates to a capsule designed for preparation of a beverage by centrifugation, the use of a capsule in a beverage producing device and a capsule system combining a capsule and a beverage producing device for preparing a beverage from a beverage substance contained in the capsule and by passing a liquid fed by the device through the substance in the capsule using centrifugal forces.

[0002] In particular, the present invention relates to a capsule forming in conjunction with a beverage production device, a dedicated restriction valve, thereby constituting a pressure-setting means for the centrifuged liquid leaving the capsule.

Background of the invention

[0003] It exist systems for preparing beverages such as coffee by forcing a liquid through ingredients contained in the capsule using centrifugal forces.

[0004] WO 2008/148604 for example relates to a capsule for preparing a beverage or liquid food from a substance, in a centrifugal brewing unit, by passing water through the substance contained in the capsule by using brewing centrifugal forces comprising: an enclosure containing a predetermined dose of substance; opening means which opens under the centrifugal effect to allow the brewed liquid to leave the capsule. The capsule may also comprise means for engaging the capsule external rotational driving means of a centrifugal brewing device wherein the engaging means are configured to offer a resistance to torque during rotation of the capsule for maintaining the capsule in a reference rotational position.

[0005] Thereby, the effect of centrifugal forces to brew coffee or prepare other food substances presents many advantages compared to the normal brewing methods using pressure pumps. For example, in traditional espresso or lungo coffee type brewing methods'using a pressure pump, it is very difficult to master all the parameters which influence the quality of extraction of delivered coffee extract. These parameters are typically the pressure, the flow rate which decreases with the pressure, the compaction of the coffee powder which also influences the flow characteristics and which depends on the coffee ground particle size, the temperature, the water flow distribution and so on. Therefore, it is not easy to vary the extraction pressure and flow rates because there are essentially determined by the resistance of the bed of coffee and the downstream filtering system.

[0006] For a centrifugal extraction, the quality of the beverage to be prepared (intensity or strength, taste, aroma, foam/crema, etc.) is complex and depends on the control of different brewing parameters and capsule design. In particular, the flow rate of the injected liquid in the capsule seems to play an important role.. The flow rate can be influenced by a number of parameters such as the rotational speed of the capsule in the device, the fluid dynamics inside the capsule, the back-pressure exerted on the centrifuged liquid. For instance, for a given back-pressure, the higher the rotational speed, the larger the flow rate. Conversely, for a given rotational speed, the larger the back-pressure, the smaller the flow.

[0007] Whereas the rotational speed of the capsule is usually controlled by control means selectively activating a rotational motor of a centrifugal beverage production device, a predefined back-pressure can be obtained by a flow restriction at the outlet of the capsule or at the outside of a centrifugal cell carrying the capsule.

[0008] For example EP 651 963 teaches that a pressure gradient is obtained by a rubber-elastic element interposed at the interface between the engagement lid and the cup of the centrifugal cell, e.g., a capsule containing coffee powder. Such an element deforms elastically to leave a filtering passage for the liquid when a certain pressure is attained at the interface.

[0009] Furthermore, documents FR 2 487 661 and WO 2006/112691 relate to centrifugal systems wherein a fixed restriction is placed downstream of the filter to create a pressure gradient.

[0010] Moreover, WO 2008/148646 and WO2009/106598 propose solutions in which a flow restriction is placed in or outside the centrifugal cell. The flow restriction can comprise a regulating valve offering an effective pressure. The valve opens under the effect of pressure. The more the valve opens, the higher the flow rate. The valve can be preloaded by a resilient element (rubber or spring). The higher the preload, the higher the opening pressure of for the centrifuged liquid upstream of the valve. More particularly, WO2009/106598 relates to a beverage production system for preparing a liquid extract from a food substance contained in a cell passing a liquid through the food substance by centrifugation of the cell comprising a gas purging means configured to remove gas from the cell as liquid fills the cell.EP1654966A1 relates to a capsule with sealing means comprising a base body with a flange-like rim and a foil member closing the body. Such capsule is not designed for being used in a centrifugal preparation device.

[0011] The centrifugal beverage production systems of the prior art however suffer from the drawback that an adaptation of the back-pressure to predefined values either requires a mechanism that makes it complex to adjust to a large variety of different predefined values of the back-pressure.

[0012] Thereby, it is to be understood that in particular with respect to coffee beverages, the back-pressure applied on the centrifuged liquid determines the extraction conditions (e.g., flow rate) thereby influencing directly the coffee taste

K-FEE SYSTEM GMBH, EX2009, page 1280
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

and aroma. Furthermore, the organoleptic texture such as the foam/crema formed on top of the prepared beverage highly also depends on the applied back-pressure. Thus, with respect to the foam/crema as well as the flow rate of a coffee beverage to be prepared, it is desired to adjust the values of the back-pressure dependent on the nature of the substance provided in a specific capsule as for different types of beverages a different quality and/or quantity of the foam/crema respectively a different flow rate is desired. Therefore, there is a need for proposing, through a capsule system, coffee varieties with different tastes, intensities and/or types, e.g., ristretto, espresso, lungo, long coffee, etc., in particular, by which the back-pressure exerted on the centrifuged liquid at the interface between the capsule and the device can be better, more independently and conveniently controlled. The term "back-pressure of the valve means" refers to the pressure loss created by the restriction or restriction valve.

[0013] As the restriction or restriction valve forms a "bottleneck effect", a pressure of liquid is created upstream of it by the effect of the centrifugation. In particular, a pressure gradient is created wherein the pressure increases gradually from the axis of rotation towards the valve. Thanks to this restriction, the pressure before the restriction is increased, and it is this pressure which has an effect on the liquid-ingredient interaction (e.g. by extraction of the substance by the liquid). This pressure created by the restriction valve can also be defined as the ratio of force ("back-force") divided by the area of surface contact at the restriction valve.

[0014] Co-pending European patent application No.08171069.1 (entitled: "Capsule for preparing a beverage by centrifugation in a beverage production device and device adapted therefore") proposes a capsule on which a force ring is provided that is engaged by a pressing surface of the beverage production device to form a valve means which provides, under the force of resilient means associated to the pressing surface, and depending on the height or thickness of the force ring, a certain back-pressure during beverage extraction.

[0015] It has now been found that the design of the force ring on the capsule impacts on the coffee in-cup quality, in particular, on the aroma content of the coffee extract.

[0016] One object of the present invention is propose a capsule designed for centrifugal extraction which further improves beverage in-cup quality in particular, coffee. The proposed solution is also easy to form, economical and can be reliably produced in mass production with a high respect of the dimensional tolerances.

[0017] In addition, the proposed solution enables to provide easily and economically different back-pressures in the device, for instance, to provide a wide range of beverages (e.g., coffee beverages). Furthermore, the proposed solution also allows the possible use of materials providing high gas barrier properties, e.g., aluminium, thereby avoiding the need for a costly overwrapping package.

[0018] The present invention provides a solution to the before-mentioned problems as well as offers additional benefits to the existing art.

Object and Summary of the invention

[0019] The present invention relates to a capsule according to claim 1.

[0020] The pressure-setting ring is more particularly designed to adjust the backpressure formed by the valve means when inserted in the beverage production device.

[0021] More particularly, the annular pressure-setting ring extends, in the axial direction of the capsule, above the plane of the annular flange portion for being engaged by a valve member of a dedicated beverage production device and, extends, in the axial direction of the capsule, below the plane of the flange portion for being received in an annular lowered portion or recess of the capsule holder of the production device.

[0022] The annular pressure-setting ring (also called "force ring") forms in combination with a dedicated pressing surface of a valve member of the beverage production device, a restriction valve for the flow of beverage that comes out of the capsule during centrifugation. The pressure-setting ring is more particularly configured, together with the dedicated pressing surface of the device, to selectively block the flowpath of the centrifuged liquid in order to delay release of the liquid from the capsule and to set the liquid flow rate as a function of the speed of rotation. More particularly, when a sufficient pressure of the centrifuged liquid is reached at the valve means, i.e., the centrifuged liquid forcing against the pressure-setting ring, the valve means opens, i.e., a restricted flow gap is provided by a pressing surface of the device moving away from the pressure-setting ring of the capsule or vice versa. Before the pressure of the centrifuged liquid is attained, the valve means remains closed. Hence, the pressure-setting ring in engagement with the pressing surface blocks the flowpath for the centrifuged liquid. It should be noted that the opening of the valve means depends on the rotational speed of provided driving means which drive the capsule in rotation in the beverage production device. Therefore, as the valve means selectively blocks the flowpath for the centrifuged liquid, a preliminary wetting step of the beverage substance, e.g., ground coffee, can be carried out, as no liquid is yet discharged from the device. As a result of a prewetting and delayed release of the beverage, a thorough wetting of the substance is made possible and the interaction time between the liquid and the beverage substance, e.g., coffee powder, substantially increases and the extraction characteristics, e.g., coffee solid content and beverage yield, can be significantly improved.

[0023] More particularly, for a capsule of the invention, the annular pressure-setting ring of the capsule extends, in

K-FEE SYSTEM GMBH, EX2009, page 1281
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

the axial direction of the capsule, above the plane of the annular flange portion, a longer distance than the distance it extends, in the axial direction of the capsule, below the plane of the flange portion.

[0024] In a mode, the annular pressure-setting ring of the capsule is hollow. More preferably, the pressure-setting ring is formed as an annular curl. By "curl" or "curled end", it is meant a portion of substantially rolled material, e.g., a rolled ply, forming a portion in relief at the free end of the flange-like rim of the capsule. The curl of material can be partially or fully rolled over. Rolling of the curl can be obtained by different techniques such as forming, embossing, deep-drawing, etc. More preferably, the curl is rolled over to form a substantially closed, hollow curl. Such characteristic provides the advantage to maintain a relatively light structure while providing a sufficient resistance to the deformation of the ring in axial direction when it is pressed by the valve member. Furthermore, it enables to use package materials in the form of a sheet such as by deep-drawing, pressing or forming.

[0025] In a particular mode, the annular pressure-setting ring forms an oval curl which longer dimension extends substantially in the axial direction. Such characteristic provides a higher resistance to the deformation of the ring without increasing the thickness of the material.

[0026] In another particular mode, the annular pressure-setting ring forms an oval curl which longer dimension extends substantially in the transversal direction.

[0027] However, in other modes of capsules, the annular pressure-setting ring forms a relatively round curl, in particular, when the distance of the annular pressure-setting ring above the plane of the annular flange portion of remains relatively short.

[0028] In particular, the annular pressure-setting ring can be made of plastic and/or metal. More preferably, it is made of aluminium or a multi-layer of aluminium and plastic, preferably aluminium-PP laminate (Polypropylene). "Aluminium" here encompasses any aluminium-based alloy or composite. Preferably, the pressure-setting ring is formed of a single piece with the flange portion and body of the capsule.

[0029] The capsule can be a closed capsule wherein the upper wall is a perforable membrane closing the body of the capsule. More preferably, the capsule is closed in a gastight manner to ensure a longer shelf life of the capsule. For this, the packaging material(s) will be chosen to provide gas barrier properties on all faces of the capsule. The capsule can moreover be filled with a gas protecting the substance against oxidation such as nitrogen or a mixture of carbon dioxide and nitrogen. In another possible mode, the capsule is not fully closed but comprises an upper wall with pores or apertures allowing liquid to be fed in and/or extracted out. The pores or apertures in the upper wall are preferably provided at the periphery of the upper wall. The pores or apertures are preferably distributed at the periphery along a substantially circular path and at a short distance from the flange portion, such as between 0.5 and 10 mm, preferably, between 1 and 8 mm.

[0030] In another mode, the annular pressure-setting ring is plain. By "plain", it is meant here that the pressure-setting ring is not hollow but filled with the same or a different material. The pressure-setting ring can, for instance, be provided as an increase of thickness of the flange-like rim protruding both above and below its flange plane. For example, the increase of material thickness forms a portion that is integral with the rest of the flange-like rim. In another example, the annular flange portion is made of flexible, film portion, onto which is sealed an annular portion of plain, solid material, e.g., hard plastic or rubber.

[0031] In a preferred mode, the ratio of the distance of the pressure-setting ring above the plane of the flange portion to the distance of the ring below the plane of the flange portion is comprised between 5:1 and 1:0.5. In particular, the distance above the plane of the flange portion is preferably comprised between 0.5 and 3 mm, preferably 0.8 and 2.5 mm. Moreover, the distance below the plane of the flange portion is preferably comprised between 0.1 and 2 mm, preferably 0.1 and 1 mm, most preferably 0.3 and 0.5 mm.

[0032] In a possible mode, the pressure-setting ring only extends axially above the plane of the flange portion of the rim but is free of any axial extension below said plane. In such a case, it is also preferred that the flange-like rim is deformable at least at the junction between the flange portion and the pressure-setting ring when a pressure of the valve member is applied onto the ring to ensure a proper fitting of the capsule in the device and correct setting of the back-pressure. For example, the deformability of the flange-like rim is obtained by at least one local portion of reduced thickness of the flange portion and/or by a sufficiently small thickness, e.g., such local portion or thickness being lower than 0.8 mm for plastic or other polymers and lower than 0.4 mm for aluminium.

[0033] Moreover, the capsule of the invention is specifically sized to provide, at the pressure-setting ring, sufficiently elevated centrifugal forces or pressures. The radial distance from the central axis (I) of the capsule to pressure-setting ring is comprised between 25 and 30 mm. It was surprisingly found that above the upper limit, a significant loss of coffee aroma can be perceived irrespective of the rotational speed of the capsule in the device. Such loss is representative of less good coffee extraction conditions at such value. Below the lower limit, due to the lower centrifugal forces exerted on the force ring, the flow rate becomes too low and the extraction conditions are also impacted. Therefore, a radius above the given lower limit enables to maintain relatively moderate rotational speeds while maintaining sufficient pressure and flow rate at the force ring. Furthermore, a shorter radius would require an increase of the depth of the capsule to maintain a size of capsule enabling the same amount of coffee powder to be stored. This would likely lead to a lower

K-FEE SYSTEM GMBH, EX2009, page 1282
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

homogeneity of extraction with areas of coffee powder less wetted than others. As will be further described, the radius is here measured as the distance from the central axis of the capsule to the top point of the force ring representing the distance (hereafter referred h_1) of the pressure-setting ring above the plane (hereafter referred P) of the flange portion of the rim.

[0034] The present invention furthermore relates to a set of capsules comprising at least two capsules of different type; preferably at least three capsules of different type, each capsule being configured according to the aforementioned capsule,
wherein the distance in the axial direction above the plane of the annular force ring, differs as a function of the type of capsules.

[0035] As resulting from the difference of said distance in the axial direction, different back-pressure values are set by the pressure setting ring of the capsule when the capsule is engaged in the beverage producing device, thereby contributing to change the characteristics of the centrifuged beverage. In particular, as the distance above the plane of the annular pressure-setting ring increases, the preload on the valve means is increased thereby increasing the pressure in the capsule and the residence time of the liquid in the capsule for a given rotational speed.

[0036] The term "type of capsules" refers here to capsules having at least one difference which characterises different beverages, e.g., coffee beverages, capable of delivering different key beverage attributes (aroma, intensity, crema/foam, flowtime, etc.), such difference being characterized by any one of the following parameters: size of the capsule, amount of the substance, density of the substance (e.g., tapped density), specific composition (e.g., blend, coffee origins), grind size, filling level and combinations thereof. The term "size of capsule" means in particular, the storage volume of the capsule potentially available for receiving the substance and/or the external volume of the capsule, e.g., of its body.

[0037] The term "set of capsules" means a series of at least two, three, four, five, six capsules or more of different types.

[0038] Preferably, the distance, in the axial direction, below the plane (P) of the flange portion, of the annular pressure-setting ring is constant throughout the set. Therefore, this distance serves as a reference for all the capsules of the set thereby ensuring that each capsule is correctly positioned in the device and the pressure-setting ring does not deflect or deform significantly since such deflection or deformation could impact on the accuracy of the back-pressure setting.

[0039] The present invention further relates to a system for preparing a beverage according to claim 11.

[0040] More particularly, the capsule holder comprises an annular transversal supporting edge comprising a first inward portion for supporting the annular flange portion and a second outward portion for supporting the annular pressure-setting ring, wherein the second outward portion forms a lowered step or recess as compared to the first inward portion.

[0041] In a preferred mode, the beverage producing device further comprises control means configured for controlling the liquid flow rate and/or the rotational speed of the drive means as a function of the type of capsule inserted in the device. In particular, controlling of the liquid flow rate and/or rotational speed can be carried out by maintaining at least one of these parameters (i.e., flow rate and/or rotational speed) constant or varying it according to a predefined evolution profile (e.g., rotational speed curve) or adjusting said parameter dynamically in function of the variation of another parameter, for example, the second of these parameters. In a particular mode, the liquid flow rate is maintained constant, at least for period of a time during extraction, by varying the rotational speed during the extraction process.

[0042] The invention as well relates to the use of the capsule as aforementioned in such device for delivering a beverage.

[0043] The invention may also relates to a capsule kit designed for being filled with a beverage substance and insertion in a beverage production device for preparing a beverage by introducing liquid in the capsule and passing liquid through the substance using centrifugal forces. The capsule kit may comprise all the characteristics of the capsule as described in the present description, in particular the pressure-setting ring. The capsule kit further comprises connection means enabling connection of the upper wall onto the body of the capsule; such connection means being configured to fix the upper wall to the body after filling of the capsule with beverage substance. Connection means can be a press-fitting arrangement, a threading, an adhesive and combination thereof. The connection means are preferably designed such that a user is able to connect the upper wall on the body of the capsule without necessarily using tools.

Brief description of the drawings

[0044] Further features, advantages and objects of the present invention will become apparent for a skilled person when reading the following detailed description of embodiments of the present invention, when taken in conjunction with the figures of the enclosed drawings.

- Fig. 1 represents a side view of a beverage capsule according to the invention; the capsule belonging to a series or set of capsules adapted for the production of a variety of coffee beverages and the capsule being the smallest of the series,
- Fig. 2 represents a detail of two bodies of capsules of Fig. 1, in particular, showing the pressure-setting ring, when the capsules are stacked on each other during storage,
- Fig. 3 represents a side view of a beverage capsule according to the invention; the capsule being of medium size

K-FEE SYSTEM GMBH, EX2009, page 1283
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

in the series,

- Fig. 4 represents a detail of bodies of capsules of Fig. 3 in stacking order,
- Fig. 5 represents a side view of a beverage capsule according to the invention; the capsule representing the largest size of the series,
- Fig. 6 represents a detail of bodies of capsules of Fig. 5 in stacking order,
- Fig. 7 represents a beverage production device in cross-section comprising a capsule of Fig. 1,
- Fig. 8 is an enlarged cross-section view of the device including the capsule of Fig. 1,
- Fig. 9 is an enlarged cross-section view of Fig. 8,
- Fig. 10 is an enlarged cross section view of Fig. 8 during centrifugation of the liquid from the capsule in the device,
- Fig. 11 is an enlarged cross-section view similar to Fig. 9 for the capsule of Fig. 5,
- Fig. 12 is a side view of a capsule of the invention according to a second embodiment,.
- Fig. 13 is an enlarged cross section view of a detail of the capsule of Fig. 12.

Detailed description of the drawings

[0045] Figures 1, 3 and 5, respectively figures 2, 4 and 6 in stacking order for detail, relate to a preferred embodiment of a set of capsules 1A, 1B, 1C according to the invention. Each capsule is for a single use and designed to deliver a beverage from a beverage producing device. The capsule preferably comprise a cup-shaped body 2, a circular, annular flange-like rim 3 and an upper wall member of disc form, preferably, a perforable membrane 4. The cup-shaped body 2 may have a bowl as illustrated or other forms. Thereby the membrane 4 and the body 2 enclose an enclosure respectively ingredient compartment 6. As shown in the figures, the membrane 4 is preferably connected onto an inner annular flange portion 7 of the rim 3 that is preferably between 1 to 5 mm. The membrane 4 is connected to the rim 3 of the body by a seal such as a heat or ultrasonic weld line.

[0046] The rim is not necessarily horizontal as illustrated. It can be slightly bended, upwards or downwards, in order to increase the resistance of the seal to the increasing pressure pushing on the membrane with time, due to degassing of the capsule substance or ingredient with time.

[0047] The rim 3 of the capsules preferably extends outwardly in a direction essentially perpendicular (as illustrated) or slightly inclined (if bended as aforementioned) relative to the central axis of symmetry I of the body corresponding to the axis of rotation Z of the capsule 1 in the beverage production device (see figure 7). Generally, the axis I represents also the centre around which the annular flange-like rim 3 extends in an annular configuration. Thereby, the axis of symmetry I is aligned with the axis of rotation Z during centrifugation of the capsule in the brewing device. For example, a slight inclination represents an angle of between about 1 and 30 degrees relative to the central axis of symmetry.

[0048] It should be understood that the shown bowl-shaped embodiment of the capsule is just an exemplary embodiment and that the capsule in particular the capsule body 2 according to the invention can take various different shapes.

[0049] The capsules 1A, 1B, 1C are preferably single-use capsules. However, it should be noticed that the capsules can deliver more than one beverage at a time, for example, a volume of coffee extract sufficient for filling two cups at a same time.

[0050] The body 2 of the respective capsules 1A, 1 B, 1 C has a convex portion 5a, 5b, 5c of variable depth, respectively, d_1, d_2, d_3. However, the portion 5a, 5b, 5c may as well be a truncated or a cylindrical portion or a combinations of portions of different shapes such as truncated, cylindrical, spherical, etc.

[0051] Hence, the capsules 1A, 1B, 1C preferably comprise different ingredients' storage volumes but a same insertion diameter 'D'. Figure 1 shows a small volume capsule 1A whereas figure 3 shows a medium volume capsule 1B and figure 5 shows a large volume capsule 1C. The insertion diameter 'D' is hereby determined at the line of intersection between the lower surface of the rim 3 and the surface of the sidewall of the body 2. However, it could be another referencing diameter of the capsule in the device.

[0052] The capsules of the invention 1A, 1B, 1C are also specifically dimensioned to provide optimal flow rates, at the pressure-setting ring 8 when the capsule is centrifuged in the beverage production device, as will explained later. For this, the radius R. representing the distance between the axis I and the distance h1 above plane P, is preferably comprised between 24 and 31 mm. More preferably, this radius is comprised between 25 and 30 mm, even most preferably of about 28 (+/-1) mm. If the radius is too low, the flow rate decreases significantly at a same closing pressure on the ring. In order to compensate for such low flow rate, it is necessary to increase the rotational speed but this influence negatively on other factors such as the cost of the noise and cost of the system. On the other hand, a too high radius also impacts negatively on the stability during the centrifugation process of the system and creates a too cumbersome capsule in the device.

[0053] In addition, the larger internal diameter of the enclosure of the capsule as measured at the junction between the flange-like rim portion 7 and the body 2 (just below the upper wall 4) is preferably comprised between 45 and 50 mm. These limit values are also preferred to ensure a sufficient width of the outlet area at the upper wall of the capsule. The lower the value is, the lower the pressure is in the upper periphery of the enclosure at a given rotational speed.

K-FEE SYSTEM GMBH, EX2009, page 1284
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Above the upper limit, it would be no longer possible to position the force ring effectively.

[0054] The body 2 of the capsules is preferably rigid or semi-rigid. It can be formed of a food grade plastic, e.g., polypropylene, with a gas barrier layer such as EVOH and the like or aluminium or a laminate of plastic and aluminium, such as aluminium-PP (polypropylene) laminate, wherein preferably PP forms the inner layer of the laminate and aluminium forms the outer layer of the laminate. Additional lacquers or colour layers can be provided. The membrane may also be formed of paper and plastic, paper and aluminium or a combination of paper, aluminium and plastic. Plastic also includes biodegradable plastics such as crystallized PLA or equivalent. The membrane 4 can be made of a thinner material such as a plastic film also including a barrier layer or aluminium or a combination of plastic and aluminium. The membrane 4 is usually of a thickness between 10 and 250 microns, for example. The membrane is perforated for creating the water inlet as will be described later in the description. The membrane also further comprises a perforable peripheral area.

[0055] Instead of the membrane 4, the capsules 1A, 1B, 1C may as well comprise rigid, semi-rigid or flexible engagement lid member which preferably has the form of a disc comprising a central portion having an inlet port for enabling the introduction of a water injection member and a peripheral portion having circumferentially arranged outlet openings.

[0056] For instance, the outlet openings can be formed by an annular layer of filter paper and/or plastic fabric. The inlet port and/or outlet openings are thereby premade before insertion of the capsule in the device. They can be covered by a removable gas-tight layer before insertion such as an overwrapping package or a peelable membrane.

[0057] The volume difference between the small and large capsules is obtained particularly by varying the depth d_1, d_2, d_3 of the body 2 of the capsules in the set. In particular, the depth of the body of the smaller capsule 1A is lower than the depth of the body of the medium-size capsules 1B and the depth of the body of the medium-size capsule is lower than the depth of the body of the larger size capsule 1C.

[0058] More generally, the internal volume of the capsule is preferably comprised 18 ml and 50 ml. These volumes have been determined to offer both enough room for receiving a sufficient amount of coffee powder while providing optimized centrifugal (coffee) extraction conditions:

[0059] Another variant would also consist in having only capsules of the largest size (Fig. 5) and different filling levels of substance accommodated in the compartments depending on the type of beverage to be produced (e.g., ristretto, espresso, lungo, long coffee, whitened coffee, tea, chocolate, etc.).

[0060] The capsules are filled with beverage substance in function of their size. Such size can be determined as aforementioned by preferably varying the depth of the capsule d_1, d_2, d_3. Therefore, the smaller volume capsule 1A contains an amount of extraction substance, e.g., ground coffee, smaller than the amount for the medium volume capsule 1B and the medium volume capsule contains an amount of extraction substance, e.g., ground coffee, smaller than the amount for the largest size capsule 1C. Hence, the small capsule 1A is preferably intended for delivering a shorter coffee beverage of between 10 ml and 60 ml with an amount of ground coffee comprised between 4 and 8 grams. The larger capsule 1B is intended for delivery of a medium-size coffee, e.g., between 60 and 120 ml and the largest capsule 1C is intended for delivery of a long-size coffee, e.g., between 120 and 500 ml. Furthermore, the medium-size coffee capsule 1B can contain an amount of ground coffee comprised between 6 and 15 grams and the long-size coffee capsule 1C can contain an amount of ground coffee between 8 and 30 grams. The filling level of substance in the capsules can also be set to ensure a well distributed flow of liquid in the ingredients without creating preferred liquid path due to the centrifugal forces in the capsules. In general, the substance should not be filled to create a compact cake or be filled to the top of the capsule in a compact way before use (i.e., centrifugation of the capsule in the device).

[0061] Preferably, the capsules in the set according to the invention may contain different blends of roast and ground coffee or coffees from different origins and/or having different roasting and/or grinding characteristics. The mean particle size ($D_{4,3}$) of roast and ground coffee contained in the capsule can be comprised between 120 and 750 microns, preferably between 160 and 500 microns.

[0062] In general, the substance may include roast and ground coffee, soluble coffee, creamers (dairy or non-dairy), tea (e.g. grey, green, white or herbal), cocoa, chicory, infant formula and combinations thereof. Additives may also be added such as sweeteners (sugar, aspartame, stevia, etc.), flavourings (cinnamon, vanilla, almond, herbs, etc.), processing aids, emulsifiers, foam boosters, fruit or plant extracts, micronutrients and combinations thereof.

[0063] The capsules of the invention, as illustrated in figures 2, 4 or 6 more particularly comprises at its flange-like rim 3, an annular pressure-setting ring 8 protruding, both upwardly and downwardly from the inward flange portion 7. In particular, the pressure-setting ring, whose function will be explained later on, comprises an upper portion 9 extending, in the axial direction of the capsule, above a plane P passing by the flange portion 7 and a lower portion 10 extending below the plane P still in axial direction of the capsule. By convention, the reference to plane P is here taken along the lower surface of the flange portion 7. In the context of the invention, the term "axial direction" refers to any direction aligned or parallel to the central axis I of the capsule. The term "transversal direction" refers to any direction perpendicular to the central axis I or inclined of an angle greater than 45 degrees. The term "lower" and "upper" refer here to the relative positions of the means, as.illustrated, when the upper wall 4 of the capsule is oriented upwards and the bottom of the body 2 downwards. More preferably, the upper portion 9 of the ring extends by a distance "h_1" which is longer than the

K-FEE SYSTEM GMBH, EX2009, page 1285
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

distance "h_2" of the lower portion 10. In particular, the distance "h_1" determines the axial length of the pressure-setting ring in the set of capsules. For this, the distance "h_1" varies in the set whereas the distance "h_2" remains constant in the set. Therefore, for example, the smallest capsule 1A is provided with a pressure-setting ring 8 which extends, above plane P, a distance h_1 which is greater than the distance h_1 of the force ring, above plane P, of the medium-size capsule 1B. Comparatively, the distance h_1 of the pressure-setting ring of the medium-size capsule 1B is also greater than the distance h_1 of the largest-size capsule 1C. Thereby, the distance h_1 preferably decreases with the increase in size of the capsule, e.g., such as depth (d_1, d_2, d_3) increasing in the set. This will result in setting different back-pressure values in the beverage production device, as will be later explained, to adapt the brewing characteristics to the type of capsules, in particular, to its size and coffee powder content. Thereby, the thickness h_1 of the pressure-setting ring 8 is preferably adapted to the type of capsule, more particularly, to the amount and/or characteristics of the beverage substance contained in the shown capsules 1A, 1B, 1C in order to enable an adjustment of the back-pressure exerted onto the capsule when being inserted in the beverage production device. For example, for capsules containing a small amount of beverage substance - e.g. capsule 1A - in order to prepare e.g. a ristretto or espresso coffee beverage, a high pressure extraction might be desired for providing the coffee with a high intensity (i.e., a large amount of total coffee solids transferred in the coffee extract) and a thick crema. These characteristics can be compared to a lower pressure extraction which might be desired for the beverage coming out of capsules 1B or 1 C containing a larger amount of coffee powder. Therefore, for a given rotational speed during the beverage extraction, the backpressure of a capsule 1A of smaller volume containing a smaller amount of substance is adapted to be higher than the backpressure of larger capsule 1B or 1C containing a higher amount of substance. Of course, the rotational speed may also vary depending on the type of capsules 1A, 1B, 1C and the beverage to be produced.

[0064] In a preferred mode of the invention, the pressure-setting ring 8 of the capsule is formed by a rolled over edge or curl of the flange-like rim thereby forming a curl which may be closed or partially closed. In particular, the curl can be formed from a ply of material by any suitable forming technique such as embossing, stamping, moulding, etc. Preferably, the upper portion 9 forms an intermediate portion as a ply of material between the flange portion 7 of the rim and the portion 10. The lower portion 10 can extend by a re-entrant portion 11 of the ply forming the end portion of the curl. It should be noted that the upper portion 9 can be convex in the axial direction, as illustrated, but other forms are possible such as flat or concave. Similarly, the lower end of the lower portion 10 can be convex in the axial direction, as illustrated, but other forms are possible such as flat or concave. Furthermore, the pressure-setting ring is preferably of hollow shape when in form of a curl as shown but a plain (i.e., non-hollow) ring is also envisaged as a possible alternative. For example, the ring can be formed as a curl and filled with material such as plastic or rubber to improve its resistance to deformation in axial direction.

[0065] For capsules 1A, 1B, the pressure-setting ring may be of oval form in the axial direction since the height "h" of the ring corresponding to the sum of distance h_1 and distance h_2 is greater than the width "w" of the ring. For capsule 1C, the width "w" can be equal making the curl substantially round or slightly longer than the height "h" of the ring thereby making the curled ring oval in the transversal direction.

[0066] As illustrated in figures 2, 4 and 5, the pressure-setting ring 8 fulfils also the function of maintaining a distance between the bodies of capsules when stacked in each other. Therefore, it facilitates de-stacking of the bodies of the capsules during storage, in particular, during manufacturing, e.g., before the bodies are filled with the beverage substance. As shown in figures 2, for instance, when the stacked bodies come in abutment by contact between the lower portion 10 onto the upper portion 8 of the pressure-setting ring, the distance h_1, h_2 of the respective portions 9, 10 ensures that the flange portions 7 remain distant (see distance h_3) from each other and do not enter directly in contact with each other. Such configuration greatly facilitates de-stacking of the bodies and thereby enables the manufacturing of the bodies of the capsules in a manufacturing area which is remote from the capsule manufacturing site (coffee handling, filling, sealing, etc.).

[0067] Figure 7 shows a sectional side view of a beverage production device according to the capsule system of the invention in a closed state thereof. Thereby, the device comprises a rotating capsule holder 20, a driving means 21, and a collector 22 onto which the centrifuged liquid impacts and drains through a beverage outlet 23. The driving means 21 comprises a rotary motor which is linked to the capsule holder 20 at the bottom side (as illustrated) or top side (not illustrated) through an axle 24 axially connected to the capsule holder. The capsule holder 20 has a circumferential surface that forms a referencing diameter substantially equal to diameter 'D' of the capsule 1 so as to ensure a tight fit of the capsule in the capsule holder 20 without possible radial play. The capsule holder 10 is preferably hollow or deep enough at its centre to be able to accommodate all capsules of the set. Accordingly, a unique capsule holder is sufficient to receive all the capsules 1A, 1B, 1C of the set. It should be noted that the capsule holder can take various shapes and may also be formed of a simple annular hollow ring.

[0068] Furthermore, the device comprises water injection means 25 having an injection member 26 being arranged to perforate the membrane 4 of the capsule 1 in a central portion thereof. As already described in WO2008/148604, the injection means 26 are connected to a liquid circuit 28 comprising a liquid supply 29 such as a water tank, a pump 30 and liquid heating apparatus 31 for providing a predefined volume of heated pressurized liquid to the capsule 1 during

K-FEE SYSTEM GMBH, EX2009, page 1286
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

the beverage extraction process. Liquid is usually water (heated, ambient or cooled). The liquid is fed in the capsule by injection through the injection member 26 having the form of a hollow needle or tube. The injection member can be formed of a sharp free end to ensure perforation of the upper wall, if necessary. The device also comprises a series of outlet perforators 27 as described in WO2008/148604. The outlet perforators are provided at the periphery of the engagement lid 33 which engages the upper wall of the capsule during closure of the device. Accordingly, outlets are produced in an annular portion of the membrane 4 thereby enabling an extracted (centrifuged) beverage to leave the capsule 1 during the rotational movement thereof.

[0069] The device further comprises a control unit 40 which controls the different elements of the device, in particular, the pump 30, heater 31 and rotational speed of the driving means 21. In particular, the control unit is programmed to adjust operational parameters during extraction including (but not limited) to: pump flow rate, pump pressure, water temperature, rotational speed, rotational speed cycles (e.g., speeds during prewetting, extraction, drying phases, etc.). Several programs can be designed specifically to the different types of capsules 1A, 1B and 1C, for example delivering specific beverages, e.g., ristretto, espresso, lungo, Americano, etc., and/or beverages having specific strength, aroma profiles, foam/crema volume, etc. The capsules can comprise an identification code, such as a barcode, radio-frequency tag, etc., for enabling the identification in the device and for setting of the operational parameters automatically. In this case, the device comprises suitable code reading means associated to the control unit. The control means and code can be configured to ensure a control of key brewing parameters such as any one or any combinations of the following parameters: liquid volume (small, medium, long, extra-long cups, etc.), rotational speed of the driving means, liquid pump speed or speed cycle (e.g., slow speed for prewetting, high speeds for extraction and drying) , liquid heating temperature, etc.

[0070] The system of the invention comprises a valve means 18 capable of providing a back-pressure against the centrifuged liquid that leaves the capsule through its outlets (perforated or premade). The valve means 18 is formed by the complementary engagement of the device on the capsule. More particularly (figure 9), the device comprises a valve member 34 which is arranged circumferentially relative to the engagement lid 33 and which has a lower annular pressing surface 35. On the capsule's side, the valve means comprises the pressure-setting ring 8 which is engaged by the annular pressing surface 35 of the valve member 34 of the device. The pressing surface 35 engages the upper portion of the pressure-setting ring under a predetermined backpressure. The pressure engagement of the two complementary portions 34, 8 of the valve means is made resilient by means of a spring-biasing means such as springs 36 placed between the valve member 34 and an annular counter-force element 37, connected directly or indirectly to, or part of the engagement lid 33. Several springs 36 (for instance 6 to 10 springs) can be evenly placed at the periphery, between the portion 34 and element 37, such as helical springs in parallel to distribute and balance the preload onto the rim of the capsule evenly. Of course, other equivalent resilient means for replacing the springs can be envisaged without departing from the scope of the invention.

[0071] The valve member 34 and the injection unit 25 are typically movable with respect to the capsule holder 20 (or vice versa) via a closure system (not shown) in order to enable insertion and ejection of the capsule 1 to. and from the capsule holder 20 before respectively after the beverage extraction process. The closure system can be a mechanical and/or hydraulic closure mechanism. Many mechanical closure mechanisms are known for coffee machines such as levers forming a knee-joint, or a cam-type closure and the like. Moreover, the water injection means 25, the valve member 34, the capsule 1 and the capsule holder 20 are all rotatable about axis Z during the centrifugation process. The valve member 34 is also made moveable independently from the engagement lid 33 to take into account the different possible thicknesses of the capsules without affecting the relative position of the injection portion when engaging the capsule. For this, portion 34 can be slidably mounted about engagement lid 33. A joint 44, such as an O-ring, can be provided between the two parts 33, 34 to ensure liquid-tightness of the valve means.

[0072] On the capsule's holder side, the pressure-setting ring 8 is firmly supported by a lowered portion or recess 38 of the supporting edge of the capsule holder 20. The lowered portion or recess 38 is lowered relative to a flange-supporting portion 39 of the edge of the capsule holder which holds the flange portion 7 of the rim. The height of the step between the lowered portion 38 and the supporting portion is preferably equal or close to distance h_2 in order to ensure a correct fitting between the capsule and the capsule holder and a firm support of the ring 8 by the capsule holder. However, it could also be that the distance "h_2" of the ring is smaller than the height of the step thereby causing the force ring to be bent relative to the flange portion 7 under the pressure of the valve member 34. The flange portion 7 can be further pressed by a peripheral portion 40 of the engagement lid 33. The peripheral portion 40 comprises channels or recesses 41 radially oriented to ensure that the centrifuged liquid, which leaves the outlets perforated by the perforating means 27, can traverse the engagement lid on its way to the valve means 18. It is possible that the flange portion 7 has a form or line of curvature (e.g., slightly concave, convex or inclined) that slightly differs from the profile of the flange-supporting surface 39. In that case, the flange portion 7 can still be deformed by the peripheral portion 40 of the engagement lid 33, e.g., be flattened against the supporting surface 39 to ensure fitting of the force-ring in recess or lowered step 39.

[0073] Therefore, the backpressure of the valve means is predetermined essentially by the pressure-setting ring 8 that changes the relative position of the valve member 34 and the compression of the spring-biasing means 36. Depending

K-FEE SYSTEM GMBH, EX2009, page 1287
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

on the type of capsules. e.g., capsules 1A, 1B or 1C placed in the device, the backpressure varies as resulting from the different geometries of the pressure-setting ring 8. Capsule 1A of figure 9 has a shorter ring 8 compared to capsule 1C of figure 11. In particular, as already mentioned, the distance h_1 is comparatively lower for capsule 1A whereas the distance h_2 is equal for all capsules 1A-1C. As a result, the spring-biasing means 36 becomes less pre-compressed when capsule 1A is engaged in the device than when capsules 1B or 1C are engaged. As the spring-biasing means 36 is more compressed, the distance "d" representing the total length of the spring-biasing means is reduced thereby increasing linearly the preload or force exerted onto the ring of the capsule according to Hooke's law. The reduction of distance "d" results here directly from the increase of distance h_1 of the pressure-setting rings since these elements are all placed in axial linear direction. Therefore, as distance h_1 decreases in the set of capsules, the preload exerted by the spring-loading means (i.e., springs 36) on the valve member 34 and, consequently, on the pressure-setting ring 8 decreases since the spring length "d" increases. This configuration results in a simple mechanical control of the back-pressure of the valve means 18 using these selectively designed capsules. For example, depending on the type of capsules, the backpressure (i.e. the pressure above the atmospheric pressure) exerted by the valve means can range between 5 N/cm^2 (0.5 bar) and 180 N/cm^2 (18 bar), more specifically between 15 N/cm^2 (1.5 bar) and 134 N/cm^2 (13.4 bar), most specifically between 27 N/cm^2 (2.7 bar) and 87 N/cm^2 (8.7 bar). These pressure values are herein measured by measuring the axial compressive force of the engaging surface 35 onto the pressure setting ring 8 in a closed position of the valve and dividing by the surface of contact between these two parts of the valve means. More particularly, the smaller coffee capsule 1A is designed to deliver ristretto (about 25 mL) and espresso coffee (about 40 mL) with the highest backpressure due to its longer upper portion of thickness h_1 of the ring, for instance, backpressure values between 100 and 180 N/cm^2. The medium-size coffee capsule 1B is more designed to deliver lungo coffee (about 100-120 mL) with backpressure values in the range of 50 and 140 N/cm^2. The largest size capsule is designed to produce long coffee (about 150-250 mL) with the lowest backpressure such as within the range of 5 to 80 N/cm^2. Coffee beverage of different quality attributes can be obtained, in particular, extraction yields comprised between about 10 and 30%, total solids between about 0.5 and 2.5% in weight and a stable crema. The definition for the extraction yield and total solids for coffee beverage is given, for example, in EP1566127.

[0074] It should be noted that an identification means is preferably associated to each type of capsule to ensure setting of the proper parameters in the beverage producing device corresponding to the type of beverage to be dispensed, in particular, the beverage volume (e.g., 25, 45, 110, 150, 250 mL, etc.), flow rate and/or the rotational speed determining the residence time and flow rate of the beverage or liquid. Identification means can be a code such as a barcode, RFID, colour recognition, magnetic or ferromagnetic means, mechanical prongs and so on.

[0075] In the device of the invention, extraction of the beverage out of the capsule 1 is obtained by driving the engagement lid 33 of the injection unit 25 (the injector 26 preferably remaining static), the valve means 18, the capsule holder 20 and capsule together, in rotation about axis Z, at an extraction speed, e.g., between 500 and 16500 rpm that can be constant or variable. The speed must be sufficient during extraction to create a centrifugal pressure of liquid in the capsule enabling opening of the valve means as described.

[0076] Liquid which is centrally injected into the capsule 1 will tend to be guided along the inner surface of the side wall of the body 2, up to the inner side of the membrane 4, and then through the perforated outlet openings created in the membrane 4 by the perforating members 24 then through the valve means 18 between surface 35 and top of the ring 8. Liquid can be filtered by the interstice created between the perforators 27 and the membrane 4 to ensure that non-soluble solid (e.g., coffee) particles, are maintained in the capsule. Filtration may also be carried out by a separate filter inserted in the capsule. Due to the centrifugation of the liquid in the capsule 1, the liquid and the beverage substance (e.g., roast and ground coffee powder) provided within the capsule are made to interact in order to form a liquid comestible (e.g., coffee liquid extract). Figure 10 illustrates the system when beverage is centrifuged out of the capsule and the valve means 18 is opened sufficiently so that liquid passes between the pressure-setting ring 8 and the valve member 34. Centrifuged beverage is given a sufficient pressure upstream the valve means to open it and create an annular restriction opening 42 for liquid flow to be projected towards the impact wall 46 of the collector at high velocity. Opening of the valve means is again obtained by the liquid forcing the valve member 34 to further urge against the springs 36. The valve member 34 is preferably formed of a non-compressible material such as hard plastic or metal. However, it should noted that the valve member and the springs could be made of an integral compressible part ensuring both engaging and resilient functions such as if made of an annular rubber ring or block. The surface area of the restriction opening is preferably comprised between 0.5 and 15.0 mm^2, more preferably 1 and 10 mm^2. The surface area of the flow restriction can vary depending on the set backpressure value and the rotational speed of the capsule wherein in general the higher the speed, the larger the surface area for a given backpressure.

As mentioned earlier, for a beverage substance which is essentially roast and ground coffee, the capsule is configured such that radius R is comprised between 22 and 31 mm, more preferably between 24 and 30 mm, most preferably between 25 and 29 mm. Surprisingly, these ranges improve the in-cup coffee quality. When the radius exceeds the maximal value, the coffee extract experiences a lower aroma content. In particular, the values of flow rates are improved and reasonable rotational speed limits are maintained.

K-FEE SYSTEM GMBH, EX2009, page 1288
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

[0077] It should be noted that a small liquid leakage through the valve means 18 can be required that helps to vent the gas or air contained in the capsule during the filling of the capsule with liquid at the beginning of the beverage preparation process. This leakage may be obtained by small radial grooves, orifices, embossments, etc., provided in any of the valve members (for instance on surface 35 of the device and/or on the surface of the upper portion 9 of the ring).

[0078] The rotational speed is also adjusted to match a preferred flow rate of the centrifuged liquid out of the capsule. After filling of the capsule with water and during the extraction phase, water continues to be fed in the capsule by the water pump at a flow rate that substantially equals the flow rate of centrifuged liquid (since the capsule is full of liquid filling the voids). At the end of the extraction phase, the water pump may be stopped while centrifugation is maintained to empty the capsule from residual liquid. This is typically the water flow rate that can be controlled during the extraction phase. Water flow rate can be measured by a flow meter placed in the fluid circuit downstream of the water pump and controlled by control unit 40. It could also be theoretically possible to measure the beverage flow rate downstream of the valve means but implementing a flow meter in this area is more complicated. The rotational speed fluctuates during extraction phase to match a flow rate of reference as preset in the control unit. The preset flow rate is chosen as a function of the type of capsule and/or beverage to be delivered. An advantage of capsules with pressure-setting ring capable of setting different backpressure values also lies in the possibility to provide different ranges of flow rate while centrifugation within a more narrow rotational speed range. Therefore, much lower rotational speeds can be run while still achieving a same diversity of coffee. The machine is thus submitted to lower mechanical constraints as centrifugal forces are lower so the system can be designed with lighter/less material and globally less electrical power is consumed. The preferred method of controlling the flow of beverage according to the set backpressure by adjusting rotational speed of the driving means is described in detail in co-pending European patent application 09178382.9 entitled: "Capsule system with flow adjustment means". This patent application is here incorporated by reference. Of course other controls of the beverage characteristics are possible such as setting different predetermined ranges of rotational speeds (or different fixed values) which are set according to the different types of capsule (1A, 1B, 1C).

[0079] Figures 12 and 13 illustrate another possible embodiment of the capsule of the invention in which the pressure-setting ring 8 is formed of a plain (i.e., non-hollow) portion extending both above and below plane P from the flange portion 7 of the flange-like rim 3 in the axial direction. As in the previous embodiment, the pressure-setting ring 8 comprises an upper portion 9 forming a distance h_1 as measured from the transversal plane P and a lower portion 10 forming a distance h_2 as measured from plane P. The distance h_1 is preferably higher than distance h_2. Furthermore, the distance h_1 varies in function of the type of capsules in the set whereas h_2 preferably remains at a constant value in the set of capsules. The flange-like rim 3 is preferably formed as an integral part of the body of the capsule including the pressure-setting ring. Considering the flat top surface of the ring, the radius R is here measured at the highest distance (h1) of the ring but also the closest one to the central axis "I" (i.e., at the inner edge of the top flat surface) which thereby corresponds to the closest pressure point of the ring relative to the central axis "I". Therefore, the radius is here independent from the transversal width of the ring. Of course, the top edge of the ring could also be concave with the highest distance (h1) being the one transversally closer to the central axis "I". The force ring can be made of plain plastic such as polypropylene or polyethylene or a combination of plastics such as PP-PE, PP-PET, PE-PET, PP-PE-PET, PP-EVOH-PET or PE-EVOH-PET or combinations of plastic and metal such as PP-aluminium or PE-aluminium and lacquers, colouring layers, adhesives, etc. It can be formed with the body by injection-moulding or thermoforming. The pressure-setting ring can be rectangular as shown or round or oval as well. The flange portion 7 can be flexible to deform during insertion and engagement by the engagement lid of the injection means.

[0080] In another possible mode (not illustrated), the capsule may comprise a pressure-setting ring which is part of the upper wall, e.g., part of the membrane or attached to it, instead of being part of the body. For instance, the ring can be formed of an annular extension of the membrane and sealed to it. In this case, the pressure-setting ring extends both axially and transversally beyond the flange portion but might not be necessary directly connected to it or be integral with it. It can also be envisaged a force-pressure ring that is separate from the body and attached to the flange portion of the body by press-fitting or clipping.

[0081] In another possible variant, the pressure setting ring of the capsule extends only above plane "P" but forms no extension below plane "P" in the direction of the bottom of the body. In this case, "h_1" varies in the set as aforementioned and "h_2" is zero millimetre.

[0082] The invention also encompasses a fillable capsule kit designed for receiving beverage substance (e.g., ground coffee). In this mode, the upper wall of the capsule is connectable to the body using removable connection means enabling the filling of the capsule with beverage substance before insertion in the beverage producing device. Connection means can be press-fitting, adhesive, a threading and combinations. For instance, the upper wall may be a disc of perforable material (e.g., thin aluminium foil) that can be connected by the user to a cup-shaped body by a tacky adhesive layer after removal of a protective band covering said adhesive layer. The adhesive layer can be formulated to provide a sufficient adhesion for closing the capsule and enabling perforation in the device. The layer may be supported by the membrane and/or flange portion of the body.

K-FEE SYSTEM GMBH, EX2009, page 1289
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

EXAMPLES:

[0083] The objective of the tests was to evaluate the impact of the radial distance (R) of the pressure setting ring of the capsules of the invention on the content of important aroma compounds in order to improve the cup quality of coffee extracted by centrifugation.

[0084] The analysis was performed with Nespresso Arpeggio roast and ground coffee blend prepared at 25 ml cup size. For each system five preparations were made and merged to give a representative sample for both systems. The samples were immediately cooled down in crushed ice and kept at -20 °C until analysed. All samples where analysed in triplicate.

13 key aroma compounds were selected representing all major compound classes (sulphur compounds, aldehydes, phenols, diketones, pyrazines).

Absolute concentrations were determined by SPME-GC/MS analysis using isotope labelled compounds as internal standards (IDA).

Two different capsule diameters (D) were studied, respectively, 52 and 63 mm.The capsule was designed such that the radial radius (R), as defined previously, was equal to D/2 with a tolerance of +/- 0.5 mm.

Two rotation speeds were tested: 5000 rpm and 10000 rpm.

The coffee grind size ($D_{4,3}$)tested was 260 microns.

The results of the aroma content present in the coffee beverages prepared by capsules with two different diameters (2.R) are shown in the table below.

The increasing of the diameter from 52 to 63 mm leads to a decrease of aroma compounds in the final beverage. The decrease of aroma at higher diameter occurs at 5000 rpm as well as at 10000 rpm. The highest impact is found for high volatiles at 5000 rpm (28% less), which also comprises many freshness markers like aldehydes and dimethylsuflides. At 10000 rpm, the loss is similar for high and low volatiles and less drastic as at 5000 rpm. Low and medium volatiles were present in 10-20% lower amount for both tested speeds.

	Relative values for 63 mm diameter force ring vs. 52 mm at two different speeds			
Ppm/R&G coffee	52 mm 5000 rpm	63 mm 5000 rpm	52 mm 10000 rpm	63 mm 10000 rpm
High volatiles	100	72	100	87
Medium volatiles	100	88	100	88
Low volatiles	100	81	100	90

[0085] Although the present invention has been described with reference to preferred embodiments thereof, many modifications and alternations may be made by a person having ordinary skill in the art without departing from the scope of this invention which is defined by the appended claims.

Claims

1. A capsule (1A, 1B, 1C) designed for insertion in a beverage production device for preparing a beverage from a substance contained in the capsule by introducing liquid in the capsule and passing liquid through the substance using centrifugal forces, the capsule comprising:

a body (2) comprising a bottom end and an open end, spaced apart in the axial direction,
an upper wall (4) for covering the body at its open end, along a direction transverse to the axial direction,
an enclosure between the body and upper wall containing an amount of beverage substance, preferably roast and ground coffee,

the capsule comprising a flange-like rim (3) extending outwardly from the body,
wherein the flange-like rim (3) comprises an annular flange portion (7) extending around a central axis (I);
wherein the capsule comprises an annular pressure-setting ring (8) extending transversally and axially beyond the flange-portion, **characterized in that** the annular pressure-setting ring (8) is configured for being engaged by a valve member (34) of the beverage production device to provide a flow restriction valve (18) for the centrifuged beverage flow leaving the capsule and **in that** the radial distance (R) from the central axis (I) of the capsule to pressure-setting ring (8) is between 25 and 30 mm.

K-FEE SYSTEM GMBH, EX2009, page 1290
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

2. Capsule according to claim 1, wherein the annular pressure-setting ring extends, in the axial direction of the capsule, above the plane (P) of the annular flange portion (7) for being engaged by a valve member (34) of a dedicated beverage production device and, extends, in the axial direction of the capsule, below the plane (P) of the flange portion for being received in an annular lowered portion (38) or recess of the capsule holder of the production device.

3. Capsule according to claim 2, wherein
the annular pressure-setting ring extends, in the axial direction of the capsule, above plane (P) of the annular flange portion of a distance (h_1) longer than the distance (h_2) it extends, in the axial direction of the capsule, below the plane (P) of the flange portion.

4. Capsule according to any of the preceding claims,
wherein the annular pressure-setting ring is hollow, and preferably forms a curl.

5. Capsule according to claim 4,
wherein the annular pressure-setting ring forms an oval curl which longer dimension (h) extends substantially in the axial direction.

6. Capsule according to any one of the preceding claims,
wherein the annular pressure-setting ring is made of plastic and/or metal, preferably is made of aluminium or a multi-layer of aluminium and plastic, preferably aluminium-PP laminate.

7. Capsule according to any one of the preceding claims,
wherein the ratio of the distance (h1) above the plane (P) of the flange portion to the distance (h2) below the plane (P) of the flange portion is comprised between 5:1 and 1:0.5; and preferably the distance (h1) above the plane (P) of the flange portion is comprised between 0.5 and 3 mm, preferably 0.8 and 2.5 mm and preferably, the distance (h2) below the plane (P) of the flange portion is comprised between 0.1 and 1 mm, preferably 0.3 and 0.5 mm.

8. Capsule according to claim 1,
wherein the larger internal diameter of the enclosure of the capsule is comprised between 45 and 50 mm.

9. Set of capsules comprising at least two capsules of different type; preferably three capsules of different type, each capsule being according to any one of the preceding claims 1 to 8,
wherein the distance (h_1), in the axial direction, above the plane (P) of the annular pressure-setting ring, differs as a function of the type of capsules, preferably increases as the capsule size in the set decreases.

10. Set of capsules according to claim 9, wherein the distance (h2), in the axial direction, below the plane (P) of the flange portion, of the annular pressure-setting ring is constant throughout the set.

11. System for preparing a beverage comprising a beverage production device for preparing a beverage and a capsule (1A, 1B, 1C) designed for insertion in the beverage production device for preparing the beverage from a substance contained in the capsule by introducing liquid in the capsule and passing liquid through the substance using centrifugal forces, the capsule comprising:

a body (2) comprising a bottom end and an open end, spaced apart in the axial direction, an upper wall (4) for covering the body at its open end, along a direction transverse to the axial direction,
an enclosure between the body and upper wall containing an amount of beverage substance, preferably roast and ground coffee,
the capsule comprising a flange-like rim (3) extending outwardly from the body around a central axis (I); the flange-like rim comprising an annular flange portion (7),
an annular pressure-setting ring (8);
the beverage production device comprising:

a capsule holder (20) for holding the capsule at least at the flange-like rim (3) during centrifugation,
rotational drive means for driving the capsule in centrifugation,
a liquid injecting unit for feeding liquid in the capsule,
a spring-biasing valve member (34) for engaging the pressure-setting ring (18) of the capsule when the capsule is inserted in the beverage production device to provide a flow restriction valve and,
wherein the pressure-setting ring (8) is configured for being engaged by the valve member (34) of the

K-FEE SYSTEM GMBH, EX2009, page 1291
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

beverage production device to provide a flow restriction valve (18) for the centrifuged beverage flow leaving the capsule;
wherein the annular pressure-setting ring extends transversally and axially beyond the flange-portion and, wherein the radial distance (R) from the central axis (I) of the capsule to pressure-setting ring (8) is between 25 and 30 mm.

12. System according to claim 11, wherein the capsule holder comprises an annular transversal supporting edge comprising a first inward portion for supporting the annular flange portion and a second outward portion for supporting the annular pressure-setting ring, wherein the second outward portion forms a lowered step or recess as compared to the first inward portion.

Patentansprüche

1. Kapsel (1A, 1B, 1C) zum Einsetzen in eine Getränkeherstellungsvorrichtung zur Zubereitung eines Getränks aus einer in der Kapsel enthaltenen Substanz, indem Flüssigkeit in die Kapsel eingeführt wird und die Flüssigkeit unter Einsatz von Zentrifugalkräften durch die Substanz hindurch geleitet wird, wobei die Kapsel umfasst:

einen Körper (2), der ein unteres Ende und ein in axialer Richtung beabstandetes, offenes Ende aufweist,
eine obere Wand (4) zum Abdecken des Körpers an seinem offenen Ende entlang einer Richtung quer zur axialen Richtung,
eine Umhüllung zwischen dem Körper und der oberen Wand, die eine Menge an Getränkesubstanz enthält, vorzugsweise gerösteten und gemahlenen Kaffee,

wobei die Kapsel einen flanschartigen Rand (3) umfasst, der sich von dem Körper nach außen erstreckt, wobei der flanschartige Rand (3) einen ringförmigen Flanschabschnitt (7) umfasst, der sich um eine Mittelachse (I) herum erstreckt; wobei die Kapsel einen ringförmigen Druckeinstellring (8) aufweist, der sich quer und axial über den Flanschabschnitt hinaus erstreckt,

dadurch gekennzeichnet, dass der ringförmige Druckeinstellring (8) so ausgelegt ist, dass er mit einem Ventilteil (34) der Getränkeherstellungsvorrichtung in Eingriff gelangt, um ein Durchflussbegrenzungsventil (18) für den aus der Kapsel austretenden, zentrifugierten Getränkedurchfluss bereitzustellen, und dass der radiale Abstand (R) von der Mittelachse (I) der Kapsel zu dem Druckeinstellring (8) zwischen 25 und 30 mm beträgt.

2. Kapsel gemäß Anspruch 1, wobei der ringförmige Druckeinstellring in der axialen Richtung der Kapsel oberhalb der Ebene (P) des ringförmigen Flanschabschnittes (7) verläuft, so dass er mit einem Ventilteil (34) einer zugehörigen Getränkeherstellungsvorrichtung in Eingriff gelangt, und in der axialen Richtung der Kapsel unterhalb der Ebene (P) des Flanschabschnittes verläuft, so dass er in einem ringförmigen abgesenkten Abschnitt (38) oder einer Vertiefung des Kapselhalters der Herstellungsvorrichtung aufgenommen wird.

3. Kapsel gemäß Anspruch 2, wobei
der ringförmige Druckeinstellring in der axialen Richtung der Kapsel oberhalb der Ebene (P) des ringförmigen Flanschabschnittes in einem Abstand (h_1) verläuft, der länger ist als der Abstand (h_2), in dem er in der axialen Richtung der Kapsel unterhalb der Ebene (P) des Flanschabschnittes verläuft.

4. Kapsel gemäß einem der vorhergehenden Ansprüche,
wobei der ringförmige Druckeinstellring hohl ist und vorzugsweise eine Bördelung bildet.

5. Kapsel gemäß Anspruch 4,
wobei der ringförmige Druckeinstellring eine ovale Bördelung bildet, deren längere Abmessung (h) im Wesentlichen in der axialen Richtung verläuft.

6. Kapsel gemäß einem der vorhergehenden Ansprüche,
wobei der ringförmige Druckeinstellring aus Kunststoff und/oder Metall besteht, vorzugsweise aus Aluminium oder mehrschichtig aus Aluminium und Kunststoff, vorzugsweise einem Aluminium-PP-Laminat besteht.

7. Kapsel gemäß einem der vorhergehenden Ansprüche,
wobei das Verhältnis des Abstandes (h_1) oberhalb der Ebene (P) des Flanschabschnittes zu dem Abstand (h_2)

K-FEE SYSTEM GMBH, EX2009, page 1292
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

unterhalb der Ebene (P) des Flanschabschnittes zwischen 5:1 und 1:0,5 liegt; und vorzugsweise der Abstand (h_1) oberhalb der Ebene (P) des Flanschabschnittes zwischen 0,5 und 3 mm, vorzugsweise zwischen 0,8 und 2,5 mm liegt, und der Abstand (h_2) unterhalb der Ebene (P) des Flanschabschnittes vorzugsweise zwischen 0,1 und 1 mm, bevorzugt zwischen 0,3 und 0,5 mm liegt.

8. Kapsel gemäß Anspruch 1,
wobei der größere Innendurchmesser der Umhüllung der Kapsel zwischen 45 und 50 mm beträgt.

9. Kapselsatz mit mindestens zwei verschiedenen Arten von Kapseln; vorzugweise drei verschiedenen Arten von Kapseln, wobei jede Kapsel eine Kapsel gemäß einem der vorhergehenden Ansprüche 1 bis 8 darstellt,
wobei der Abstand (h_1) in der axialen Richtung oberhalb der Ebene (P) des ringförmigen Druckeinstellrings in Abhängigkeit des Kapseltyps unterschiedlich ist und sich vorzugsweise erhöht, wenn die Kapselgröße in dem Satz abnimmt.

10. Kapselsatz gemäß Anspruch 9, wobei der Abstand (h_2) des ringförmigen Druckeinstellrings in axialer Richtung unterhalb der Ebene (P) des Flanschabschnittes über den ganzen Satz konstant ist.

11. System zur Zubereitung eines Getränks, mit einer Getränkeherstellungsvorrichtung zur Zubereitung eines Getränks und einer Kapsel (1A, 1B, 1C) zum Einsetzen in die Getränkeherstellungsvorrichtung zur Zubereitung des Getränks aus einer in der Kapsel enthaltenen Substanz, indem Flüssigkeit in die Kapsel eingeführt wird und die Flüssigkeit unter Einsatz von Zentrifugalkräften durch die Substanz hindurch geleitet wird,
wobei die Kapsel Folgendes aufweist:

einen Körper (2) mit einem unteren Ende und einem in der axialen Richtung beabstandeten, offenen Ende,
eine obere Wand (4) zum Abdecken des Körpers an seinem offenen Ende entlang einer Richtung quer zur axialen Richtung,
eine Umhüllung zwischen dem Körper und der oberen Wand, die eine Menge an Getränkesubstanz enthält, vorzugsweise gerösteten und gemahlenen Kaffee,
wobei die Kapsel einen flanschartigen Rand (3) umfasst, der sich von dem Körper nach außen um eine Mittelachse (I) herum erstreckt; wobei der flanschartige Rand einen ringförmigen Flanschabschnitt (7) aufweist,
einen ringförmigen Druckeinstellring (8);
wobei die Getränkeherstellungsvorrichtung Folgendes umfasst:

einen Kapselhalter (20) zum Halten der Kapsel zumindest an dem flanschartigen Rand (3) während der Zentrifugierung,
Drehantriebseinrichtungen zum Versetzen der Kapsel in Zentrifugierung,
eine Flüssigkeitseinspritzeinheit zum Einführen von Flüssigkeit in die Kapsel,
ein federvorgespanntes Ventilteil (34) zum Eingreifen in den Druckeinstellring (8) der Kapsel, wenn die Kapsel in die Getränkeherstellungsvorrichtung eingesetzt ist, um ein Durchflussbegrenzungsventil bereitzustellen, und
wobei der Druckeinstellring (8) so ausgelegt ist, dass er mit dem Ventilteil (34) der Getränkeherstellungsvorrichtung in Eingriff gelangt, um ein Durchflussbegrenzungsventil (18) für den aus der Kapsel austretenden, zentrifugierten Getränkedurchfluss bereitzustellen;
wobei sich der ringförmige Druckeinstellring quer und axial über den Flanschabschnitt hinaus erstreckt, und wobei der radiale Abstand (R) von der Mittelachse (I) der Kapsel zu dem Druckeinstellring (8) zwischen 25 und 30 mm beträgt.

12. System gemäß Anspruch 11, wobei der Kapselhalter eine ringförmige, quer verlaufende Auflagekante umfasst, die einen ersten, nach innen gerichteten Abschnitt zum Abstützen des ringförmigen Flanschabschnittes und einen zweiten, nach außen gerichteten Abschnitt zum Abstützen des ringförmigen Druckeinstellrings aufweist, wobei der zweite, nach außen gerichtete Abschnitt eine abgesenkte Stufe oder Vertiefung gegenüber dem ersten, nach innen gerichteten Abschnitt bildet.

Revendications

1. Capsule (1A, 1B, 1C) conçue pour une insertion dans un dispositif de production de boisson pour préparer une boisson à partir d'une substance contenue dans la capsule par introduction de liquide dans la capsule et par passage

K-FEE SYSTEM GMBH, EX2009, page 1293
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

de liquide à travers la substance en utilisant des forces centrifuges,
la capsule comprenant :

un corps (2) comprenant une extrémité inférieure et une extrémité ouverte, espacées dans la direction axiale, une paroi supérieure (4) pour recouvrir le corps à son extrémité ouverte, le long d'une direction transversale à la direction axiale,
une enceinte entre le corps et la paroi supérieure contenant une quantité de substance de boisson, de préférence du café torréfié et moulu,

la capsule comprenant un rebord de type bride (3) s'étendant vers l'extérieur à partir du corps,
dans laquelle le rebord de type bride (3) comprend une partie de bride annulaire (7) s'étendant autour d'un axe central (I) ; dans laquelle la capsule comprend une bague annulaire de réglage de pression (8) s'étendant transversalement et axialement au-delà de la partie de bride,

caractérisée en ce que la bague annulaire de réglage de pression (8) est configurée pour qu'un organe formant valve (34) du dispositif de production de boisson vienne en prise avec elle afin de fournir une valve de restriction d'écoulement (18) pour l'écoulement de boisson centrifugée quittant la capsule et **en ce que** la distance radiale (R) de l'axe central (I) de la capsule à la bague de réglage de pression (8) est comprise entre 25 et 30 mm.

2. Capsule selon la revendication 1, dans laquelle la bague annulaire de réglage de pression s'étend, dans la direction axiale de la capsule, au-dessus du plan (P) de la partie de bride annulaire (7) pour qu'un organe formant valve (34) d'un dispositif dédié de production de boisson vienne en prise avec elle, et s'étend, dans la direction axiale de la capsule, au-dessous du plan (P) de la partie de bride pour être reçue dans une partie abaissée annulaire (38) ou un évidement du support de capsule du dispositif de production.

3. Capsule selon la revendication 2, dans laquelle
la bague annulaire de réglage de pression s'étend, dans la direction axiale de la capsule, au-dessus du plan (P) de la partie de bride annulaire selon une distance (h_1) plus grande que la distance (h_2) selon laquelle elle s'étend, dans la direction axiale de la capsule, au-dessous du plan (P) de la partie de bride.

4. Capsule selon l'une quelconque des revendications précédentes,
dans laquelle la bague annulaire de réglage de pression est creuse, et forme de préférence une boucle.

5. Capsule selon la revendication 4,
dans laquelle la bague annulaire de réglage de pression forme une boucle ovale dont la dimension la plus grande (h) s'étend sensiblement dans la direction axiale.

6. Capsule selon l'une quelconque des revendications précédentes,
dans laquelle la bague annulaire de réglage de pression est réalisée en matière plastique et/ou métal, de préférence est réalisée en aluminium ou en un multicouche d'aluminium et de matière plastique, de préférence en stratifié aluminium-PP.

7. Capsule selon l'une quelconque des revendications précédentes,
dans laquelle le rapport de la distance (h_1) au-dessus du plan (P) de la partie de bride sur la distance (h_2) au-dessous du plan (P) de la partie de bride est compris entre 5:1 et 1:0,5 ; et de préférence la distance (h_1) au-dessus du plan (P) de la partie de bride est comprise entre 0,5 et 3 mm, de préférence 0,8 et 2,5 mm et de préférence, la distance (h_2) au-dessous du plan (P) de la partie de bride est comprise entre 0,1 et 1 mm, de préférence 0,3 et 0,5 mm.

8. Capsule selon la revendications 1,
dans laquelle le diamètre interne le plus grand de l'enceinte de la capsule est compris entre 45 et 50 mm.

9. Ensemble de capsules comprenant au moins deux capsules de type différent ; de préférence trois capsules de type différent, chaque capsule étant selon l'une quelconque des revendications précédentes 1 à 8,
dans lequel la distance (h1), dans la direction axiale, au-dessus du plan (P) de la bague annulaire de réglage de pression, diffère en fonction du type de capsules, de préférence augmente lorsque la taille de capsule dans l'ensemble diminue.

10. Ensemble de capsules selon la revendication 9, dans lequel la distance (h_2), dans la direction axiale, au-dessous

K-FEE SYSTEM GMBH, EX2009, page 1294
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

du plan (P) de la partie de bride, de la bague annulaire de réglage de pression est constante dans la totalité de l'ensemble.

11. Système pour préparer une boisson comprenant un dispositif de production de boisson pour préparer une boisson et une capsule (1A, 1B, 1C) conçue pour une insertion dans le dispositif de production de boisson pour préparer la boisson à partir d'une substance contenue dans la capsule par introduction de liquide dans la capsule et par passage de liquide à travers la substance en utilisant des forces centrifuges,
la capsule comprenant :

un corps (2) comprenant une extrémité inférieure et une extrémité ouverte, espacées dans la direction axiale, une paroi supérieure (4) pour recouvrir le corps à son extrémité ouverte, le long d'une direction transversale à la direction axiale,
une enceinte entre le corps et la paroi supérieure contenant une quantité de substance de boisson, de préférence du café torréfié et moulu,
la capsule comprenant un rebord de type bride (3) s'étendant vers l'extérieur à partir du corps autour d'un axe central (I) ; le rebord de type bride comprenant une partie de bride annulaire (7),
une bague annulaire de réglage de pression (8) ;
le dispositif de production de boisson comprenant :

un support de capsule (20) pour supporter la capsule au moins au niveau du rebord de type bride (3) au cours de la centrifugation,
des moyens d'entraînement en rotation pour entraîner la capsule en centrifugation, une unité d'injection de liquide pour acheminer du liquide dans la capsule,
un organe formant valve précontraint par ressort (34) pour venir en prise avec la bague de réglage de pression (8) de la capsule lorsque la capsule est insérée dans le dispositif de production de boisson afin de fournir une valve de restriction d'écoulement et,
dans lequel la bague de réglage de pression (8) est configurée pour que l'organe formant valve (34) du dispositif de production de boisson vienne en prise avec elle afin de fournir une valve de restriction d'écoulement (18) pour l'écoulement de boisson centrifugée quittant la capsule ;

dans lequel la bague annulaire de réglage de pression s'étend transversalement et axialement au-delà de la partie de bride et,
dans lequel la distance radiale (R) de l'axe central (I) de la capsule à la bague de réglage de pression (8) est comprise entre 25 et 30 mm.

12. Système selon la revendication 11, dans lequel le support de capsule comprend un bord transversal annulaire de support comprenant une première partie intérieure pour supporter la partie de bride annulaire et une deuxième partie extérieure pour supporter la bague annulaire de réglage de pression, dans lequel la deuxième partie extérieure forme une marche abaissée ou un évidement par rapport à la première partie intérieure.

K-FEE SYSTEM GMBH, EX2009, page 1295
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

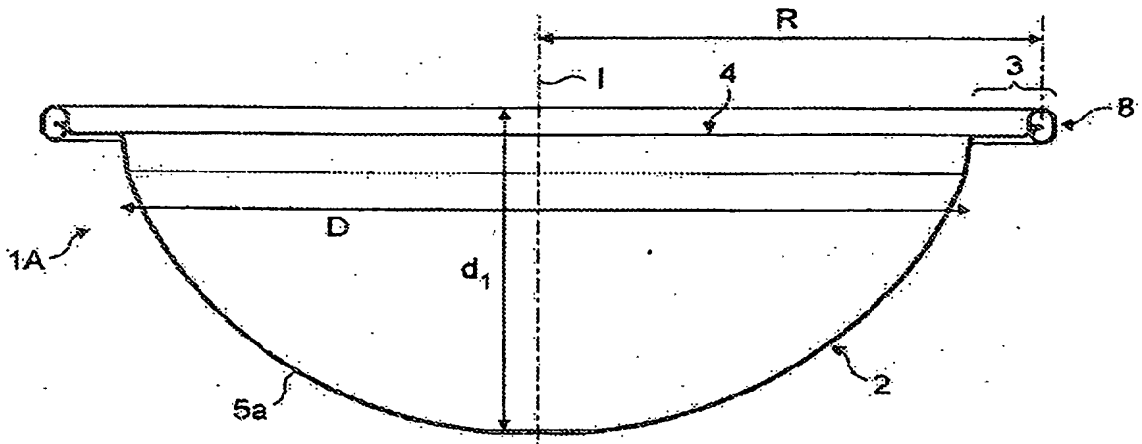


FIG. 1

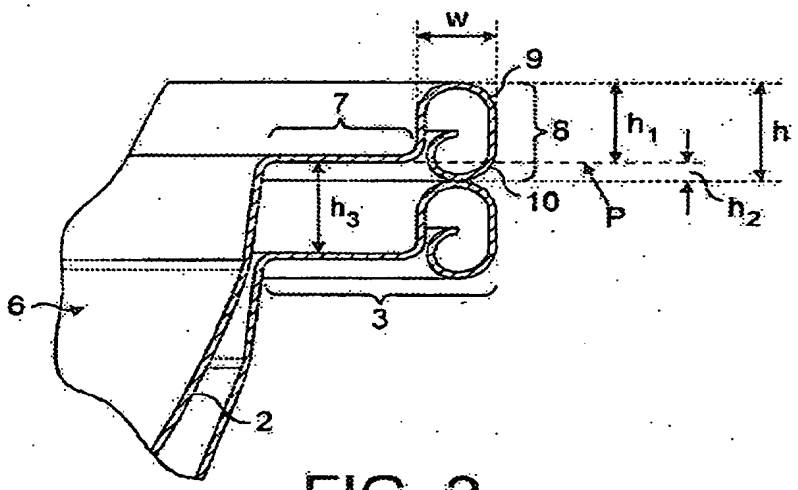


FIG. 2

K-FEE SYSTEM GMBH, EX2009, page 1296
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

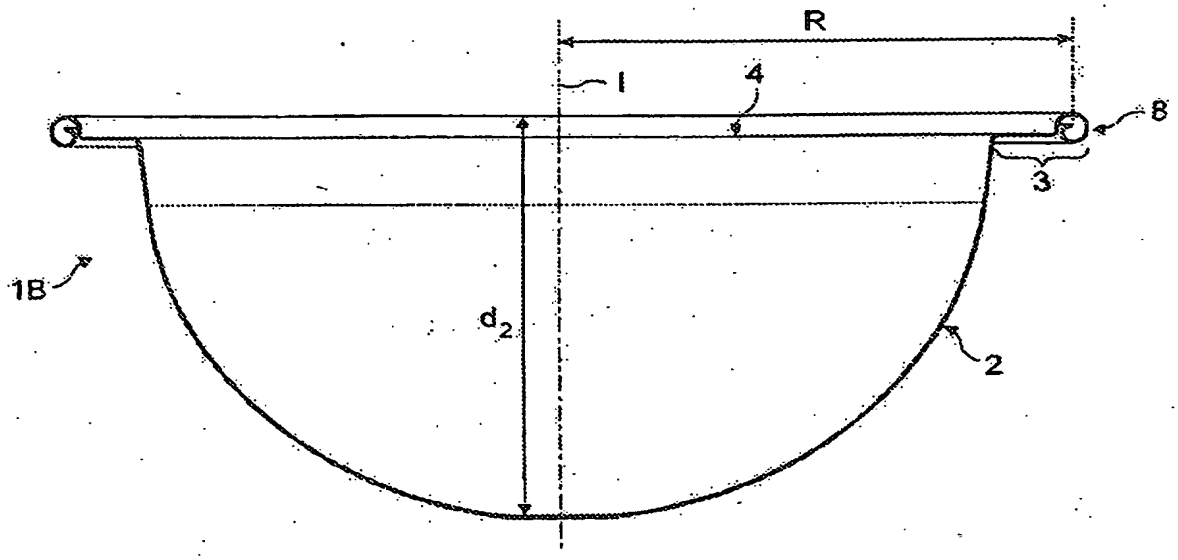


FIG. 3

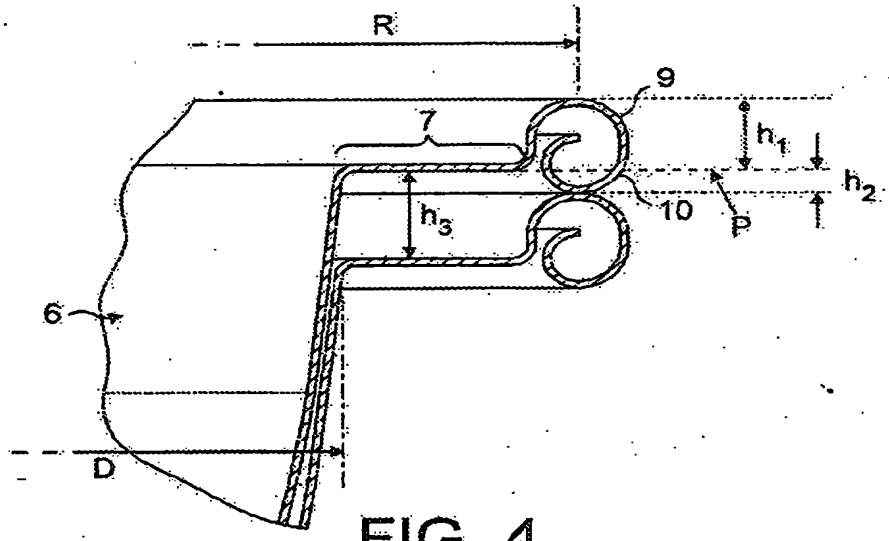


FIG. 4

K-FEE SYSTEM GMBH, EX2009, page 1297
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

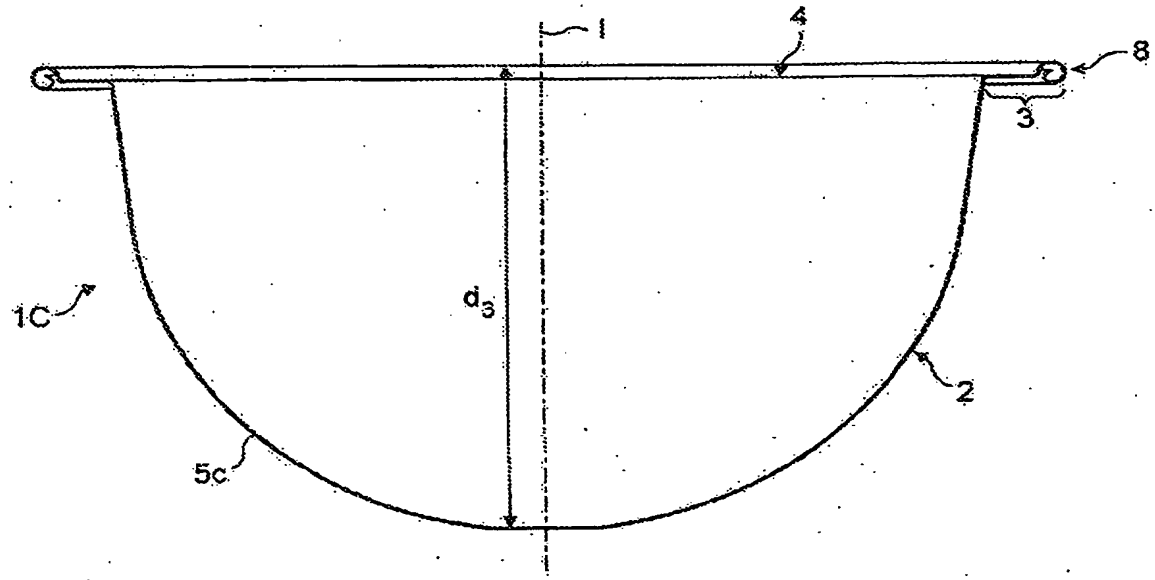


FIG. 5

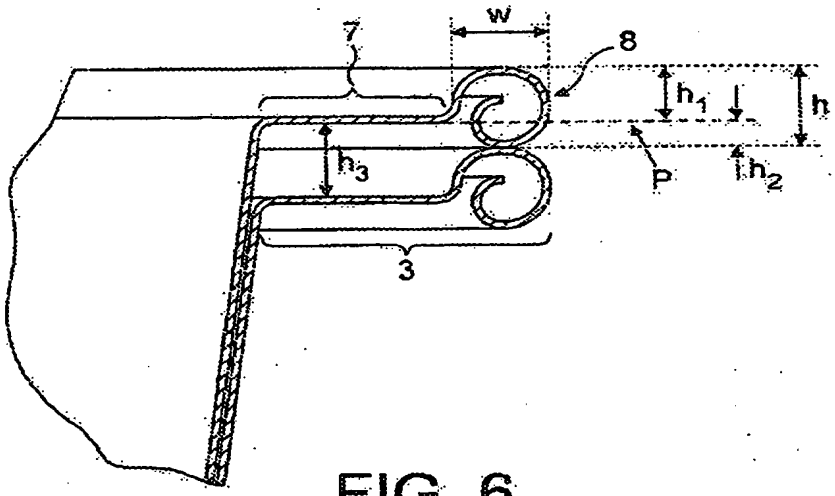


FIG. 6

K-FEE SYSTEM GMBH, EX2009, page 1298
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

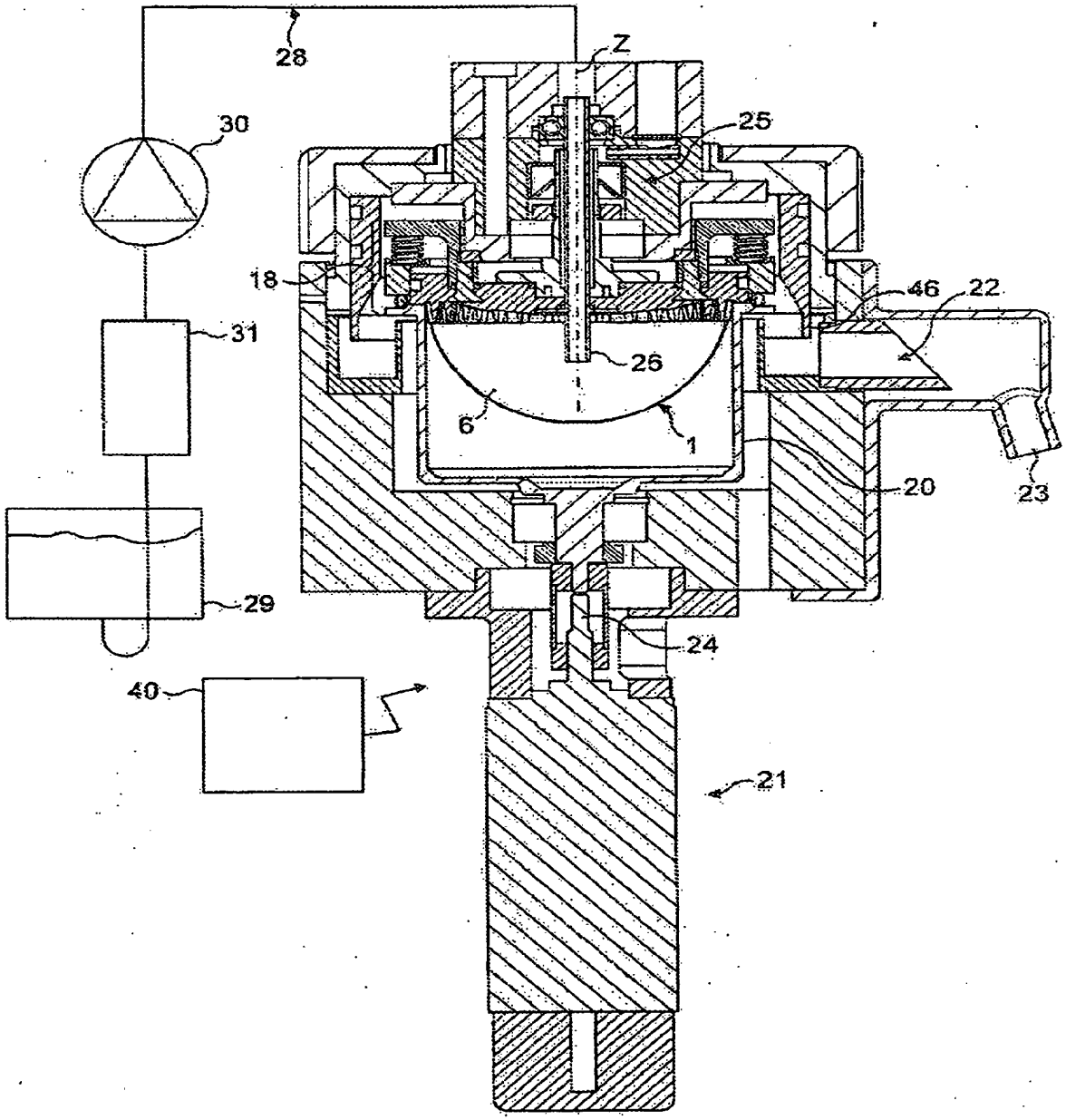


FIG. 7

K-FEE SYSTEM GMBH, EX2009, page 1299
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

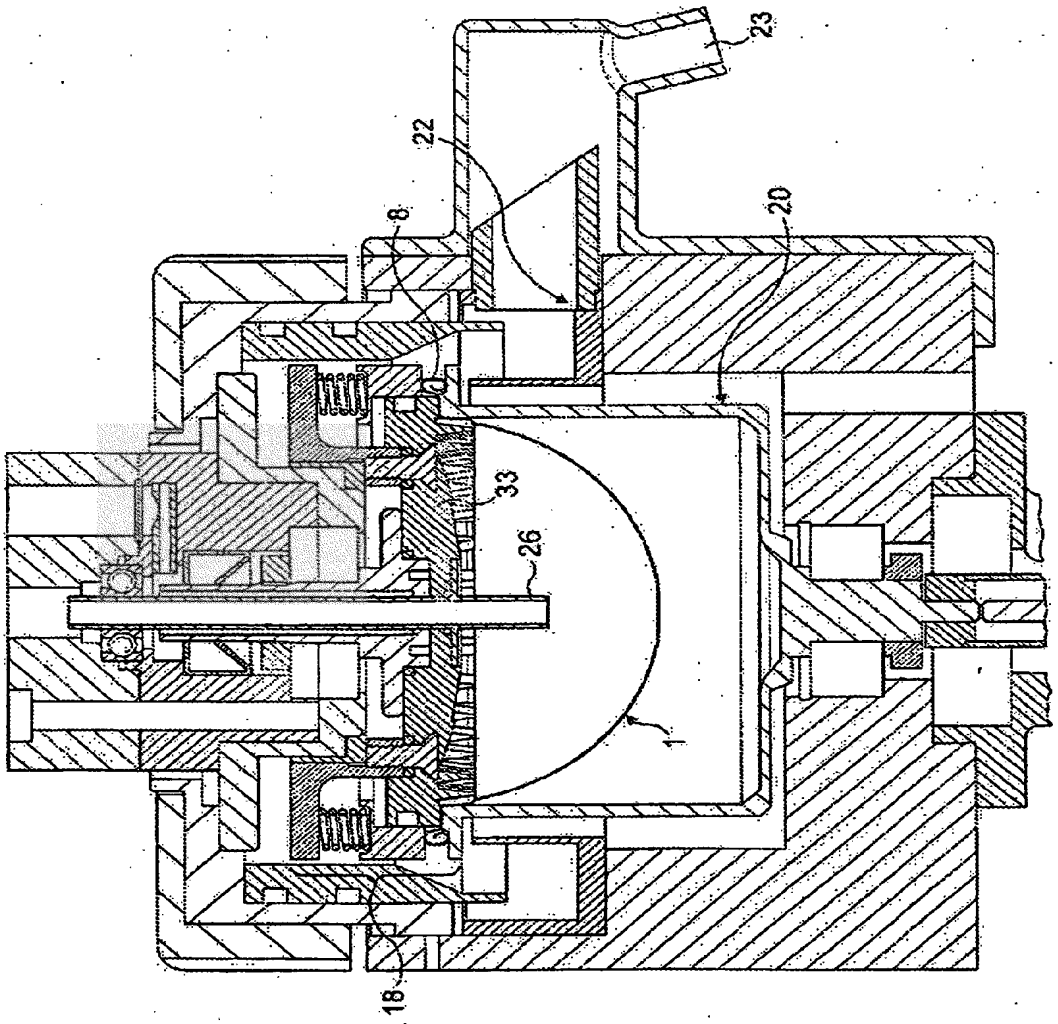


FIG. 8

K-FEE SYSTEM GMBH, EX2009, page 1300
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

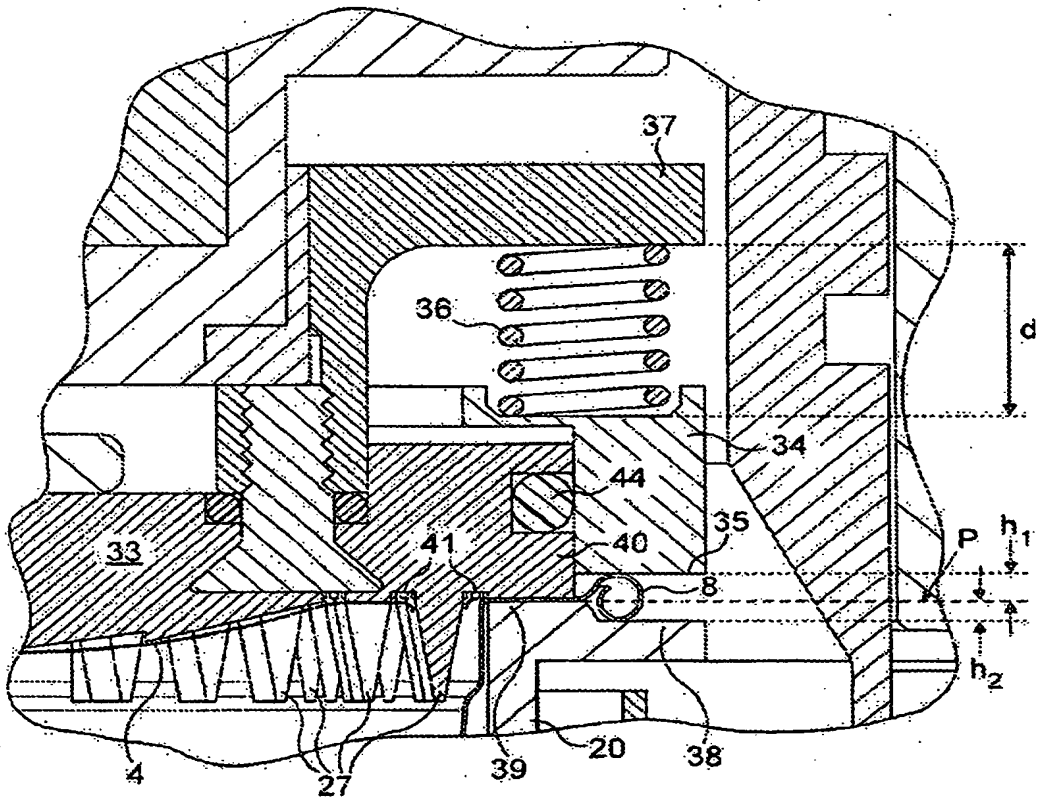


FIG. 9

K-FEE SYSTEM GMBH, EX2009, page 1301
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

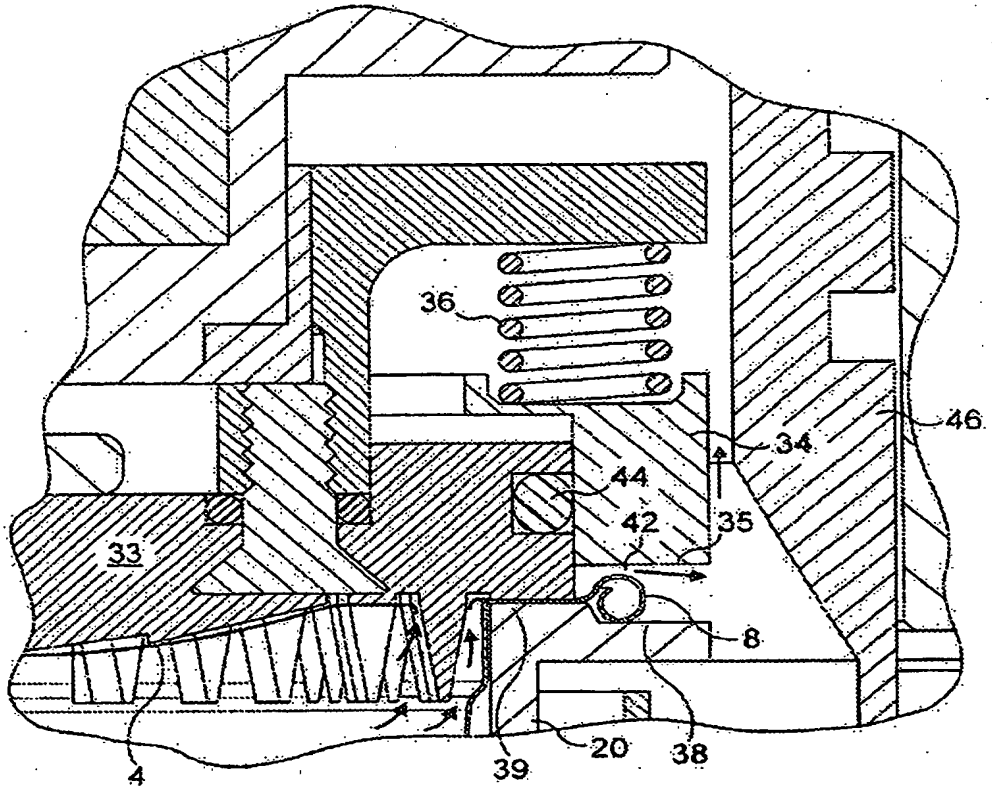


FIG. 10

K-FEE SYSTEM GMBH, EX2009, page 1302
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

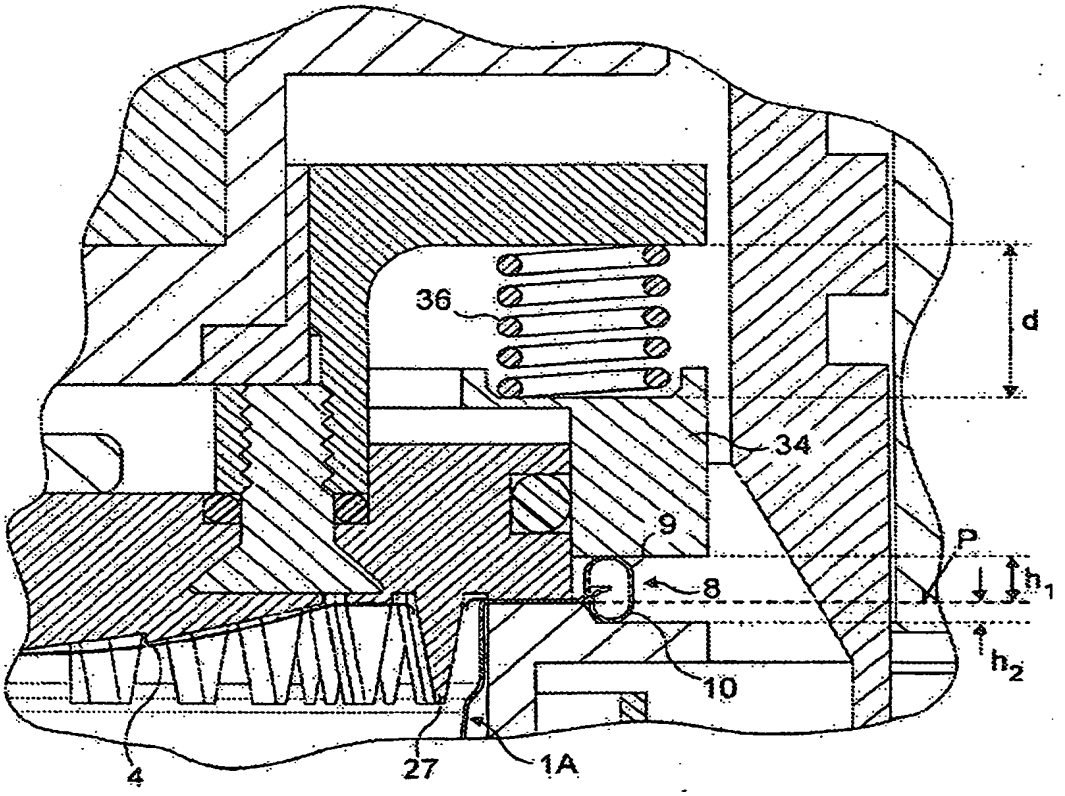


FIG. 11

K-FEE SYSTEM GMBH, EX2009, page 1303
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

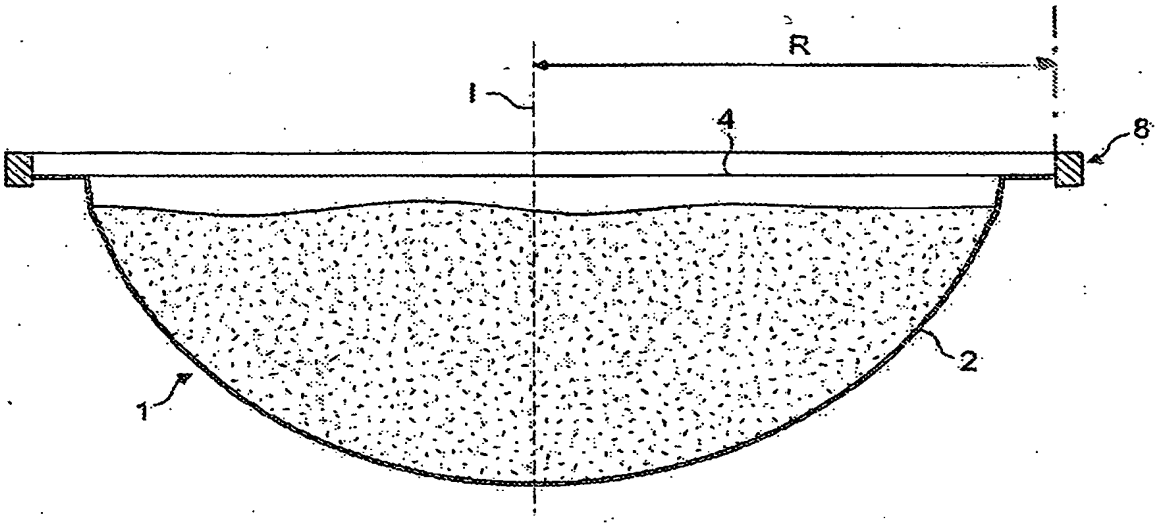


FIG. 12

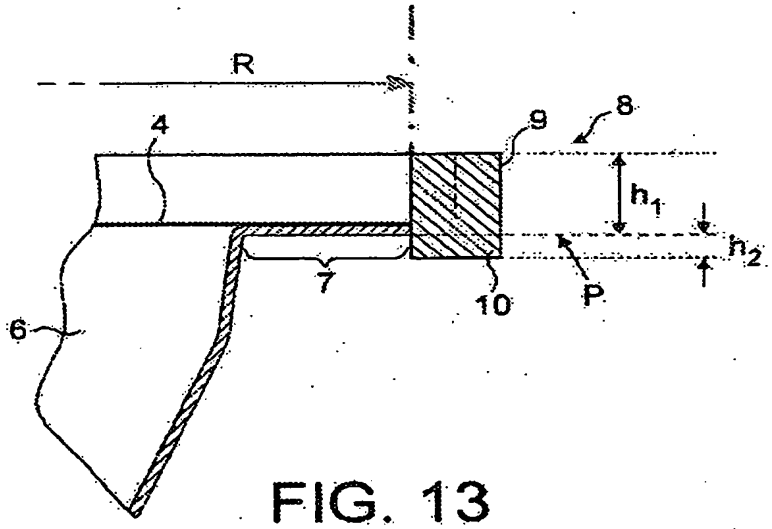


FIG. 13

K-FEE SYSTEM GMBH, EX2009, page 1304
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

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

- WO 2008148604 A **[0004] [0068]**
- EP 651963 A **[0008]**
- FR 2487661 **[0009]**
- WO 2006112691 A **[0009]**
- WO 2008148646 A **[0010]**
- WO 2009106598 A **[0010]**
- EP 1654966 A1 **[0010]**
- EP 08171069 A **[0014]**
- EP 1566127 A **[0073]**
- EP 09178382 A **[0078]**

K-FEE SYSTEM GMBH, EX2009, page 1305
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 349 176 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
23.03.2016 Bulletin 2016/12

(21) Application number: **09821433.1**

(22) Date of filing: **20.10.2009**

(51) Int Cl.:
A61J 1/03 *(2006.01)* ***B65D 83/04*** *(2006.01)*

(86) International application number:
PCT/AU2009/001381

(87) International publication number:
WO 2010/045677 (29.04.2010 Gazette 2010/17)

(54) PERSONALISED MEDICATION HOLDER

PERSONALISIERTER ARZNEIMITTELBEHÄLTER

PORTE-MÉDICAMENT PERSONNALISÉ

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **21.10.2008 AU 2008101035**

(43) Date of publication of application:
03.08.2011 Bulletin 2011/31

(73) Proprietor: **Manrex Pty. Ltd**
Leichhardt, NSW 2040 (AU)

(72) Inventors:
- **STEVENS, Gerard**
  Huntleys Point
  NSW 2111 (AU)
- **STEVENS, Ian**
  Killara
  NSW 2071 (AU)
- **STEVENS, Peter**
  Chatswood West
  NSW 2067 (AU)

(74) Representative: **Harrison IP Limited**
Box Tree House
Northminster Business Park
Northfield Lane
York YO26 6QU (GB)

(56) References cited:

DE-A1- 4 324 771	**US-A- 3 154 225**
US-A- 3 503 493	**US-A- 3 811 564**
US-A- 4 209 126	**US-A- 4 534 468**
US-A- 4 691 820	**US-A- 5 620 087**
US-A1- 2004 206 653	**US-A1- 2006 086 640**
US-A1- 2007 241 024	**US-B1- 6 520 329**

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 349 176 B1

Printed by Jouve, 75001 PARIS (FR)

K-FEE SYSTEM GMBH, EX2009, page 1306
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Description

Field of the invention

[0001] **THIS INVENTION** relates to the administration of doses of prescribed solid medication to a patient and is more specifically concerned with the provision of a hermetically sealed holder containing the medication doses and which is easily opened, the holder having a portion of a strip adhering to it which positively identifies the patient to whom the medication is to be administered. This ensures that the patient can be positively identified from the holder before it is opened, and, after administration, the open holder indicates the identity of the patient for whom the medication was intended and the nature of the medication itself.

The prior art

[0002] It has been proposed to provide solid medication in rectangular sealed sachets of a thin flexible and disposable material. Each sachet contains doses of prescribed medication which are to be administered to a particular patient at a specified time on a specified day. These sachets are supplied in the form of a continuous string having lines of transverse perforations enabling individual sachets of the string to be detached from one another as required. The string may be provided in a coiled form in a dispenser on which the identity of the patient is displayed. The name of the patient may also appear on the individual sachets of the coil.

[0003] Nursing homes and other aged-care facilities may require a qualified nurse to administer medication to a large number of patients. The dispensers for the patients are often stored together for convenience. The nurse will detach a sachet from the dispenser corresponding to a particular patient and take the sachet to the patient. The sachet will then be broken open in the presence of the patient and the medication administered. In some cases the action of breaking open the sachet will destroy the print giving the patients name so that it becomes illegible.

[0004] To save time it sometimes happens that a nurse required to administer medication doses to more than one patient at a particular time will take the sachets from more than one dispenser in the store. This enables the nurse to provide medication to different patients without having to return to the store after each administration in order to obtain a fresh sachet. However there is then a risk of the nurse confusing one sachet with another if the sachets are not marked with the patients' names. This can result in incorrect medication being administered to a patent. Moreover it sometimes happens that two patients share the same name. This also can result in the two patients receiving each other's medication.

[0005] US 3 811 564 A discloses a container having means adapted to provide access to a contents holding portion of the container.

Object of the invention

[0006] An object of this invention is to reduce the risk of medication being administered incorrectly.

The invention

[0007] In accordance with the invention, there is provided a string comprising a plurality of individually detachable medication holders each in the form of a cup having a stiff coplanar rim from which a respective integrally-moulded inflexible flange having a flat upper surface coplanar with that of the rim extends outwardly from one side of the cup, there being solid medication doses hermetically sealed within a cup cavity by a section of a first portion of a sealing strip which adheres in a manually-releasable manner to a coplanar upper surface of the rim, a second portion of the sealing strip adhering to the flat upper surface of the flange, information positively identifying the patient for whom the medication doses are intended being displayed on one of the two portions, and a manually-operable device provided on the strip on the opposite side of the cup to the flange and from which a line or lines of severance extend(s) within the confines of the path of the seal formed between the rim and the first portion of the strip so that leakage of air into the cup by way of the line or lines of severance is avoided, the shape and position of the severance line or lines being such that the device can be used to lift the section of the first portion of the strip covering the cup cavity without detaching the second portion of the strip from the flange.

[0008] An advantage of the invention is that it enables a check on the identity of the patient to be confirmed from the second portion of the strip by a nurse in the presence of the patient and before the cup is opened and the medication doses are administered. Also, after the administration of the medication doses there is a permanent record on the holder that a particular identified patient has received the prescribed medication it contained.

Preferred features of the invention

[0009] Suitably the free end of the flange is provided with a square-cut end and a flat undersurface. This enables a rectangular extension flap on the second portion of the strip to be folded around the square-cut end and into adherent contact with the flat undersurface of the flange. The exposed surface of the flap may, for example, identify the individual medication doses contained in the cup. This configuration of the strip enables all of the required information on the strip to be printed on one side of it before it is used to seal the prescribed medication doses into the cup. A pressure-sensitive cold sealing strip is preferably used. In another arrangement the line of severance is formed as a closed loop extending around the printed information on the second portion of the strip in adherent contact with the flange.

[0010] The invention enables a string of identical hold-

K-FEE SYSTEM GMBH, EX2009, page 1307
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ers to be held together by a printed sheet which provides the sealing strips of the holders. The sheet may be in the form of a strip of extended length. To facilitate individual detachment of a holder from the string, the sheet may be provided with lines of weakness such as perforations, extending between the holders. If the sheet is of extended length the set of holders may be spaced from one another. It is also conceivable that the sheet may be rectangular and formed with a net of lines of weakness so that the individual holders can be located in respective interstices in the net.

[0011] Although it is preferred to form the holder from a moulded plastics material, the nature of the material from which it is formed and the process by which the holder is made are not essential to the carrying out of the invention.

Introduction to the drawings

[0012] The invention will now be described in more detail, by way of examples, with reference to the accompanying drawings, in which:

In the drawings

[0013]

FIGURE 1 is a perspective view of an empty plastics holder prior to a cup, forming part of the holder, being loaded with medication doses;

FIGURE 2 shows the holder of figure 1 after the cavity of the cup has been loaded with doses of medication and sealed by a first portion of a foil sealing strip;

FIGURE 3 shows the holder of figure 2 after removal of the first portion of a sealing strip so that the medication doses in the cup are exposed for removal.

FIGURE 4 is a perspective view of a second form of holder which is shown empty; FIGURE 5 shows the holder of figure 4 hermetically sealed by a sealing strip and having a cup containing medication doses within its cavity which is closed by the sealing strip;

FIGURE 6 shows a stage in the opening of the holder of figure 5 to give access to the medication doses;

FIGURE 7 shows the holder of figure 6 inverted after removal of the medication doses and displaying the legend giving the contents of the cup and which is printed on the underside of a flange of the holder; and,

FIGURES 8 and 9 respectively show in plan and side views a string of holders held together by an elongated sheet which has sections of its length providing sealing strips for respective holders, the sheet having lines of weakness extending between its opposite sides and disposed between the holders to facilitate their detachment from the sheet.

[0014] In the accompanying descriptions of the embodiments of the invention illustrated in the drawings the same reference numerals have been used for similar parts, but in the case of the first embodiment the numerals are in the "ten" series and in the case of the second embodiment they are in the "hundred" series.

Description of first embodiment

[0015] Figure 1 shows a holder 10 moulded from a transparent plastics material to provide a cup 12 of substantially square cross-section surrounded by an outwardly-turned, coplanar, stiff rim 13 which is extended on one side to provide a rectangular flange 14. The flange 14 has a flat upper surface 11 which is coplanar with the rim 13 of the holder, and a flat lower surface. The edge of the flange remote from the cup 12 is square-cut and is referenced 16.

[0016] In this embodiment the thickness of the plastics material of the cup 12 diminishes towards its base 15. This provides the base with a high degree of flexibility enabling it to be easily pushed upwardly into the cavity of the cup by finger pressure to facilitate the removal of medication doses which have been loaded into the cup interior.

[0017] Figure 2 shows the holder 10 of figure 1 after its cup 12 has been loaded with medication doses as prescribed by a doctor, and sealed by a rectangular pressure-sensitive adhesive flexible sealing strip 17 which adheres to the upper surface of the flange 14 and to the rim 13 of the cup as well as to other parts of the holder. The strip 17 is divided by a line of severance 18 having rounded corners, into a first portion 10 closing the cavity of the cup 12 and adhering to the inner part of its rim 13, and a second portion 20 comprising the remainder of the strip 17. The line of severance 18 extends along the path of a hermetic seal formed between the rim 13 and the first portion 10 and enables the first and second portions 10 and 20 of the strip 17 to be readily separated from one another. This is achieved by manually pressing down a device 21 marked "push" and provided in one corner 22 of the holder, the device 21 being located beneath one corner of the line of severance 18 as shown. The sealing strip at the associated corner of the line of severance can then be lifted up by being gripped between the fingers so that it no longer covers the cup. This may be assisted by pressing the flexible base 15 of the cup upwardly.

[0018] The upper surface of the strip 17 is printed so that the central region of its first portion 10 identifies the name of the patient for whom the medication doses have been prescribed. The first portion also lists the time at which the medication is to be taken; and, the nature of

K-FEE SYSTEM GMBH, EX2009, page 1308
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

the medication doses within the cup.

[0019] As shown in figure 3, the second portion 20 of the strip adhering to the upper flat face of the flange 14, is printed with a picture of the face of the patient, the time at which the medication doses in the cup are to be taken, and a bar code 23 which provides in coded form all of the printed information mentioned above. As illustrated, the name of the patient also appears along one margin of the strip so that it remains in place after removal of the central region of the first portion 10 of the strip 17.

Description of second embodiment

[0020] Figure 4 shows a holder 100 made from a rigid moulded plastics or some other material. The holder provides a cubical cup 112 into which prescribed medication doses can be placed and stored until required for use. The mouth of the cup is surrounded by an outwardly-turned flat rim 113 having its upper surface coplanar with the upper surface 111 of a rectangular flange 114 which extends outwardly from the cup 112 at one side of the holder 100. The rim 113 is provided centrally at its edge opposite the flange 114 with a device in the form of a part-circular cut-out 150.

[0021] As is shown in figure 5, the coplanar surfaces of the rim 113 and the flange 114 are covered by an adhering sealing strip 117. A first portion 110 of the sealing strip 117 covers the cavity of the cup 112 and a second portion 120 adheres to the upper surface of the flange 114. The strip 117 has an extension flap 140 which wraps around the square-cut edge 104 of the end of the flange 114 and adheres to the flat underside of the flange 114 as shown in figure 7. The nature of the medication within the cup 112 is written on the exposed face of the flap 140 as is diagrammatically illustrated at 129 in figure 7.

[0022] The second portion 120 of the strip 117 carries a picture of the patient to whom the prescribed medication is to be administered. The first portion 110 lists the nature of the medication doses in the cavity of the cup 112. Other information contained on or adjacent the first portion 110 identifies the patient by name, and the time at which the medications doses are to be administered. All of this information is encoded in a bar code 151 on the first portion 110 of the sealing strip.

[0023] As is apparent from figure 5 part of the sealing strip 117 overlaps the cut-out 150 to provide a pull-tab 152 for releasing the first portion 110 of the sealing strip 117 from the mouth of the cup 112. This release is achieved by a pair of severance lines 130,131 respectively formed through the sealing strip 117 and extending from the pull-tab 152 along the paths of the seal formed between the sealing strip and the rim 113 at opposite sides of the cup 112. This is apparent from figure 6 which shows the portion 110 of the sealing strip 117 partially lifted from the top of the cup 112. As the lines of severance 130,131 extend within the confines of the path of the seal on the rim 113 leakage of air through the severance lines and into the cup 112 when it is closed by the sealing strip 117, is avoided. It will also be noticed from figures 5 and 6 that the two lines of severance 130,131 terminate at the end of the cup 112 opposite the cut-out 150. Thus the cup can be fully opened without totally detaching any part of the sealing strip 117 from the holder 100. Once opened, the medication doses can be accessed by simply inverting the cup over the palm of the hand.

[0024] Figures 8 and 9 show how a set of holders 100 as shown in the second of the embodiments described, can be connected together so that they can be provided in the form of a coil (not shown). Individual holders 100 can be detached from the outer end of the coil as required.

[0025] After the holders have been arranged side-by-side as shown in figure 8 and their cups 112 filled with the required prescribed medication doses, an elongated sheet 160 providing the sealing strips 117 for the holders 100 can be laid over the top of the line of holders and cold sealed to their rims 113 and flanges 114. The elongated sheet 160 is provided with lines of weakness 161 such as perforations, each of these lines being located between a pair of holders as shown in figure 9. Once each of the holders 100 has been sealed, the elongated sheet 160 with the string of holders can be coiled up in readiness for use.

[0026] The advantage of this way of handling the holders 110 is that even though the holders may have been detached from the coil they can each be visually correlated with the requirements of a particular patient whose face and name appear on the holder. It should be born in mind that it is not uncommon for two patients in an aged care facility to have the same name and, a clear distinction cannot always be made between two different patients.

Modifications of the embodiments.

[0027] In one modification of the embodiments the picture of the face of the patient which is necessary to provide the positive identification, is provided on the first portion of the sealing strip rather than the second portion.

[0028] In a second modification of the embodiments the information concerning the nature of the contents of the cup is provided on a label adhered to the underside of the flange and which is separate from the sealing strip.

[0029] In a third modification of the embodiments the adherence of the sealing strip to the holder is achieved by some other acceptable technique than cold pressure sealing.

Claims

1. A string (160) comprising a plurality of individually detachable medication holders (100) each in the form of a cup having a stiff coplanar rim (113) from which a respective integrally-moulded inflexible flange (114) having a flat upper surface (111) coplanar with that of the rim extends outwardly from one

K-FEE SYSTEM GMBH, EX2009, page 1309
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

side of the cup, there being solid medication doses hermetically sealed within a cup cavity by a section of a first portion (110) of a sealing strip (117) which adheres in a manually-releasable manner to a coplanar upper surface of the rim (113), a second portion (120) of the sealing strip (117) adhering to the flat upper surface (111) of the flange (114), information positively identifying the patient for whom the medication doses are intended being displayed on one of the two portions (110, 120), and a manually-operable device (152) provided on the strip (117) on the opposite side of the cup to the flange (114) and from which a line or lines of severance (130, 131) extend(s) within the confines of the path of the seal formed between the rim (113) and the first portion (110) of the strip (117) so that leakage of air into the cup by way of the line or lines of severance (130, 131) is avoided, the shape and position of the severance line or lines (130, 131) being such that the device (152) can be used to lift the section of the first portion (110) of the strip covering the cup cavity without detaching the second portion (120) of the strip from the flange (114).

2. A holder string as claimed in claim 1, in which the contents of the cup are identified in writing on the underside of the flange (114).

Patentansprüche

1. Band (160), das eine Vielzahl von einzeln abnehmbaren Medikamentenhalterungen (100) umfasst,
welche jeweils die Form eines Bechers mit einem steifen, koplanaren Rand (113) haben, von dem sich jeweils ein angeformter, unflexibler Kragen (114) mit einer flachen Oberfläche (111), die mit der des Randes in einer Ebene liegt, von einer Seite des Bechers nach außen erstreckt, wobei feste Medikamentendosen in einer Becherkavität hermetisch durch einen Abschnitt eines ersten Teils (110) eines Versiegelungstreifens (117) versiegelt sind, welcher manuell lösbar an einer koplanaren Oberfläche des Randes (113) haftet, wobei ein zweiter Abschnitt (120) des Versiegelungsstreifens (117) an der flachen Oberfläche (111) des Kragens (114) haftet, wobei Informationen, die den Patienten, für den die Medikamentendosen vorgesehen sind, eindeutig identifizieren, auf einem der beiden Abschnitte (110, 120) abgebildet sind;
und eine manuell bedienbare Vorrichtung (152), die an dem Streifen (117) auf der von dem Kragen (114) gegenüberliegenden Seite des Bechers bereitgestellt wird, und von der eine oder mehrere Abtrennlinien (130, 131) innerhalb der Grenzen des Verlaufs der Versieglung verlaufen, die zwischen dem Rand (113) und dem ersten Abschnitt (110) des Streifens (117) gebildet wird, sodass das Eindringen von Luft in den Becher über die eine oder mehreren Abtrennlinien (130, 131) verhindert wird, wobei die Form und Anordnung der einen oder mehreren Abtrennlinien (130, 131) so beschaffen sind, dass die Vorrichtung (152) dazu genutzt werden kann, den Abschnitt des ersten Teils (110) des Streifens, der die Becherkavität bedeckt, anzuheben, ohne den zweiten Teil (120) des Streifens von dem Kragen (114) abzulösen.

2. Halterungsband nach Anspruch 1, wobei der Inhalt des Bechers schriftlich auf der Unterseite des Kragens (114) identifiziert werden.

Revendications

1. Une chaîne (160) comprenant une pluralité de porte-médicaments détachables individuellement (100), chacun
ayant la forme d'un gobelet avec un bord coplanaire rigide (113) duquel une bride inflexible respective moulée de façon intégrale (114), possédant une surface supérieure plate (111), coplanaire avec celle du bord, s'étend vers l'extérieur depuis un côté du gobelet, des doses d'un médicament solide étant scellées de façon hermétique au sein de la cavité d'un gobelet par une section d'une première partie (110) d'une bande de fermeture (117) qui adhère de façon manuellement détachable à une surface coplanaire supérieure du bord (113), une deuxième partie (120) de la bande de fermeture (117) adhérant à la surface supérieure plate (111) de la bride (114), des informations identifiant positivement le patient auquel les doses de médicament sont destinées étant affichées sur une des deux parties (110, 120),
et un dispositif à actionnement manuel (152) étant placé sur la bande (117), du côté opposé du gobelet à la bride (114), et d'où une ou plusieurs lignes de détachement (130, 131) s'étendent au sein des limites du chemin du joint formé entre le bord (113) et la première partie (110) de la bande (117), de façon à éviter des infiltrations d'air dans le gobelet par le biais de la ligne ou des lignes de détachement (130, 131), la forme et l'emplacement de la ligne ou des lignes de détachement (130, 131) étant tels que le dispositif (152) puisse être utilisé pour soulever la section de la première partie (110) de la bande recouvrant la cavité du gobelet sans détacher, de la bride (114), la deuxième partie (120) de la bande.

2. Une chaîne de gobelets selon la revendication 1, dans laquelle le contenu du gobelet est identifié par écrit sur le dessous de la bride (114).

K-FEE SYSTEM GMBH, EX2009, page 1310
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

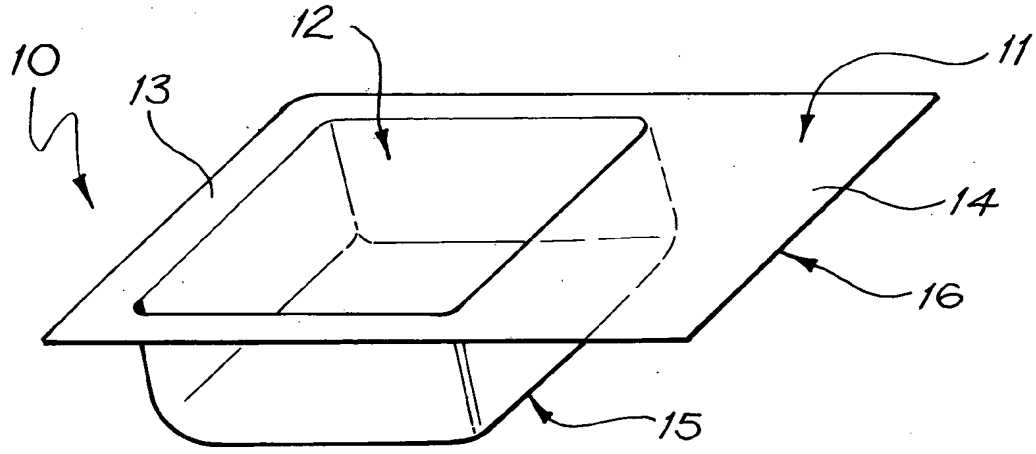


FIG. 1

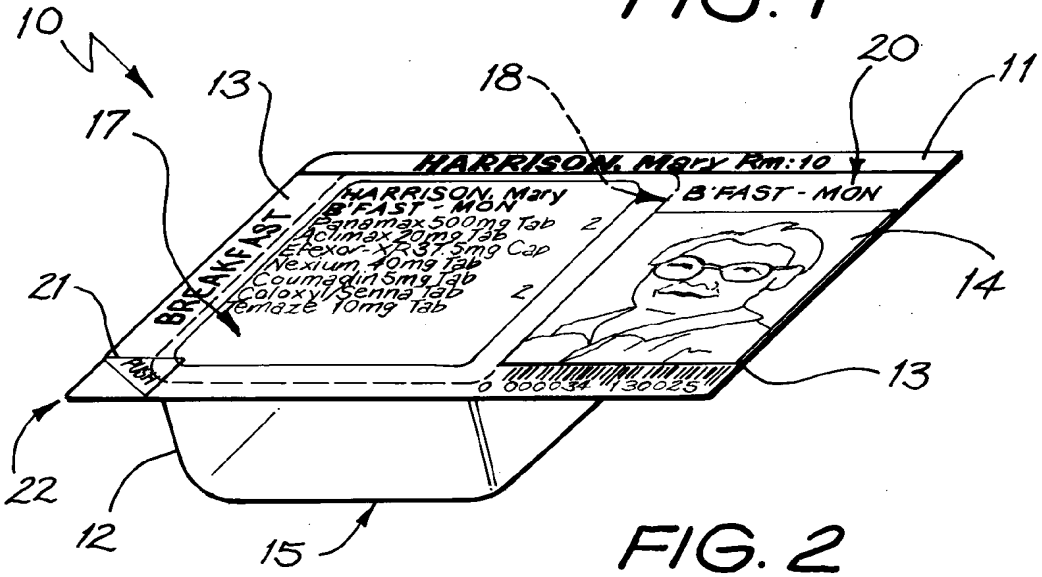


FIG. 2

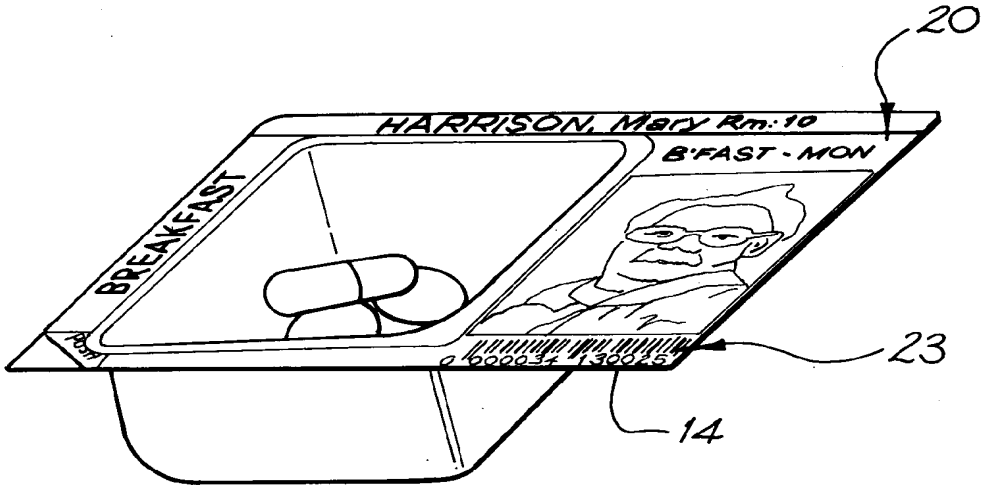


FIG. 3

K-FEE SYSTEM GMBH, EX2009, page 1311
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

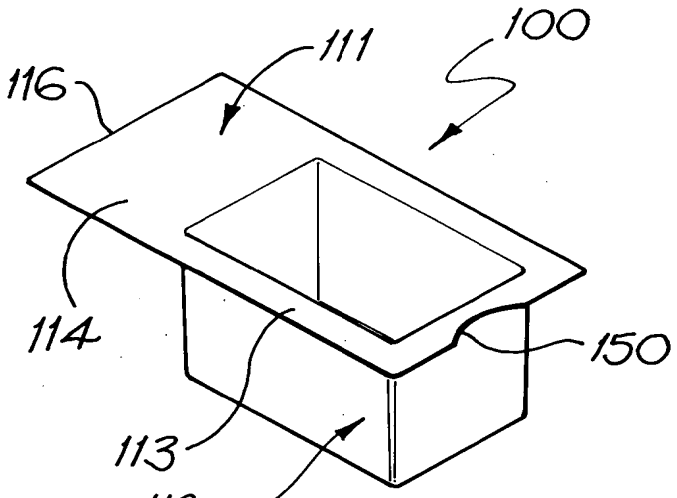


FIG.4

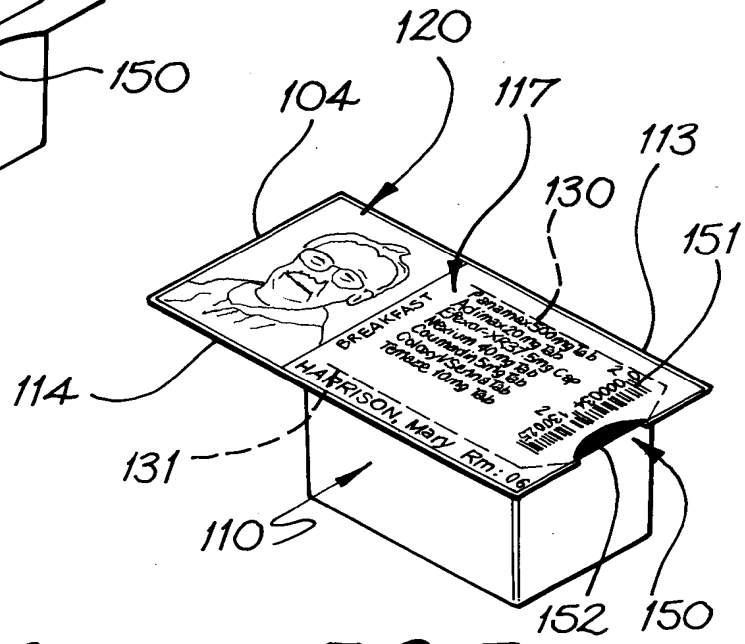


FIG. 5

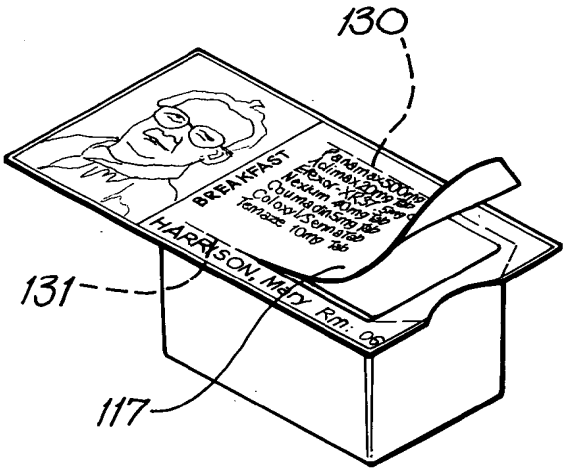


FIG. 6

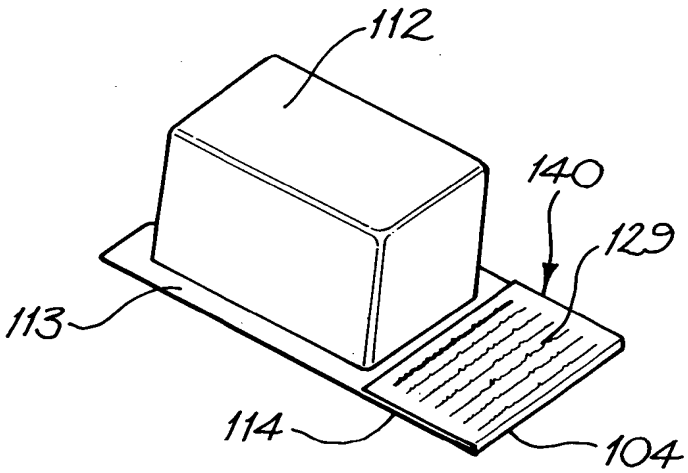


FIG. 7

K-FEE SYSTEM GMBH, EX2009, page 1312
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

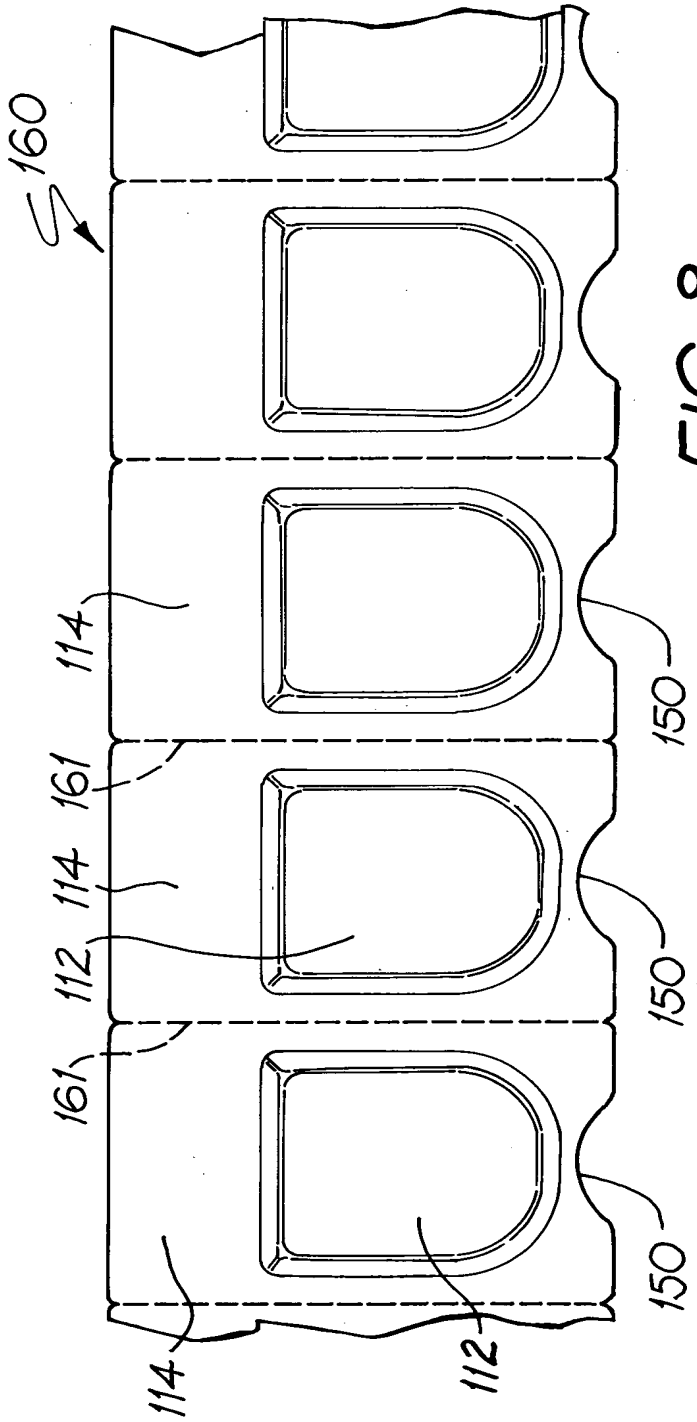


FIG.8

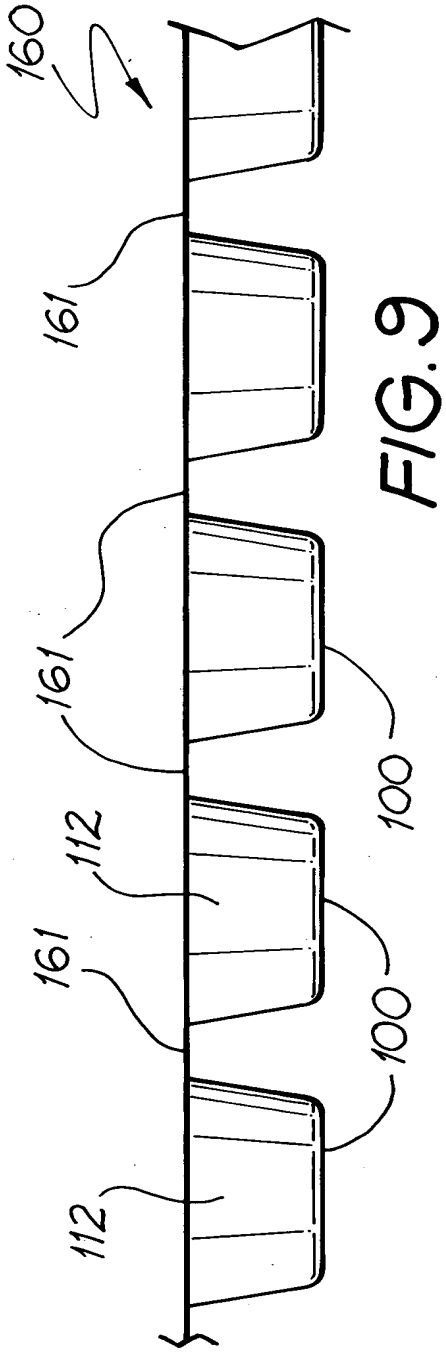


FIG.9

K-FEE SYSTEM GMBH, EX2009, page 1313
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

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

- US 3811564 A **[0005]**

K-FEE SYSTEM GMBH, EX2009, page 1314
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 890 271 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
20.02.2008 Bulletin 2008/08

(51) Int Cl.:
G07F 13/06 *(2006.01)* ***A47J 31/24*** *(2006.01)*

(21) Application number: **07113345.8**

(22) Date of filing: **27.07.2007**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **28.07.2006 IT BO20060566**

(71) Applicant: **Grimac S.r.l.**
40069 Zola Predosa (IT)

(72) Inventor: **Mengoli, Massimo**
Gramaglione 40045 (IT)

(74) Representative: **Jorio, Paolo et al**
Studio Torta S.r.l.
Via Viotti, 9
10121 Torino (IT)

(54) Method and device for controlling the dispensing of an infusion product for a dispensing machine

(57) Method for controlling the dispensing of an infusion product for a dispensing machine (1) provided with a percolator means (2) capable of receiving a container (4) for a product dose (5) provided with an RFID tag (14) containing information (IC, EDT, TO, PO) that identifies the said container (4) and that relates to the characteristics of the product dose (5), said method involving reading (101) the information (IC, EDT, TO, PO) from the RFID tag (14), enabling or inhibiting (102, 103, 105, 106, 107, 109, 110) dispensing of the product dose (5) from the container (4) based on the identification information (IC) of the container (4) and the expiry date (EDT) of the product dose (5), and adjusting (111, 112, 113) the dispensing of the product dose (5) on the basis of optimum dispensing parameters (TO, PO) relating to the type of infusion product.

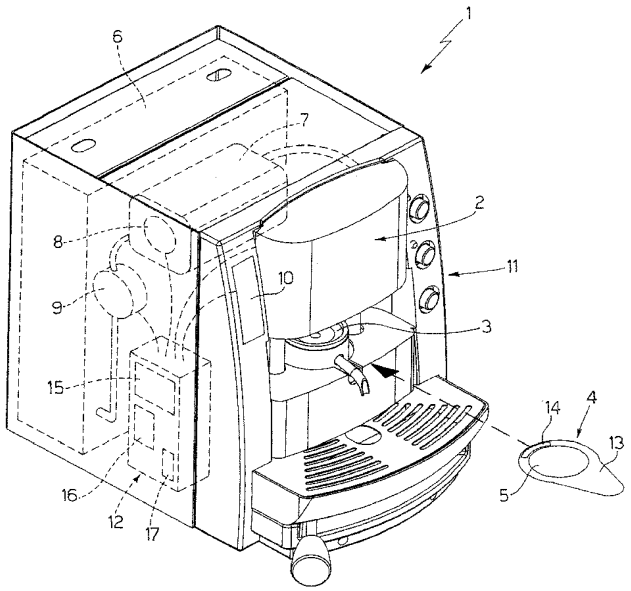


Fig.1

Printed by Jouve, 75001 PARIS (FR)

K-FEE SYSTEM GMBH, EX2009, page 1315
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

EP 1 890 271 A1

Description

[0001] This invention relates to a method and a device for controlling the dispensing of an infusion product for a dispensing machine.

[0002] In particular, this invention advantageously, but not exclusively, applies to controlling the dispensing of a dose of an anhydrous infusion product, such as coffee or tea, contained in a pod, to which the following description will make explicit reference although without losing its general nature.

[0003] Known coffee dispensing machines typically comprise a percolator unit capable of receiving a container, constituting a pod or capsule, containing a dose of coffee; a tank for containing the water to be dispensed to the percolator unit, a boiler controlled by a thermostat to keep the water to be dispensed to the percolator unit at a desired dispensing temperature, and a pump to push the water from the tank to the boiler, and thus to the percolator unit, at a desired dispensing pressure.

[0004] This type of machine does not allow the dispensing process to be controlled in order to optimise it or inhibit it on the basis of the characteristics of the actual product dose. In fact, different blends of coffee could require, for better percolation, different infusion temperatures and/or dispensing pressures, or they could have different expiry dates.

[0005] The aim of this invention is to provide a method and to create a device for controlling the dispensing of an infusion product for a dispensing machine, which do not have the above-mentioned drawbacks and, at the same time, are easy and economical to make.

[0006] This invention provides a method and a device for controlling the dispensing of an infusion product for a dispensing machine, a dispensing machine and a container for a dose of infusion product according to the attached claims.

[0007] This invention will now be described with reference to the accompanying drawings, which show a non-limiting embodiment thereof, in which:

- Figure 1 shows a dispensing machine comprising a device for controlling the dispensing of an infusion product according to this invention; and
- Figure 2 shows a flow chart of a method for controlling the dispensing of an infusion product used in the control device shown in Figure 1.

[0008] In Figure 1, 1 shows generally as a whole a machine for dispensing an anhydrous infusion product in doses.

[0009] The dispensing machine 1 comprises a percolator unit 2 of a known type capable of receiving, in its percolation cup 3, a container 4 for a product dose 5; a tank 6 to contain the water to be dispensed to the percolator unit 2; a boiler 7 controlled by a thermostat 8 to control the dispensing temperature TE of the water to the percolator unit 2; a pump 9 connected between the tank 6 and the boiler 7 to control the dispensing pressure PE of the water to the percolator unit 2; a display 10, of the liquid-crystal type for example, to display messages to a user; a push-button panel 11 to turn on the dispensing machine 1 and for the user to select the type of dispensing; and a control device 12 connected to the percolator unit 2, the thermostat 8, the pump 9, the display 10 and the push-button panel 11 to control the dispensing of the product dose 5.

[0010] In the embodiment shown in Figure 1, the container 4 comprises a pod 13 of a soft material permeable to water encompassing the product dose 5; and a respective RFID (Radio Frequency Identification) tag 14 of a known type, which is applied to the pod 13 and in which is stored information relating to the container 4 and to the product dose 5 contained therein. The RFID tag 14 is of the type that has an 8 Kbyte memory capacity and which can be excited by a radiofrequency of 13.56 MHz.

[0011] The information in the RFID tag 14 includes the type of product; the production date PDT and the expiry date EDT of the respective product dose 5; an optimum infusion temperature TO for the product; an optimum dispensing pressure PO for the product; an identity code IC for recognising the respective container 4; information on the manufacturer and on the traceability of the product; and other recommended settings of the dispensing machine 1 to enable better dispensing.

[0012] As schematically shown in Figure 1, the control device 12 comprises an RFID reader 15 of a known type capable of remotely reading the information contained in the RFID tag 14 by generating radio waves at a frequency of 13.56 MHz and using a communication protocol of the ISO 15693 type; an electronic memory 16 capable of storing information relating to several containers 4; and an internal clock 17 capable of providing the current date.

[0013] The method of controlling the dispensing of an infusion product according to this invention, first and foremost, enables the dispensing machine 1 to recognise the container 4 by storing in the memory 15 a plurality of allowable identity codes AIC associated with a respective plurality of containers 4 that can be used with the dispensing machine 1; and, when the user wishes to dispense a product dose 5, to insert the container 4 in the dispensing cup 3 of the percolator unit 2 so that the RFID tag 14 is placed at a sufficiently short distance from the RFID reader 15.

[0014] The method for controlling the dispensing of an infusion product according to this invention involves performing a series of actions implemented by the control device 12, shown in the flow chart in Figure 2 and described below.

[0015] Referring to Figure 2, the method involves reading, by means of the RFID reader 15, when the container 4 is housed in the percolator cup 3, the above-listed information contained in the RFID tag 14 of the container 4 (block 101); and subsequently to recognise the container 4.

[0016] In detail, the recognition of the container 4 in-

K-FEE SYSTEM GMBH, EX2009, page 1316
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

volves comparing the identity code IC read with the allowable identity codes AIC stored in the memory 15 (block 102) ; if the identity code IC matches one of the allowable identity codes AIC, this identity code IC is then removed from the allowable identity codes AICs so that the relative container 4 can no longer be used by the dispensing machine 1 (block 103); otherwise, the display 10 will display an error message MSG1 which, in fact, indicates that the container 4 has an unknown provenance (block 104); and the operation of the percolator unit 2 is immediately inhibited, for example by the electrical connection being cut off by the push-button panel 11 which is involved in starting up dispensing (block 105).

[0017] If the container 4 is recognised, i.e. the relative identity code IC is recognised and eliminated, an additional comparison is made. In particular, with the aid of the clock 16, the current date CDT is determined (block 106), which is then compared to the expiry date EDT read previously (block 107); if the expiry date EDT is prior to the current date CDT, an error message MSG2 is displayed, which indicates that the product dose 5 has expired (block 108); and the operation of the percolator unit 2 is immediately inhibited (block 109); otherwise the percolator unit 2 is enabled, or the electrical connection of that part of the push-button panel 11 that concerns starting dispensing is maintained or restored (block 110).

[0018] At this point, the dispensing machine 1 is adjusted to optimise dispensing on the basis of other information read in block number 101. In particular, the dispensing temperature TE, by setting it to the optimum infusion temperature TO, is adjusted (block 111); the dispensing pressure PE is adjusted, setting it to the optimum dispensing pressure PO (block 112); and other dispensing parameters of the dispensing machine 1 are adjusted to the recommended settings read (block 113).

[0019] Lastly, the display 10 displays a message MSG3 which comprises, for example, the type of product, the manufacturer, the product traceability information, the production date PDT-, etc. (block 114); and the dispensing machine 1 is put on hold, awaiting the user's commands, ready to dispense the product dose 5 (block 115).

[0020] According to a second embodiment of this invention (not shown), the container 4 comprises a capsule of perforated rigid material and the RFID tag 14 is applied to the capsule.

[0021] According to a third and simplified embodiment of this invention (not shown), the RFID tag 14 is applied to a pack of a plurality of containers 4 of a number N containing respective product doses 5. This RFID tag 14 stores information relating to all the containers 4 contained in the pack, and in particular the respective identity codes IC and expiry dates EDT of the respective product doses 5, etc.

[0022] According to this third embodiment, the stage of reading the information contained in the RFID tag 14 (block 101) is performed before opening the pack and using the containers 4. Furthermore, in the memory 16 the number N of containers 4 contained in the pack is stored; each time that a product dose is dispensed, this number N is reduced by one unit; and the operation of the percolator unit 2 is inhibited when the number N reaches zero.

[0023] The main advantage of the above-described method for controlling the dispensing of an infusion product is to enable the dispensing machine 1 to recognise the individual product doses 5 and, consequently, to adjust or inhibit the dispensing of the product dose 5 on the basis of its identity.

[0024] Consequently, it is possible to set the dispensing parameters of the machine to optimum values for each of the different blends of coffee, or for other infusion products, such as tea, carcadé, etc.

[0025] Furthermore, it is possible to create a proprietary match between the container 4 and the dispensing machine 1 which guarantees the proper operation of the dispensing machine 1 and the quality of the infusion product used.

Claims

1. Method for controlling the dispensing of an infusion product for a dispensing machine (1) comprising percolator means (2) capable of receiving a container (4) for a product dose (5); this method comprising the stages of:

   - associating an RFID tag (14) to a respective number (N) of containers (4), the said RFID tag (14) comprising first information (IC, EDT) relating to these containers (4) and to the respective product doses (5);
   - reading (101) the first information (IC, EDT) from the RFID tag (14);
   - enabling (102, 103, 105, 106, 107, 109, 110) dispensing of the product dose (5) from each of these containers (4) on the basis of the first information (IC, EDT) read.

2. Method according to claim 2, in which the said first information (IC, EDT) comprises identity codes (IC), each associated respectively with one of the said containers (4); the said stage of enabling (102, 103, 105, 106, 107, 109, 110) dispensing of the product dose (5) comprising the stages of:

   - recognising (102, 103) the relative container (4) by means of the respective identity code (IC); and
   - if the container (4) is not recognised, inhibiting (105) the operation of the said percolating means (2).

3. Method according to claim 2 and comprising the stage of:

K-FEE SYSTEM GMBH, EX2009, page 1317
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

- memorising a plurality of allowable identity codes (AIC);

the said stage of recognising (102, 103) the container (4) comprising the stages of:

- comparing (102) the respective identity code (IC) with the allowable identity codes (AIC);
- if the identity code (IC) matches one of the allowable identity codes (AIC), removing (103) the identity code (IC).

4. Method according to claims 2 or 3, in which the said first information (IC, EDT) comprises expiry dates (EDT), each associated respectively with one of the said product doses (5); the said stage of enabling (102, 103, 105, 106, 107, 109, 110) dispensing of the product dose (5) comprising the stages of:

- determining (106) the current date (CDT);
- comparing (107) the expiry date (EDT) relating to the product dose (5) with the current date (CDT); and
- if the expiry date (EDT) is prior to the current date (CDT), inhibiting (109) the operation of the said percolating means (2).

5. Method according to claim 4, in which the said stage of enabling (102, 103, 105, 106, 107, 109, 110) dispensing of the product dose (5) comprises the stages of:

- if the relative said container (4) is recognised and the relative said expiry date (EDT) is after the said current date (CDT), enabling (110) the operation of the said percolator means (2).

6. Method according to any of the preceding claims, in which the said RFID tag (14) comprises second information (TO, PO) relating to the said infusion product; the method comprising the stages of:

- reading (101) the second information (TO, PO) from the RFID tag (14); and
- adjusting (111, 112, 113) the dispensing parameters of the product dose (5) on the basis of such second information (TO, PO).

7. Method according to claim 6, in which the said second information (TO. PO) comprises an optimum infusion temperature value (TO) for the said product; the said dispensing parameters comprising a dispensing temperature of the water (TE) to the said percolator means (2); the said stage of adjusting (111, 112, 113) the dispensing parameters comprising the stages of:

- setting (111) the dispensing temperature of the water (TE) to the optimum infusion temperature value (TO).

8. Method according to claims 6 or 7, in which the said second information (TO, PO) comprises an optimum dispensing pressure value (PO) for the said product; the said dispensing parameters comprising a dispensing pressure of the water (PE) to the said percolator means (2); the said stage of adjusting (111, 112, 113) the dispensing parameters comprising the stages of:

- setting (112) the water dispensing pressure (PE) to the optimum dispensing pressure value (PO).

9. Method according to any one of the preceding claims, in which the said number (N) of containers (4) is greater than one; the said stage of enabling (102, 103, 105, 106, 107, 109, 110) dispensing of the product dose (5) comprising the stages of:

- memorising the number (N) of containers (4);
- decreasing this number (N) of containers (4) by one unit each time a product dose (5) is dispensed; and
- if the number (N) of containers (4) reaches zero, inhibiting the operation of the said percolator means (2) .

10. A device for controlling the dispensing of an infusion product for a dispensing machine (1) comprising percolator means (2) capable of receiving a container (4) for a product dose (5); means of controlling the temperature of the water (7, 8) dispensed to the percolator means (2); and means of controlling the pressure of the water (9) dispensed to the percolator means (2); the control device (12) **being characterised in that** it comprises RFID reading means (15), electronic memorising means (16) and time measurement means (17); and **in that** it is configured to implement the method of controlling the dispensing of an infusion product according to any of the preceding claims.

11. Dispensing machine for an infusion product; the machine comprising percolator means (2) capable of receiving a container (4) for a product dose (5); means of controlling the temperature of the water (7, 8) dispensed to the percolator means (2); and means of controlling the pressure of the water (9) dispensed to the percolator means (2); the dispensing machine (1) **being characterised in that** it comprises a device (12) for controlling the dispensing of an infusion product according to the preceding claim.

12. Container for an anhydrous infusion product dose that can be used by a dispensing machine (1) of the

K-FEE SYSTEM GMBH, EX2009, page 1318
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

type described in the preceding claim; the container (4) comprising an RFID tag (14), which comprises information (IC, EDT, TO, PO) relating to the said container (4) and to the product dose (5).

13. Container according to claim 12 and comprising a pod (13) of soft material permeable to water, the said RFID tag (14) being applied to the said pod (13).

K-FEE SYSTEM GMBH, EX2009, page 1319
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

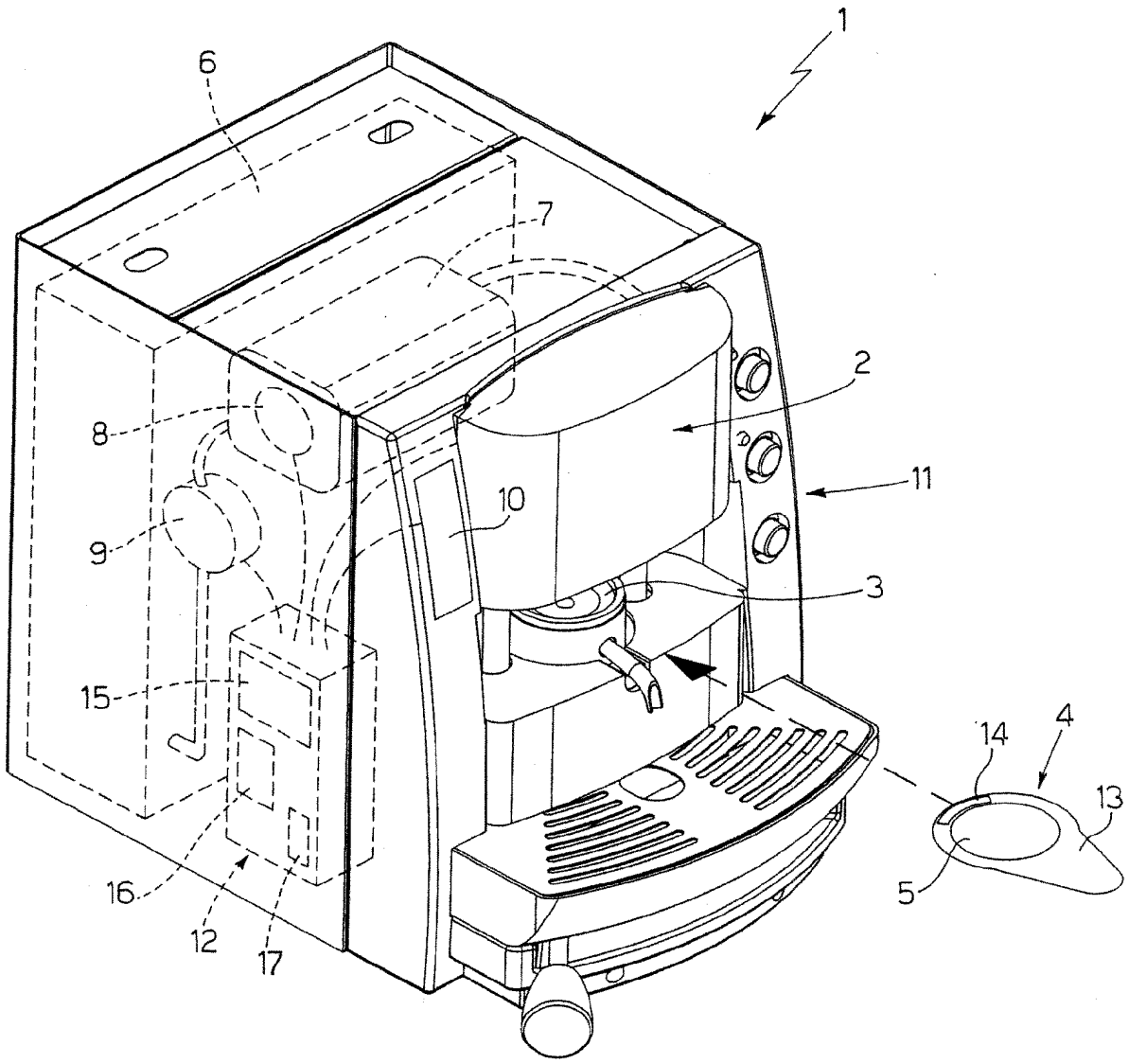


Fig.1

K-FEE SYSTEM GMBH, EX2009, page 1320
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

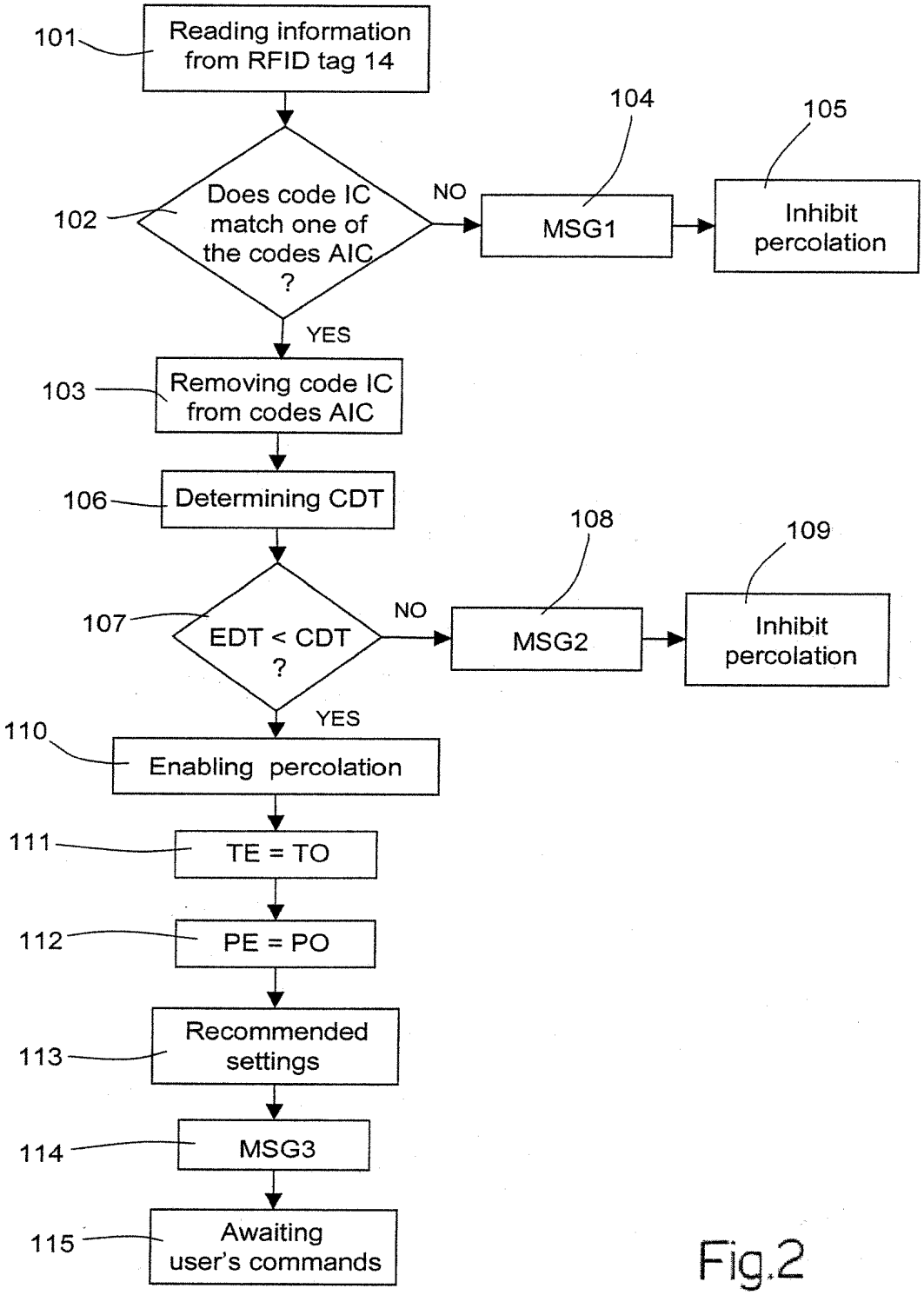


Fig.2

K-FEE SYSTEM GMBH, EX2009, page 1321
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 11 3345

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2005/063091 A (KONINKL PHILIPS ELECTRONICS NV [NL]; ERLANDSSON JAN H [GB]; HARRIS DAV) 14 July 2005 (2005-07-14) * abstract * * page 1, lines 9-18 * * page 2, lines 6-19 * * page 3, lines 12-14 * * page 4, line 32 - page 7, line 14 * * page 7, line 29 - page 8, line 9 * * page 9, lines 5-15 * * figures *	1-13	INV. G07F13/06 A47J31/24
X	WO 03/005295 A (NESTEC SA [CH]; THOMAS KEVIN R [US]; CARDWELL DONALD [US]; HU RUGUO [U) 16 January 2003 (2003-01-16) * abstract * * page 17, paragraph 2 - page 19, paragraph 1 * * page 21, paragraph 2 - page 22, paragraph 1 * * page 23, last paragraph - page 25, paragraph 1 * * page 28, paragraph 2 * * page 29, last paragraph - page 30, paragraph 1 * * figures *	1-13	TECHNICAL FIELDS SEARCHED (IPC) G07F A47J
A	WO 2005/003022 A (BUNN O MATIC CORP [US]; KNEPLER JOHN T [US]) 13 January 2005 (2005-01-13) * abstract * * paragraphs [0025], [0027] - [0029], [0031], [0032], [0034], [0038], [0049], [0051], [0054] * * figures *	1-13	

-/--

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 November 2007	Breugelmans, Jan

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

K-FEE SYSTEM GMBH, EX2009, page 1322
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 11 3345

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2002/088816 A1 (VAITKUS JOSEPH [US] ET AL) 11 July 2002 (2002-07-11) * abstract * * figures * -----	1-13	

TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 November 2007	Breugelmans, Jan

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

2

EPO FORM 1503 03.82 (P04C01)

K-FEE SYSTEM GMBH, EX2009, page 1323
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 11 3345

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-11-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2005063091 A	14-07-2005	CN 1897853 A	17-01-2007
		JP 2007526025 T	13-09-2007
		US 2007203587 A1	30-08-2007
WO 03005295 A	16-01-2003	EP 1405261 A1	07-04-2004
		US 2006108415 A1	25-05-2006
		US 2003006281 A1	09-01-2003
WO 2005003022 A	13-01-2005	CA 2530383 A1	13-01-2005
US 2002088816 A1	11-07-2002	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

K-FEE SYSTEM GMBH, EX2009, page 1324
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 493 357 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
02.09.2015 Bulletin 2015/36

(21) Application number: **10827590.0**

(22) Date of filing: **30.10.2010**

(51) Int Cl.:
A47J 31/36 *(2006.01)* ***A47J 31/44*** *(2006.01)*
A47J 31/02 *(2006.01)* ***A47J 31/06*** *(2006.01)*

(86) International application number:
PCT/US2010/054896

(87) International publication number:
WO 2011/053890 (05.05.2011 Gazette 2011/18)

(54) **COFFEE MAKER WITH MULTI AND SINGLE CUP MODES**

KAFFEEMASCHINE MIT MEHR- UND EINZELTASSENMODUS

MACHINE À CAFÉ AVEC DES MODES POUR TASSES MULTIPLES ET UNE SEULE TASSE

(84) Designated Contracting States:
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

(30) Priority: **30.10.2009 US 610181**
17.11.2009 US 620584
16.04.2010 US 762262

(43) Date of publication of application:
05.09.2012 Bulletin 2012/36

(73) Proprietor: **Rivera, Adrian**
Whittier, California 90605 (US)

(72) Inventor: **Rivera, Adrian**
Whittier, California 90605 (US)

(74) Representative: **Nordic Patent Service A/S**
Højbro Plads 10
1200 Copenhagen K (DK)

(56) References cited:
WO-A1-2007/119546
WO-A2-2006/090183
MC-A- 411
US-A- 5 123 335
US-A- 5 233 914
US-A- 5 829 340
US-A1- 2009 229 471

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 493 357 B1

Printed by Jouve, 75001 PARIS (FR)

K-FEE SYSTEM GMBH, EX2009, page 1325
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Description

[0001] The present application is a Continuation In Part of US Patent Application Serial No. 12/610,181 filed October 30, 2009, and US Patent Application Serial No. 12/620,584 filed November 17, 2009, and US Patent Application Serial No. 12/762,262 filed April 16, 2010, which applications are incorporated in their entirety herein by reference.

Technical Field

[0002] The present invention relates to coffee makers and in particular to a coffee maker utilizing a stream of hot water through tamped ground coffee.

Background Art

[0003] Coffee is generally prepared in a coffee maker by measuring an amount of ground coffee into a coffee filter, closing a lid over the ground coffee, and providing a stream of hot water through the loosely packed ground coffee. Unfortunately, water passes freely through the loosely packed ground coffee and does not obtain the full flavor which might otherwise be obtained.

[0004] US Patent Application No. 11/777,831 filed July 13, 2007 for "Pod Adapter System for Single Service Beverage Brewers" by the present applicant overcomes this problem using pre-packaged coffee in closed filter paper commonly called a pod, and inserting the closed pod into a pod holder including a tamping spring and bottom tamper for tamping the pod between the bottom tamper and a coffee holder lid. While the pod adapter of the'831 application works well for coffee pods, it does not allow the simple use of bulk ground coffee not pre-packaged in the closed pod.

[0005] US Patent Application Serial No. 12/610,181 filed October 30, 2009 for "Self Tamping Coffee Holder" filed by the present applicant further discloses a coffee making apparatus and methods which provide a tamped packing of loose ground coffee thereby obtaining richer flavor. The Coffee maker includes a reservoir, a pump, a heater, and a check valve. Coffee grounds are first loosely deposited in a coffee holder and then tamped onto a compacted state. The coffee holder may be filled loosely with the coffee and then placed into the coffee making apparatus and compacted, or the coffee may be compacted in the coffee holder and then the coffee holder placed into the coffee making apparatus. The compacting may be by a spring or by a resilient solid material and may be part of the coffee holder or part of the coffee making apparatus.

[0006] Further, US Patent Application Serial No. 12/620,584 filed November 17, 2009 for "Self Tamping Coffee Holder" filed by the present applicant further discloses a self-tamping coffee holder which tamps loose ground coffee obtaining richer flavor. The coffee holder includes a holder base and a holder cap. Coffee is loosely deposited in the coffee holder and the holder cap is attached to the holder base. An internal filter chamber holds the coffee and allows tamping of the coffee into a compacted state. The filter chamber may be formed by a fixed filter or by a removeable filter constructed of filter paper, nylon mesh, metal mesh, or any material capable of holding the coffee while allowing a flow of heated water through the coffee. The tamping may be by a spring or by a resilient solid material attached to the coffee holder and may push the coffee down inside the filter or push the filter and the coffee up against the holder lid.

[0007] While the 831, 181, and 584 patents successfully address tamping loose coffee, the coffee maker generally prepares a fixed quantity of coffee, either several cups of coffee to fill a carafe, or a single cup. Most users do not have space for multiple coffee makers so must pick between the multi-cup or single cup coffee makers.

[0008] Further state of the art documents are: WO2007/119546, WO2006/090183.

Disclosure of the Invention

[0009] The present invention addresses the above and other needs by providing a coffee making apparatus and methods which provide a tamped packing of loose ground coffee thereby obtaining richer flavor. The Coffee maker includes a reservoir, a pump, a heater, and a check valve. Coffee grounds are first loosely deposited in a coffee holder and then tamped onto a compacted state. The coffee holder may be filled loosely with the coffee and then placed into the coffee making apparatus and compacted, or the coffee may be compacted in the coffee holder and then the coffee holder placed into the coffee making apparatus. The compacting may be by a spring or by a resilient solid material and may be part of the coffee holder or part of the coffee making apparatus.

[0010] In accordance with one aspect of the invention, there is provided apparatus for tamping coffee. The apparatus includes a coffee maker and a coffee holder. The coffee holder receives a portion of untamped coffee and a holder lid closes the coffee holder after receiving the untamped coffee. A tamper resides inside the coffee holder and limits the portion of the coffee holder interior accessible by the untamped coffee and partially resides outside the coffee holder. The coffee maker includes a coffee maker lid openable to position the coffee holder inside the coffee maker, a coffee holder cavity under the coffee maker lid for receiving the coffee holder. A pad residing on a bottom surface of the coffee maker lid and is configured to reduce the combined vertical space occupied by the coffee holder and tamper to urge the tamper into the coffee holder thereby tamping the coffee. A hot water nozzle is attached to the coffee maker for providing a flow of hot water to the tamped coffee to make a coffee drink. The top tamping devices as disclosed in Figures: 9, 10, 11A, 11B, 11C, 11D, 14A, 14B, 14C, 18B, 18C, 25, 26A, 26B, 26C, 38A, 38B, 38C, 42, 43 with the according description are embodiments which are not cov-

K-FEE SYSTEM GMBH, EX2009, page 1326
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ered by this invention after claim 1.

[0011] In accordance with another aspect of the invention, there is provided apparatus for tamping coffee. The apparatus includes a coffee maker and a coffee holder. The coffee holder has a coffee holder interior space for receiving a portion of untamped coffee and a holder lid closing the coffee holder interior space after receiving the untamped coffee. The coffee maker includes a coffee maker lid openable to position the coffee holder inside the coffee maker and a coffee holder cavity under the coffee maker lid for receiving the coffee holder. A tamper residing in the coffee holder cavity is coupled to the coffee holder lid to advance into the coffee holder interior space when the coffee maker lid is closed. A hot water nozzle attached to the coffee maker for providing a flow of hot water to the tamped coffee to make a coffee drink.

[0012] In accordance with yet another aspect of the invention, there is provided a coffee making system combining a forced flow of heated water forced though tamped coffee, and apparatus and methods for tamping loose coffee for use in the coffee maker.

[0013] In accordance with another aspect of the invention, there is provided a self-tamping coffee holder tamps loose ground coffee obtaining richer flavor. The coffee holder includes a holder base and a holder cap. Coffee is loosely deposited in the coffee holder and the holder cap is attached to the holder base. An internal filter chamber holds the coffee and allows tamping of the coffee into a compacted state. The filter chamber may be formed by a fixed filter or by a removeable filter constructed of filter paper, nylon mesh, metal mesh, or any material capable of holding the coffee while allowing a flow of heated water through the coffee. The tamping may be by a spring or by a resilient solid material attached to the coffee holder and may push the coffee down inside the filter or push the filter and the coffee up against the holder lid.

[0014] In accordance with yet another aspect of the invention, there is provided a self tamping coffee holder comprising; a coffee holder base for receiving a portion of untamped coffee; a holder lid closing the coffee holder after receiving the untamped coffee in the coffee holder; and a tamper element of the coffee holder advancing inside the coffee holder to tamp the untamped coffee inside the coffee holder. The self tamping coffee holder may further include a tamping spring. The tamping spring may reside under the untamped coffee inside the holder base and attaching the holder lid to the coffee holder sandwiches the coffee between the holder lid and the tamping spring to tamp the coffee, and the holder lid may include a small passage allowing entry of a nozzle into the coffee holder but not entry of tamping apparatus into the coffee holder. In another embodiment the tamping spring resides over the untamped coffee and the tamping spring may be attached to the holder lid and attaching the holder lid to the holder base sandwiches the coffee between the holder base and the tamping spring to tamp the coffee. The tamper may be a recessed portion of the holder lid which enters the holder base when the holder lid is attached to a holder base to sandwich the coffee between the holder base and the recessed portion of the holder lid to tamp the coffee and the holder lid may include a male threaded portion and the holder base includes a female threaded portion and the holder lid is attached to the holder base by screwing the holder lid into the holder base and the coffee is sandwiched between the male threaded portion and the holder base to tamp the coffee. The self tamping coffee holder may further include a filter paper cup lining the interior of the holder base and the filter paper cup may include a top rim portion reaching above and outwardly from the interior of the holder base for sandwiching between the holder base and the holder lid to seal the coffee holder, and the engagement of the holder lid with the holder base may sandwiches the top rim portion of the filter paper cup to secure the filter paper cup. When the tamping spring resides in the bottom of the holder base, a bottom tamper may be supported by the tamping spring, and the coffee holder may further including a latch for holding the bottom tamper in a down position and releasing the bottom tamper to tamp the coffee after the coffee is in the coffee holder and the holder lid is attached, and a lever may be included for holding the latch in a first position retaining the bottom tamper, wherein a user may press the lever to release the latch to tamp the coffee. Further, attaching the holder lid to the holder base may press the arm against the lever to release the latch to tamp the coffee.

[0015] In accordance with another aspect of the invention, there is provided a self tamping coffee holder comprising: a holder base; a filter cup residing in the interior of the holder base for receiving a portion of untamped coffee; a top rim portion of the filter cup reaching above and outwardly from the interior of the holder base; a holder lid closing the holder base after receiving the untamped coffee in the coffee holder, engagement of the holder lid with the holder base sandwiching the top rim portion of the filter paper cup and secures the filter paper cup; and a tamping spring inside the coffee holder under the coffee to sandwich the coffee between a bottom tamper and the holder lid to tamp the untamped coffee inside the holder base when the holder lid is attached. The filter cup may include a rim and a filtering material attached to the rim and forming a concave surface for holding coffee and the filter cup is preferably made from filter paper.

[0016] In accordance with yet another aspect of the invention, there is provided a self tamping coffee holder comprising: a holder base; a filter chamber residing in the interior of the holder base for receiving a portion of untamped coffee; a top rim portion of the filter cup reaching above the interior of the holder base; a holder lid closing the holder base after receiving the untamped coffee in the coffee holder; and a recessed portion of the holder lid reaching inside the holder base to tamp the untamped coffee inside the filter chamber when the holder lid is attached.

[0017] In accordance with still another aspect of the invention, there is provided a multi-mode coffee maker

K-FEE SYSTEM GMBH, EX2009, page 1327
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

which facilitates switching between a carafe mode and a single cup mode. The coffee maker includes switches for selecting the amount of coffee brewed, a drip valve normally closed to prevent dripping and opened by insertion of a carafe or a single cup adapter into the coffee maker, and a hot plate for maintaining the temperature of coffee in the carafe, the hot plate independent switchable on and off. An upper edge of the carafe, and an arm reaching from the single cup adapter, engage a lever opening the drip valve. The hot plate may be manually turned on and off, or the single cup adapter may cooperate with a switch in the coffee maker to turn the hot plate off.

[0018] In accordance with another aspect of the invention, there is provided a multi-mode coffee maker comprising: a body; a cavity in the body for receiving dry coffee; a water container coupled to the body for providing water to make brewed coffee; a heater for heating the water to make the brewed coffee; manually operated controls to select between a volume of brewed coffee for filling a single cup brewed coffee container and for filling a multi-cup brewed coffee container; a mouth on the front of the body for receiving the brewed coffee container; a platform at the bottom of the mouth for supporting the multi-cup brewed coffee container; a hot plate on a top surface of the platform for heating the multi-cup brewed coffee container; a spout/drip valve above the platform having an open position for releasing the volume of brewed coffee into the brewed coffee container and a closed position for restricting the release of the volume of brewed coffee; a valve actuator connected to the spout/drip valve, the valve actuator cooperating with the multi-cup brewed coffee container to open the spout/drip valve when the multi-cup brewed coffee container is placed into the multi-mode coffee maker; and a single cup adapter configured to fit into the mouth of the multi-mode coffee maker, the single cup adapter including: a single cup platform for supporting the single cup brewed coffee container; an actuating arm, the actuating arm cooperating with the valve actuator to open the spout/drip valve when the single cup adapter is positioned in the multi-mode coffee maker; and a finger reaching from the single cup adapter to actuate a switch attached to the multi-mode coffee maker to turn the hot plate off when the single cup adapter is positioned in the multi-mode coffee maker.

[0019] In accordance with another aspect of the invention, there is provided a multi-mode coffee maker comprising: a body; an opening lid attached to the body for receiving a dry coffee holder; a water container coupled to the body for providing water to make brewed coffee; a heater for heating the water to make the brewed coffee; manually operated controls to select between a volume of brewed coffee for filling a single cup brewed coffee container and for filling a multi-cup brewed coffee container; a mouth on the front of the body for receiving the brewed coffee container; a platform at the bottom of the mouth for supporting the multi-cup brewed coffee container; a hot plate on a top surface of the platform for heating the multi-cup brewed coffee container; a spout/drip valve above the platform having an open position for releasing the volume of brewed coffee into a brewed coffee container comprising a multi-cup brewed coffee container and a single cup brewed coffee container and a closed position for restricting the release of the volume of brewed coffee; a drip valve lever connected to the spout/drip valve, the drip valve lever cooperating with an upper lip of the multi-cup brewed coffee container to open the spout/drip valve when the multi-cup brewed coffee container is placed into the multi-mode coffee maker; a single cup adapter configured to fit into the mouth of the multi-mode coffee maker to support the single cup brewed coffee container, the single cup adapter including: a single cup platform for supporting the single cup brewed coffee container; a drip tray for catching drips from the spout/drip valve when the single cup brewed coffee container is not resting on the single cup adapter; an upward reaching arm, the upward reaching arm cooperating with the drip valve lever to open the spout/drip valve when the single cup adapter is placed into the multi-mode coffee maker; and a rearward reaching finger configured to enter a passage in the body of the multi-mode coffee maker to actuate a switch to turn the hot plate off; and a first dry coffee holder configured to hold an amount of dry coffee for making a first sufficient volume of dry coffee to fill the multi-cup brewed coffee container; and a second dry coffee holder configured to hold an amount of the dry coffee for making a second sufficient volume of brewed coffee to fill the single cup brewed coffee container, the first and second dry coffee holders interchangeably fitting the multi-mode coffee maker.

[0020] In accordance with still another aspect of the invention, there is provided a reuseable brewed beverage cartridge. The reuseable brewed beverage cartridge includes a base and a cover. The base includes an inlet for water (preferably heated) and an outlet for beverage, and a wall separating the inlet form the outlet. Brewing material in placed inside the wall and the water entering the inlet travels up the exterior of the wall, and then down through the brewing material to create a brewed beverage. Loose brewing material, prepackaged brewing material, for filter paper filled with loose brewing material.

Brief Description of the Drawing

[0021] The above and other aspects, features and advantages of the present invention will be more apparent from the following more particular description thereof, presented in conjunction with the following drawings wherein:

FIG. 1A is a front view of a coffee maker according to the present invention.

FIG. 1B is a side view of the coffee maker according to the present invention.

FIG. 1C is a top view of the coffee maker according

K-FEE SYSTEM GMBH, EX2009, page 1328
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

to the present invention.

FIG. 2 is a side view of the coffee maker with an open lid allowing placement of a coffee holder according to the present invention inside the coffee maker.

FIG. 2A is a functional diagram of the coffee maker.

FIG. 3 is a side view of a first coffee holder according to the present invention.

FIG. 4 is a cross-sectional side view of the first coffee holder according to the present invention taken along line 4-4 of FIG. 3.

FIG. 5A is a cross-sectional side view of the first coffee holder according to the present invention taken along line 4-4 of FIG. 3 showing an empty coffee holder with the tamping spring and the bottom tamper according to the present invention.

FIG. 5B is a cross-sectional side view of the first coffee holder according to the present invention taken along line 4-4 of FIG. 3 showing the coffee holder with the tamping spring and bottom tamper, a portion of coffee, and the holder lid ready to attach to a holder body according to the present invention.

FIG. 5C is a cross-sectional side view of the first coffee holder according to the present invention taken along line 4-4 of FIG. 3 showing the coffee holder with the tamping spring and bottom tamper, the portion of coffee in the coffee holder, and the holder lid ready to attach to the holder body according to the present invention.

FIG. 5D is a cross-sectional side view of the first coffee holder according to the present invention taken along line 4-4 of FIG. 3 showing the coffee holder with the tamping spring and bottom tamper, the portion of coffee in the coffee holder, and the holder lid attached to the coffee holder body, according to the present invention.

FIG. 6 is a top view of the first holder lid.

FIG. 7A is a side view of a filter paper cup according to the present invention.

FIG. 7B is a top view of the filter paper cup according to the present invention.

FIG. 7C is a second embodiment of the filter paper cup with a lid.

FIG. 8A shows the first coffee holder ready for insertion into the coffee maker.

FIG. 8B shows the first coffee holder inserted into the coffee maker before tamping the coffee.

FIG. 8C shows the first coffee holder inserted into the coffee maker after tamping the coffee.

FIG. 9 is a side view of a second coffee holder.

FIG. 10 is a cross-sectional side view of the second coffee holder.

FIG. 11A is a cross-sectional side view of the second coffee holder.

FIG. 11B is a cross-sectional side view of the second coffee holder taken along line 10-10 of FIG. 9 showing the coffee holder with the holder lid, tamping spring and top tamper, and a portion of coffee, ready to attach.

FIG. 11C is a cross-sectional side view of the second coffee holder taken along line 10-10 of FIG. 9 showing the portion of untamped coffee in the coffee holder, and the holder lid, tamping spring and top tamper, ready to attach to the holder base.

FIG. 11D is a cross-sectional side view of the second coffee holder taken along line 10-10 of FIG. 9 showing the portion of coffee in the coffee holder and the tamping spring, top tamper, and the holder lid attached to the coffee holder.

FIG. 12 is a top view of the second holder lid.

FIG. 13 is a top view of the bottom tamper.

FIG. 14A shows the second coffee holder ready for insertion into the coffee maker.

FIG. 14B shows the second coffee holder inserted into the coffee maker before tamping the coffee.

FIG. 14C shows the second coffee holder inserted into the coffee maker after tamping the coffee.

FIG. 15 is a side view of a third coffee holder according to the present invention.

FIG. 16 is a cross-sectional side view of the third coffee holder according to the present invention taken along line 16-16 of FIG. 15.

FIG. 17A is a cross-sectional side view of the third coffee holder according to the present invention taken along line 16-16 of FIG. 15 showing the portion of coffee above the coffee holder and the top tamper and the holder lid ready to attach to the coffee holder, according to the present invention.

FIG. 17B is a cross-sectional side view of the third coffee holder according to the present invention taken along line 16-16 of FIG. 15 showing the portion of coffee in the coffee holder, and the top tamper and the holder lid ready to attach to the coffee holder, according to the present invention.

FIG. 17C is a cross-sectional side view of the third coffee holder according to the present invention taken along line 16-16 of FIG. 15 showing the portion of coffee in the coffee holder, and the bottom tamper, the top tamper, and the holder lid attached to the coffee holder, according to the present invention.

FIG. 18A shows the third coffee holder ready for insertion into a second coffee maker according to the present invention.

FIG. 18B shows the third coffee holder inserted into the coffee maker before tamping the coffee.

FIG. 18C shows the third coffee holder inserted into the coffee maker after tamping the coffee.

FIG. 19 is a side view of a fourth coffee holder according to the present invention.

FIG. 20 is a cross-sectional side view of the fourth coffee holder according to the present invention taken along line 20-20 of FIG. 19.

FIG. 21A is a cross-sectional side view of the fourth coffee holder according to the present invention taken along line 20-20 of FIG. 19 showing the coffee holder with the bottom tamper, a portion of coffee, and the holder lid ready to attach, according to the

K-FEE SYSTEM GMBH, EX2009, page 1329
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

present invention.

FIG. 21B is a cross-sectional side view of the fourth coffee holder according to the present invention taken along line 20-20 of FIG. 19 showing the coffee holder with the bottom tamper, a portion of coffee in the coffee holder, and the holder lid ready to attach, according to the present invention.

FIG. 21C is a cross-sectional side view of the fourth coffee holder according to the present invention taken along line 20-20 of FIG. 19 showing the coffee holder with the bottom tamper, a portion of coffee in the coffee holder, and the holder lid attached, according to the present invention.

FIG. 22A shows the fourth coffee holder ready for insertion into the coffee maker.

FIG. 22B shows the fourth coffee holder inserted into the coffee maker before tamping the coffee.

FIG. 22C shows the fourth coffee holder inserted into the coffee maker after tamping the coffee.

FIG. 23A shows the fourth coffee holder ready for insertion into the coffee maker having a tamping block according to the present invention.

FIG. 23B shows the fourth coffee holder inserted into the coffee maker having the tamping block before tamping the coffee.

FIG. 23C shows the fourth coffee holder inserted into the coffee maker having the tamping block after tamping the coffee.

FIG. 24 is a side view of a fifth coffee holder according to the present invention.

FIG. 25 is a cross-sectional side view of the fifth coffee holder taken along line 25-25 of FIG. 24.

FIG. 26A is a cross-sectional side view of the fifth coffee holder taken along line 25-25 of FIG. 24 showing the portion of coffee above the coffee holder body, and the holder lid with the top tamper and tamping spring, ready to attach to the coffee holder body.

FIG. 26B is a cross-sectional side view of the fifth coffee holder taken along line 25-25 of FIG. 24 showing the coffee holder with the portion of coffee in the coffee holder, and the holder lid with the top tamper and tamping spring ready to attach to the coffee holder body.

FIG. 26C is a cross-sectional side view of the fifth coffee holder taken along line 25-25 of FIG. 24 showing the portion of coffee in the coffee holder, and the holder lid with the top tamper and tamping spring attached to the holder body.

FIG. 27 is a side view of a sixth coffee holder according to the present invention.

FIG. 28 is a cross-sectional side view of the sixth coffee holder according to the present invention taken along line 28-28 of FIG. 27.

FIG. 29A is a cross-sectional side view of the sixth coffee holder according to the present invention taken along line 28-28 of FIG. 27 showing the portion of coffee above the coffee holder, and the holder lid ready to attach to the holder body, according to the present invention.

FIG. 29B is a cross-sectional side view of the sixth coffee holder according to the present invention taken along line 28-28 of FIG. 27 showing the portion of coffee in the coffee holder, and the holder lid ready to attach to the holder body, according to the present invention.

FIG. 29C is a cross-sectional side view of the sixth coffee holder according to the present invention taken along line 28-28 of FIG. 27 showing the portion of coffee in the coffee holder, and the holder lid attached and tamping the coffee, according to the present invention.

FIG. 30 is a side view of a seventh coffee holder according to the present invention.

FIG. 31 is a cross-sectional side view of the seventh coffee holder according to the present invention taken along line 31-31 of FIG. 30.

FIG. 32A is a cross-sectional side view of the seventh coffee holder according to the present invention taken along line 31-31 of FIG. 30 showing the portion of coffee above the coffee holder, and the holder lid ready to attach to the holder body, according to the present invention.

FIG. 32B is a cross-sectional side view of the seventh coffee holder according to the present invention taken along line 31-31 of FIG. 30 showing the portion of coffee in the coffee holder, and the holder lid ready to attach to the holder body, according to the present invention.

FIG. 32C is a cross-sectional side view of the seventh coffee holder according to the present invention taken along line 31-31 of FIG. 30 showing the portion of coffee in the coffee holder, and the holder lid attached to the holder body and the coffee tamped between the bottom tamper and spring and the holder lid, according to the present invention.

FIG. 33 is a side view of an eighth coffee holder according to the present invention.

FIG. 34A is a cross-sectional side view of the eighth coffee holder taken along line 34-34 of FIG. 33 showing a portion of coffee for placing inside the coffee holder and the holder lid with an insertable portion and an O-Ring inside the coffee holder for sealing according to the present invention.

FIG. 34B is a cross-sectional side view of the eighth coffee holder taken along line 34-34 of FIG. 33 showing the portion of coffee inside the coffee holder and the holder lid with the insertable portion inserted into the coffee holder and cooperating with the O-Ring inside the coffee holder for sealing.

FIG. 35 is a side view of a ninth coffee holder according to the present invention.

FIG. 36A is a cross-sectional side view of the ninth coffee holder taken along line 36-36 of FIG. 35 showing a portion of coffee for placing inside the coffee holder and a holder lid with a threaded portion for

K-FEE SYSTEM GMBH, EX2009, page 1330
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

screwing inside the holder body for sealing according to the present invention.

FIG. 36B is a cross-sectional side view of the ninth coffee holder taken along line 36-36 of FIG. 35 showing the portion of coffee inside the coffee holder and a holder lid with the threaded portion screwed into the holder body and tamping the coffee according to the present invention.

FIG. 37A shows a third coffee maker having a coffee holder for receiving a portion of coffee and tamping spring according to the present invention for tamping the coffee when the coffee maker lid is closed.

FIG. 37B shows the third coffee maker with the coffee holder holding the portion of coffee and the tamping spring under the coffee holder according to the present invention for tamping the coffee when the coffee maker lid is closed.

FIG. 37C shows the third coffee maker with the coffee holder holding the portion of tamped coffee with the coffee maker lid closed for tamping the coffee according to the present invention.

FIG. 38A shows a third coffee maker having a coffee holder for receiving a portion of coffee and tamping spring attached to the coffee maker lid for tamping the coffee when the coffee maker lid is closed.

FIG. 38B shows the third coffee maker with the coffee holder holding the portion of untamped coffee for tamping the coffee when the coffee maker lid is closed.

FIG. 38C shows the third coffee maker with the coffee holder holding the portion of tamped coffee with the coffee maker lid closed to push the tamping spring into the coffee holder for tamping the coffee.

FIG. 39A shows a fourth coffee maker having a coffee holder for receiving a packet containing untamped coffee, a knife for cutting the packet open, and tamping spring attached to the coffee maker lid according to the present invention for tamping the coffee when the coffee maker lid is closed.

FIG. 39B shows the fourth coffee maker with the coffee holder holding the packet of untamped coffee according to the present invention for tamping the coffee when the coffee maker lid is closed.

FIG. 39C shows the fourth coffee maker with the coffee holder holding the packet of tamped coffee with the coffee maker lid closed to push the tamping spring into the coffee holder for tamping the coffee according to the present invention.

FIG. 40A shows a fifth coffee maker accepting a horizontal coffee holder and tamping spring residing horizontally in a coffee holder cavity according to the present invention for tamping the coffee when the coffee maker lid is closed.

FIG. 40B shows the fifth coffee maker with the coffee holder residing horizontally in the coffee holder cavity according to the present invention for tamping the coffee when the coffee maker lid is closed.

FIG. 40C shows the fifth coffee maker with the coffee holder residing horizontally in the coffee holder cavity with the coffee maker lid closed and the coffee holder pushed against the tamping spring for tamping the coffee, according to the present invention.

FIG. 41 is a side view of a tenth coffee holder with straight walls according to the present invention.

FIG. 42 is a cross-sectional view of the tenth coffee holder.

FIG. 43 is a cross-sectional view of the tenth coffee holder.

FIG. 44 is a side view of an eleventh coffee holder with straight walls according to the present invention.

FIG. 45 is a cross-sectional view of the eleventh coffee holder taken along line 45-45 of FIG. 44 showing an empty coffee holder.

FIG. 46 is a cross-sectional view of the eleventh coffee holder taken along line 45-45 of FIG. 41 showing a full and tamped coffee holder.

FIG, 47A is a side view of a top tamper.

FIG, 47B is a top view of the top tamper.

FIG, 47C is a side view of a top tamper with a seal according to the present invention.

FIG, 47D is a top view of the top tamper with a seal.

FIG. 48 is a perspective view of a filter paper cup with a folding cup lid.

FIG. 49 is a side view of an twelfth coffee holder with straight walls according to the present invention.

FIG. 50 is a cross-sectional view of the twelfth coffee holder taken along line 50-50 of FIG. 49 showing an empty coffee holder.

FIG. 51A is a cross-sectional view of the twelfth coffee holder taken along line 50-50 of FIG. 49 showing a lid, coffee, a filter paper cup, above the base, and the coffee holder base.

FIG. 51B is a cross-sectional view of the twelfth coffee holder taken along line 50-50 of FIG. 49 showing the lid, above the coffee and the filter paper cup resting in the coffee holder base.

FIG. 51C is a cross-sectional view of the twelfth coffee holder taken along line 50-50 of FIG. 49 showing the lid, above the coffee and the filter paper cup resting in the coffee holder base with a filter paper cover folded over the coffee in the filter paper cup.

FIG. 51D is a cross-sectional view of the twelfth coffee holder taken along line 50-50 of FIG. 49 showing the lid attached to the base with the coffee and the filter paper cup residing in the coffee holder base with the coffee tamped.

FIG. 52 is a side view of a thirteenth coffee holder with a releaseable tamping latch according to the present invention.

FIG. 53 is a cross-sectional view of the thirteenth coffee holder taken along line 53-53 of FIG. 52 showing an empty coffee holder.

FIG. 54A is a cross-sectional view of the thirteenth coffee holder taken along line 53-53 of FIG. 52 showing a lid, coffee, a filter paper cup, above the base, and the coffee holder base, with the tamping latch

K-FEE SYSTEM GMBH, EX2009, page 1331
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

retaining the bottom tamper.

FIG. 54B is a cross-sectional view of the thirteenth coffee holder taken along line 53-53 of FIG. 52 showing the lid, above the coffee and the filter paper cup resting in the coffee holder base, with the tamping latch retaining the bottom tamper.

FIG. 54C is a cross-sectional view of the thirteenth coffee holder taken along line 53-53 of FIG. 52 showing the lid, above the coffee and the filter paper cup resting in the coffee holder base with the tamping latch retaining the bottom tamper.

FIG. 54D is a cross-sectional view of the fourteenth coffee holder taken along line 53-53 of FIG. 52 showing the lid attached to the base with the coffee and the filter paper cup residing in the coffee holder base with tamping latch released and the coffee tamped.

FIG. 55 is a side view of a fourteenth coffee holder with a releaseable tamping latch according to the present invention.

FIG. 56 is a cross-sectional view of the fourteenth coffee holder taken along line 56-56 of FIG. 55 showing an empty coffee holder.

FIG. 57A is a cross-sectional view of the fourteenth coffee holder taken along line 56-56 of FIG. 55 showing a lid, coffee, a filter paper cup, above the base, and,the coffee holder base, with the tamping latch retaining the bottom tamper.

FIG. 57B is a cross-sectional view of the fourteenth coffee holder taken along line 56-56 of FIG. 55 showing the lid, above the coffee and the filter paper cup resting in the coffee holder base, with the tamping latch retaining the bottom tamper.

FIG. 57C is a cross-sectional view of the fourteenth coffee holder taken along line 56-56 of FIG. 55 showing the lid, above the coffee and the filter paper cup resting in the coffee holder base, with the tamping latch released but just prior to tamping.

FIG. 57D is a cross-sectional view of the fourteenth coffee holder taken along line 56-56 of FIG. 55 showing the lid attached to the base with the coffee and the filter paper cup residing in the coffee holder base with tamping latch released and the coffee tamped.

FIG. 58 is a side view of a fourteenth coffee holder with a releaseable tamping lock according to the present invention.

FIG. 59 is a cross-sectional view of the fourteenth coffee holder taken along line 59-59 of FIG. 58 showing an empty coffee holder.

FIG. 60A is a cross-sectional view of the fourteenth coffee holder taken along line 59-59 of FIG. 58 showing a lid, coffee, a filter paper cup, above the base, and the coffee holder base, with the tamping lock retaining the bottom tamper.

FIG. 60B is a cross-sectional view of the fourteenth coffee holder taken along line 59-59 of FIG. 58 showing the lid, above the coffee and the filter paper cup resting in the coffee holder base, with the tamping lock retaining the bottom tamper.

FIG. 60C is a cross-sectional view of the fourteenth coffee holder taken along line 59-59 of FIG. 58 showing the lid, above the coffee and the filter paper cup resting in the coffee holder base prior to tamping.

FIG. 60D is a cross-sectional view of the fourteenth coffee holder taken along line 59-59 of FIG. 58 showing the lid attached to the base with the coffee and the filter paper cup residing in the coffee holder base with tamping lock released and the coffee tamped.

FIG. 61A is a top view of a lock according to the present invention.

FIG. 61B is a bottom view of a second bottom tamper with cooperates with the tamping lock according to the present invention.

FIG. 62A shows a pre-packaged brewing material for use in the coffee making according to the present invention.

FIG. 62B shows a cut away view of the pre-packaged brewing material for use in the coffee making according to the present invention showing the brewing material.

FIG. 62C shows the pre-packaged brewing material in a coffee holding having a window to expose a bar code.

FIG. 63D shows the pre-packaged brewing material in the coffee holding having the window to expose a bar code in the cavity of a coffee maker including a bar code reader.

FIG. 62E shows a coffee holder having the bar code on the coffee holder in the cavity of a coffee maker including the bar code reader

FIG. 63A is a side view of a filter cup according to the present invention.

FIG. 63B is a top view of the filter cup according to the present invention.

FIG. 64 is a side view of multi-mode coffee maker according to the present invention.

FIG. 65A is a front view of the multi-mode coffee maker according to the present invention with a carafe positioned for receiving a volume of coffee.

FIG. 65B is a side view of the multi-mode coffee maker according to the present invention with the carafe positioned for receiving a volume of coffee.

FIG. 66A is a front view of the multi-mode coffee maker according to the present invention with a coffee cup positioned for receiving a volume of coffee.

FIG. 66B is a side view of the multi-mode coffee maker according to the present invention with the coffee cup positioned for receiving a volume of coffee.

FIG. 67A is a front view of a single cup adapter according to the present invention.

FIG. 67B is a side view of the single cup adapter according to the present invention.

FIG. 67C is a top view of the single cup adapter according to the present invention.

FIG. 67D is a side view of a second single cup adapter according to the present invention.

FIG. 68 is a cross-sectional view of the single cup

K-FEE SYSTEM GMBH, EX2009, page 1332
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

adapter according to the present invention taken along line 68-68 of FIG. 67A.

FIG. 69A is a side view of a multi- serving coffee holder according to the present invention for use in the multi-mode coffee maker for making several cups of coffee.

FIG. 69B is a side view of a single-serving coffee holder according to the present invention for use in the multi-mode coffee maker for making one cup of coffee.

FIG. 70 shows a coffee maker and reuseable cartridge according to the present invention.

FIG. 71A shows a side view of the reuseable cartridge according to the present invention.

FIG. 71B shows a top view of the reuseable cartridge according to the present invention.

FIG. 72 show a cross-sectional view of the reuseable cartridge according to the present invention taken along line 72-72 of FIG. 71B.

FIG. 73A shows a side view of a cover of the reuseable cartridge according to the present invention.

FIG. 73B shows a top view of the cover of the reuseable cartridge according to the present invention.

FIG. 74 show a cross-sectional view of the cover of the reuseable cartridge according to the present invention taken along line 74-74 of FIG. 73B.

FIG. 75A shows a side view of a base of the reuseable cartridge according to the present invention.

FIG. 75B shows a top view of the base of the reuseable cartridge according to the present invention.

FIG. 76 show a cross-sectional view of the base of the reuseable cartridge according to the present invention taken along line 76-76 of FIG. 75B.

FIG.77A shows a side view of a brewed beverage pod for use in the reuseable cartridge according to the present invention.

FIG.77B shows a top view of the brewed beverage pod for use in the reuseable cartridge according to the present invention.

FIG.78A shows a side view of filter paper for use in the reuseable cartridge according to the present invention.

FIG.78B shows a top view of the filter paper for use in the reuseable cartridge according to the present invention.

Corresponding reference characters indicate corresponding components throughout the several views of the drawings.

Best Mode for Carrying out the Invention

[0022] The following description is of the best mode presently contemplated for carrying out the invention. This description is not to be taken in a limiting sense, but is made merely for the purpose of describing one or more preferred embodiments of the invention. The scope of the invention should be determined with reference to the claims.

[0023] A front view of a coffee 10 maker according to the present invention is shown in FIG. 1A a side view of the coffee maker 10 is shown in FIG. 1B, and a top view of the coffee maker 10 is shown in FIG. 1C. The coffee maker 10 includes a body 12, an opening lid 14, a lid handle 16, a water container 18, a display 20, controls 22, a platform 24 and a mouth 12a. A coffee pitcher 26 rests on the platform 24 inside the mouth 12a and has a pitcher lid 28. The coffee maker 10 provides a flow of hot water through coffee grounds to produce a coffee drink. The flow of water may be heated by one of any known means, for example, an electrical heating coil or a conductive coating on tubing carrying the water.

[0024] A side view of the coffee maker 10 with an open lid 14 allowing placement of a coffee holder 30 according to the present invention inside the coffee maker 10 is shown in FIG. 2. The lid 14 includes a lid hinge 14a and a water tube 15 carries heated water into the lid 14. A pad 17 resides on a bottom surface of the lid 14 and presses against the coffee holder 30 when the lid 14 is closed, and in cooperation with other means discloses hereafter, tamps coffee contained in the coffee holder 30. A nozzle 19 extending down from the closed lid 14 directs the flow of hot water into the coffee holder 30.

[0025] A functional diagram of the coffee maker 10 is shown in FIG. 2A. The preferred coffee maker 10 includes the water tank 18, water pump 21, a heater 13, check valve 23 and the nozzle 18. The pump 21 preferably provides at least one PSI water pressure. The water heater 13 may include a heating coil or a resistive coating or any other means for heating water. The check valve 23 limits the water pressure at the nozzle 19 by returning some of the water flow to the water tank 18. While a the water pump 21 is a preferred method for providing a flow of water to the nozzle 19, other methods include pressuring the water in the water tank 18, and a coffee maker using any means to provide a forced flow of water is intending to within the scope of the present invention.

[0026] A side view of a first coffee holder 30a according to the present invention is shown in FIG. 3 and a cross-sectional side view of the first coffee holder 30a including a holder body 31, a first holder lid 32a, a bottom tamper 34, and a tamping spring 36 according to the present invention taken along line 4-4 of FIG. 3 is shown in FIG. 4. A volume (or coffee holder interior) 38 is provided inside the coffee holder 30a to receive loose coffee 41. A passage 33 in the lid 32a is provided for the nozzle 19 (see FIG, 2).

[0027] A cross-sectional side view of the first coffee holder 30a taken along line 4-4 of FIG. 3 showing an empty coffee holder 30a with the tamping spring 36 and the bottom tamper 34 ready for filling are shown in FIG. 5A. A cross-sectional side view of the first coffee holder 30a taken along line 4-4 of FIG. 3 showing the coffee holder 30a with the tamping spring 36 and bottom tamper 34, a portion of loose coffee 41, and the holder lid 32a ready to attach is shown in FIG. 5B. A cross-sectional side view of the first coffee holder 30a taken along line

K-FEE SYSTEM GMBH, EX2009, page 1333
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

4-4 of FIG. 3 showing the coffee holder 30a with the tamping spring 36 and bottom tamper 34, a portion of coffee in the volume 38, and the holder lid 32a ready to attach is shown in FIG. 5C. A cross-sectional side view of the first coffee holder 30a taken along line 4-4 of FIG. 3 showing the coffee holder 30a with the tamping spring 36 and bottom tamper 34, a portion of loose coffee 41 in the volume 38, and the holder lid 32a attached to the coffee holder 30a, is shown in FIG. 5D.

[0028] A top view of the first holder lid 32a showing the passage 33 provided for the nozzle 19 (see FIG, 2) is shown in FIG. 6.

[0029] A side view of a filter paper cup 40 according to the present invention is shown in FIG. 7A and a top view of the filter paper cup 40 is shown in FIG. 7B. The filter paper cup 40 includes a bottom 40b, sides 40a, and a rim 40c. The rim 40c rests on a top edge of the holder body 31 and is held between the holder cap and body when the cap is placed on the body, thereby preventing or restricting the escape of coffee 41 from the cup 40 when hot water flows into the coffee holder 30a.

[0030] A second embodiment of the filter paper cup 40' with a folding paper lid 40d is shown in FIG. 7C. The lid 40d of the filter paper cup 40' may be folded over the cup 40' after loose coffee is poured into the cup. The lid 40d preferably includes a perforation 40e centered on the lid 40d allowing the nozzle 19 to enter and/or inject the hot flow of water into the tamped coffee 41.

[0031] The filter cups may be made from several materials including filter paper, nylon mesh, steel mesh, or any material suitable for filtration.

[0032] The first coffee holder 30a is shown ready for insertion into a first coffee maker 10a in FIG. 8A, the first coffee holder 30a is shown inserted into the coffee maker 10 before tamping the coffee 41 in FIG. 8B, and the first coffee holder 30a is shown in the coffee maker 10 after tamping the coffee 41 in FIG. 8C. The coffee maker includes a cavity 11 for accepting the coffee holder and has walls 11a for aligning the coffee holder in the coffee maker. When the lid 14 is closed, the pad 17 on the bottom of the lid 14 and/or arms 25 attached to the bottom of the lid 25, push the coffee holder 30a down over the tamping spring 36 and the coffee 41 is tamped between the lid 32a and the bottom tamper 34. The arms 25 push the coffee holder 30a down ahead of the nozzle 19 thereby seating the coffee holder 30a in the cavity 11 for alignment of the nozzle 10 with the passage 33 in the lid 32a.

[0033] A side view of a second coffee holder 30b according to the present invention is show n in FIG. 9 and a cross-sectional side view of the second coffee holder 30b taken along line 10-10 of FIG. 9 is shown in FIG. 10. The coffee holder 30b includes the holder body 31, a second holder lid 32b, a tamping spring 36, a spring washer 35a, and a top tamper 35b.

[0034] A cross-sectional side view of the second coffee holder 30b taken along line 10-10 of FIG. 9 showing an empty coffee holder 30b is shown in FIG. 11A. A cross-sectional side view of the second coffee holder 30b taken along line 10-10 of FIG. 9 showing the holder lid 32b and a loose portion of coffee 41 above the empty coffee holder 30b is shown in FIG. 11B. A cross-sectional side view of the second coffee holder 30b taken along line 10-10 of FIG. 9 showing the holder lid 32b above the coffee holder 30b with the portion of loose coffee 41 in the coffee holder 32b is shown in FIG. 11C. A cross-sectional side view of the second coffee holder 32b taken along line 10-10 of FIG. 9 showing the coffee holder with the holder lid 32b attached to the coffee holder 30b and a portion of loose coffee 41 in the coffee holder 30b is shown in FIG. 11D. The tamping spring 36 extends upward out of the coffee holder 30b for tamping the loose coffee as disclosed hereafter.

[0035] A top view of the second holder lid 32b is shown in FIG. 12. The holder lid 32b includes a larger passage 33a allowing passage of the tamping spring 36 through the holder lid 32b.

[0036] A top view of the bottom tamper 34 is shown in FIG. 13. The bottom tamper 34 includes perforations 34a to allow coffee drink to pass through the bottom tamper 34.

[0037] The second coffee holder 30b is shown ready for insertion into the coffee maker 10 in FIG. 14A, the second coffee holder 30b is shown inserted into the coffee maker 10 before tamping the coffee 41 in FIG. 14B, and the second coffee holder 30b is shown in the coffee maker 10 after tamping the coffee 41 in FIG. 14C. The coffee maker 10 may include a long nozzle 19a to reach the top tamper 35b for "injection" of the heated water into the tamped coffee, but may also include the nozzle 19 and the heated water may pass through the coffee 41 under the pull of gravity.

[0038] A side view of a third coffee holder 30c according to the present invention is shown in FIG. 16 and a cross-sectional side view of the third coffee holder 30c taken along line 16-16 of FIG. 15 is shown in FIG. 16. The coffee holder 30c includes the holder body 31, the second holder lid 32b, the bottom tamper 34, and the top tamper 35b.

[0039] A cross-sectional side view of the third coffee holder 30c taken along line 16-16 of FIG. 15 showing the coffee holder 30c with the holder lid 32b, the top tamper 35b, and a portion of coffee, ready to attach to the holder 31, is shown in FIG. 17A. A cross-sectional side view of the third coffee holder taken along line 16-16 of FIG. 15 showing the coffee holder 30c with the holder lid 32b and the top tamper ready to attach, and a portion of coffee 41 in the coffee holder, is shown in FIG. 17B. A cross-sectional side view of the third coffee holder 30c taken along line 16-16 of FIG. 15 showing the coffee holder with the holder lid and the top tamper attached and a loose portion of coffee 41 in the coffee holder is shown in FIG. 17C. The coffee holder 30c is configured to use with a coffee make 10b (see FIGS. 18A-18C) including apparatus for entering the coffee holder for tamping the loose coffee 41.

[0040] The third coffee holder 30c ready for insertion

K-FEE SYSTEM GMBH, EX2009, page 1334
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

into a second coffee maker 10b in FIG. 18A, the third coffee, holder 30c is shown residing in the coffee maker 10b before tamping the coffee 41 in FIG. 18B, and the third coffee holder 30c is shown residing in the coffee maker 10b after tamping the coffee 41 in FIG. 18C. The coffee maker 10b includes the tamping spring 36 attached to the pad 17 on the bottom of the lid 14. When the lid 14 is closed the tamping spring 36 enters the coffee holder 30c through the lid passage 33a (see FIG. 12) and pushes the top tamper 35b against the coffee 41 to tamp the coffee 41.

[0041] A side view of a fourth coffee holder 30d according to the present invention is shown in FIG. 19 and a cross-sectional side view of the fourth coffee holder 30 taken along line 20-20 of FIG. 19 is shown in FIG. 20. The coffee holder 30d includes the holder body 31, the first holder lid 32a, and the bottom tamper 34.

[0042] A cross-sectional side view of the fourth coffee holder 30d taken along line 20-20 of FIG. 19 showing the coffee holder with the bottom tamper 34, and a portion of coffee 41 and the holder lid ready to attach is shown in FIG. 21A. A cross-sectional side view of the fourth coffee holder 30d taken along line 20-20 of FIG. 19 showing the coffee holder 30d with the bottom tamper 34, the portion of coffee 41 in the coffee holder 30d, and the holder lid 32a ready to attach is shown in FIG. 21B. A cross-sectional side view of the fourth coffee holder 30d taken along line 20-20 of FIG. 19 showing the coffee holder 30d with the bottom tamper 34, a portion of coffee in the coffee holder 41, and the holder lid 32a is shown in FIG. 21C.

[0043] The fourth coffee holder 30d ready for insertion into another embodiment of the second coffee maker 10b in FIG. 22A, the fourth coffee holder 30d is shown residing in the coffee maker 10b before tamping the coffee 41 in FIG. 22B, and the fourth coffee holder 30d is shown residing in the coffee maker 10b after tamping the coffee 41 in FIG. 22C. The coffee maker 10b may include the tamping spring 36 residing in the bottom of the coffee holder cavity 11. When the lid 14 is closed, the pad 17 pushed the coffee holder 30d down over the tamping spring 36 and the tamping spring 36 enters the coffee holder 30c through the bottom of the holder body 31 and pushes the bottom tamper 34 against the coffee 41 to tamp the coffee 41.

[0044] The fourth coffee holder 30d ready for insertion into another embodiment of the second coffee maker 10b in FIG. 23A, the fourth coffee holder 30d is shown residing in the coffee maker 10b before tamping the coffee 41 in FIG. 23B, and the fourth coffee holder 30d is shown residing in the coffee maker 10b after tamping the coffee 41 in FIG. 23C. The coffee maker 10b may include a resilient solid block 42 residing in the bottom of the coffee holder cavity 11. When the lid 14 is closed, the pad 17 pushed the coffee holder 30d down over the resilient solid block 42 and the resilient solid block 42 enters the coffee holder 30c through the bottom of the holder body 31 and pushes the bottom tamper 34 against the coffee 41 to tamp the coffee 41.

[0045] A side view of a fifth coffee holder 30e according to the present invention is shown in FIG. 24 and a cross-sectional side view of the fifth coffee holder 30e taken along line 25-25 of FIG. 24 is shown in FIG. 25. The fifth coffee holder 30e includes the holder body 31, the holder lid 32b, the tamping spring 36 and the top tamper 35b attached to the holder lid 32a.

[0046] A cross-sectional side view of the fifth coffee holder 30e taken along line 25-25 of FIG. 24 showing the coffee holder 30e with a portion of coffee 41, and the holder lid 32b with the top tamper 35b and tamping spring 36 attached, above the holder body 31, is shown in FIG. 26A. A cross-sectional side view of the fifth coffee holder 30e taken along line 25-25 of FIG. 24 showing the coffee holder with the portion of coffee 41 in the coffee holder, and the holder lid 32b with the top tamper 35b and tamping spring 36 attached, above the holder body 31, is shown in FIG. 26B. A cross-sectional side view of the fifth coffee holder 30e taken along line 25-25 of FIG. 24 showing the coffee holder 30e with the portion of coffee 41 in the coffee holder 30e, and the holder lid 32b with the top tamper 35b and tamping spring 36 attached to the holder base 31 is shown in FIG. 26D. The tamping spring 36 and top tamper 35b tamp the coffee 41 to provide a tamped coffee when the holder lid 32b is attached to the holder base 31.

[0047] A side view of a sixth coffee holder 30f according to the present invention is shown in FIG. 27 and a cross-sectional side view of the sixth coffee holder 30f taken along line 28-28 of FIG. 27 is shown in FIG. 28. The sixth coffee holder 30f includes the holder body 31 and a third holder lid 32c. The third holder lid 32c includes a recessed portion 32' which reaches into the interior of the sixth coffee holder 30f. The recessed portion 32' is preferably a solid resilient material.

[0048] A cross-sectional side view of the sixth coffee holder 30f taken along line 28-28 of FIG. 27 showing the sixth coffee holder 30f with a portion of coffee 41, and the holder lid 32c, above the holder body 31, is shown in FIG. 29A. A cross-sectional side view of the sixth coffee holder 30f taken along line 28-28 of FIG. 27 showing the coffee holder with the portion of coffee 41 in the coffee holder, and the holder lid 32c above the holder body 31, is shown in FIG. 29B. A cross-sectional side view of the sixth coffee holder 30f along line 28-28 of FIG. 27 showing the sixth coffee holder 30f with the portion of coffee 41 in the coffee holder 30e, and the holder lid 32e attached to the holder base 31 is shown in FIG. 26D. A cushion 32' tamps the coffee 41 to provide a tamped coffee when the holder lid 32e is attached to the holder base 31. The cushion 32' is preferably made from a resilient material to cushion the tamping of fhe loose coffee.

[0049] A side view of a seventh coffee holder 30g according to the present invention is shown in FIG. 30 and a cross-sectional side view of the seventh coffee holder 30g taken along line 31-31 of FIG. 30 is shown in FIG. 31. The seventh coffee holder 30g includes the holder

K-FEE SYSTEM GMBH, EX2009, page 1335
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

body 31, the holder lid 32b, the tamping spring 36, and the bottom tamper 34 inside the holder base 31.

[0050] A cross-sectional side view of the seventh coffee holder 30g taken along line 31-31 of FIG. 30 showing the seventh coffee holder 30g with a portion of coffee 41 and the holder lid 32a above the holder body 31, and with the bottom tamper 34 and tamping spring 36 inside the holder base 31, is shown in FIG. 26A. A cross-sectional side view of the seventh coffee holder 30g taken along line 31-31 of FIG. 30 showing the coffee holder with the portion of coffee 41 in the filter paper 40 in the holder base 31 resting on the bottom tamper 34 supported by the tamping spring 36, and the holder lid 32a above the holder body 31, is shown in FIG. 26B. A cross-sectional side view of the seventh coffee holder 30g taken along line 31-31 of FIG. 30 showing the seventh coffee holder 30g with the portion of coffee 41 in the coffee holder 30e, and the holder lid 32a attached to the holder base 31, is shown in FIG. 26D. The tamping spring 36 and bottom tamper 34 tamp the coffee 41 upward against the tamper lid 32a to provide a tamped coffee when the holder lid 32a is attached to the holder base 31.

[0051] A side view of an eighth coffee holder 30h according to the present invention is shown in FIG. 33, a cross-sectional side view of the eighth coffee holder 30h taken along line 34-34 of FIG. 33 showing a portion of coffee 41 for placing inside the coffee holder and a fourth holder lid 32d with an insertable portion and an O-Ring 50 inside the coffee holder for sealing is shown in FIG. 34A, and a cross-sectional side view of the eighth coffee holder taken along line 34-34 of FIG. 33 showing the portion of coffee 41 inside the coffee holder 30h and the holder lid 32d with the insertable portion inserted into the coffee holder base 31a is shown in FIG. 34B. The filter paper 40 extends up above the O-ring 50 and the O-Ring 50 cooperates with the holder lid 32d to sandwich the top edge of the filter paper 40 for sealing the filter paper 40 to reduce or prevent the coffee 41 from escaping when the flow of hot water is provided to the coffee holder 30h. The holder base 31a is preferably cylindrical but may also be conical in shape.

[0052] A side view of a ninth coffee holder 30i according to the present invention is shown in FIG. 35, a cross-sectional side view of the ninth coffee holder 30i taken along line 36-36 of FIG. 35 showing a portion of coffee 41 for placing inside the coffee holder and a fifth holder lid 32e with a threaded portion for screwing inside the holder base 31b for sealing is shown in FIG. 36A, and a cross-sectional side view of the ninth coffee holder 30i taken along line 36-36 of FIG. 35 showing the portion of coffee 41 inside the coffee holder and the holder lid 32e with the threaded portion screwed into the coffee holder and tamping the coffee 41 is shown in FIG. 36B. The threads both provide tamping and sealing the coffee to reduce or prevent the coffee 41 from escaping when the flow of hot water is provided to the coffee holder 30h. The holder base 31b is preferably cylindrical to facilitate having internal threads, and at least the threaded portion is preferably cylindrical.

[0053] A third coffee maker 10c having a coffee holder 30 according to the present invention for receiving a portion of coffee and a tamping spring 36 for tamping the coffee is shown in FIG. 37A, the third coffee maker 10c with the coffee holder 30 holding the portion of coffee 41 is shown in FIG. 37B, and the third coffee maker 10c with the coffee holder 30 holding the portion of coffee 41 with the coffee maker lid 14 closed for tamping the coffee 41 is shown in FIG. 37C. When the lid 14 is closed, the pad 17 pushes the coffee holder 30 down and the tamping spring 36 enters the bottom of the coffee holder 30 to tamp the coffee 41. While attaching the lid 32a to the holder 30 is preferred in order to prevent coffee grounds from escaping the holder 30, the coffee maker 10c may also be used without the lid 32a and the pad 17 may serve to seal the coffee 41 in the holder 30. In this instance, the coffee maker lid 14 serves as a coffee holder lid.

[0054] A third coffee maker 10c having a coffee holder for receiving a portion of coffee and tamping spring 36 attached to the coffee maker lid 14 according to the present invention for tamping the coffee 41 when the coffee maker lid 14 is closed is shown in FIG. 38A, the third coffee maker with the coffee holder 30 holding the portion of coffee 41 is shown in FIG. 38B, and the third coffee maker 10c with the coffee holder 30 holding the portion of coffee 41 with the coffee maker lid 14 closed to push the tamping spring 36 into the coffee holder 30 for tamping the coffee 41 is shown in FIG. 38C.

[0055] A fourth coffee maker 10d having a third holder base 31c for receiving a packet 41a containing untamped coffee, a knife 50 for cutting the packet 41a open, and tamping spring 36 under the holder base 31c according to the present invention for tamping the coffee when the coffee maker lid is closed is shown in FIG. 39A, the fourth coffee maker 10d with the holder base 31c holding the packet 41a of untamped coffee is shown in FIG. 39B, and fourth coffee maker with the holder base 31c holding the packet of tamped coffee 41c with the coffee maker lid 14 closed to push the holder base down over the tamping spring 36 for tamping the coffee is shown in FIG. 39C. The coffee maker 10d includes a somewhat pointed nozzle 19b to puncture the packet 41 a to provide the flow of hot water to the tamped coffee in the packet 41 a. Known coffee packets include internal filters to allow a flow of hot water through the packet to make the coffee drink while preventing coffee grounds from escaping. The cut in the packet 41a made by the knife 50 allows the coffee drink to escape from the packet while filter material in the packet 41a prevent coffee grounds from escaping. The tamping spring 36 may also be attached to the lid 14 as in FIGS. 38A -38C.

[0056] The packet 41a may be an air tight pod containing coffee in filter paper and positioning the knife on the side of the holder base 31 c results in less likelihood of the knife 50 cutting the filter paper. The packet 41a is preferably air tight to maintain coffee freshness and may

K-FEE SYSTEM GMBH, EX2009, page 1336
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

be plastic, metal foil, or other air tight material which is sufficiently flexible to allow the coffee contained in the packet 41a to be tamped. Alternatively, the knife 50 may be eliminated when the packet 41 a is configured to burst under pressure to expose the coffee, for example, when the coffee maker tamps the coffee, the packet 41a also bursts. In one embodiment, filter paper 41 is inserted into the holder base 31 c without the knife 50, and the packet 41 a bursts during compacting to release the coffee into the filter paper.

[0057] Known coffee makers use a sealed cup or capsule having a somewhat ridged cup with a foil cover. Such cups might be compressible and used in the coffee maker 10d, however, a similar cup or capsule having a less ridged cup which may be compressed in the coffee maker 10d are more suitable for use in the coffee maker 10d to allow tamping of the coffee contained in the cup or capsule.

[0058] A fifth coffee maker 10e for horizontally receiving the coffee holder 30 is shown in FIG. 40A, the fifth coffee maker with the coffee holder 30 residing in the coffee maker is shown in FIG. 40B, and the fifth coffee maker with the coffee maker lid 14 closed and the tamping spring 36 entering the coffee holder 30 for tamping the coffee 41 is shown in FIG. 40C. The fifth coffee maker 10d may alternatively include a tamping spring entering the coffee holder top, or a resilient solid block pushed into the coffee holder 30 to tamp the coffee. Preferably, a horizontal ram 42a is actuated when the lid 14 is closed and pushed the coffee holder 30 against the spring 36 to tamp the coffee. The horizontal ram 42a may actuated by an electrical solenoid, by pressure, or by mechanical levers connected to the lid 14. The fifth coffee maker 10e may further include any of the features described above for other embodiments of the coffee maker according to the present invention and may be configured to use any of the coffee holders described above according to the present invention.

[0059] A side view of a tenth coffee holder 30j with straight walls according to the present invention is shown in FIG. 41, and a cross-sectional view of the tenth coffee holder 30j taken along line 42-42 of FIG. 41 showing an empty coffee holder is shown in FIG. 42. The coffee holder 30j provides straight cylindrical inside walls allowing a better fit between the top tamper 35b and the inside walls to reduce or eliminate coffee 41 escaping past the top tamper 35b during tamping.

[0060] A cross-sectional view of the tenth coffee holder 30j taken along line 42-42 of FIG. 41 showing a full and tamped coffee holder is shown in FIG. 43. The tamping spring 36 has been pushed down by the lid 32b to tamp the coffee 41.

[0061] A side view of an eleventh coffee holder 30k with straight walls according to the present invention is shown in FIG. 44, a cross-sectional view of the eleventh coffee holder 30k taken along line 45-45 of FIG. 44 showing an empty coffee holder is shown in FIG. 45, and a cross-sectional view of the eleventh coffee holder 30k taken along line 45-45 of FIG. 41 showing a full and tamped coffee holder. As with the coffee holder 30j, the coffee holder 30k provides straight cylindrical inside walls allowing a better fit between the lid 32f and the inside walls to reduce or eliminate coffee 41 escaping past the lid 32f during tamping. The lid 32f may be used with or without the top tamper 35b.

[0062] A side view of a top tamper 35b is shown in FIG. 47A and a top view of the top tamper 35B is shown in FIG. 47B. A side view of a top tamper 35b' with a seal 60 according to the present invention is shown in FIG. 47C and a top view of the top tamper 35b' with the seal 60 is shown in FIG. 47D. In some instances, for example with a very fine ground coffee, an amount of coffee may escape past the top tamper 35b. In such instances, a user may prefer to use the top tamper 35b' with the seal 60 to reduce or eliminate the escape of the coffee.

[0063] A perspective view of a filter paper cup 40' with a folding cup lid 40d is shown in FIG. 48 (also see FIG. 7C). The cup lid 40d may be folded over the rim 40c to reduce or prevent coffee from escaping during tamping of subsequent processing. The lid 40d may also include a perforation 40e centered on the lid 40d allowing the nozzle 19 to enter and/or inject the hot flow of water into the tamped coffee 41, but in some embodiments, the lid 40d does not include the perforation 40e. The filter paper cup 40' may be used in the coffee containers described herein, and may able be used in a coffee machine having a cavity for receiving the filter paper cup 40'. While the cup 40' is preferably made from filter paper, the cup may also be made from a reusable mech.

[0064] A side view of an twelfth coffee holder 301 with straight walls according to the present invention is shown in FIG. 49, and a cross-sectiorial view of the twelfth coffee holder 301 taken along line 50-50 of FIG. 49 showing an empty coffee holder is shown in FIG. 50. The twelfth coffee holder 301 includes a straight walled base and the tamping spring below the coffee, and additionally uses a filter paper cup 40' with the folding lid 40d.

[0065] A cross-sectional view of the twelfth coffee holder 301 taken along line 50-50 of FIG. 49 showing the lid 32a, coffee 41, the filter paper cup 40' with lid 40d, above the coffee holder base 31a is shown in FIG. 51A, a cross-sectional view of the twelfth coffee holder 301 taken along line 50-50 of FIG. 49 showing the lid 32a, above the coffee 41 and the filter paper cup 40' resting in the coffee holder base 31a is shown in FIG. 51B, a cross-sectional view of the twelfth coffee holder 301 taken along line 50-50 of FIG. 49 showing the lid 32a, above the coffee 41 and the filter paper cup 40' resting in the coffee holder base 31 a with the filter paper cover 40d folded over the coffee 41 in the filter paper cup 40' is shown in FIG. 51C, and a cross-sectional view of the twelfth coffee holder 301 taken along line 50-50 of FIG. 49 showing the lid 32a attached to the base 31a with the coffee 41 and the filter paper cup 40' residing in the coffee holder base 31a with the coffee 41 tamped is shown in FIG. 51D. In embodiments with the coffee 41 partially exposed above the

K-FEE SYSTEM GMBH, EX2009, page 1337
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

base 31 a, some coffee 41 may escape during tamping. Using the filter paper cup 40' having the fold over paper lid 40d reduces or eliminates such escape of coffee 41 and additionally provides a drum like taut surface for consistent puncturing

[0066] A side view of a thirteenth coffee holder 30m with a releaseable tamping latch 64 according to the present invention is shown in FIG. 52 and a cross-sectional view of the thirteenth coffee holder 30m taken along line 53-53 of FIG. 52 showing an empty coffee holder is shown in FIG. 53. The latch 64 is held in a latched position by a spring loaded lever 62 on the exterior of the base 31a.

[0067] A cross-sectional view of the thirteenth coffee holder 30m taken along line 53-53 of FIG. 52 showing the lid 32a, coffee 41, the filter paper cup 40, above the base 31a, and the coffee holder base 31a, with the tamping latch 64 retaining the bottom tamper 34 is shown in FIG. 54A, a cross-sectional view of the thirteenth coffee holder 30m taken along line 53-53 of FIG. 52 showing the lid 32a above the coffee 41 and the filter paper cup 40 resting in the coffee holder base 31a, with the tamping latch 64 retaining the bottom tamper 34 is shown in FIG. 54B, a cross-sectional view of the thirteenth coffee holder 30m taken along line 53-53 of FIG. 52 showing the lid 32a, above the coffee 41 and the filter paper cup 40 resting in the coffee holder base 31a with the tamping latch 64 retaining the bottom tamper 34 is shown in FIG. 54C, and a cross-sectional view of the fourteenth coffee holder 30m taken along line 53-53 of FIG. 52 showing the lid 32a attached to the base 31a with the coffee 41 and the filter paper cup 40 residing in the coffee holder base 31a with tamping latch 64 released and the coffee 41 tamped is shown in FIG. 54D. The lever 62 thus holds the latch 64 until the lever 62 is pushed to release the latch 62 to release the bottom tamper 34 to tamp the coffee 41.

[0068] A side view of a fourteenth coffee holder 30n with a releaseable tamping latch 64 according to the present invention is shown in FIG. 55 and a cross-sectional view of the fourteenth coffee holder taken along line 56-56 of FIG. 55 showing an empty coffee holder is shown in FIG. 56. The lever 62 holds the latch 64 until the arm 66 attached to the lid 32g pushes the lever 62 to release the latch 64.

[0069] A cross-sectional view of the fourteenth coffee holder 30n taken along line 56-56 of FIG. 55 showing the lid 32g, coffee 41,and the filter paper cup 40, above the coffee holder base 31a, with the tamping latch 64 retaining the bottom tamper 34 is shown in FIG 57A, a cross-sectional view of the fourteenth coffee holder 30n taken along line 56-56 of FIG. 55 showing the lid 32g above the coffee 41 and the filter paper cup 40 resting in the coffee holder base 31a, with the tamping latch 64 retaining the bottom tamper 34 is shown in FIG. 57B, a cross-sectional view of the fourteenth coffee holder 30n taken along line 56-56 of FIG. 55 showing the lid 32g, above the coffee 41and the filter paper cup 40 resting in the coffee holder base 31a with the tamping latch 64 released but just prior to tamping (the bottom tamper has been released but has not moved upward against the coffee 41) is shown in FIG. 57C, and a cross-sectional view of the fourteenth coffee holder 30n taken along line 56-56 of FIG. 55 showing the lid 32g attached to the base with the coffee 41 and the filter paper cup 40 residing in the coffee holder base31 a with tamping latch 64 released and the coffee 41 tamped is shown in FIG. 57D. The lever 62 thus holds the latch 64 until the lever 62 is pushed by the arm 66 to release the latch 64 to release the bottom tamper 34 to tamp the coffee 41.

[0070] A side view of a fourteenth coffee holder 30o with a releaseable tamping lock according to the present invention is shown in FIG. 58 and a cross-sectional view of the fourteenth coffee holder 30o taken along line 59-59 of FIG. 58 showing an empty coffee holder is shown in FIG. 59. The coffee holder 30o includes a tamping lock 70 which engages a second bottom tamper 34' to hold the second bottom tamper in a down position for filling the coffee holder with coffee and releases the bottom tamper 34' to be pushed upwards by the tamping spring 36 to tamp the coffee after the holder lid 32b is attached to the base 31a.

[0071] A cross-sectional view of the fourteenth coffee holder 30o taken along line 59-59 of FIG. 58 showing a lid 32b, coffee 41, a filter paper cup 40, above the coffee holder base 31, with the tamping lock 70 retaining the bottom tamper 34' is shown in FIG. FIG. 60A, cross-sectional view of the fourteenth coffee holder taken along line 59-59 of FIG. 58 showing the lid, above the coffee and the filter paper cup resting in the coffee holder base, with the tamping latch retaining the bottom tamper 34' is shown in FIG. FIG. 60B, a cross-sectional view of the fourteenth coffee holder taken along line 59-59 of FIG. 58 showing the lid, above the coffee and the filter paper cup resting in the coffee holder base prior to tamping is shown in FIG. 60A, and a cross-sectional view of the fourteenth coffee holder taken along line 59-59 of FIG. 58 showing the lid 32b attached to the base 31a with the coffee 41 and the filter paper cup 41 residing in the coffee holder base 31a with tamping lock released and the coffee tamped is shown in FIG. 60D.

[0072] A top view of a tamping lock 70 according to the present invention is shown in FIG. 61A and a bottom view of a second bottom tamper 34' which cooperates with the tamping lock 70 according to the present invention is shown in FIG. 61B. The tamping lock 70 includes teeth 72 which are inserted between and turned to engage lips 74 on the bottom of the bottom tamper 34' to hold the bottom tamper in the down position for filling the coffee holder 30o with coffee 41. After the coffee holder 30o is filled with coffee and the holder lid 32b attached, the tamping lock is twisted to release the bottom tamper 32b to tamp the coffee.

[0073] A pre-packaged rimmed brewing pod 41b for use in the coffee making according to the present invention is shown in FIG.62A, a cut away view of the pre-packaged brewing material 41a for use in the coffee mak-

K-FEE SYSTEM GMBH, EX2009, page 1338
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ing showing the pod 41b is shown in FIG. 62B, and a coffee holder 30p having a window 77 is shown in Fig. 62C. The pod 41b is generally suitable for use in any of the coffee holders 30a-30o described above. The pod 41b further includes an identification feature 76 to provide information to the coffee maker to properly brew the specific brewing material 41 in the pod 41b. The rim of the pod 41b is captured by the lid of the coffee holder 30p thereby providing a drum like (or taut) surface for consistent puncturing by the pointed nozzle 19b (see FIGS. 39A-39C).

[0074] The pre-packaged rimmed brewing pod 41b is shown residing in a coffee holder 30p in FIG. 62D with the identification feature 76 cooperating with a sensor 78 residing in or near the cavity 11 of the coffee maker, and a coffee holder 30q having the identification feature 76 affixed to the coffee holder 30d is shown in FIG. 62E with the identification feature 76 cooperating with the sensor 78 residing in or near the cavity 11 of the coffee maker. The window 77 provides visual cooperation between the identification feature 76 and sensor 78 when necessary.

[0075] The identification feature 76 may be visual (for example any feature which may be read or a bar code), a readable magnetic strip, a Radio Frequency Identification (RFID), or any feature able to contain information and provide that information to a reader. The identification feature 76 may be read by a sensor 78 appropriately positioned in the cavity 11 of the coffee maker. The identification feature 76 may be on any surface of the prepackaged brewing material 41 a and in the instance of a visual identification feature 76, the window 77 may be positioned on the coffee holder 30p and the sensor may be positioned in the cavity 11 to correspond with the position of the visual identification feature 76. A window 77 is generally not required for a magnetic or RF identification feature 76 and the location of the corresponding sensor 78 generally only need be sufficiently near to the identification feature 76.

[0076] In another embodiment, a sensor 78 resides on the exterior of the coffee maker. A bulk brewing material container, a pre packaged pod, a coffee holder, a recipe book, or any apparatus carrying an identification feature, may be swept past the sensor or held against or near the sensor, to provide brewing information to the coffee maker.

[0077] A side view of a filter cup 80 according to the present invention is shown in FIG. 63A and a top view of the filter cup 80 is shown in FIG. 63B. The filter cup 80 includes a ring 84 made a of a material sufficiently strong to hold shape in the proposed use. Filter material 82 is attached to the ring 84. The filter cup 80 is insertable into the coffee holder and in many embodiments is a replacement for the filter paper cup 40.

[0078] A side view of multi-mode coffee maker 100 according to the present invention is shown in FIG. 64. The multi-mode coffee maker 100 allows the user to easily make a single cup of coffee or several cups of coffee. The multi-mode coffee maker 100 includes manually operated controls 102 for selecting a volume of water for a single cup of coffee or to fill a carafe, residing in the mouth 114 of the multi-mode coffee maker 100. The controls 102 may also allow selection of a large or small cup of coffee, and of hot water only. Alternatively, the multi-mode coffee maker 100 may detect the presence of a single cup adapter 118 and limit the volume of coffee produced to an amount for a single cup, for example as an override if a user accidentally selects a volume of coffee too large for a single cup.

[0079] A spout/drip valve 104 releases the desired amount of coffee into a carafe or coffee positioned on a platform 24, and a drip valve actuator (or valve lever) 106 is actuateable to open and close the spout/drip valve 104. In other examples, the drip valve actuator may be pneumatic, hydraulic, or electric, and may be any mechanical link which opens the spout/drip valve 104. The spout/drip valve 104 may further be manually opened by a user. For example, the spout/drip valve 104 is opened by placing the multi-cup brewed coffee container 26 in the coffee maker 100 and openable for use of the single cup brewed coffee container 116 by either a mechanical or electrically operated actuator or by positioning of the single cup adapter 118 for use of the single cup.

[0080] In another embodiment the spout/drip valve 104 is opened by the positioning of a single cup adapter into position for use of a single cup in the coffee maker, for example by an arm on the single cup adapter cooperating with a lever connected to the spout/drip valve, by an arm residing at the rear of the mouth, the single cup adapter pushing against the arm to open the spout/drip valve, or by any mechanical or electrical apparatus connected to the spout/drip valve and actuated by positioning the single cup adapter to use a single cup in the coffee maker. In still another embodiment the flow of brewed coffee is controlled by turning the pump 21 on and off, by controlling a boiler, or by controlling a valve preventing the flow of water to the coffee holder.

[0081] A hot plate 108 is recessed on the top surface of the platform 24 and the recess is larger than the footprint of the multi-cup brewed coffee container (or carafe) 26 allowing contact with the hot plate 108 for keeping a carafe at a minimum temperature. A passage 110 allows a finger 120 of a single cup adapter 118 (see FIG. 67B) to engage a switch 112 to turn off the hot plate 108 when the single cup adapter 118 is in use.

[0082] A front view of the multi-mode coffee maker 100 with a carafe 26 residing on the platform 24 for receiving a selected volume of coffee is shown in FIG. 65A and a side view of the multi-mode coffee maker 100 with the carafe 26 positioned for receiving a selected volume of coffee is shown in FIG. 65B. The top edge of the carafe 26 pushes the valve lever 106 upward opening the spout/drip valve 104 to allow the selected volume of coffee to flow into the carafe 26.

[0083] A front view of the multi-mode coffee maker 100 with a coffee cup (or single cup brewed coffee container) 116 residing on a single cup adapter 118 for receiving

K-FEE SYSTEM GMBH, EX2009, page 1339
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

the selected volume of coffee is shown in FIG. 66A and a side view of the multi-mode coffee maker 100 with the coffee cup residing on the single cup adapter 118 for receiving the selected volume of coffee is shown in FIG. 66B. The single cup adapter 118 includes an upward reaching arm portion 118b (see FIG.67B) which pushes the valve lever 106 upward opening the spout/drip valve 104 to allow the selected volume of coffee to flow into the coffee cup 116.

[0084] A front view of a single cup adapter 118 according to the present invention is shown in FIG. 67A, a side view of the single cup adapter 118 is shown in FIG. 67B, a top view of the single cup adapter 118 is shown in FIG. 67C, and a cross-sectional view of the single cup adapter 118 taken along line 68-68 of FIG. 67A is shown in FIG. 68. The single cup adapter 118 includes a base portion 118a which includes a single cup platform 129 for supporting the coffee cup 116 and a drip basin (or tray) 124 for catching and holding drops from the spout/drip valve 104. A grill 126 resides over the drip basin 124 and the coffee cup 116 rests on the grill 126. An arm portion 118b reaches up and an angled surface 128 at the top of the arm portion 118b cooperates with the valve lever 106 to open the spout/drip valve 104 when the single cup adapter 118 is positioned in the coffee maker 100 In another embodiment, the drip tray may be integrated into the coffee maker 100 and may pivot or slide into position under the coffee cup 116, for example, the single cup adapter 118 may have an open side or rear that the drip tray slides or pivots into.

[0085] A downward protrusion 122 on the bottom of the base portion 118a fits into a recess in the platform 24 to correctly position the single cup adapter 118 in the mouth 114 of the coffee maker 100, and to resist easy detachment of the single cup adapter 118 from the coffee maker 100. A rearward reaching finger 120 enters the passage 110 to actuate the switch 112 (see FIG. 64) to turn off the hot plate when the single cup adapter 118 is attached to the coffee maker 100. The finger 120 and switch 112 are one example of a means for turning off the hot plate 108 when the single cup adapter 118 is attached to the coffee maker 100. Other means include a magnet switch detecting the presence of the hot plate 108 in the single cup adapter 118 by the proximity of a magnet and piece of magnetically attractive metal or a second magnet, a switch in the platform, or even a manual switch, and a coffee maker according to the present invention with any switch for turning off the hot plate is intended to come within the scope of the present invention.

[0086] A side view of a second single cup adapter 118' according to the present invention is shown in FIG. 67D. The single cup adapter 118' is a compact version of the single cup adapter 118 and does not include the arm portion 118b. The single cup adapter 118' provide single serving functions through the insertion of the rearward reaching finger 120 into the coffee maker 100. These functions include shutting off the hot plate 108 (see FIG. 64), opens the open the spout/drip valve 104 to release brewed beverage, setting the coffee maker 100 to the single serving mode (limits the beverage to one to sixteen ounces).

[0087] A side view of a multi-serving dry coffee holder 130a according to the present invention for use in the multi-mode coffee maker 100 for making several cups of brewed coffee is shown in FIG. 69A and a side view of a single-serving dry coffee holder 130b according to the present invention for use in the multi-mode coffee maker 100 for making one cup of coffee is shown in FIG. 69B. A variety of dry coffee holders 30a-30o and means for containing and tamping dry coffee in a coffee maker are disclosed in FIGS. 3 though 63B, and a multi-mode coffee maker 100 including any of the coffee holders disclosed herein; or any other coffee holder, is intended to come within the scope of the present invention.

[0088] A coffee maker 210 and reuseable cartridge 230 according to the present invention are shown in FIG. 70, a side view of the reuseable cartridge 230, is shown in FIG. 71B, a top view of the reuseable cartridge 230 is shown in FIG. 71B, and a cross-sectional view of the reuseable cartridge according to the present invention taken along line 72-72 of FIG. 71B. The reuseable cartridge 230 comprises a cover 230a and a base 230b. The cover 230a is removeable from the base 230b to fill the reuseable cartridge 230 with brewing material 41. Generally, the reuseable cartridge 230 is filled by pouring loose coffee 41 into the base 230b. Once filled with the brewing material 41, the reuseable cartridge 230 is inserted into the cavity 211 of the coffee maker 210 and the lid 214 is closed. The lid 214 of the coffee maker 210 generally includes a projections 214a which engages recesses 236a of the cover 236 to urge the reuseable cartridge 230 into position in the cavity 211. A flow of water 232 (generally a flow of heated water) enters the reuseable cartridge 230, passes through the brewing material 41, and a flow of brewed beverage 234 exits the reuseable cartridge 230. An the identification feature 76 resides on a bottom surface providing the benefits described in FIGS. 62A-62E above. Such identification feature 76 may be attached other positions on the exterior of the reuseable cartridge 230.

[0089] A side view of a cover 230a of the reuseable cartridge 230 is shown in FIG. 73A, a top view of the cover 230a of the reuseable cartridge 230 is shown in FIG 73B, and a cross-sectional view of the cover 230a of the reuseable cartridge 230 taken along line 74-74 of FIG. 73B. The cover includes recesses 236a and 236b.

[0090] A side view of a base 230b of the reuseable cartridge 230 is shown in FIG.75A, a top view of the base 230b is shown in FIG. 75B, and a cross-sectional view of the base 230b taken along line 76-76 of FIG. 75B is shown in FIG.76. The base 230b includes entry port 238a for the flow of water 232, and exit port 238b for the flow of brewed beverage 234. The flow of water 232 enters the base 230a and much climb over the wall 240 to reach the interior of the 244 of the base 230b. Forcing the flow

K-FEE SYSTEM GMBH, EX2009, page 1340
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

of water 232 over the wall 240 causes the flow of water 232 to pass through the brewing material 41, thereby producing a rich brewed beverage. A filter 242 resides over the exit port 238b to prevent the brewing material 41 from escaping into a cup of brewed beverage.

[0091] A side view of a brewed beverage pod 250 for use in the reuseable cartridge 230 according to the present invention is shown in FIG. 77A and a top view of the brewed beverage pod 250 is shown in FIG. 77B. The brewed beverage pod 250 is shaped to conform reasonable well to the interior of the 244 of the base 230b and includes a passage 250a for the recess 236a in the cover 230a..

[0092] A side view of a filter paper 252 for use in the reuseable cartridge 230 according to the present invention is shown in FIG. 78A and a top view of the filter paper 252 is shown in FIG. 78B. The filter paper 252 is shaped to conform reasonable well to the interior of the 244 of the base 230b and includes a passage 252a for the recess 236a in the cover 230a.. The filter paper 252 includes a filter cover 252'. After inserting the filter paper 252 into the base 230b and filling the filter paper 252 with brewing material 41, the filter cover 252' is folded over the brewing material 41 and the cover 230a is pressed onto the base 230b. A rim 253 of the filter paper 252, and matching rim 253' of the filter cover 252' may be sandwiched between the cover 230a and base 230b to securely hold the filter cover 252' on the filter paper 252 to retain the brewing material 41 in the filter paper 252.

[0093] While the present invention is described above as placing loose coffee in a coffee holder, the invention may also be practiced by placing prepackaged coffee, for example coffee pods, into the coffee holder. Further, while the coffee holder is generally described as having a snap on lid, a screw on lid may also be used, and in general the various elements of different embodiments described above may be mixed to provide new embodiments and such new embodiments are intended to come within the scope of the present invention.

[0094] Further, many embodiments are described as including a coffee chamber comprising a filter paper cup. In many cases, a filter cup made of nylon mesh or metal mesh is equally suitable, and any coffee holder or combination of coffee maker and coffee holder including a filter chamber which holds coffee and allows the coffee to be tamped as described above is intended to come within the scope of the present invention regardless of the specific filter material. Further, those skilled in the art will recognize that the features of the various embodiments of the present invention disclosed herein may be combined to provide various combinations. All of such combinations are intended to come with the scope of the present invention.

Industrial Applicability

[0095] The present invention finds industrial applicability in the field of beverage makers.

Scope of the Invention

[0096] While the invention herein disclosed has been described by means of specific embodiments and applications thereof, numerous modifications and variations could be made thereto by those skilled in the art without departing from the scope of the invention set forth in the claims.

Claims

1. A self-tamping coffee holder (30) comprising:

   a coffee holder base (31) having an open top for receiving a removable filtering material cup (40) into a holder cavity (38) inside the coffee holder; the filtering material cup configured to receive a portion of untamped coffee (41);
   a holder lid (32) configured to engage and close the open top of the coffee holder base after receiving the filtering material cup and the portion of untamped coffee;
   a tamper (34) residing in the bottom of the coffee holder base configured to tamp the portion of untamped coffee.

2. The self-tamping coffee holder of claim 1, wherein the tamper comprises a bottom tamper (34) configured to reside in the bottom of the coffee holder base below the untamped coffee, the bottom tamper configured to tamp the portion of coffee upwards against the holder lid.

3. The self-tamping coffee holder of claim 2, wherein the bottom tamper comprises: a spring (36) residing in a bottom portion of the coffee holder base; and a tamper supported by the spring, the spring and tamper configured to tamp the filtering material containing the portion of untamped coffee against the holder lid.

4. The self-tamping coffee holder of claim 1, wherein the filtering material cup (40) is a filter paper cup (40).

5. The self-tamping coffee holder of claim 4, wherein the coffee holder base (31) is a frustoconical coffee holder base having a smaller bottom and larger top.

6. The self-tamping coffee holder of claim 4, wherein the filter paper cup (40) includes a rim (40c) configured to trap between the coffee holder (30) and holder lid (32).

7. The self tamping coffee holder of claim 6, wherein the filter paper cup (40) includes a cover having a cover rim overlapping the rim (40c) of the filter paper cup, the cover rim and the rim of the filter paper cup

K-FEE SYSTEM GMBH, EX2009, page 1341
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

are configured to trap between the coffee holder (30) and holder lid (32).

8. The self-tamping coffee holder of claim 7, wherein the cover rim is configured to be held taut between the coffee holder (30) and holder lid (32) to provide a drum-like surface for consistent puncturing by a nozzle (19) of a coffee maker.

9. The self tamping coffee holder of claim 8, wherein the cover rim is hingedly attached to the filter paper cup (40).

10. the self-tamping coffee holder of claim 9, wherein the holder lid (32) includes an opening (33) configured for passage of the nozzle (19) of the coffee maker.

11. The self-tamping coffee holder of claim 10, wherein the opening (33) in the holder lid (32) is permanently open.

12. The self-tamping coffee holder of claim 1, wherein the filtering material cup (40) is a mesh cup.

13. The self-tamping coffee holder of claim 12, wherein the mesh cup is a metal mesh cup.

14. A self-tamping coffee holder of claim 11, wherein the self-tamping coffee holder (30) is frustoconically shaped and the rim (40c) of the filter paper cup (40) configured to receive a portion of untamped coffee reaches radially outward from a top edge of the filter paper cup

15. A method for using a self-tamping coffee holder (30), the method comprising: placing a filter paper cup (40) inside a frustoconical shaped coffee holder base (31), the coffee holder base comprising:

a smaller diameter bottom;
a larger diameter top;
a holder cavity (38) inside the coffee holder base; and
the top open for receiving a removable filter paper cup (40);
positioning a rim (40c) reaching radially outward from a top edge of the filter paper cup over the top of the coffee holder base;
depositing a portion of untamped coffee (41) into the filter paper cup;
folding a hingedly attached cover of the filter paper cup over the rim of the filter paper cup;
pushing a holder lid (32) downward against the filter paper cup and the hingedly attached cover containing the portion of untamped brewing material downward into the holder base depressing a spring (36) and tamper (34) attached to the spring residing in the bottom of the holder base;
sandwiching the rim of the filter paper cup and an overlapping outside edge of the hingedly attached cover of the filter paper cup between the holder lid and the holder base;
holding the filter paper cover taut between the holder lid and holder base to provide a drum like surface for consistent puncturing by a nozzle (19) of a coffee maker (10), the holder lid including a permanently open passage (33) for the nozzle;
engaging a holder lid to, the holder base.

Patentansprüche

1. Selbst verdichtender Kaffeehalter (30), der Folgendes umfasst:

eine Kaffeehalterbasis (31), die eine offene Oberseite zum Aufnehmen einer abnehmbaren Filtermaterialschale (40) in einem Halterhohlraum (38) innerhalb des Kaffeehalters hat, wobei die Filtermaterialschale ausgelegt ist, um eine Dosis nicht verdichteten Kaffees (41) aufzunehmen,
einen Halterdeckel (32), der ausgelegt ist, um in die offene Oberseite der Kaffeehalterbasis nach dem Aufnehmen der Filtermaterialschale und der Dosis nicht verdichteten Kaffees einzugreifen und sie zu schließen,
einen Stampfer (34), der sich in dem Boden der Kaffeehalterbasis befindet, der ausgelegt ist, um die Dosis nicht verdichteten Kaffees zu verdichten.

2. Selbst verdichtender Kaffeehalter nach Anspruch 1, wobei der Stampfer einen Bodenstampfer (34) umfasst, der ausgelegt ist, um in dem Boden der Kaffeehalterbasis unterhalb des nicht verdichteten Kaffees zu liegen, wobei der Bodenstampfer ausgelegt ist, um die Kaffeedosis aufwärts gegen den Halterdeckel zu verdichten.

3. Selbst verdichtender Kaffeehalter nach Anspruch 2, wobei der Bodenstampfer Folgendes umfasst: eine Feder (36), die in einem Bodenabschnitt der Kaffeehalterbasis liegt, und einen Stampfer, der von der Feder getragen wird, wobei Feder und Stampfer ausgelegt sind, um das Filtermaterial, das die Dosis nicht verdichteten Kaffees enthält, gegen den Halterdeckel zu verdichten.

4. Selbst verdichtender Kaffeehalter nach Anspruch 1, wobei die Filtermaterialschale (40) eine Filterpapierschale (40) ist.

5. Selbst verdichtender Kaffeehalter nach Anspruch 4,

K-FEE SYSTEM GMBH, EX2009, page 1342
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

wobei die Kaffeehalterbasis (31) eine frustokonische Kaffeehalterbasis ist, die einen kleineren Boden und eine größere Oberseite hat.

6. Selbst verdichtender Kaffeehalter nach Anspruch 4, wobei die Filterpapierschale (40) einen Rand (40c) aufweist, der ausgelegt ist, um zwischen dem Kaffeehalter (30) und dem Halterdeckel (32) gefangen zu sein.

7. Selbst verdichtender Kaffeehalter nach Anspruch 6, wobei die Filterpapierschale (40) eine Abdeckung aufweist, die einen Abdeckungsrand hat, der den Rand (40c) der Filterpapierschale überlappt, wobei der Abdeckungsrand und der Rand der Filterpapierschale ausgelegt sind, um zwischen dem Kaffeehalter (30) und dem Halterdeckel (32) gefangen zu sein.

8. Selbst verdichtender Kaffeehalter nach Anspruch 7, wobei der Abdeckungsrand ausgelegt ist, um straff zwischen dem Kaffeehalter (30) und dem Halterdeckel (32) gehalten zu werden, um eine trommelähnliche Oberfläche zum konsistenten Durchstoßen durch eine Düse (19) der Kaffeemaschine bereitzustellen.

9. Selbst verdichtender Kaffeehalter nach Anspruch 8, wobei der Abdeckungsrand an der Filterpapierschale (40) gelenkig befestigt ist.

10. Selbst verdichtender Kaffeehalter nach Anspruch 9, wobei der Halterdeckel (32) eine Öffnung (33) aufweist, die für das Durchgehen der Düse (19) der Kaffeemaschine ausgelegt ist.

11. Selbst verdichtender Kaffeehalter nach Anspruch 10, wobei die Öffnung (33) in dem Halterdeckel (32) ständig offen ist.

12. Selbst verdichtender Kaffeehalter nach Anspruch 1, wobei die Filtermaterialschale (40) eine Siebschale ist.

13. Selbst verdichtender Kaffeehalter nach Anspruch 12, wobei die Siebschale eine Metallsiebschale ist.

14. Selbst verdichtender Kaffeehalter nach Anspruch 11, wobei der selbst verdichtende Kaffeehalter (30) frustokonisch geformt ist und der Rand (40c) der Filterpapierschale (40), der ausgelegt ist, um eine Dosis nicht verdichteten Kaffees aufzunehmen, radial von der Oberkante der Filterpapierschale nach außen reicht.

15. Verfahren zum Verwenden eines selbst verdichtenden Kaffeehalters (30), wobei das Verfahren Folgendes umfasst:

Platzieren einer Filterpapierschale (40) innerhalb einer frustokonisch geformten Kaffeehalterbasis (31), wobei die Kaffeehalterbasis Folgendes umfasst:

einen Boden mit kleinerem Durchmesser,
eine Oberseite mit größerem Durchmesser,
einen Halterhohlraum (38) innerhalb der Kaffeehalterbasis, und
wobei die Oberseite offen ist, um eine abnehmbare Filterpapierschale (40) aufzunehmen,

Positionieren eines Rands (40c), der radial von einer Oberkante der Filterpapierschale über die Oberseite der Kaffeehalterbasis nach außen reicht,
Ablegen einer Dosis nicht verdichteten Kaffees (41) in der Filterpapierschale,
Falten einer gelenkig befestigten Abdeckung der Filterpapierschale über den Rand der Filterpapierschale,
Hinunterdrücken eines Halterdeckels (32) gegen die Filterpapierschale und die gelenkig befestigte Abdeckung, die die Dosis nicht verdichteten Brühmaterials enthält, nach unten in die Halterbasis, wobei eine Feder (36) und ein Stampfer (34), der an der Feder befestigt ist, die in dem Boden der Halterbasis liegt, gedrückt wird,
Einschließen im Sandwich des Rands der Filterpapierschale und einer überlappenden Außenkante der gelenkig befestigten Abdeckung der Filterpapierschale zwischen dem Halterdeckel und der Halterbasis,
Straffhalten der Filterpapierabdeckung zwischen dem Halterdeckel und der Halterbasis, um eine trommelähnliche Oberfläche zum konsistenten Durchstoßen durch eine Düse (19) einer Kaffeemaschine (10) bereitzustellen, wobei der Halterdeckel einen ständig offenen Durchgang (33) für die Düse aufweist,
Einrasten eines Halterdeckels auf der Halterbasis.

Revendications

1. Récipient à café à tassage automatique (30) comprenant :

une base de récipient à café (31) ouverte sur le dessus, pour la réception d'un gobelet amovible en un matériau filtrant (40) dans une cavité de récipient (38) à l'intérieur du récipient à café ; le gobelet en matériau filtrant étant configuré pour recevoir une dose de café non tassé (41) ;
un couvercle de récipient (32) configuré pour

K-FEE SYSTEM GMBH, EX2009, page 1343
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

engager et fermer le dessus ouvert de la base du récipient à café, après réception du gobelet en matériau filtrant et de la dose de café non tassé ;
un tasseur (34) logé au fond de la base du récipient à café, configuré pour tasser la dose de café non tassé.

2. Récipient à café à tassage automatique selon la revendication 1, dans lequel le tasseur comprend un tasseur de fond (34) configuré pour se loger au fond de la base du récipient à café, sous le café non tassé, le tasseur de fond étant configuré pour tasser la dose de café vers le haut, contre le couvercle de récipient.

3. Récipient à café à tassage automatique selon la revendication 2, dans lequel le tasseur de fond comprend : un ressort (36) logé dans une partie de fond de la base du récipient à café ; et un tasseur supporté par le ressort, le ressort et le tasseur étant configurés pour tasser le matériau filtrant contenant la dose de café non tassé contre le couvercle de récipient.

4. Récipient à café à tassage automatique selon la revendication 1, dans lequel le gobelet en matériau filtrant (40) est un gobelet en papier filtre (40).

5. Récipient à café à tassage automatique selon la revendication 4, dans lequel la base de récipient à café (31) est une base de récipient à café frustoconique présentant un fond plus petit et un dessus plus grand.

6. Récipient à café à tassage automatique selon la revendication 4, dans lequel le gobelet en papier filtre (40) comprend un rebord (40c) configuré pour se coincer entre le récipient à café (30) et le couvercle de récipient (32).

7. Récipient à café à tassage automatique selon la revendication 6, dans lequel le gobelet en papier filtre (40) comprend un recouvrement présentant un rebord de recouvrement chevauchant le rebord (40c) du gobelet en papier filtre, le rebord de recouvrement et le rebord du gobelet en papier filtre étant configurés pour se coincer entre le récipient à café (30) et le couvercle de récipient (32).

8. Récipient à café à tassage automatique selon la revendication 7, dans lequel le rebord de recouvrement est configuré pour être tendu entre le récipient à café (30) et le couvercle de récipient (32) pour fournir une surface semblable à un tambour, destinée à être perforée de façon uniforme par un embout (19) d'une machine à café.

9. Récipient à café à tassage automatique selon la revendication 8, dans lequel le rebord de recouvrement est relié de façon pivotante au gobelet en papier filtre (40).

10. Récipient à café à tassage automatique selon la revendication 9, dans lequel le couvercle de récipient (32) comprend une ouverture (33) configurée pour laisser passer l'embout (19) de la machine à café.

11. Récipient à café à tassage automatique selon la revendication 10, dans lequel l'ouverture (33) dans le couvercle de récipient (32) est ouverte en permanence.

12. Récipient à café à tassage automatique selon la revendication 1, dans lequel le gobelet en matériau filtrant (40) est un gobelet en maille.

13. Récipient à café à tassage automatique selon la revendication 12, dans lequel le gobelet en maille métallique.

14. Récipient à café à tassage automatique selon la revendication 11, dans lequel le récipient à café à tassage automatique (30) présente une forme frustoconique et le rebord (40c) du gobelet en papier filtre (40) configurée pour recevoir une dose de café non tassé s'étend radialement vers l'extérieur, à partir d'un bord supérieur du gobelet en papier filtre.

15. Procédé pour l'utilisation d'un récipient à café à tassage automatique (30), le procédé comprenant :

la disposition d'un gobelet en papier filtre (40) à l'intérieur d'une base de récipient à café (31) de forme frustoconique, la base de récipient à café comprenant :

un fond à diamètre plus petit ;
un dessus à diamètre plus grand ;
une cavité de récipient (38) à l'intérieur de la base de récipient à café ; et
le dessus ouvert pour recevoir un gobelet en papier filtre (40) amovible ;

le positionnement d'un rebord (40c) s'étendant radialement vers l'extérieur à partir d'un bord supérieur du gobelet en papier filtre, par-dessus le haut de la base du récipient à café ;
le dépôt d'une dose de café non tassé (41) dans le gobelet en papier filtre ;
le repli d'un recouvrement relié de façon pivotante du gobelet en papier filtre, par-dessus le rebord du gobelet en papier filtre ;
l'abaissement d'un couvercle de récipient (32) contre le gobelet en papier filtre et le recouvrement relié de façon pivotante contenant la dose de produit non tassé à infuser, vers le bas dans la base du récipient, en poussant un ressort (36)

K-FEE SYSTEM GMBH, EX2009, page 1344
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

et un tasseur (34) relié au ressort logé au fond de la base du récipient ;
la mise en sandwich du rebord du gobelet en papier filtre et d'un bord extérieur superposé du recouvrement relié de façon pivotante du gobelet en papier filtre, entre le couvercle de récipient et la base de récipient ;
le maintien du recouvrement en papier filtre tendu entre le couvercle de récipient et une base du récipient pour fournir une surface semblable à un tambour, destinée à être perforée de façon uniforme par un embout (19) d'une machine à café (10), le couvercle de récipient comprenant un passage (33) ouvert en permanence pour l'embout ;
l'engagement d'un couvercle de récipient sur la base du récipient.

K-FEE SYSTEM GMBH, EX2009, page 1345
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

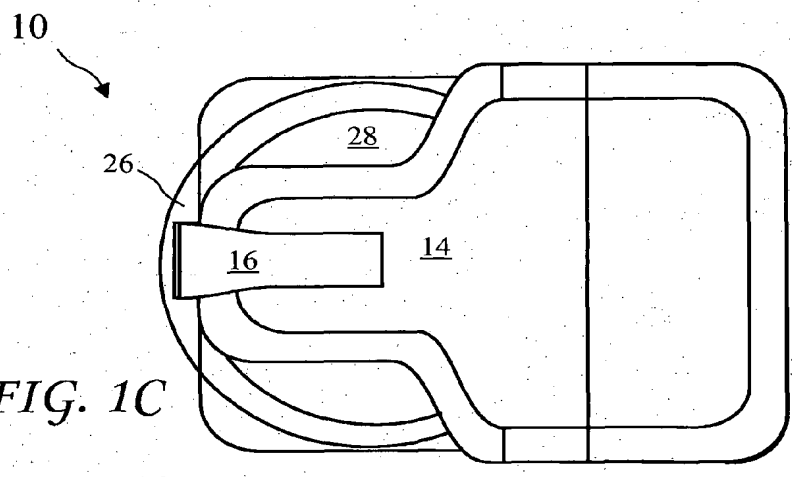


FIG. 1C

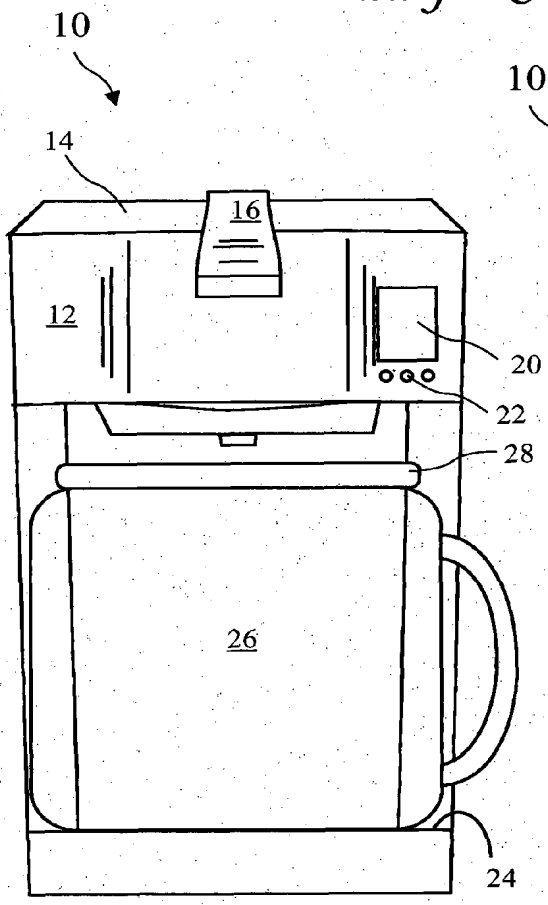


FIG. 1A

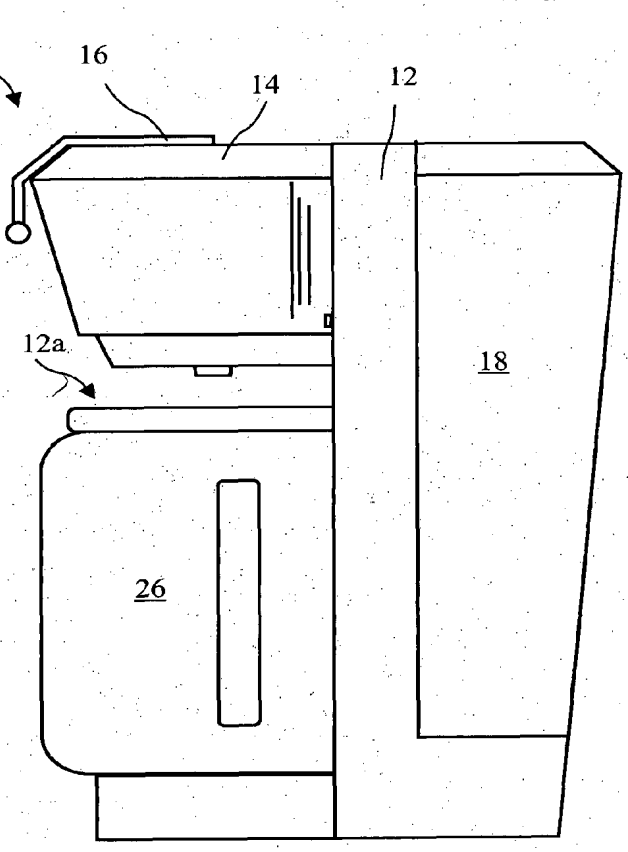


FIG. 1B

K-FEE SYSTEM GMBH, EX2009, page 1346
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

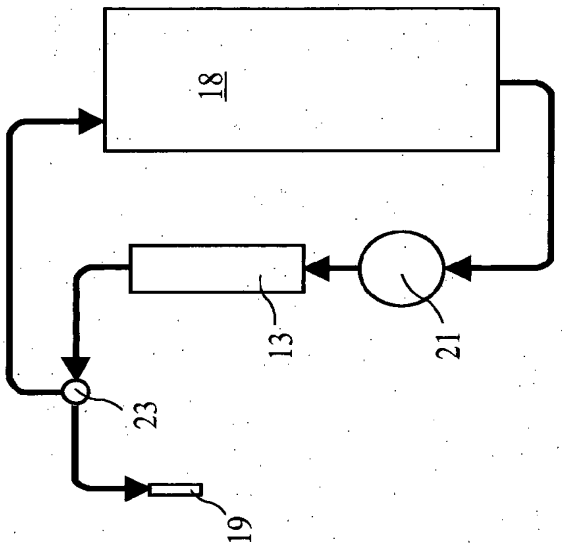


FIG. 2A

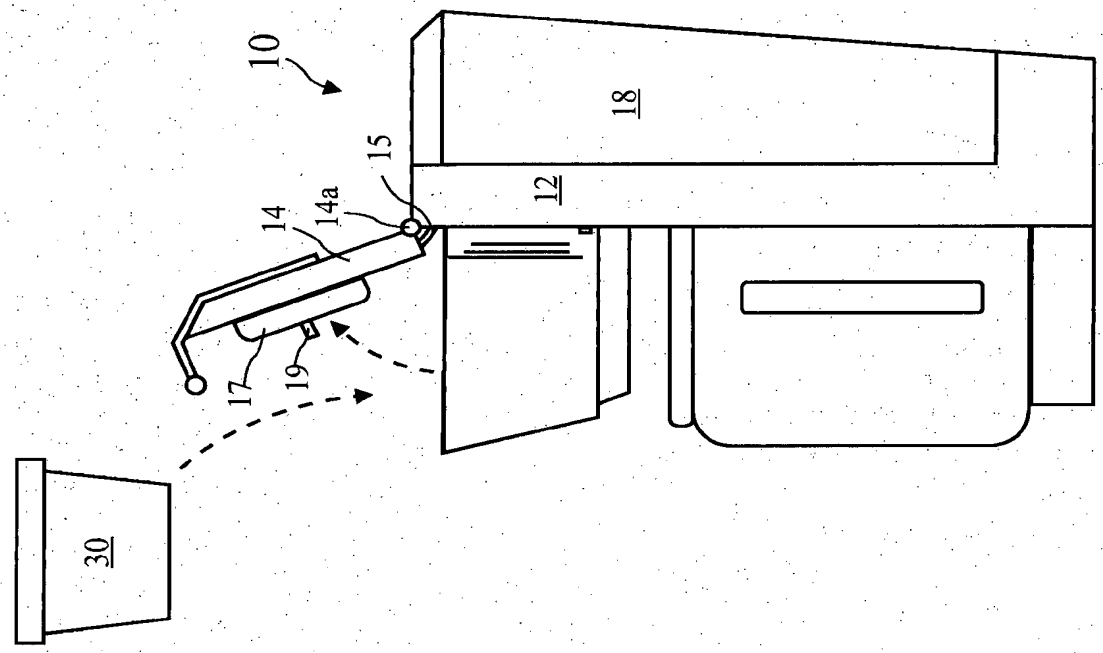


FIG. 2

K-FEE SYSTEM GMBH, EX2009, page 1347
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

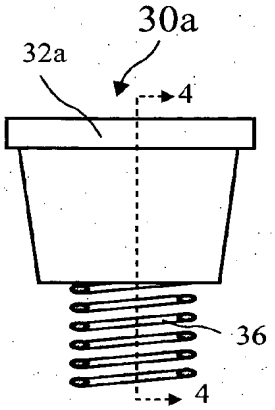


FIG. 3

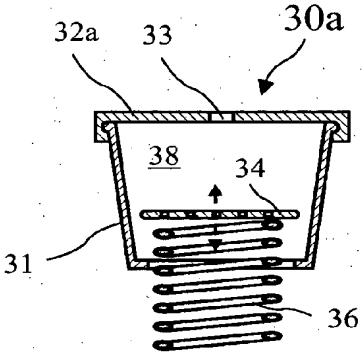


FIG. 4

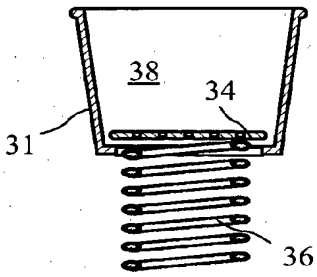


FIG. 5A

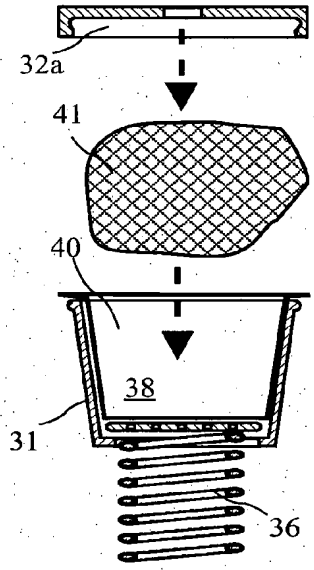


FIG. 5B

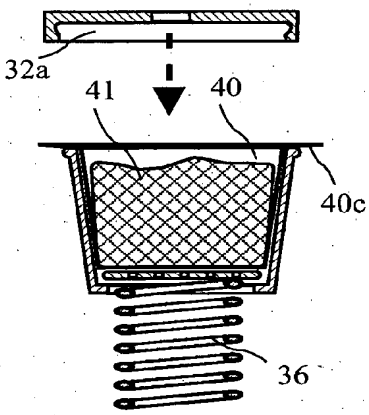


FIG. 5C

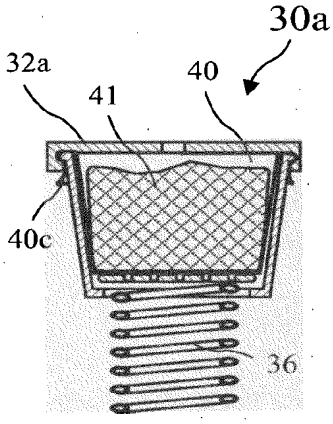


FIG. 5D

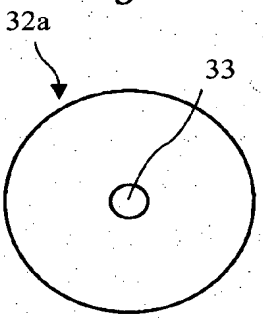


FIG. 6

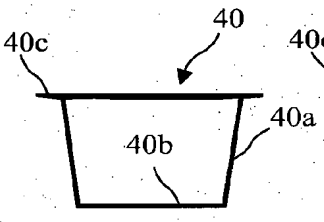


FIG. 7A

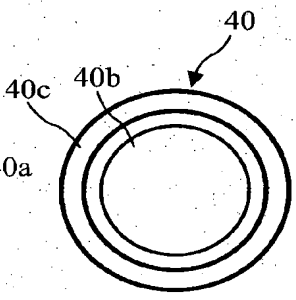


FIG. 7B

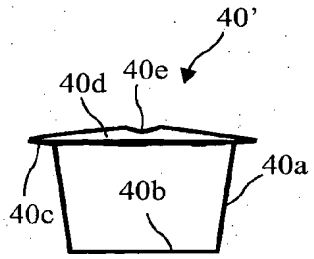


FIG. 7C

K-FEE SYSTEM GMBH, EX2009, page 1348
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

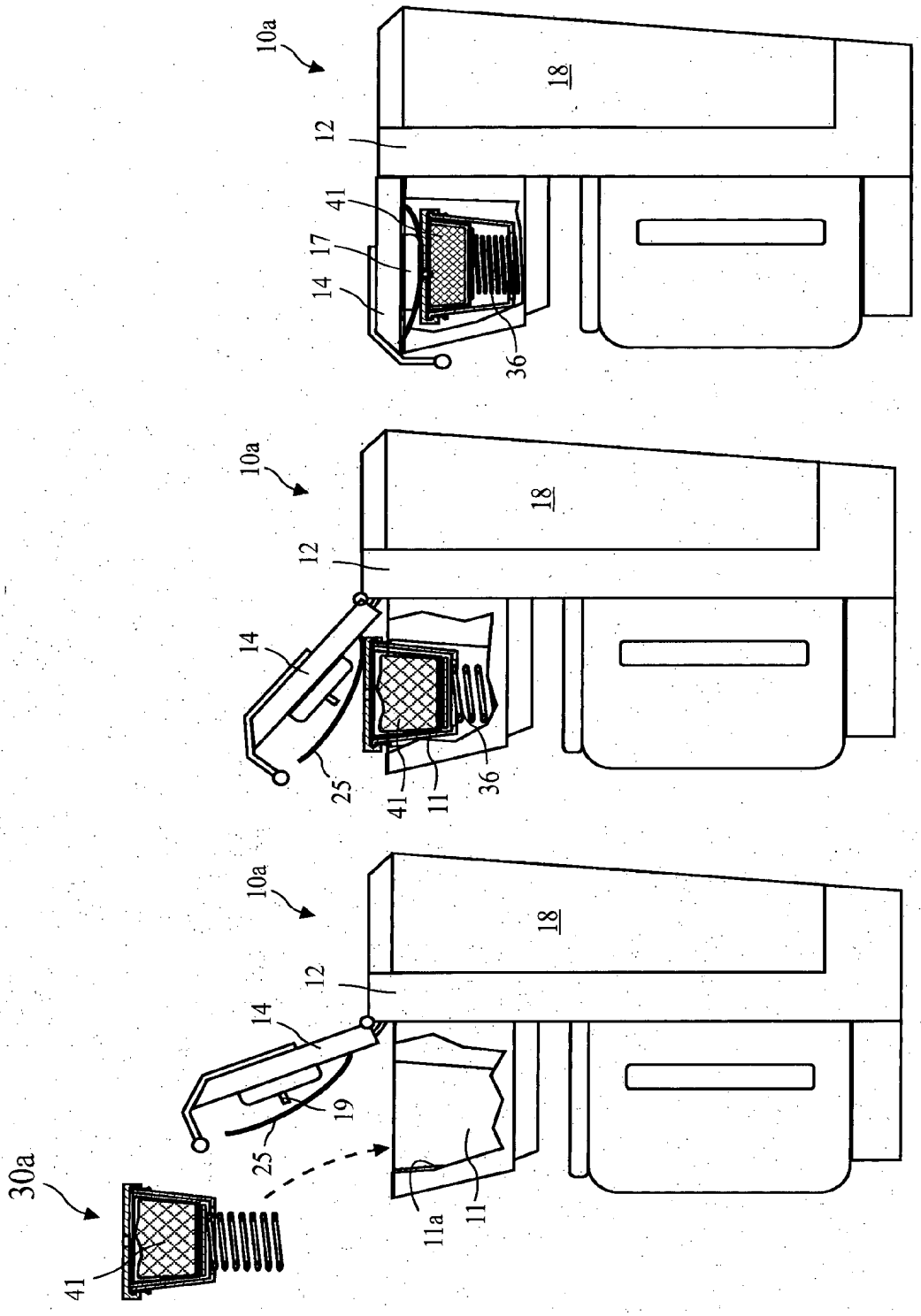


FIG. 8C

FIG. 8B

FIG. 8A

K-FEE SYSTEM GMBH, EX2009, page 1349
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

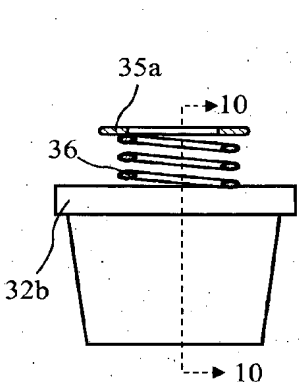


FIG. 9

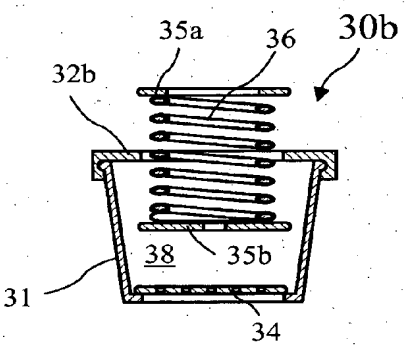


FIG. 10

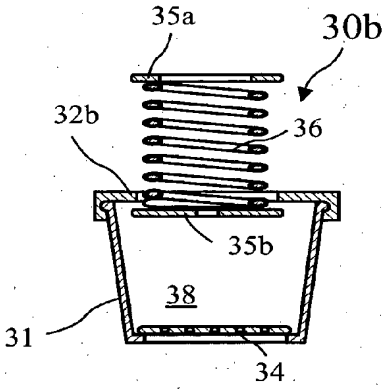


FIG. 11A

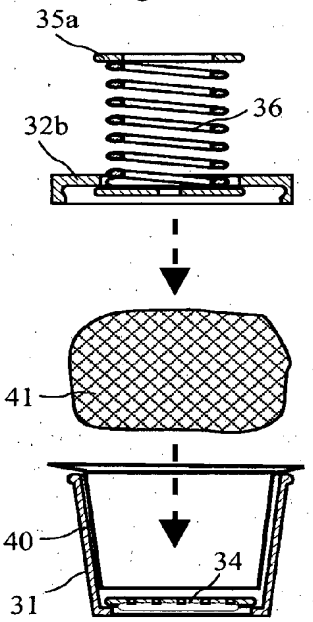


FIG. 11B

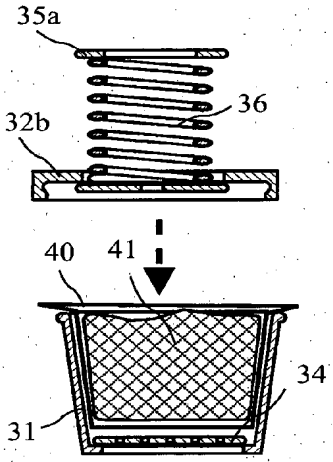


FIG. 11C

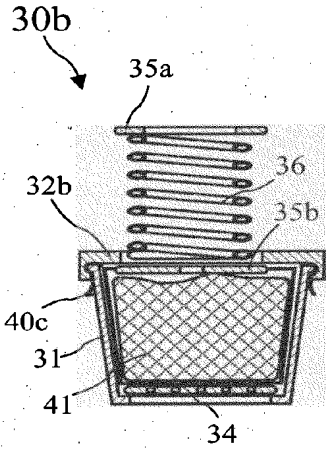


FIG. 11D

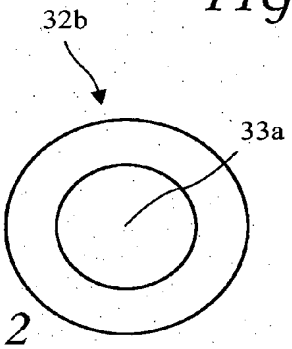


FIG. 12

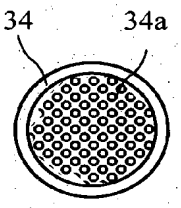


FIG. 13

K-FEE SYSTEM GMBH, EX2009, page 1350
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

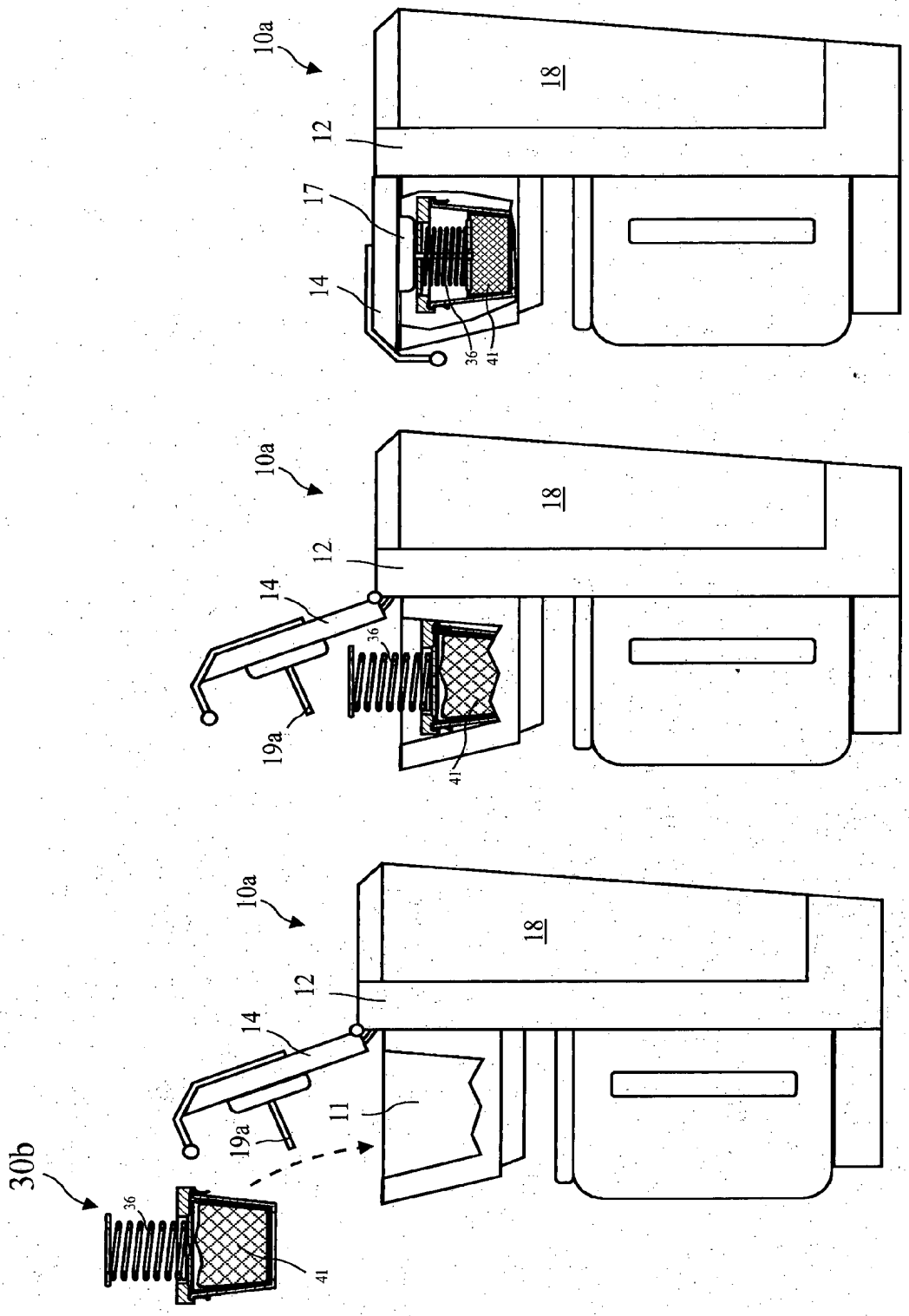


FIG. 14C

FIG. 14B

FIG. 14A

K-FEE SYSTEM GMBH, EX2009, page 1351
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

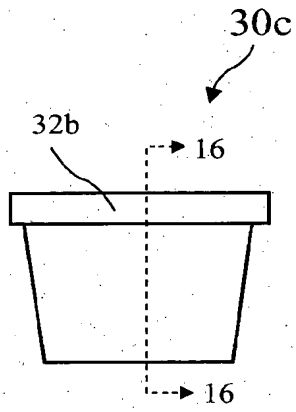


FIG. 15

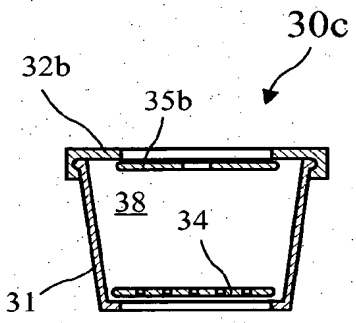


FIG. 16

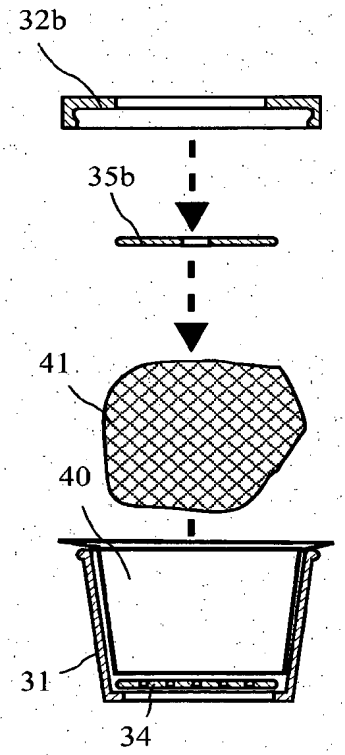


FIG. 17A

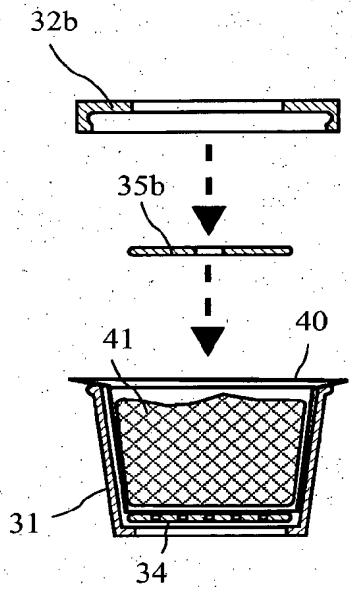


FIG. 17B

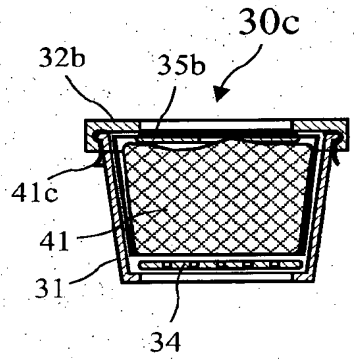


FIG. 17C

K-FEE SYSTEM GMBH, EX2009, page 1352
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

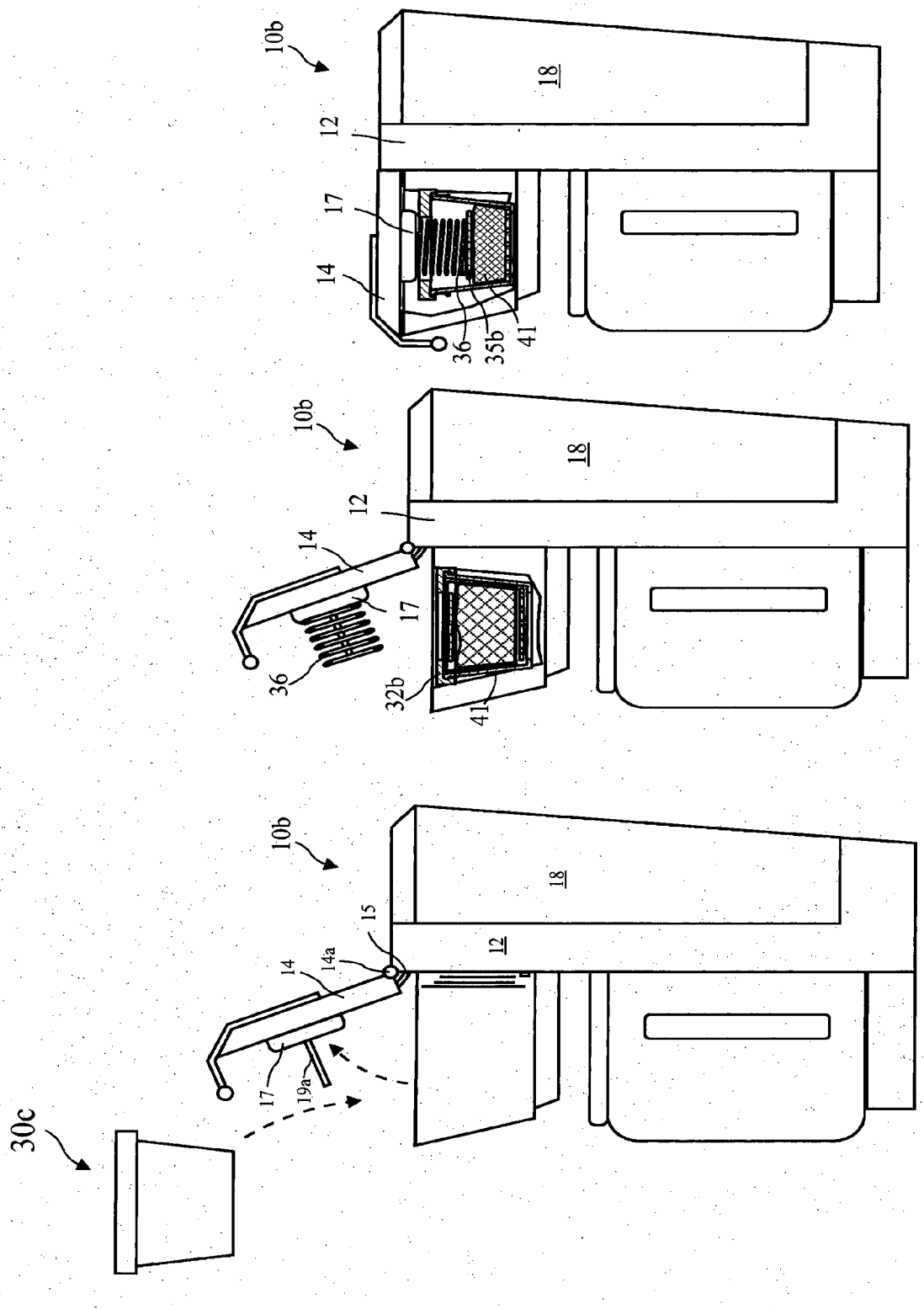


FIG. 18C

FIG. 18B

FIG. 18A

K-FEE SYSTEM GMBH, EX2009, page 1353
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

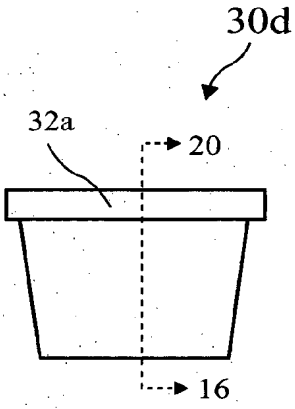


FIG. 19

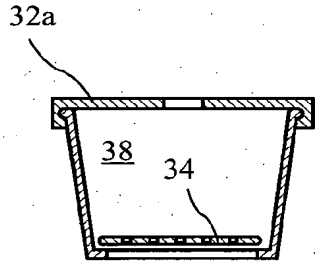


FIG. 20

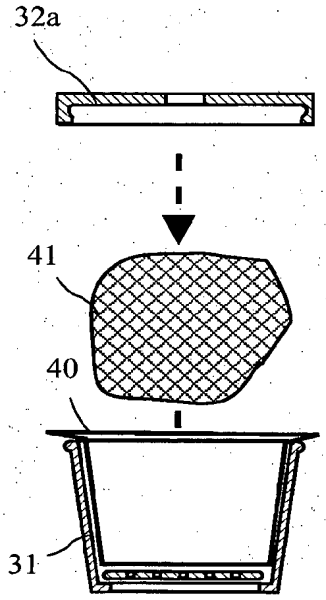


FIG. 21A

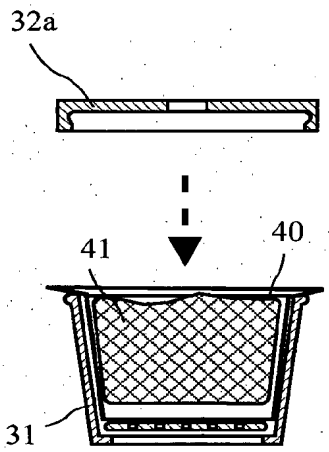


FIG. 21B

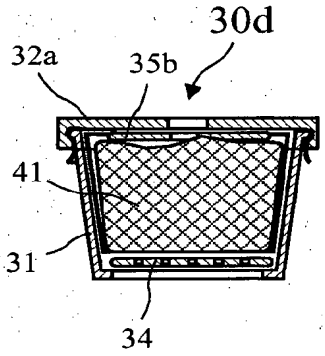


FIG. 21C

K-FEE SYSTEM GMBH, EX2009, page 1354
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

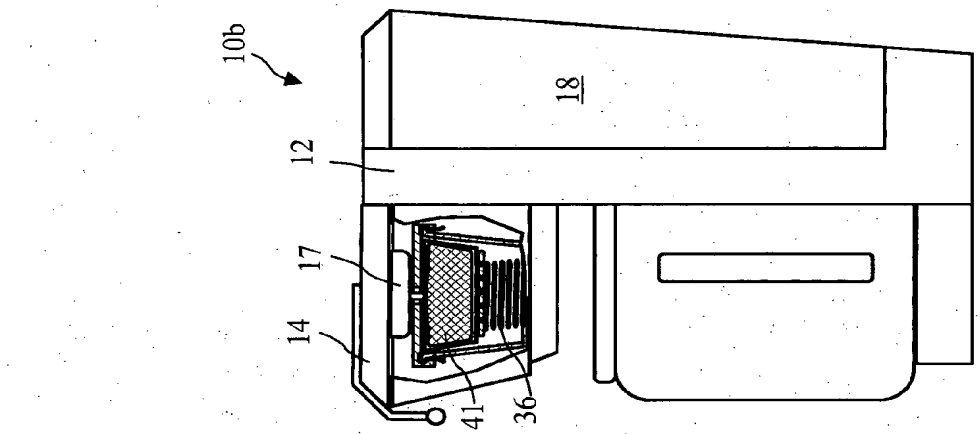


FIG. 22C

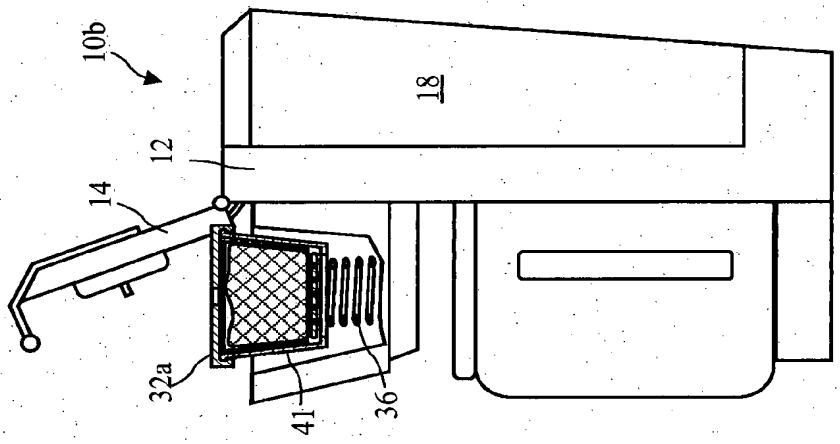


FIG. 22B

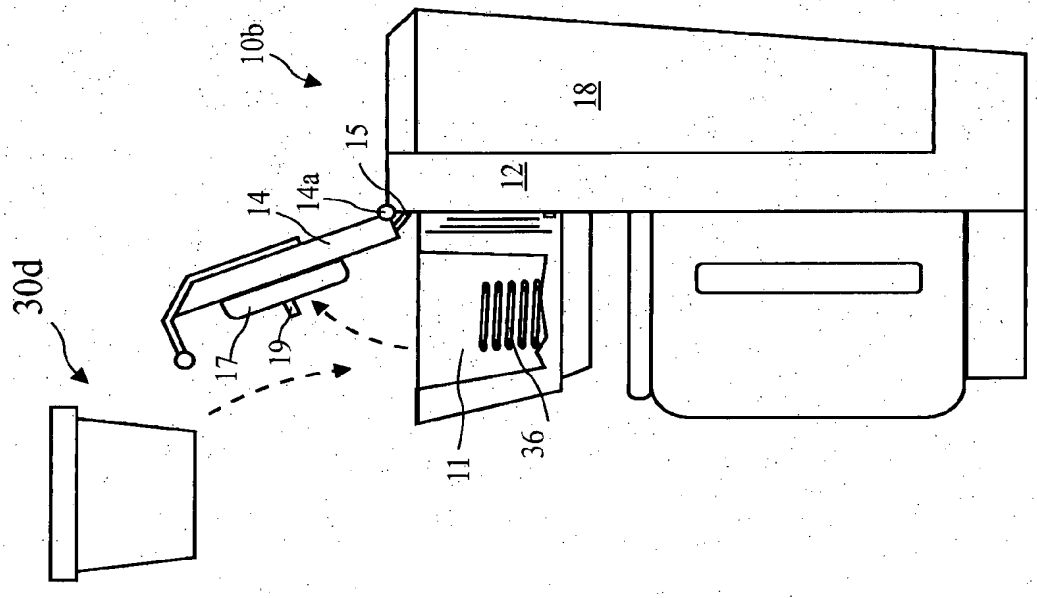


FIG. 22A

K-FEE SYSTEM GMBH, EX2009, page 1355
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

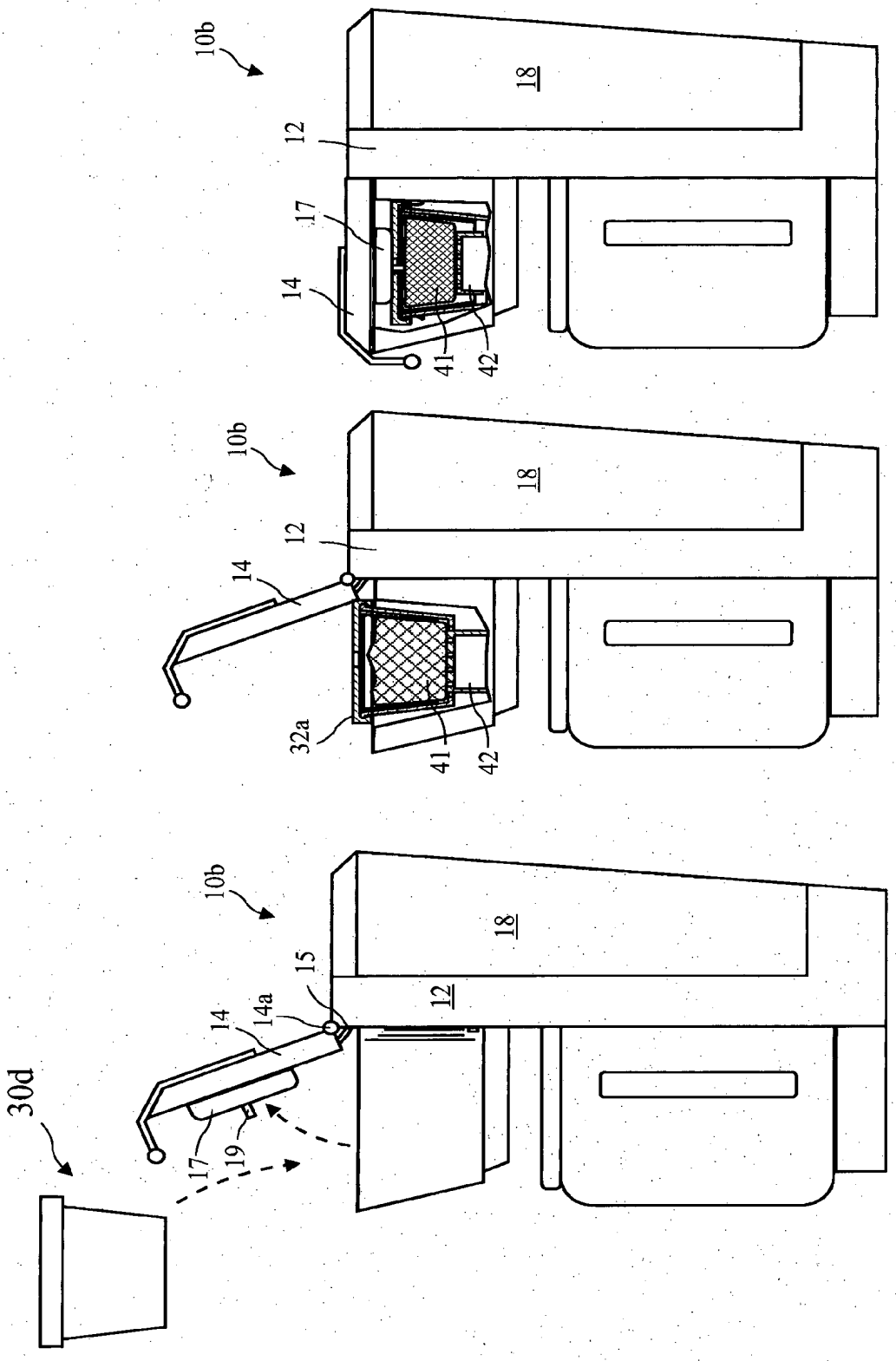


FIG. 23C

FIG. 23B

FIG. 23A

K-FEE SYSTEM GMBH, EX2009, page 1356
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

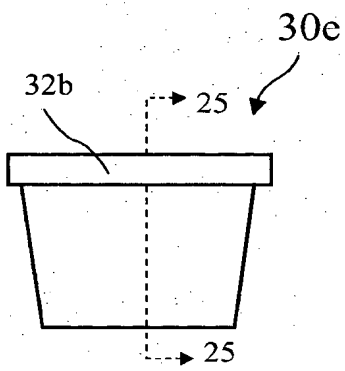


FIG. 24

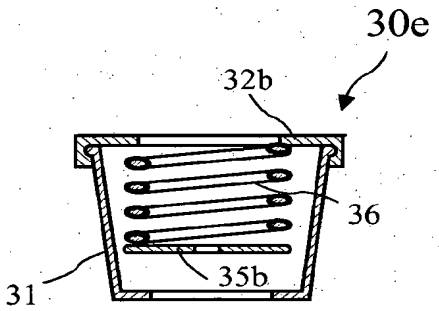


FIG. 25

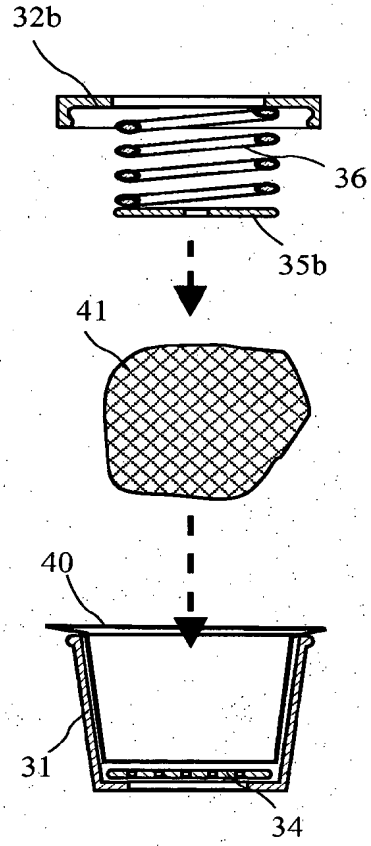


FIG. 26A

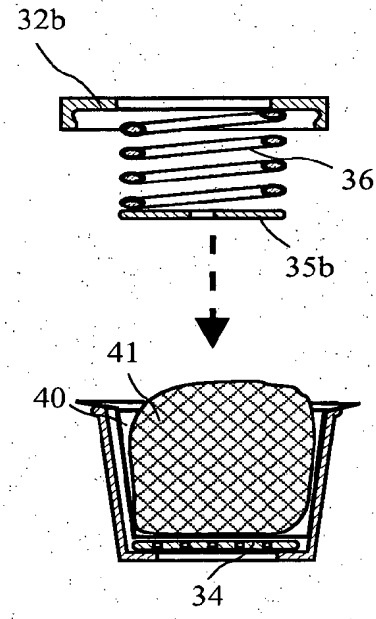


FIG. 26B

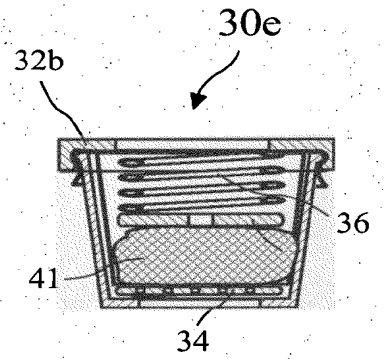


FIG. 26C

K-FEE SYSTEM GMBH, EX2009, page 1357
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

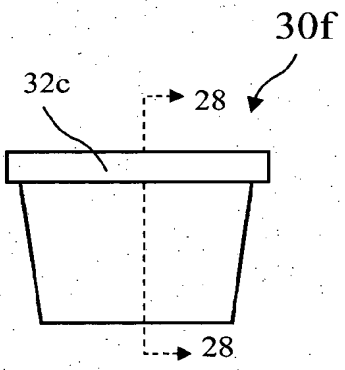


FIG. 27

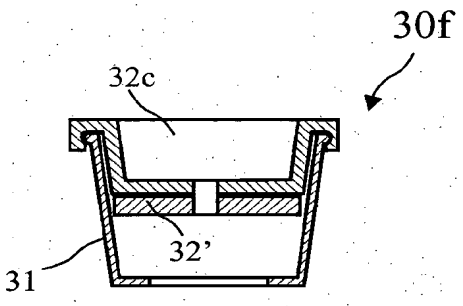


FIG. 28

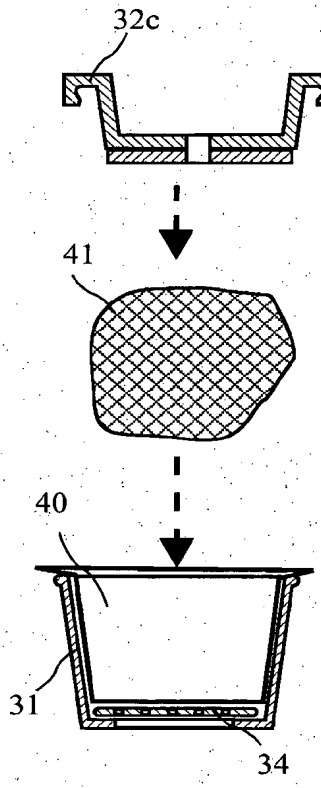


FIG. 29A

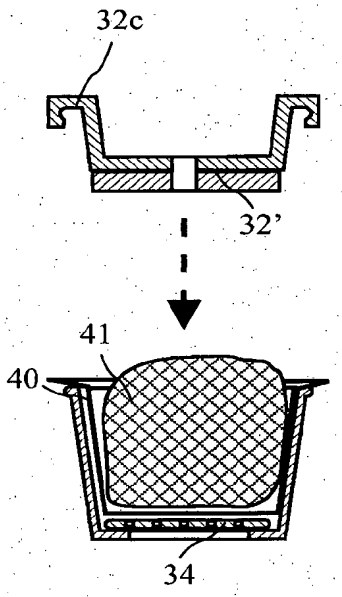


FIG. 29B

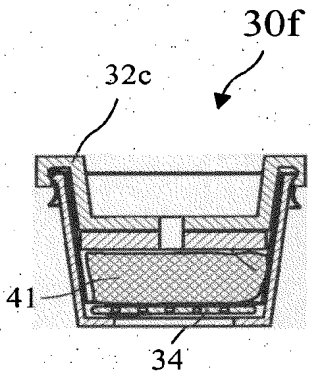


FIG. 29C

K-FEE SYSTEM GMBH, EX2009, page 1358
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

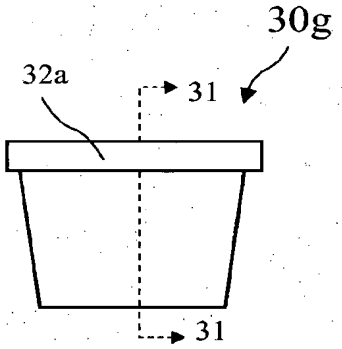


FIG. 30

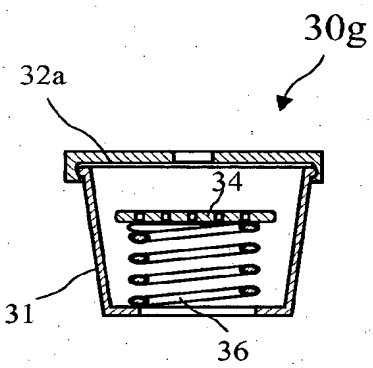


FIG. 31

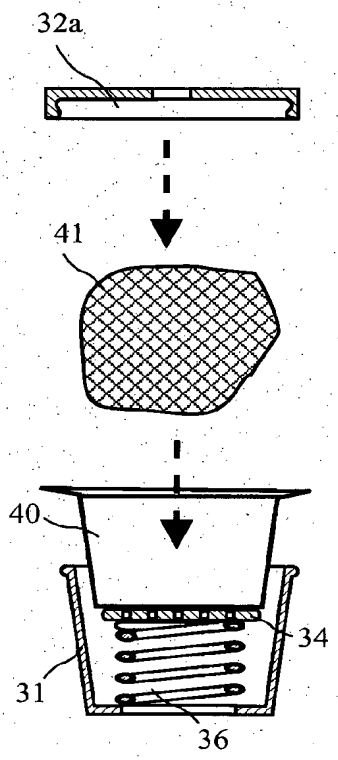


FIG. 32A

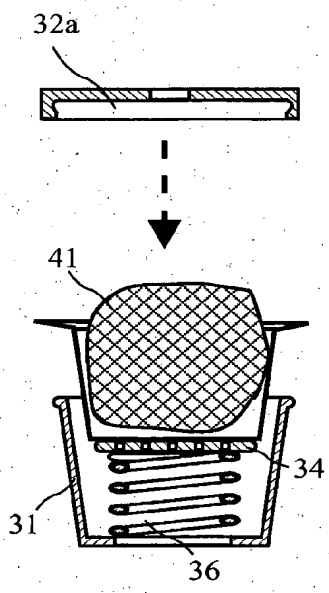


FIG. 32B

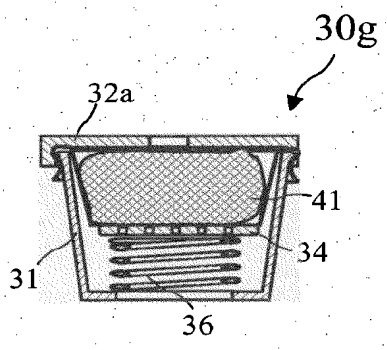


FIG. 32C

K-FEE SYSTEM GMBH, EX2009, page 1359
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

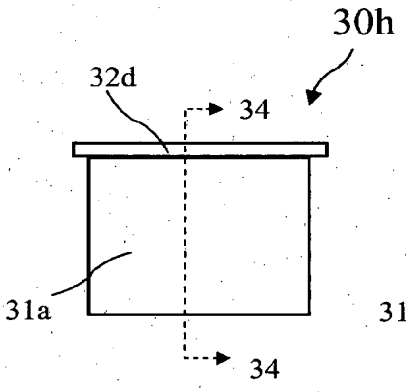


FIG. 33

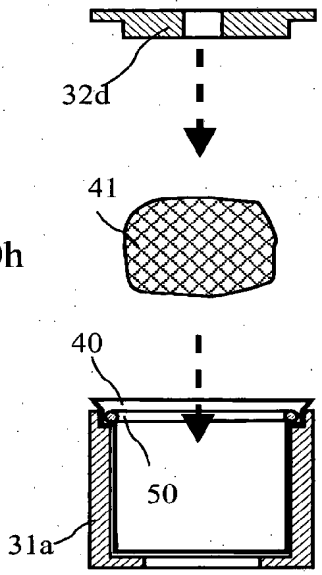


FIG. 34A

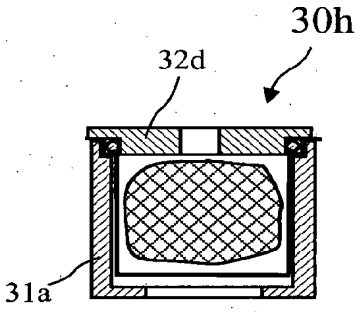


FIG. 34B

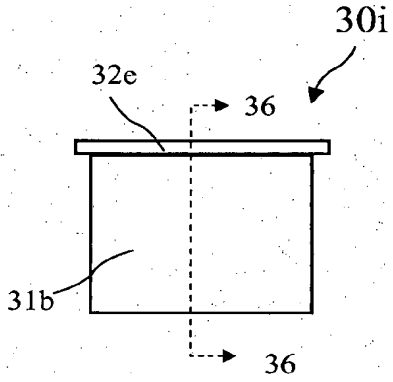


FIG. 35

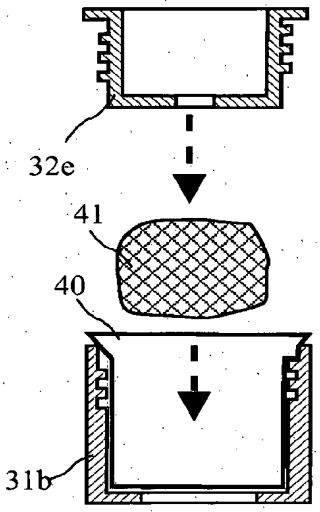


FIG. 36A

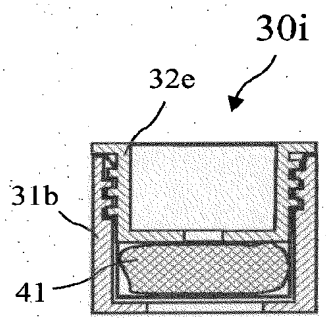


FIG. 36B

K-FEE SYSTEM GMBH, EX2009, page 1360
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

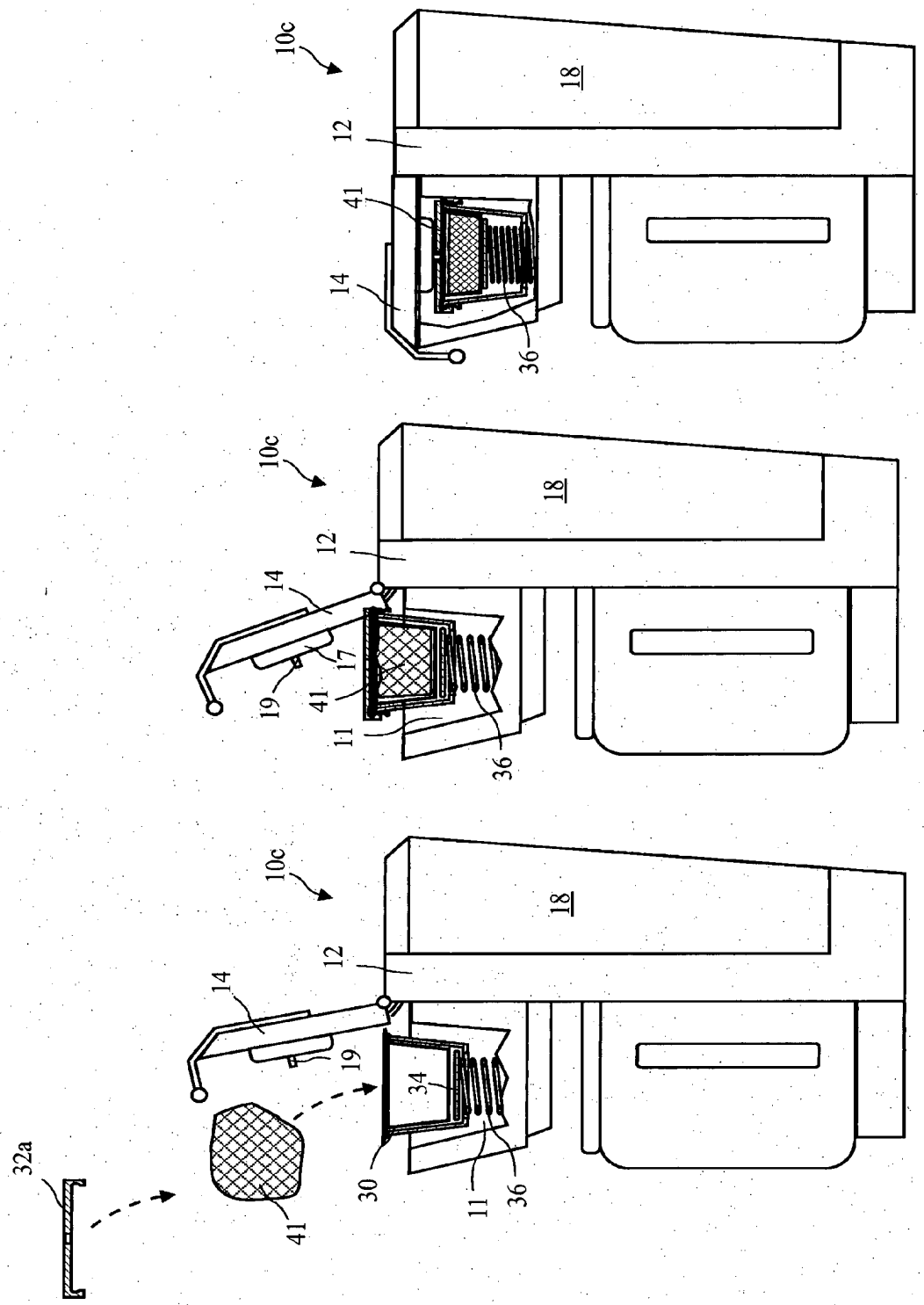


FIG. 37C

FIG. 37B

FIG. 37A

K-FEE SYSTEM GMBH, EX2009, page 1361
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

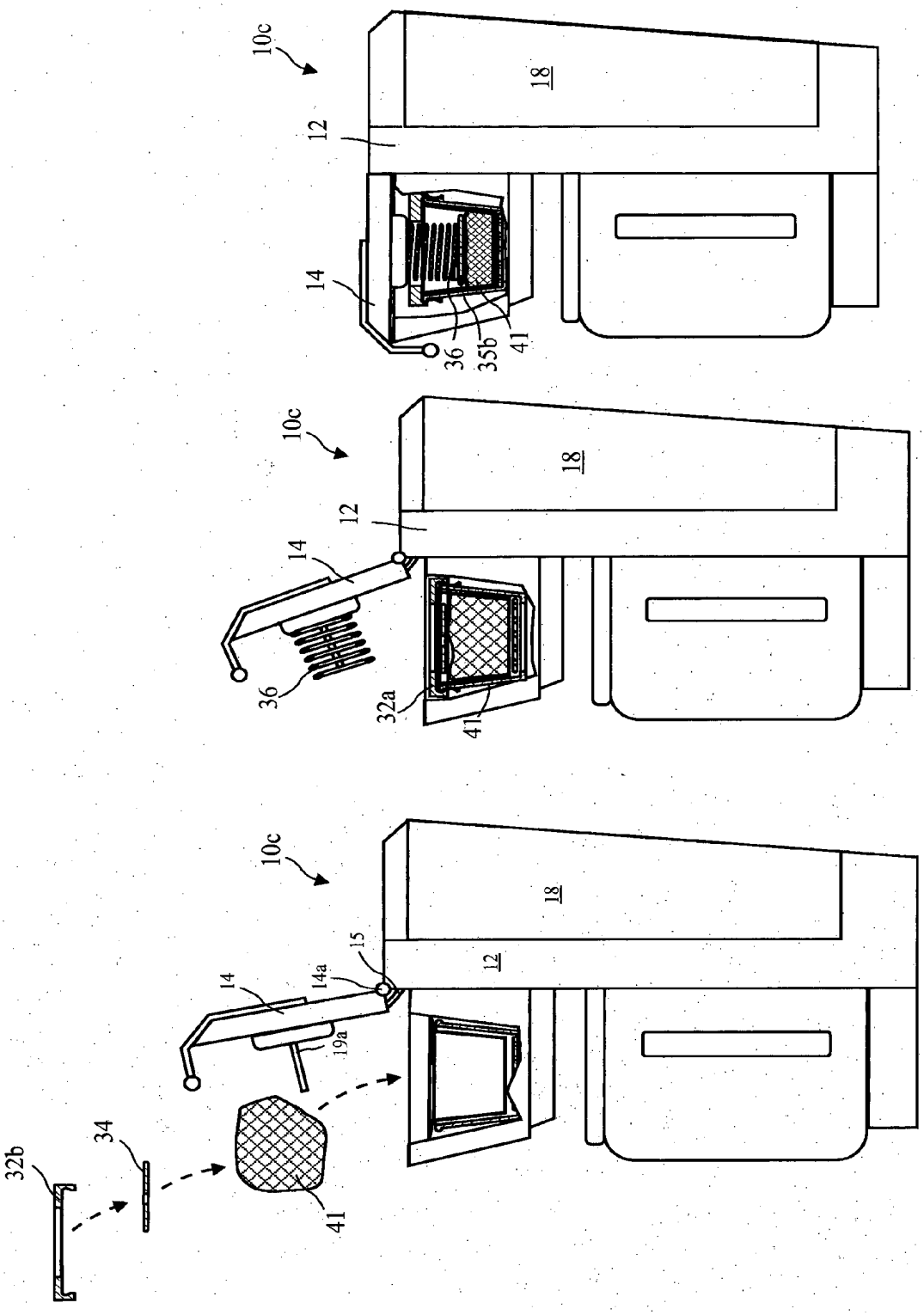


FIG. 38C

FIG. 38B

FIG. 38A

K-FEE SYSTEM GMBH, EX2009, page 1362
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

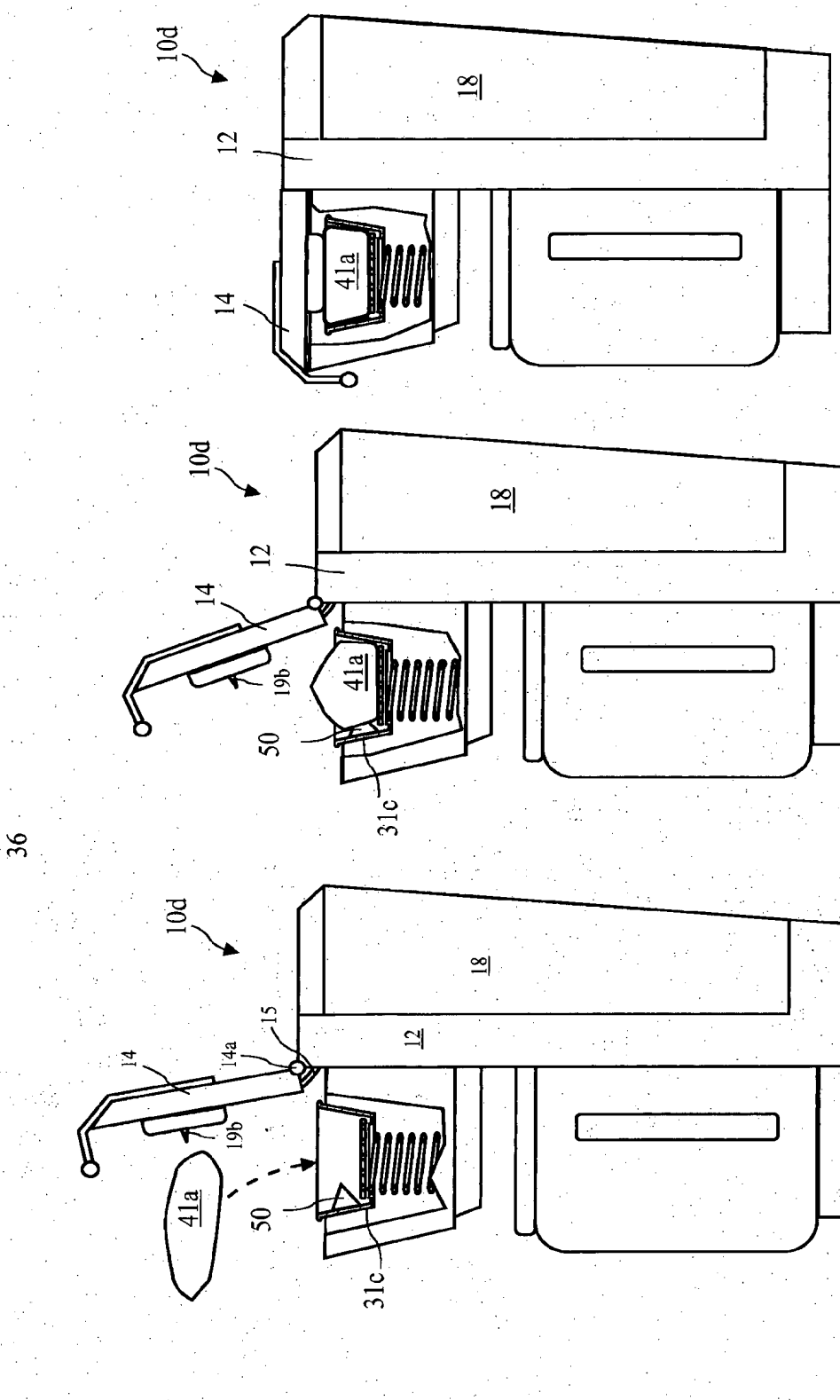


FIG. 39C

FIG. 39B

FIG. 39A

K-FEE SYSTEM GMBH, EX2009, page 1363
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

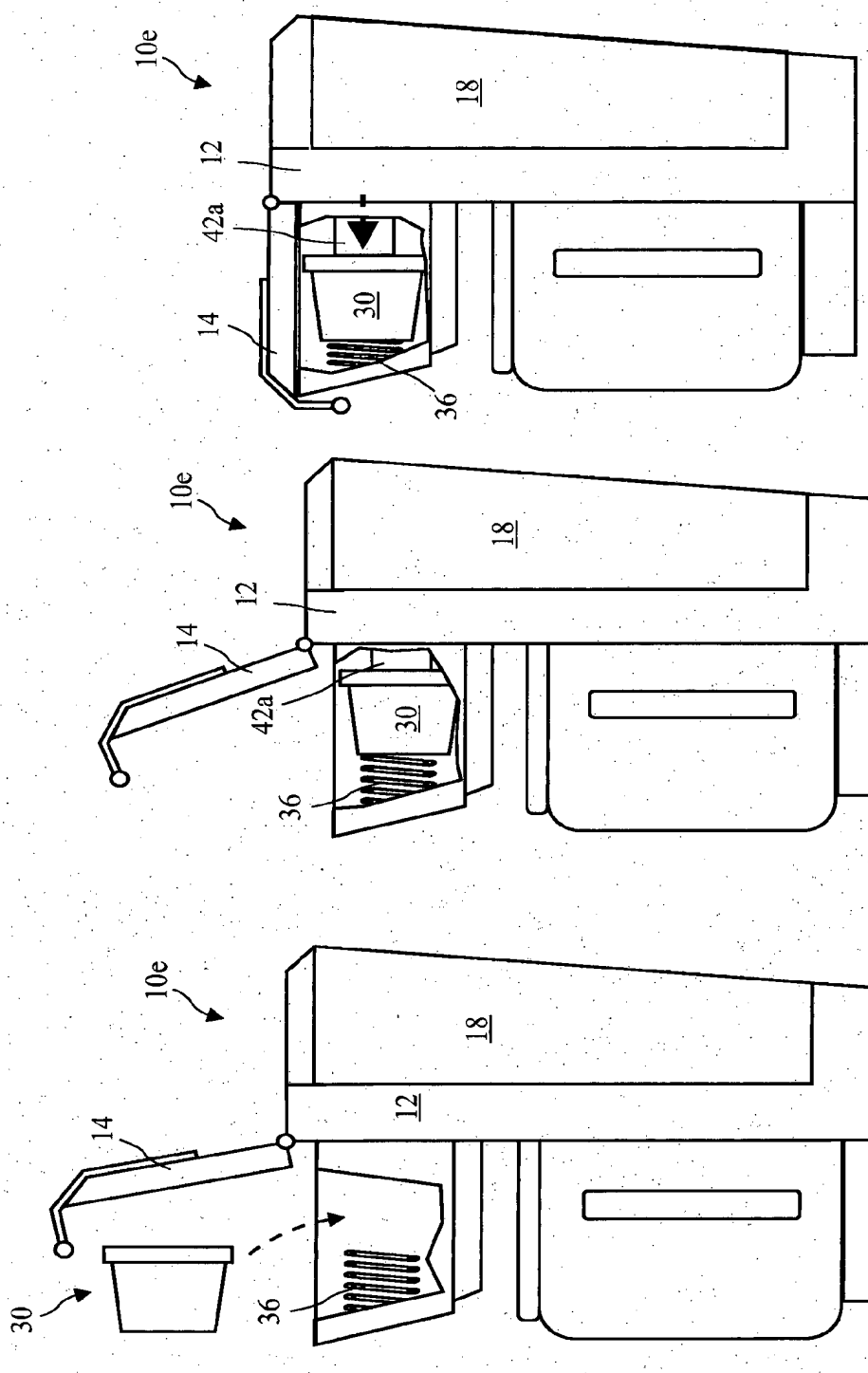


FIG. 40C

FIG. 40B

FIG. 40A

K-FEE SYSTEM GMBH, EX2009, page 1364
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

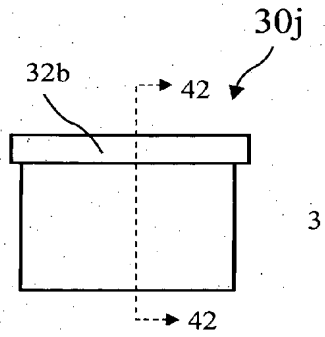


FIG. 41

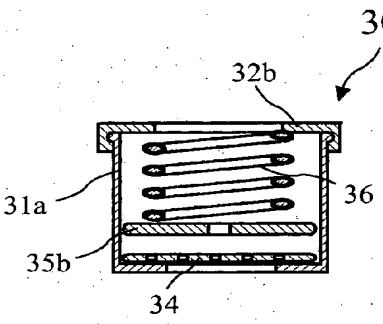


FIG. 42

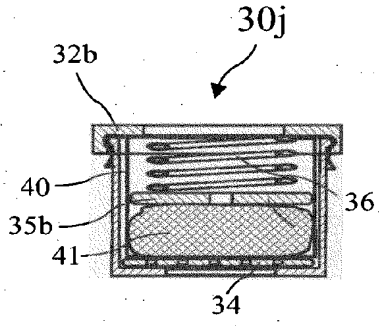


FIG. 43

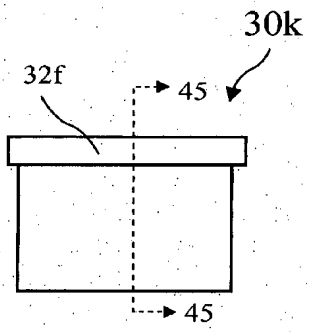


FIG. 44

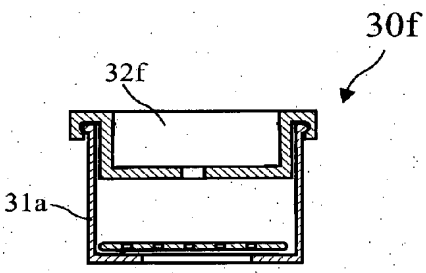


FIG. 45

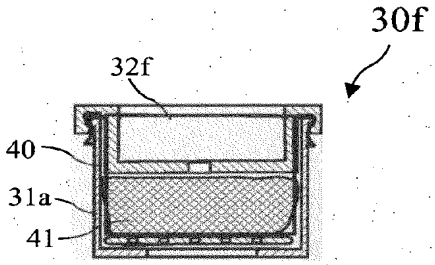


FIG. 46

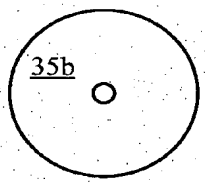


FIG. 47B

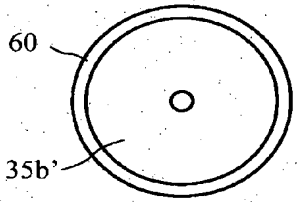


FIG. 47D

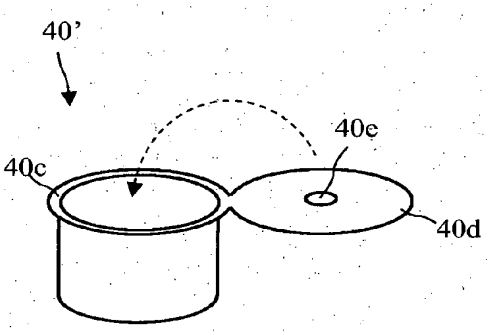


FIG. 48



FIG. 47A

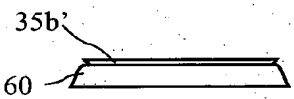


FIG. 47C

K-FEE SYSTEM GMBH, EX2009, page 1365
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

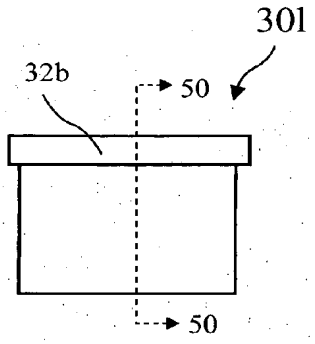


FIG. 49

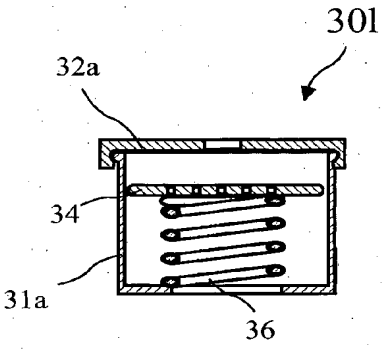


FIG. 50

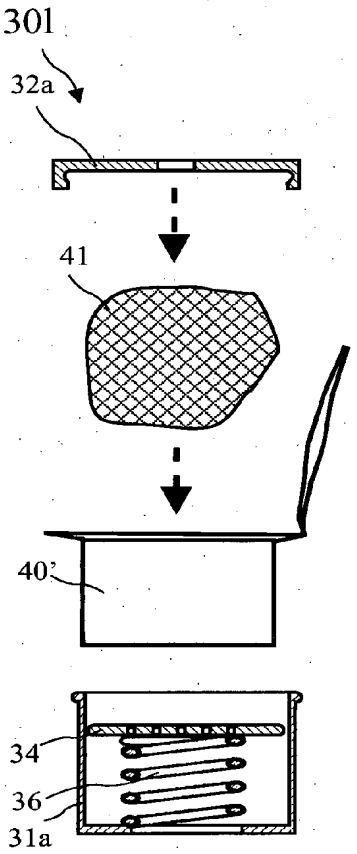


FIG. 51A

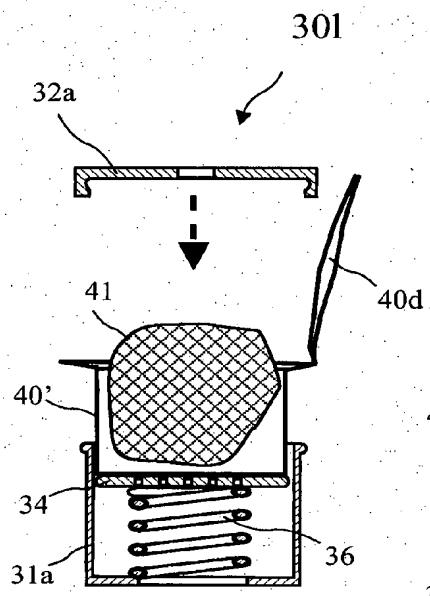


FIG. 51B

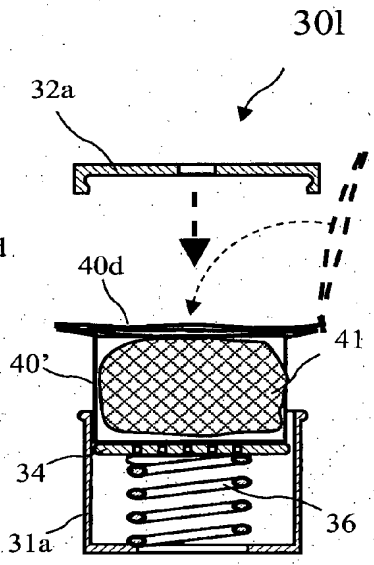


FIG. 51C

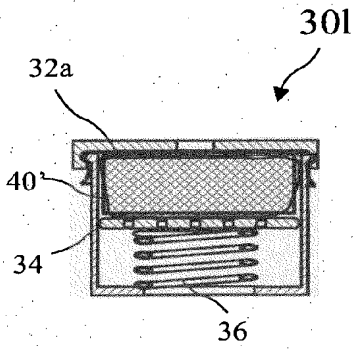


FIG. 51D

K-FEE SYSTEM GMBH, EX2009, page 1366
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

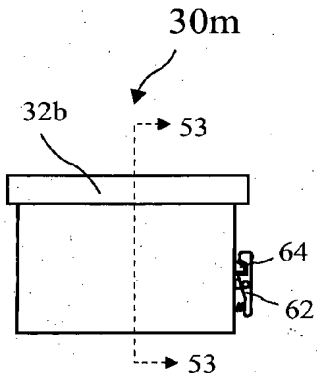


FIG. 52

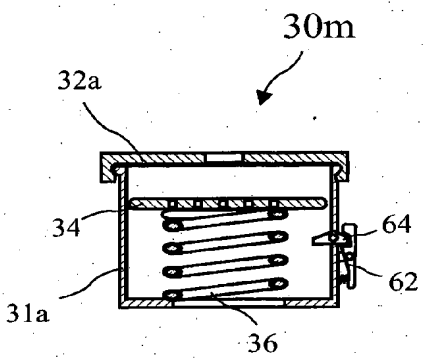


FIG. 53

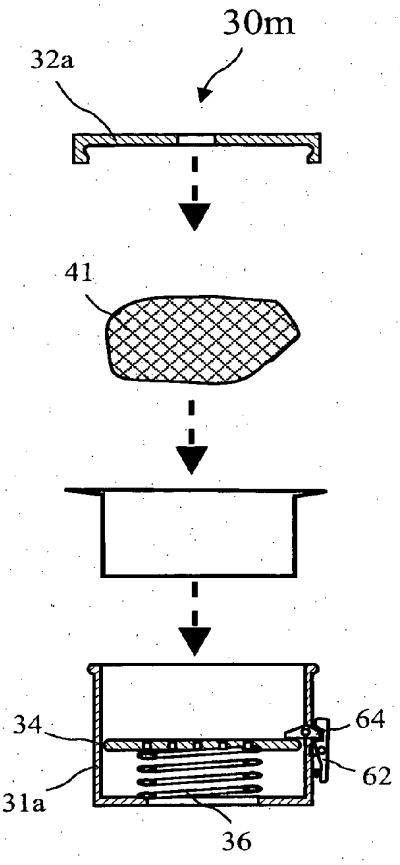


FIG. 54A

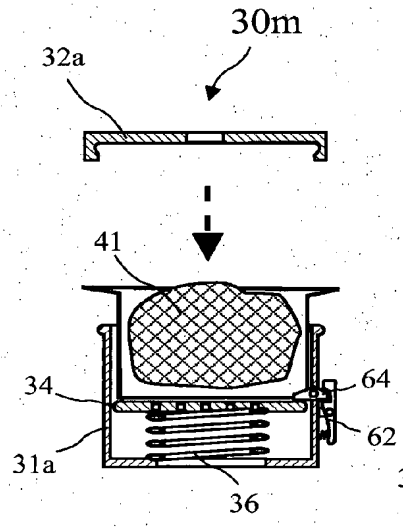


FIG. 54B

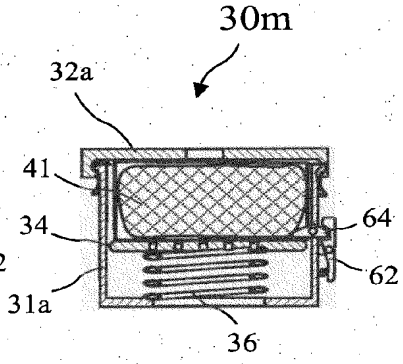


FIG. 54C

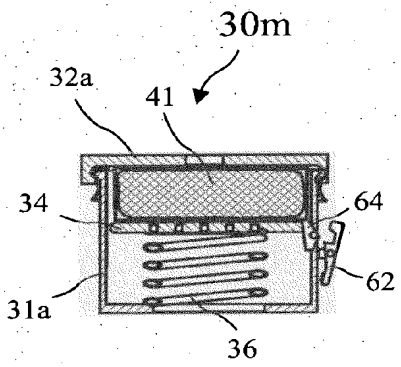


FIG. 54D

K-FEE SYSTEM GMBH, EX2009, page 1367
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

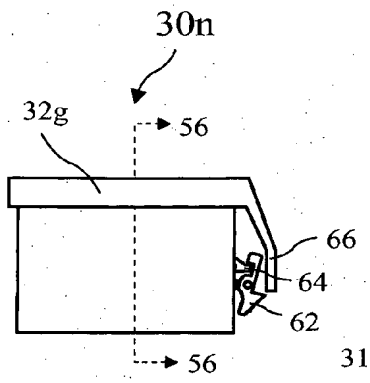


FIG. 55

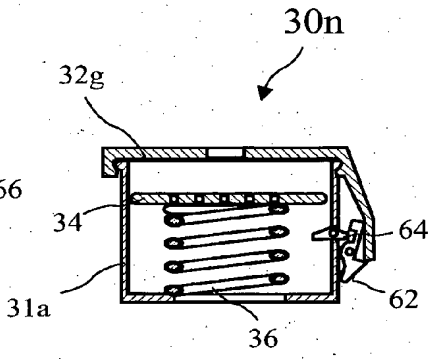


FIG. 56

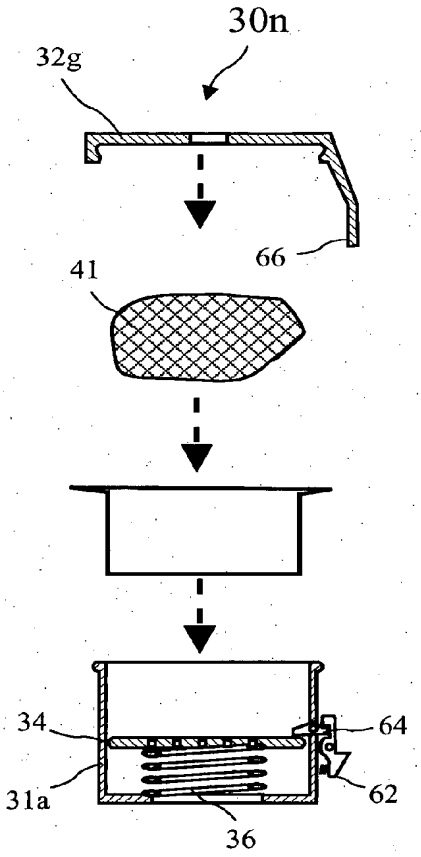


FIG. 57A

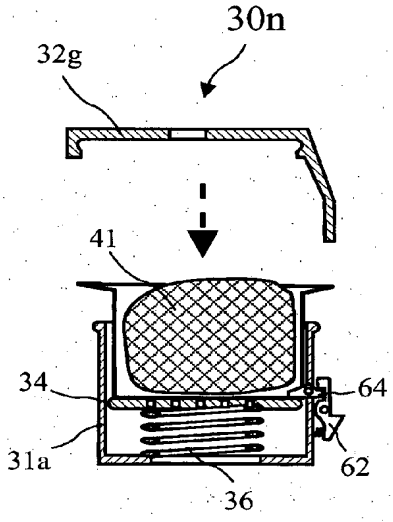


FIG. 57B

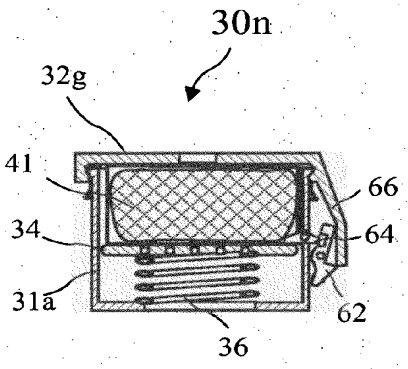


FIG. 57C

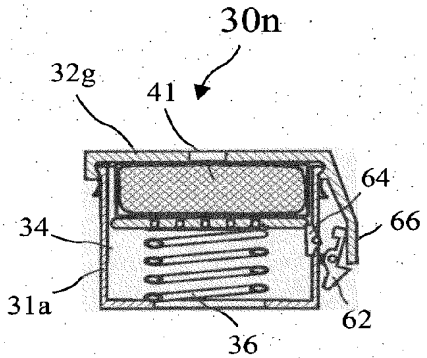


FIG. 57D

K-FEE SYSTEM GMBH, EX2009, page 1368
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

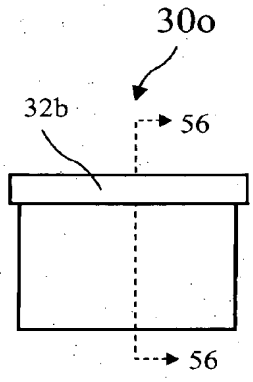


FIG. 58

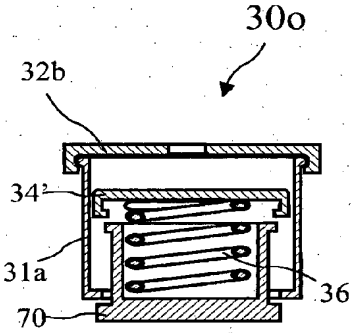


FIG. 59

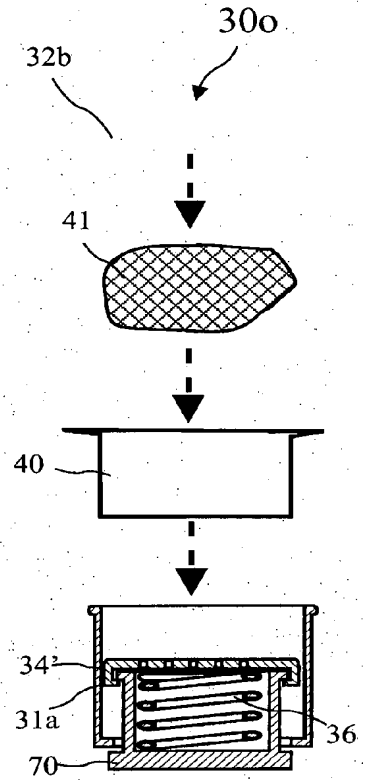


FIG. 60A

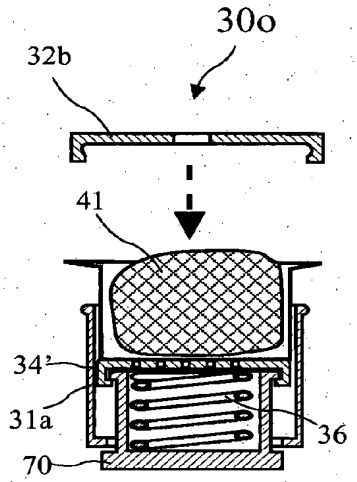


FIG. 60B

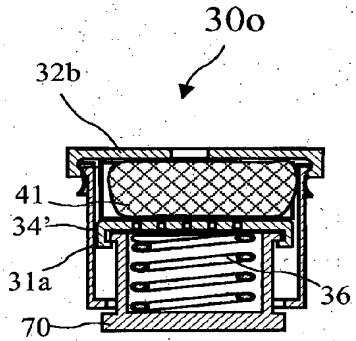


FIG. 60C

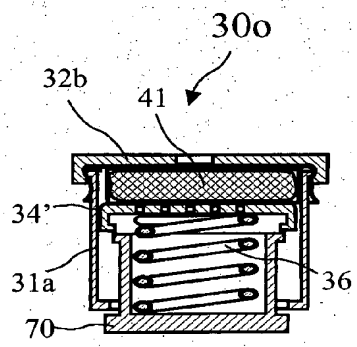


FIG. 60D

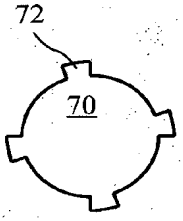


FIG. 61A

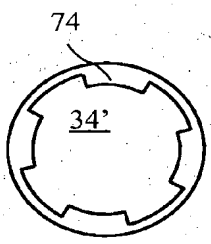


FIG. 61B

K-FEE SYSTEM GMBH, EX2009, page 1369
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

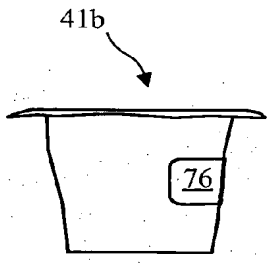


FIG. 62A

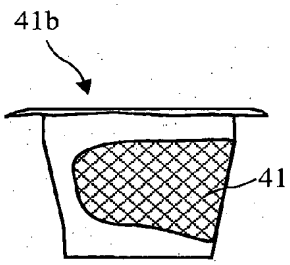


FIG. 62B

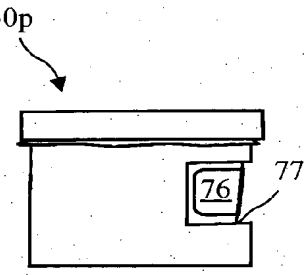


FIG. 62C

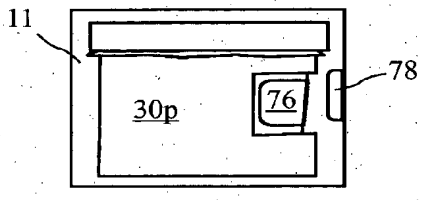


FIG. 62D

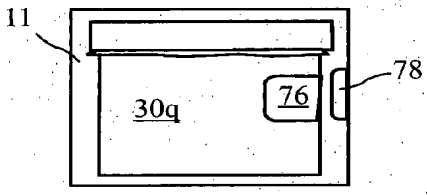


FIG. 62E

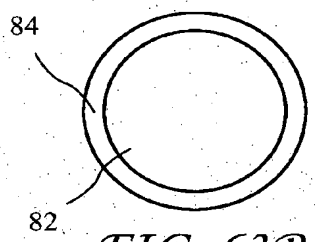


FIG. 63B

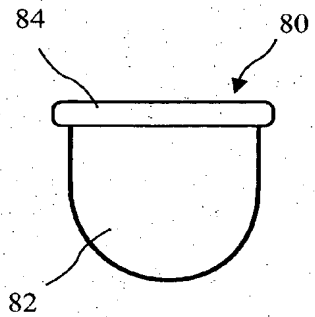


FIG. 63A

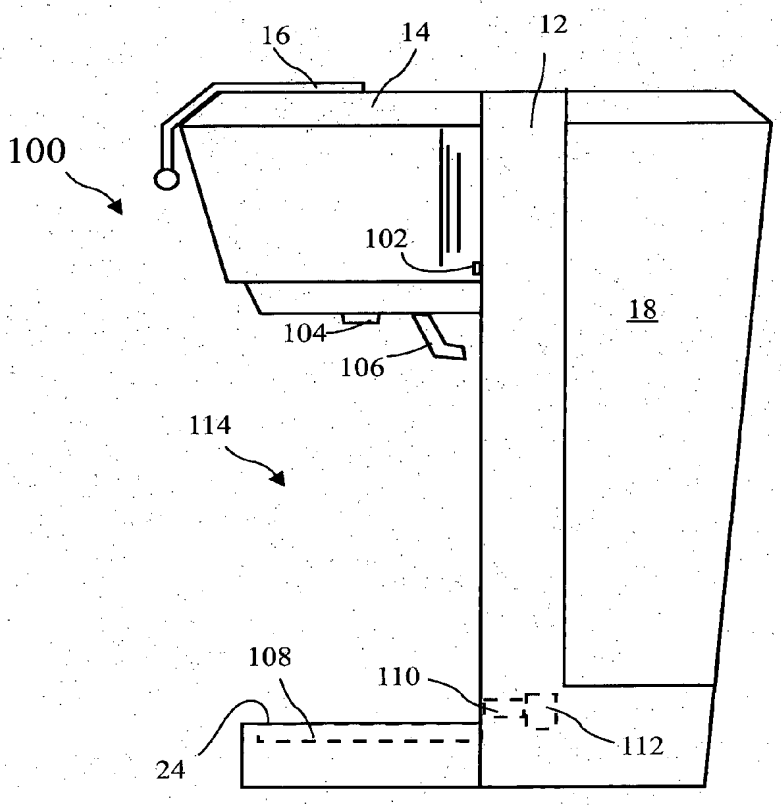


FIG. 64

K-FEE SYSTEM GMBH, EX2009, page 1370
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

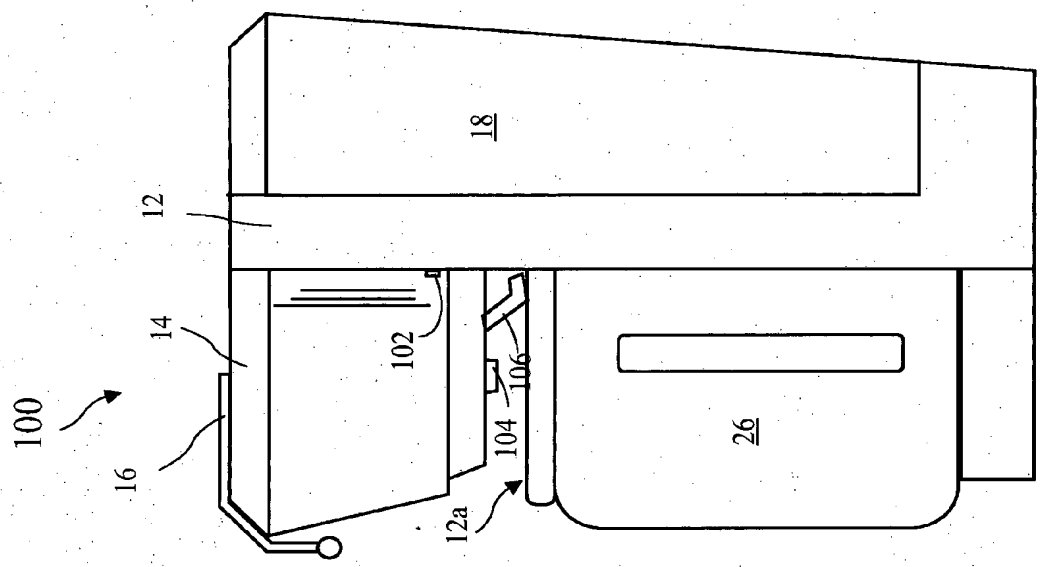


FIG. 65B

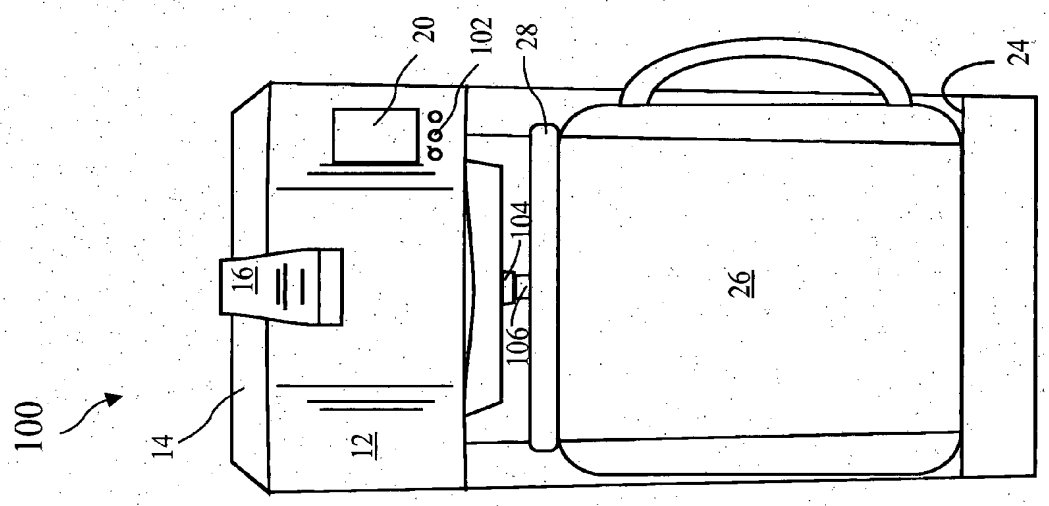


FIG. 65A

K-FEE SYSTEM GMBH, EX2009, page 1371
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

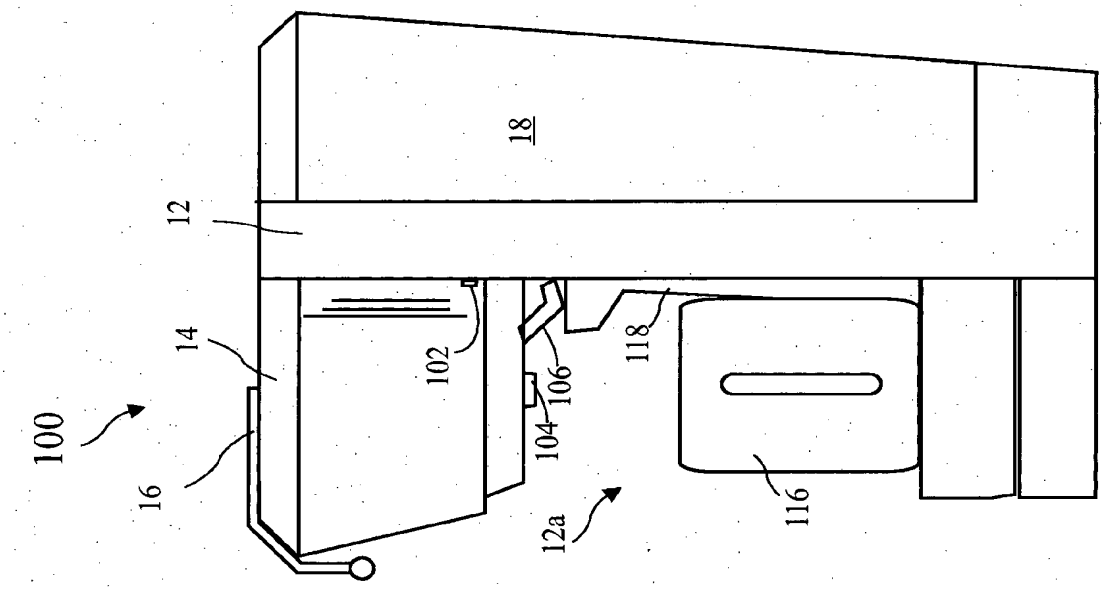


FIG. 66B

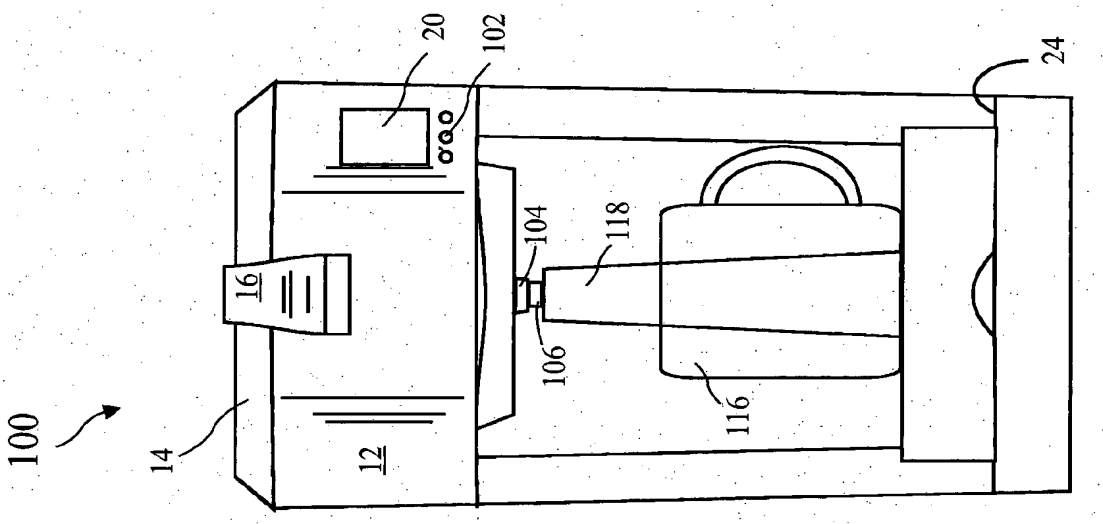


FIG. 66A

K-FEE SYSTEM GMBH, EX2009, page 1372
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

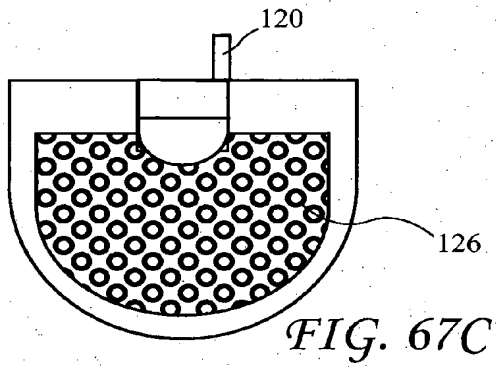


FIG. 67C

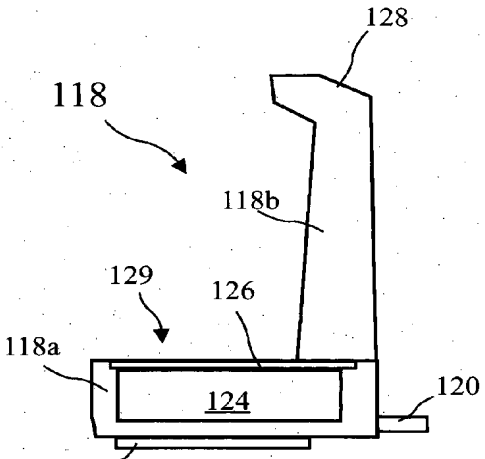


FIG. 68

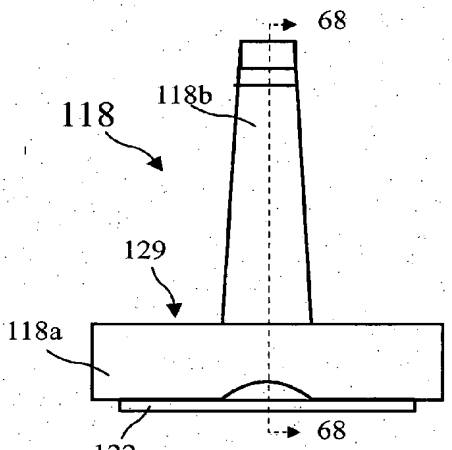


FIG. 67A

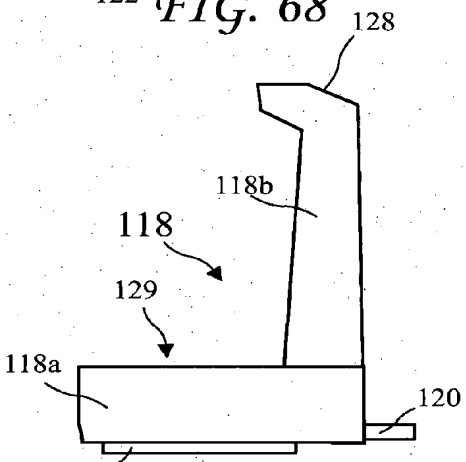


FIG. 67B

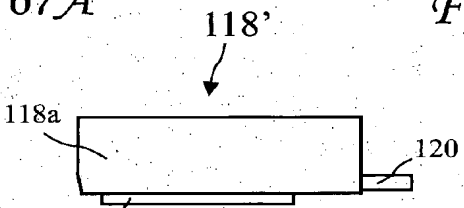


FIG. 67D

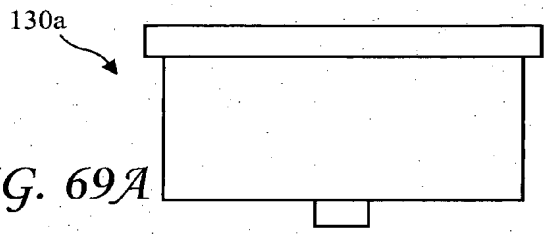


FIG. 69A

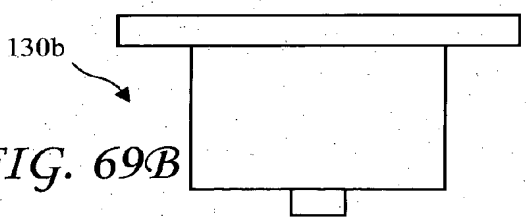


FIG. 69B

K-FEE SYSTEM GMBH, EX2009, page 1373
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

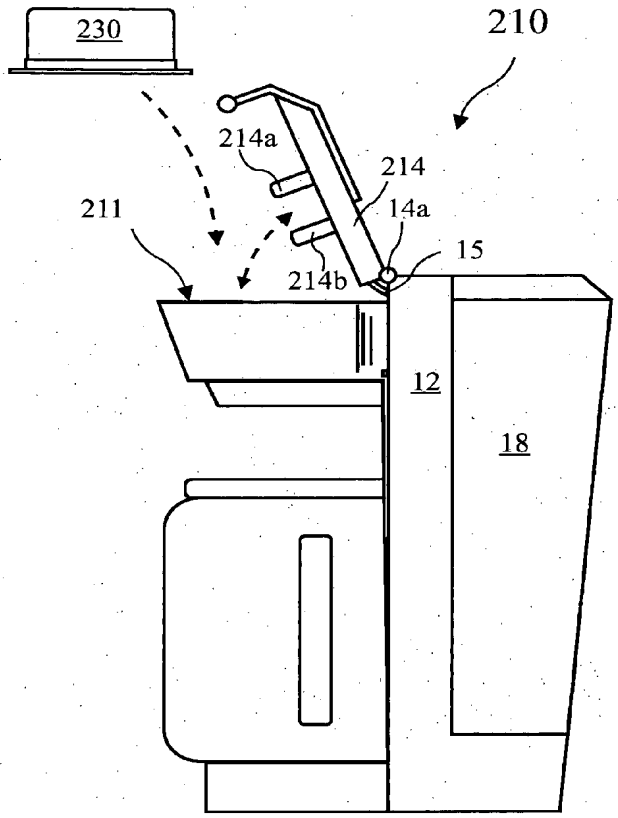


FIG. 70

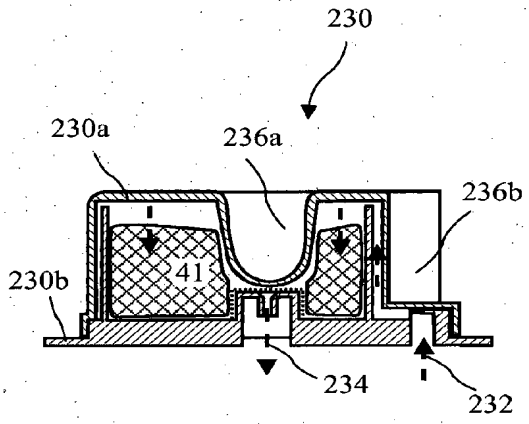


FIG. 72

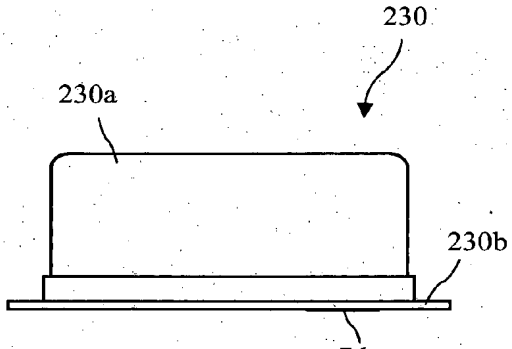


FIG. 71A

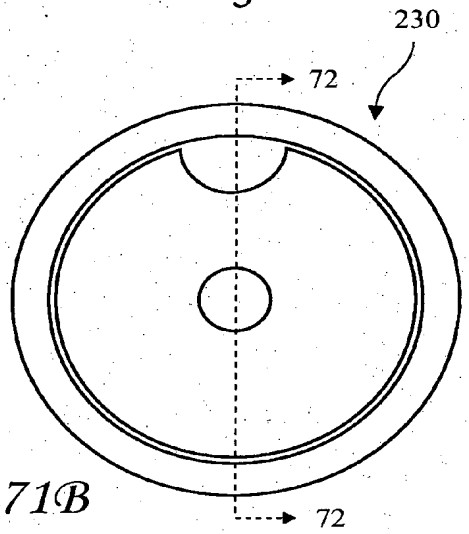


FIG. 71B

K-FEE SYSTEM GMBH, EX2009, page 1374
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

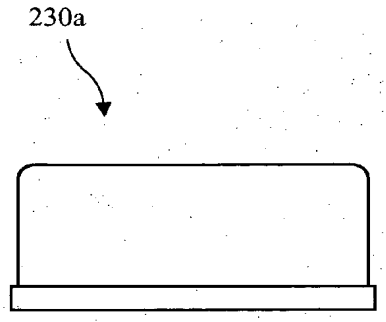


FIG. 73A

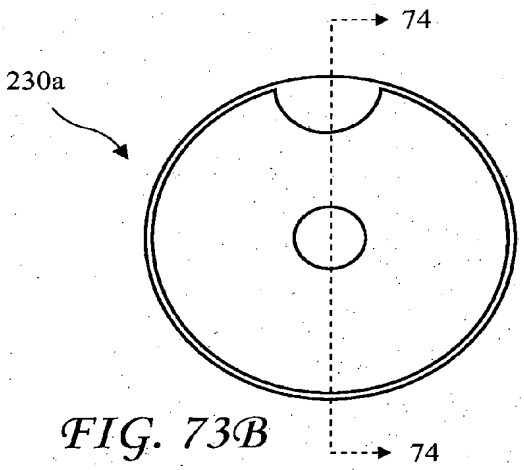


FIG. 73B

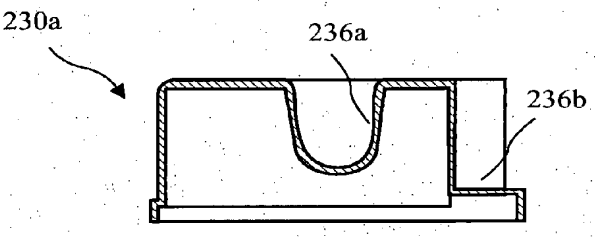


FIG. 74

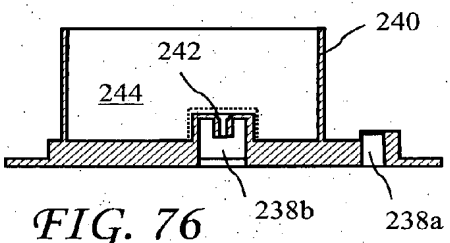


FIG. 76



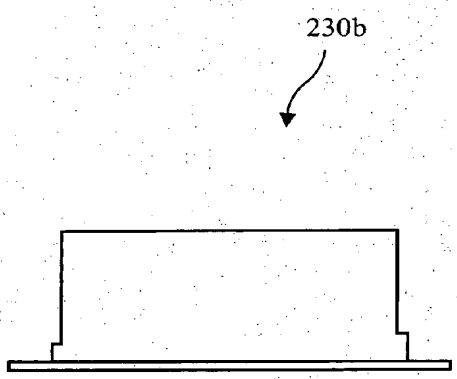


FIG. 75A

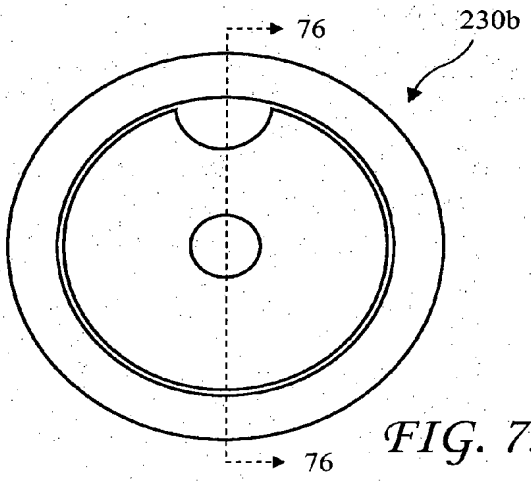


FIG. 75B

K-FEE SYSTEM GMBH, EX2009, page 1375
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

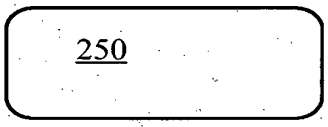


FIG. 77A

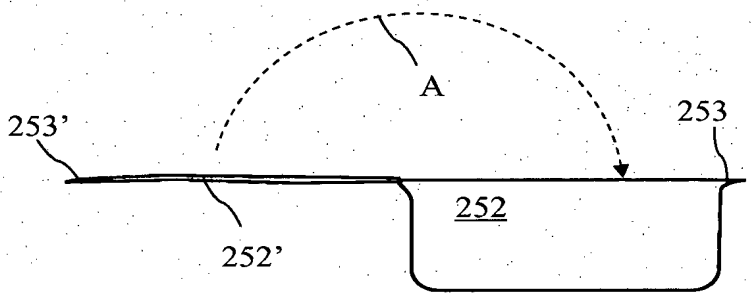


FIG. 78A

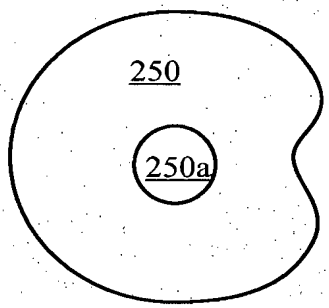


FIG. 77B

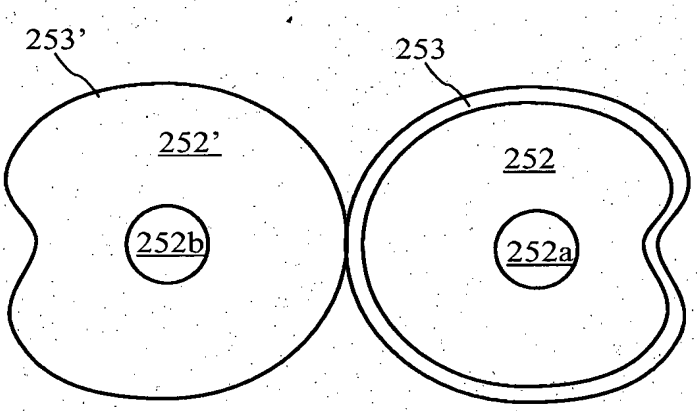


FIG. 78B

K-FEE SYSTEM GMBH, EX2009, page 1376
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

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

- US 61018109 A **[0001] [0005]**
- US 62058409 A **[0001] [0006]**
- US 76226210 A **[0001]**
- US 11777831 B **[0004]**
- WO 2007119546 A **[0008]**
- WO 2006090183 A **[0008]**

K-FEE SYSTEM GMBH, EX2009, page 1377
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19)日本国特許庁（ＪＰ）　(12) **公開特許公報**（Ａ）　(11)特許出願公開番号
特開2000－79046
(P2000－79046A)
(43)公開日 平成12年3月21日(2000.3.21)

(51)Int.Cl⁷	識別記号	ＦＩ	ﾃｰﾏｺｰﾄﾞ（参考）
Ａ４７Ｇ 23/08		Ａ４７Ｇ 23/08	Ｚ　３Ｂ１１５
Ａ４７Ｆ 10/04		Ａ４７Ｆ 10/04	

審査請求　未請求　請求項の数 9ＯＬ（全 6 数）

(21)出願番号　特願平10－250702

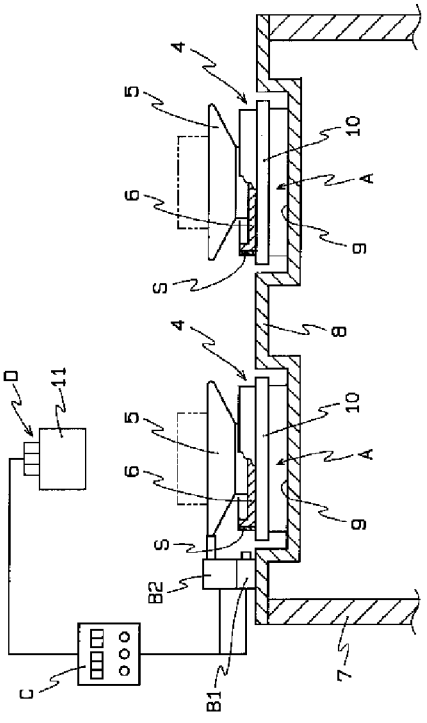
(22)出願日　平成10年9月4日(1998.9.4)

(71)出願人　598121374
株式会社すし太郎
大阪府吹田市五月が丘北3－15
(72)発明者　清水　豊
大阪府吹田市古江台1－16－9
(74)代理人　100065226
弁理士　朝日奈　宗太　（外１名）

Ｆターム（参考）　3B115　AA28 AA30 BB03 CB07 DC01
DC08

(54)【発明の名称】　皿卓および該皿卓のための飲食物循環搬送装置

(57)【要約】
【課題】　容器の識別を正確に行なうことができるとともに、搬送中の容器の乱れをなくし見映えを良くすることができる皿卓を提供する。
【解決手段】　飲食物が盛り付けられるかまたは飲食物を含む容器５を載置する皿卓６に、前記容器５を識別するための識別手段である識別コードが施されている。



K-FEE SYSTEM GMBH, EX2009, page 1378
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

1

【特許請求の範囲】

【請求項１】　飲食物が盛り付けられるかまたは飲食物を含む容器を載置する皿卓に、前記容器を識別するための識別手段が施されてなる皿卓。

【請求項２】　前記識別手段が彩色である請求項１記載の皿卓。

【請求項３】　前記識別手段が識別マークである請求項１記載の皿卓。

【請求項４】　飲食物が盛り付けられるかまたは飲食物を含む容器を載置する皿卓を搬送路に沿って循環搬送させる循環駆動手段と、前記皿卓に施される識別手段を検知する第一の検知手段と、前記容器の有無を検知する第二の検知手段と、前記第一の検知手段からの検知信号と予め入力されている設定入力信号とを対比するとともに、前記第二の検知手段により検知される容器の有無の検知信号から、前記皿卓に載置される容器を前記搬送路から排除させるか否かを判断する制御手段と、該制御手段からの出力信号に基づいて前記設定入力信号に合致し、飲食物が残っている容器を知らせる通報手段とからなる飲食物循環搬送装置。

【請求項５】　請求項４記載の通報手段に代えて、前記容器を搬送路から排除させる排除手段を備えてなる飲食物循環搬送装置。

【請求項６】　前記識別手段が識別マークである請求項４または５記載の飲食物循環搬送装置。

【請求項７】　飲食物が盛り付けられるかまたは飲食物を含む容器を載置する皿卓を搬送路に沿って循環搬送させる循環駆動手段と、前記皿卓に施される識別手段を検知する検知手段と、該検知手段からの検知信号と予め入力されている設定入力信号とを対比し、前記皿卓に載置される容器を前記搬送路から排除させるか否かを判断する制御手段と、該制御手段からの出力信号に基づいて前記設定入力信号に合致する前記容器を知らせる通報手段とからなる飲食物循環搬送装置。

【請求項８】　請求項７記載の通報手段に代えて、前記容器を搬送路から排除させる排除手段を備えてなる飲食物循環搬送装置。

【請求項９】　前記識別手段が彩色である請求項７または８記載の飲食物循環搬送装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は皿卓および該皿卓のための飲食物循環搬送装置に関する。さらに詳しくは、寿司、赤出し、茶碗蒸し、瓶ビール、ジュース、サラダ、フルーツまたはアイスクリームなどの、飲食物を盛り付けるかまたは飲食物を含む容器を搬送路に沿って循環搬送させるようにした寿司店舗に用いられる皿卓および該皿卓のための飲食物循環搬送装置に関する。

【０００２】

【従来の技術】従来より、作業者が寿司などの飲食物を

2

盛った容器を客の目の前の搬送路に載せて搬送させ、客が好みの飲食物を容器ごと搬送路から取り出して食べられるようにした飲食物搬送装置がある（特開平８－８０２４４号公報参照）。かかる搬送装置は、飲食物が盛り付けられた容器が長時間に渡って搬送路から取り出されない場合、飲食物の品質が低下するため、所定時間経過した飲食物を選び出すことができるように、図５に示すように、各容器５０に識別マーク５１を設ける一方、搬送路５２を周回する各容器５０の識別マーク５１を読み取る読取装置５３と、該読取装置５３からの出力信号に基づいて各容器５０の搬送路５２における周回回数をカウントして、周回回数が設定回数以上となった容器５０を検索するコントローラ５４と、該コントローラ５４からの出力信号に基づいて搬送路５２での周回回数が設定回数以上となった容器５０を報知する報知装置５５とから構成されている。また前記報知装置に代えて容器を搬送路上から退避させる退避装置を設けるようにしている。

【０００３】

【発明が解決しようとする課題】しかしながら、かかる搬送装置では、容器に識別マークが設けられているため、長期使用による容器洗浄により識別マークの表面および周縁が変質したり、識別マークの表面にしわが発生するなどして正確な識別ができなくなる惧れがある。また、識別マークを皿に貼付するばあい、マーク周縁にゴミや汚れが蓄積する惧れがある。一方、数多く搬送させようとするあまり、隣接する容器の周縁部が搬送中に深く重なり合い、識別に支障をきたすとともに容器が搬送路からはずれてしまう惧れもある。

【０００４】本発明は、叙上の事情に鑑み、容器の識別を正確に行なうことができるとともに、搬送中の容器の乱れをなくし見映えを良くすることができる皿卓および該皿卓のための飲食物循環搬送装置を提供することを目的とする。

【０００５】

【課題を解決するための手段】本発明の皿卓は、飲食物が盛り付けられるかまたは飲食物を含む容器を載置する皿卓に、前記容器を識別するための識別手段が施されてなることを特徴とする。

【０００６】また本発明の飲食物循環搬送装置は、飲食物が盛り付けられるかまたは飲食物を含む容器を載置する皿卓を搬送路に沿って循環搬送させる循環駆動手段と、前記皿卓に施される識別手段を検知する第一の検知手段と、前記容器の有無を検知する第二の検知手段と、前記第一の検知手段からの検知信号と予め入力されている設定入力信号とを対比するとともに、前記第二の検知手段により検知される容器の有無の検知信号から、前記皿卓に載置される容器を前記搬送路から排除させるか否かを判断する制御手段と、該制御手段からの出力信号に基づいて前記設定入力信号に合致し、飲食物が残ってい

K-FEE SYSTEM GMBH, EX2009, page 1379
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

る容器を知らせる通報手段とからなることを特徴とする。

【０００７】また本発明の飲食物循環搬送装置は、前記通報手段に代えて、前記容器を搬送路から排除させる排除手段を備えてなることを特徴とする。

【０００８】さらに本発明の飲食物循環搬送装置は、飲食物が盛り付けられるかまたは飲食物を含む容器を載置する皿卓を搬送路に沿って循環搬送させる循環駆動手段と、前記皿卓に施される識別手段を検知する検知手段と、該検知手段からの検知信号と予め入力されている設定入力信号とを対比し、前記皿卓に載置される容器を前記搬送路から排除させるか否かを判断する制御手段と、該制御手段からの出力信号に基づいて前記設定入力信号に合致する前記容器を知らせる通報手段とからなることを特徴とする。

【０００９】また本発明の飲食物循環搬送装置は、前記通報手段に代えて、前記容器を搬送路から排除させる排除手段を備えてなることを特徴とする。

【００１０】

【発明の実施の形態】以下、添付図面に基づいて、本発明の皿卓および該皿卓のための飲食物循環搬送装置を説明する。

【００１１】図１は本発明の飲食物循環搬送装置の一実施の形態を示す平面図、図２は皿卓の一実施の形態を示す要部断面図、図３は本発明の他の実施の形態を示す平面図、図４は図３における排除手段を示す要部平面図である。

【００１２】図１～２に示すように、本発明の一実施の形態にかかわる飲食物循環搬送装置は、店舗内を客室１と厨房室２とに区画するように設置されており、循環駆動手段Ａ、皿卓を検知する第一の検知手段Ｂ１と飲食物を盛り付けるかまたは飲食物を含む容器を検知する第二の検知手段Ｂ２、制御手段Ｃおよび通報手段Ｄとから構成されている。なお、前記厨房室２には、洗い場などが客室１から見えないように仕切り壁３が設けられている。

【００１３】前記客室１には、閉ループ状の搬送路４に沿って客用カウンター１ａ、テーブル１ｂおよび椅子１ｃが適宜配置され、厨房室２内の作業者が飲食物を盛り付けた容器または飲食物を含む容器（以下、これらを単に容器という）５を搬送路４に載せたのち、客が、目の前に搬送された容器５を搬送路４上から取り出して食べることができるようにされている。この容器５は合成樹脂などで作製された皿卓６に載置されており、該皿卓６には識別手段Ｓである、バーコードなどの識別マークが施されている。前記合成樹脂としては、メラミン樹脂、尿素樹脂またはグアナミン樹脂などを用いることができる。この識別マークは、皿卓６の外周面にマークシールを貼り付けるか、または刻設により施すことができる。前記合成樹脂の表面の部分には、細菌やカビに対して抗菌効果が高い抗菌性ゼオライトなどを含有させるのが好ましい。

【００１４】前記循環駆動手段Ａは、前記容器５を載置する皿卓６を搬送路４に沿って循環搬送させるように、たとえば断面コ字状に枠組みされた搬送台７の上壁８の２列凹部９に収納される無端状のフラットチェーン１０と、該フラットチェーン１０を前記凹部９の側面に案内させながらベルトコンベアにより循環移動させるモータなどの駆動装置とから構成することができる。

【００１５】前記識別マークを用いる場合、前記第一の検知手段Ｂ１としては、マークを読み取ることができるレーザ式のバーコードスキャナーなどを用いることができる。

【００１６】また前記第二の検知手段Ｂ２としては、前記容器５を検知することができる、たとえばリミットスイッチなどを用いることができる。

【００１７】前記制御手段Ｃとしては、識別コードと時間との関係を制御できるマイクロコンピュータを用いることができ、そのハードウエアの構成には、検知手段Ｂ１、Ｂ２と通報手段Ｄとの信号の受け渡しに必要なＩ／Ｏインターフェースやタイマー演算処理を行なうＣＰＵなどを含んでいる。

【００１８】前記通報手段Ｄとしては、前記制御手段Ｃからの出力信号に基づいて、前記設定入力信号に合致する前記皿卓６に載置された容器５を視覚に知らせる照明具１１または聴覚に知らせるブザーなどを用いることができる。前記照明具１１に照らされた容器５については、作業員により速やかに搬送路４から取り出され、飲食物は廃棄されるとともに、容器は洗浄される。なお、皿卓６は搬送路４上から取り除かずに、常時搬送させる。

【００１９】前記制御手段Ｃにおける設定入力信号には、容器の設定周回回数とすることができる。これにより、検知手段Ｂ１からの出力信号に基づいて各皿卓６上の容器５の搬送路４における周回回数を累積し、その周回回数が設定回数以上に合致したとき、および第二の検出手段Ｂ２の検知信号により、皿卓６に飲食物が残っている容器５が載っている場合、前記制御手段Ｃからの出力信号により、前記照明具１１が該当する容器５を照らして作業員に知らせる。前記皿卓の設定回数としては、一律にすることもできるが、寿司、赤出しまたはサラダなどの飲食物によって鮮度時間が異なるため、適宜飲食物に合わせて設定するのが好ましい。

【００２０】なお、設定入力信号としては、設定周回回数に変えて設定時間とすることもできる。そして、この場合にも、識別コードの種類毎に設定時間を変えることができる。たとえば、赤出しを厨房室から出す場合に、この赤出し専用の皿卓（設定時間は寿司より短かく設定されている）を厨房室内に置いておき、この皿卓に載せて赤出しを搬送路上に供給することができる。

K-FEE SYSTEM GMBH, EX2009, page 1380
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

【００２１】つぎに本発明の他の実施の形態を説明する。本実施の形態では、識別手段Ｓとして前記識別コードに代えて彩色が用いられている。

【００２２】前記彩色は、皿卓６の外周全面または外周等間隔位置の部位に塗料を塗布したり、着色シールを貼り付けたりすることにより施すことができる。

【００２３】また、前記第一の検知手段Ｂ１としては、前記皿卓６に施される彩色を検知するために、反射光の波長を認識できる非接触センサであれば、本発明においては、とくに限定されるものではないが、たとえば色差検出装置またはＣＣＤカメラなどを用いることができる。

【００２４】なお、本実施の形態では、前記実施の形態における第二の検知手段は省略されている。

【００２５】前記制御手段Ｃは、まず前記第一の検知手段Ｂ１が検知した皿卓６の彩色の検知信号と予め入力されている設定入力信号とを対比する。たとえば容器５に盛り付けられた飲食物の品質を低下させずに客に提供できる時間、すなわち循環搬送させる時間を４５分間と設定した場合、各作業者は開店から１５分間ごとに容器５を色分けした皿卓、たとえば青色、黄色、緑色および赤色（後は順次色を繰り返す）を施した皿卓６に載せて、搬送路４上に置く。これにより、該容器５が搬送路４を循環搬送されるあいだに、前記検知手段Ｂ１からの出力信号に基づいて各皿卓６上の容器５の搬送時間をタイマーにより累積し、その搬送時間が設定入力信号である、設定時間以上にならないように、たとえば３色目である緑色の皿卓の使用開始（スタートからカウントして３０分後）とともに１色目である青色の皿卓を順次回収するべく、前記制御手段Ｃは皿卓排除の判断をする。この制御手段Ｃからの出力信号により、前記通報手段Ｄ、たとえば照明具が該当する容器を照らして作業員に知らせる。なお、本実施の形態においては、客が容器を取ったあとの空の皿卓は搬送路上の所定の箇所で回収して、次のサイクルでの使用に備える必要がある。

【００２６】なお、本発明においては、図３～４に示すように、通報手段Ｄである照明具１１の代わりに、排除手段Ｄ１であるバタフライ１２にすることができる。このバタフライ１２は、支持軸１３が上壁８の下部に設置されるモータに連結されており、前記制御手段Ｃにより揺動自在に制御されている。これにより、たとえば前記検知手段Ｂ１からの出力信号に基づいて各皿卓６上の容器５の搬送路４における周回回数を累積し、その周回回数が設定回数以上に合致したとき、制御手段Ｃからの出力信号により、前記バタフライ１２が揺動して該当する容器５を作業員に知らせる、そして前記皿卓６と容器５、または容器５だけを搬送路４からスロープ１４、ローラコンベアまたベルトコンベアを伝って洗い場へ強制排除する。

【００２７】また本発明においては、来店客数により、*皿卓の数量を決めることにより、搬送中の飲食物の総数をコントロールすることもできる。これにより、客数に応じた数の寿司などを供給することができるので、廃棄する寿司などの数を減らすことができ、効率的である。

【００２８】なお、ベルトコンベアは回転することにより、多少の熱が発生し、また熱いお湯のパイプが通っているために熱が発生している。このため、該ベルトの隙間から潤滑油が滲み出て、ベルトに付着する場合がある。しかしながら、本発明においては、容器が皿卓に載せられているため、容器に潤滑油が付着することがなくなり、衛生的である。またベルトコンベアがコーナーを回転するとき、皿卓があることにより、容器に盛られている飲食物に生じる衝撃を和らげることができ、飲食物を安定して搬送することができる。さらに容器を隣に置いて搬送させても、皿卓で一定の間隔を保つことができるため、飲食物を安定して搬送させることができるとともに、隣接する容器同士が搬送中の振動により近付き過ぎて重なりを起こしても、皿卓同士が当接して所定の間隔を保つことから、前記容器同士の重なりが大きくならず、容器の乱れが生じない。その結果、搬送中の容器の見映えを良くすることができる。

【００２９】

【発明の効果】以上説明したとおり、本発明によれば、容器を皿卓に載置し、該皿卓に識別手段を施したことにより、容器が常時清潔に保たれた状態で搬送路を循環搬送させることができるので、搬送中の容器の見映えを良くすることができる。また前記皿卓が容器同士の重なりを少なくすることができるので、さらに搬送中の容器の見映えを良くすることができる。

【図面の簡単な説明】

【図１】本発明の飲食物循環搬送装置の一実施の形態を示す平面図である。

【図２】皿卓の一実施の形態を示す要部断面図である。

【図３】本発明の他の実施の形態を示す平面図である。

【図４】図４は図３における排除手段を示す要部平面図である。

【図５】従来の飲食物搬送装置の一例を示す要部断面図である。

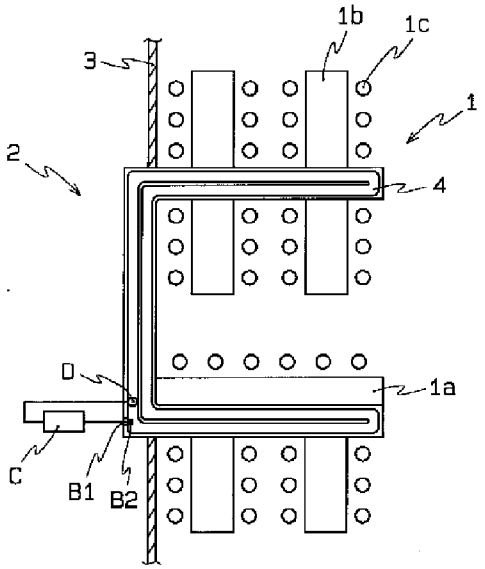
【符号の説明】

１　客室
２　厨房室
３　仕切り壁
４　搬送路
５　容器
６　皿卓
７　搬送台
８　上壁
９　凹部
１０　フラットチェーン
１１　照明具

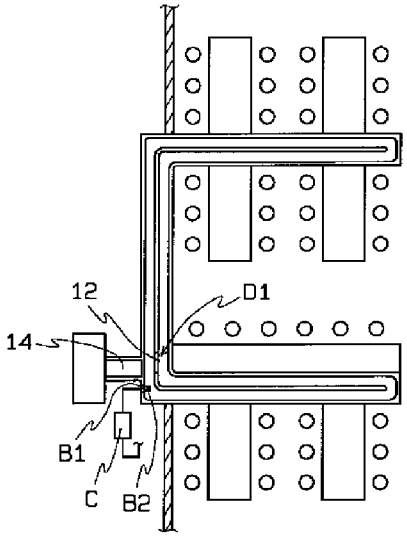
K-FEE SYSTEM GMBH, EX2009, page 1381
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

１２　バタフライ
１３　支持軸
１４　スロープ
Ａ　循環駆動手段
Ｂ１、Ｂ２　検知手段
＊Ｃ　制御手段
Ｄ　通報手段
Ｄ１　排除手段
Ｓ　識別手段
＊

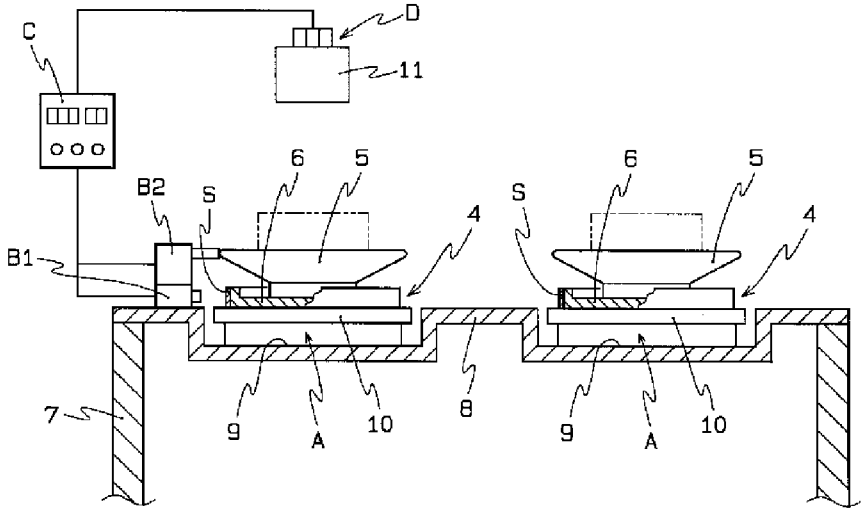
【図１】



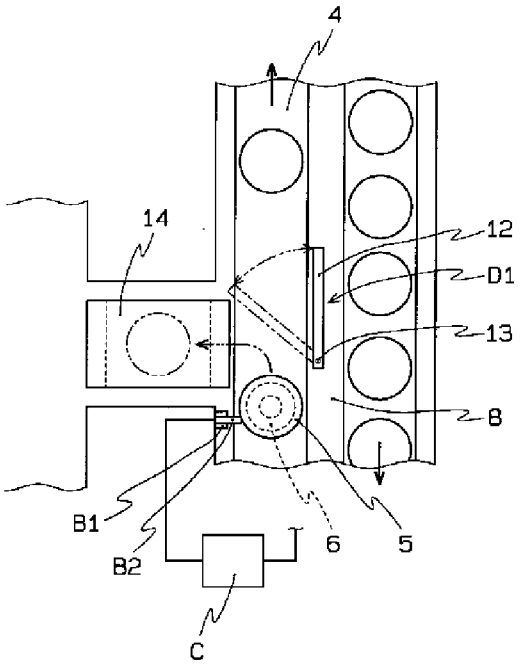
【図３】



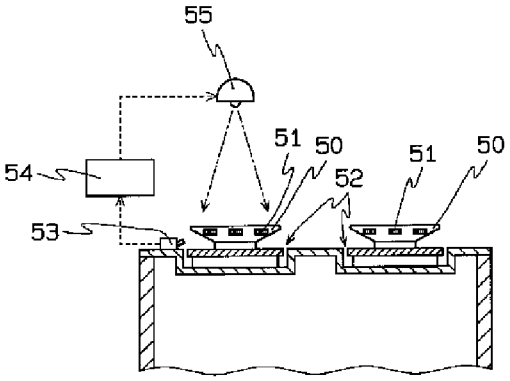
【図２】



【図４】



【図５】



(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 427 066 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
21.11.2012 Bulletin 2012/47

(21) Application number: **10721382.9**

(22) Date of filing: **04.05.2010**

(51) Int Cl.:
A23L 1/29 *(2006.01)* ***A47J 31/06*** *(2006.01)*
A47J 31/44 *(2006.01)* ***A61L 2/02*** *(2006.01)*
B65D 85/804 *(2006.01)* ***A47J 31/36*** *(2006.01)*
A47J 31/40 *(2006.01)*

(86) International application number:
PCT/EP2010/056005

(87) International publication number:
WO 2010/128031 (11.11.2010 Gazette 2010/45)

(54) CAPSULE FOR PREPARING A NUTRITIONAL PRODUCT INCLUDING A FILTER

KAPSEL FÜR DIE HERSTELLUNG EINES NÄHRPRODUKTS, DIE EIN FILTER BEINHALTET

CAPSULE PERMETTANT LA CONFECTION D'UN PRODUIT NUTRITIONNEL ET INCLUANT UN FILTRE

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

(30) Priority: **05.05.2009 EP 09159373**
11.06.2009 EP 09162485

(43) Date of publication of application:
14.03.2012 Bulletin 2012/11

(73) Proprietor: **Nestec S.A.**
1800 Vevey (CH)

(72) Inventors:
- **DOLEAC, Frédéric**
  25160 Vaux et Chantegrue (FR)
- **ABRAHAM, Sophie**
  25160 Malbuisson (FR)
- **DOUDIN, Yasmine**
  1337 Vallorbe (CH)
- **EPARS, Yann**
  1305 Penthalaz (CH)
- **FABOZZI, Thierry Jean Robert**
  1201 Geneve (CH)
- **WYSS, Heinz**
  3672 Oberdiessbach (CH)
- **BEZET, Nicolas**
  7100 Macon (FR)
- **SCORRANO, Lucio**
  1400 Yverdon-les-Bains (CH)
- **DOGAN, Nihan**
  1090 La Croix-sur-Lutry (CH)
- **MEIER, Alain**
  6837 Caneggio (CH)

(74) Representative: **Borne, Patrice Daniel et al**
Nestec S.A.
Avenue Nestlé 55
1800 Vevey (CH)

(56) References cited:
EP-A1- 1 774 878
EP-A1- 1 826 148
EP-A2- 1 574 452
WO-A1-2008/132571
WO-A1-2008/148834
US-A- 4 136 202

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 427 066 B1

Printed by Jouve, 75001 PARIS (FR)

K-FEE SYSTEM GMBH, EX2009, page 1384
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Description

[0001] The present invention relates to a capsule for hygienically preparing a nutritional product containing nutritional ingredients by mixing the ingredients with a liquid; the capsule containing a filter filtering the liquid supplied in the capsule for removing undesired components contained in the liquid. The invention more particularly relates to a capsule for insertion in a device for supplying liquid in the capsule for preparing a nutritional product by mixing with the nutritional ingredients such as an infant formula, growing-up formula or adult nutrition formula. The invention also relates to a method using such capsule.

[0002] Nutritional compositions can be, for instance, infant formulas or also nutritional liquids for toddlers, invalids, elderly people, persons having nutritional deficiencies or athletes. These compositions are prepared from ingredients contained in a capsule by addition of a liquid such as water. The liquid may contain undesired contaminants such as micro-organisms or solid particles (e.g., dust, minerals, organic residues, etc.). These undesired contaminants should be removed from the liquid before the liquid is mixed with the ingredients.

[0003] Therefore, there is a need for a capsule which enables preparation of nutritional composition for instance an infant formula or other food compositions in a convenient and safe manner.

[0004] WO2006/077259 discloses a method for preparing a single serving of a nutritional composition comprising introducing liquid such as water into a cartridge containing a unit dose of the composition in concentrated form. Thereby, the water is treated prior to the introduction into the cartridge in order to remove pathogens from the water. This treatment may be for instance a pre-heating, a filtering or an irradiation of the water with ultraviolet light.

[0005] WO 2008/012314 relates to a device which teaches the principle of treating water by means of a filter used for the preparation of nutritional compositions from a capsule inserted in a dispenser.

[0006] WO 2008/148834 relates to a single-use capsule for preparing a food liquid from a food substance contained in the capsule by introducing water in the capsule and passing water through the substance using the centrifugal forces for producing the food liquid which is centrifuged peripherally in the capsule relatively to a central axis of the capsule corresponding to an axis of rotation during the centrifugation.

[0007] A capsule with an integrated antimicrobial filter has been described in WO 2009/092629and No. 09156782.6 filed on 31 March 2009.

[0008] An approach consists in covering the compartment containing the ingredients with the filter. One problem is that a large filter surface tends to deforms under the

[0009] pressure of liquid added to the sealing pressure of the capsule against the liquid supply device (i.e., the beverage making appliance). Since the filter is placed above the compartment, the support of the filter is difficult to realize or requires a relatively thick and rigid plastic elements under the filter. Therefore, the impact on the cost is high because the filter material, typically, an antimicrobial membrane such PES (polyethersulfone) as well as the plastic material, dramatically increases the overall price of the capsule and render the business model non-viable. Furthermore, the impact on environment is higher because of this excess of packaging and filter material.

[0010] Therefore, there is a need for proposing another solution which is simpler, more economical solution, in particular, requiring less packaging and filter material while still offering a suitable technical filtering solution.

[0011] Another requirement is to ensure the release of the dedicated amount of the nutritional composition contained in the capsule to ensure a complete feed for each capsule, e.g., to the baby or child. No significant amount of nutritional liquid should be left in the capsule, most preferably, the capsule should be emptied from any liquid and solids. For this, the filter in the capsule can create a too high resistance to the pressurized gas (e.g., air) injected in the capsule during the emptying operation. As a result, the pressure of gas can be insufficient to properly empty the capsule or a too high pressure of gas is required which has an impact on the complexity and cost of the system.

[0012] Another requirement is to ensure that there is no contact between the gas opening device for the gas purge and contaminated liquid, e.g., nutritional ingredients or liquid, which would otherwise require systematic cleaning and so a clean-in-place system which would render the device more complex.

[0013] Another requirement is to lower the risk of perforating the filter by pressure of gas during the gas purge of the capsule that would provide contamination of the delivered nutritional product/composition.

[0014] Another requirement is to ensure that the filter can support the deformation under the pressure of liquid supplied in the capsule, in particular, the pressure at the upstream surface of filter.

[0015] One or more of the above-referenced problems are solved by the appended claims.

[0016] For this, the invention relates to a capsule for the preparation of a nutritional product in a device adapted to supply liquid in the capsule, said capsule comprising:

at least one compartment containing nutritional ingredients for the preparation of the nutritional product in combination with the supplied liquid,
a filter adapted for removing contaminants contained in the liquid,
wherein the filter has a filtering surface smaller than the cross section of the mouth of the compartment.

[0017] Preferably, at least a part of the filtering surface of the filter is offset relative to the cross section of the

K-FEE SYSTEM GMBH, EX2009, page 1385
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

mouth of the compartment when viewed in the axial projection of the capsule.

[0018] The approach of the invention essentially lies in reducing the surface of the filter and displacing it away from the centre of the capsule to ensure less deformation both by the pressing/sealing forces and the liquid forces exerting themselves on the filter. This configuration also result in a lower consumption of packaging and filter material and consequently a reduced cost and reduced impact on environment.

[0019] Preferably, more than 50% of the filtering surface of the filter is placed outside the cross section of the mouth of the compartment when viewed in the axial projection of the capsule.

[0020] Most preferably, the liquid filtering surface of the filter is placed fully outside the cross section of the compartment when viewed in the axial projection of the capsule.

[0021] Preferably, the filtering surface of the filter is at least two times smaller than the larger cross section of the compartment. The cross section of the compartment is here meant to be the cross section in the transversal plane of the capsule. Most preferably, the cross section is three or more times less than the larger cross section of the compartment.

[0022] The filter is preferably placed in a filter-receiving seat which has a smaller depth than the depth of the compartment. The advantage is that the filter can be better clamped and supported in the liquid supply device, in particular from beneath, and consequently it support less effort and flexes less under the liquid load under pressure.

[0023] The filter receiving seat preferably forms a lateral extension of the capsule comprising a flange-like rim for cooperating with the liquid supply device which extends beyond the flange-like rim bordering the compartment. Again, these characteristics aim at providing a capsule design wherein the force bearing surfaces exerting on the capsule are moved away from the ingredients' compartment. In particular, the flange-like rim of the filter receiving seat merges on the same plane with the flange-like rim bordering the compartment.

[0024] The filter preferably comprises a microporous filter membrane. The material for the membrane can be chosen from the list consisting of PES (polyethersulfone), cellulose acetate, cellulose nitrate, polyamide and combination thereof. The membrane may be formed of a porous layer and/or micro-fibres. For antimicrobial purpose the filter preferably has a pores size of less than 0.2 microns. It may have a thickness of less than 500 microns, preferably comprised between 100 and 300 microns. More than one membrane can be used in series with the same or different pore sizes and/or thicknesses. The membrane has preferably a longer dimension comprised between 8 mm and 40 mm, more preferably between 10 and 30 mm. The filter membrane is preferably a circular, squared, a rectangular or polygonal membrane.

[0025] The filter membrane is supported by an outlet wall in which is provided at least one conduit terminating by an injection nozzle directed towards the compartment. The conduit and nozzle aim at refocusing the filtered liquid in a privileged direction inside the compartment. The direction can be either normal or inclined relative to the top plane of the capsule.

[0026] The filter comprises an inlet wall comprising a liquid inlet of smaller cross section than the filtering surface of the filter membrane. The inlet wall is sufficiently rigid for proposing a pressing surface for a relative sealing pressure engagement against of the liquid supply means of the external device.

[0027] In the preferred mode, the filter is formed as a relatively rigid filter unit comprising a flexible microporous membrane inserted in a pressure resistant, handleable, relatively rigid apertured casing. Hence, the casing protects the membrane against the shocks, pressure, scratching, bending, etc., both during manufacturing of the capsule and during beverage preparation.

[0028] The casing can be formed of two half-casings which are welded together, which pinch and/or weld the filter at its circumference. The two half-casings can be associated by clipping and/or ultrasonic welding. These elements are sufficiently rigid to resist bending under the pressure of liquid injected in the capsule. These elements are made of foodgrade polymer such as PP, PA, PE, PA/PP, PVC, PS, PEEK, PLA or starch-based material and combinations thereof.

[0029] Preferably, the microporous filter membrane is supported by a structure in relief such as a plurality of ridges/studs protruding from the outlet wall and/or a grid placed between the outlet wall and the filter membrane. This relief structure ensures a minimal deflection of the filter membrane under the pressure of liquid and also enables collection of the liquid at the downstream side of the filter to an outlet of the casing to be supplied in the compartment.

[0030] The filter unit also comprises an outlet nozzle extending from the offcentred filter-receiving seat towards and above the first compartment. The outlet nozzle comprises one or at least a limited number of small-diameter outlets for providing a high-momentum jet of liquid in the compartment. Preferably, the nozzle comprises a single outlet having a diameter of less 1.0 mm, most preferably between 0.2 and 0.7 mm. In a variant, two parallel or non-parallel outlets are provided in the nozzle. The outlet is capable of providing a jet of liquid with a flow velocity comprised between 1 and 20 m/sec. The jet created by the nozzle produces a turbulent flow in the compartment which is effective for dissolving and/or dispersing all the ingredients in the liquid.

[0031] The capsule further comprises a selectively openable gas inlet which is placed in bypass of the filter to allow gas introduction from the exterior of the capsule into the compartment without passing through the filter. As a result, the filter membrane does not create a pressure loss for the gas before the ingredient's compartment. More preferably, the openable gas inlet is formed

K-FEE SYSTEM GMBH, EX2009, page 1386
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

in the filter unit, e.g., through the inlet wall, and communicates with the outlet nozzle. The gas inlet enables introduction of gas for emptying the capsule from liquid and so ensuring that the full content of the capsule is well delivered from the capsule. The gas inlet can be opened by piercing or breaking a part of the capsule. When the gas inlet is placed in communication with the filtered side of the filter unit, i.e., conduit leading to the nozzle, it is assured that the opening member pertaining to the liquid supply device for opening the gas inlet comes in contact only with filtered liquid.

[0032] The nutritional ingredients are under the form of a liquid concentrate, a paste, a gel or powder. In a preferred mode, the ingredients form an infant formula.

[0033] The appended drawings are given as a matter of illustration of the best modes.

Figure 1 is a perspective top view of a capsule according to preferred mode of the invention;

Figure 2 is a perspective bottom view of the capsule of figure 1;

Figure 3 is a side view of the capsule of figure 1;

Figure 4 is cross section of the capsule of figure 3 along line A;

Figure 5 is an exploded cross sectional view of the capsule of figure 1 showing the different elements before assembly;

Figure 6 is an enlarged perspective and cross sectional view of the filter unit of the capsule of figure 1;

Figure 7 is an exploded view of the filter unit of figure 6;

Figure 8 is a bottom plane view of the filter unit of figure 6;

Figure 9 is an enlarged plane cross sectional view of the filter unit of figure 8 along line E;

Figure 10 is a detail in cross section of the welded assembly of the filter unit of figure 6;

Figure 11 is another detail in cross section of the filter membrane connection in the casing of the filter unit;

Figure 12 shows another detail in cross section of the inlet of the filter unit;

Figure 13 shows, in top perspective view, a second embodiment of the capsule of the present invention with the top membrane being removed for clarity;

Figure 14 shows in cross section perspective view the capsule of figure 13;

Figure 15 shows a perspective view of a fluid supply device of the invention in which is inserted a capsule of the invention before opening of the liquid inlet for supply of liquid in the capsule;

Figure 16 shows a perspective view from a different angle of the fluid supply device of the invention still before opening of the liquid inlet;

Figure 17 is a cross sectional view of the device of figure 15 along a plane passing through the liquid injector still before opening of the liquid inlet;

Figure 18 is a cross sectional view of the device of figure 15 along a plane passing through the liquid injector still after opening of the liquid inlet;

Figure 19 is a cross sectional view of the device of figure 15 along a plane passing through the gas injector before opening of the gas inlet;

Figure 20 is a cross sectional view of the device of figure 15 along a plane passing through the gas injector after opening of the gas inlet.

[0034] The general aspect of the capsule according to a first mode of the invention is illustrated in connection with figures 1 to 3 given as a preferred example only. The capsule 1 A generally comprises a body 2 for receiving nutritional ingredients, a filter technology and a product delivery technology as will be discussed later on. The capsule has a cup 3 formed in the body which is closed by a liquid impermeable top membrane or foil 4 which is sealed onto the flange like rim 5 of the body. The membrane 4 may be simply liquid impervious or, most preferably, liquid and gas impervious. In particular, the membrane can be a multilayer comprising a gas barrier such as EVOH and/or aluminium. As will be explained in more detail later on, the top membrane is made of a puncturable material such as thin polymer and/or aluminium to enable liquid to be supplied by means of a liquid injector 6 on one hand, and gas to be supplied in the capsule by means of a gas injector 7 on the other hand.

[0035] The bottom 8 of the cup 3 comprises a product outlet 9 intended for the release of the liquid nutritional composition/product from the capsule. The product outlet 9 may comprise one or several openings for streaming of the liquid composition towards a receptacle such as a baby bottle, glass or cup. The product outlet 9 may extend from the cup bottom by a short duct 10 for directing the flow of liquid and reducing side projections of liquid which could contaminate the surroundings of the receptacle.

[0036] The body of the capsule extends on the upper side by an extension portion 11 which receives the filter for filtering liquid supplied to the capsule. As illustrated

K-FEE SYSTEM GMBH, EX2009, page 1387
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

on figure 2, the capsule may further comprises a three-dimensional coding structure 12 capable of co-acting with positioning sensors of the liquid supply device, for discriminating the type of the capsule inserted in the device so that the preparation cycle may be tailored to the recognized capsule type, e.g., by supplying the proper volume of liquid, varying temperature, flow rate, etc.

[0037] In view of figures 4 and 5, the capsule comprises, in the cup, a compartment 13 containing nutritional ingredients 14 formed by the bottom and sidewall of the cup 3. The volume of the compartment may vary depending on the volume of liquid to be injected in. In general, a large volume is preferred for large volume of liquid so that the compartment serves as a mixing bowl for the ingredients and liquid to form the composition.

[0038] The capsule may comprise a product delivery system 15 for ensuring a proper interaction of the supplied liquid and the ingredients contained in the compartment of the capsule and for reducing, preferably avoiding, contact of nutritional liquid with the device. In a particular mode, the product delivery system is designed to open at least one orifice through the capsule for delivery of the composition when a sufficient pressure of liquid has been reached in the compartment. For this, the bottom 8 of the cup comprises perforating elements 16 strategically placed to perforate a lower membrane 17 normally separating the compartment 13 from the liquid product outlet 9. The lower membrane is typically a thin liquid-tight perforable membrane made of aluminium and/or polymer. The membrane is sealed at the bottom edge of the cup. For instance, the membrane is a 30-micron foil of aluminium. A capsule comprising such a product delivery system is described in PCT/EP09/053033 filed on 16 March 2009 which is incorporated here by reference. It should be noted that the product delivery system can be designed differently. For instance, it can be a simple valve comprising an orifice or slot normally closed and which opens under the pressure which builds in the compartment as resulting from the liquid being supplied in. In another alternative, it can also be a porous wall forming a product filter.

[0039] The capsule of the invention is further designed to ensure filtration of the liquid being supplied in the compartment. The rationale for filtration of incoming liquid is essentially linked to the requirement for controlling a perfect quality of the liquid, e.g., water, entering in the delivered composition. Water can be supplied at a temperature of service, e.g., at about 35-40 degrees Celsius, by heating of ambient water coming from a water tank of the fluid supply device. More preferably, the filtration is carried out to remove contaminants including microorganisms such as bacteria, yeast or molds and eventually viruses, e.g., which have not been destroyed by the water heating operation. For this, a solution can consists in inserting, in a predetermined area of the capsule, a filter unit 18 in the form of a pressure resistant, handleable unit comprising an outer protective casing 19 and at least one filter media, in particular, a filter membrane 20. The filter unit 18 is preferably rigid in the sense that it is more rigid than the filter membrane and preferably, it is also resistant to significant deflection upon application of the liquid and sealing pressure exerted by the liquid coming out of the injector and by the sealing engagement of the fluid supply device itself onto the capsule. The filter unit presents the advantage to facilitate the placing of the filter technology in the capsule, without requiring specific connection means, and it reduces the risk of damaging the filter membrane.

[0040] For antimicrobial purpose, the filter membrane has preferably a pore size of less than 0.4 microns, most preferably of less than 0.2 microns. It may have a thickness of less than 500 microns, preferably between 10 and 300 microns. The material of the membrane can be chosen from the list consisting of PES (polyethersulfone), cellulose acetate, cellulose nitrate, polyamide and combinations thereof.

[0041] In particular, the filter unit is insertable in a filter receiving seat 21 formed at the extension portion 11 of the body. The filter receiving seat is so designed to position the filter unit in an offcentred manner relative to the compartment. As a result, the deformation of the capsule due to the pressure of liquid and the sealing with the device can be reduced compared to a more central positioning above the compartment. The filter receiving seat 21 may be, for instance, a U-shaped cavity of relatively low depth (d) compared to the depth (D) of the compartment. The seat 21 has a bottom wall and a sidewall matching at least part of the bottom and sidewall of the filter unit, in particular, of its larger portion 27. The filter unit may not require any specific connection with the filter receiving seat but it is simply maintained in place by the complementary shapes of the unit, e.g., by press-fitting, in the seat and the closure obtained by the top membrane 4. For instance, the seat 21 may comprise corrugations or recesses in its sidewall, e.g., near the compartment, for receiving the filter unit by press-fitting (not shown).

[0042] As illustrated in figure 4, the filter unit 18 is sized so that its filtering surface (F) is at least two times, preferably several times smaller than the larger cross section (C) of the mouth (i.e., upper opening) of the compartment 13, e.g., corresponding to the upper opening of compartment. Furthermore, the largest portion of filtering surface (F) is axially offset relative to the cross section (C) of the compartment (13) when the capsule is viewed in projection view along axial line A. By "largest portion", it is meant that at least 60%, preferably 85% of the filtering surface is placed outside the cross section of the compartment in the projection along direction A. The filtering surface is here considered as the total surface of the filter membrane minus its pinched circumference 30. A certain overlap of the surfaces may be considered as acceptable. A first problem solved is the reduction of the compartment and the ability to better control the deformation of the filter. Another problem solved is about the reduction of the amount of material for the filter membrane and consequently the reduction of the manufacturing cost and

K-FEE SYSTEM GMBH, EX2009, page 1388
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

the impact of the used capsule on environment. Another advantage is the possibility to compress the capsule, in particular, the cup of the capsule after emptying for reducing the storage volume of the used capsules. For this, the capsule may be provided with a sidewall including weakened lines oriented in such as way to promote compression of the cup in the axial direction.

[0043] As illustrated in figures 6 to 9, the filter unit of the invention comprises an inlet wall 22 for introduction of liquid in the unit and an outlet wall 23 for delivery of filtered liquid in the compartment 13. The inlet wall comprises a liquid inlet 24 whereas the outlet wall comprises a liquid outlet 25 formed at a nozzle 26 of the unit. The liquid inlet and outlets 24, 25 are spaced apart in the axial direction so that liquid inlet 24 is placed outside the contour of the compartment 13 whereas the outlet 25 is placed inside the contour of the compartment. As a matter of preferred design, the filter casing can take the form of a racket with a larger portion 27 positioned in the seat and extending by a narrowing portion 28 of nozzle which extends transversally above the compartment. The outlet 25 preferably has a small diameter, e.g., between 0.2 and than 1.5 mm, to form a jet of liquid under pressure that promotes dissolution and/or dispersion of the ingredients by liquid projected through the nozzle. The outlet may be formed of several discrete openings. The number of openings should be small, preferably between I and 5 at maximum to avoid a too large reduction of the flow velocity. The flow velocity through the outlet of the nozzle is preferably comprised between 1 and 20 m/sec. The outlet can have different cross section such as circular, oval, rectangular, etc.

[0044] The casing encloses the filter membrane 20 in an inner compartment 29 forming an upstream side and downstream side with the circumference 30 of the filter being sealed by the casing in a liquid-tight manner so to avoid bypass of the filter by liquid. At the downstream side of the compartment, the filter membrane is further supported by a support structure formed, e.g., of a multitude of small studs 31. The studs have flat free ends to reduce axial deflection of the filter membrane under pressure and avoid its breakage. The studs are preferably formed along the whole cross section of the filter membrane. More preferably, adjacent studs are not distanced of more than 2.5 mm. Between the support structure is formed a multitude of channels 32 for collecting the liquid being filtered through the membrane. The outlet wall 23 comprises at least one outlet conduit 33 for making fluid communication between the downstream side of the filter membrane, via channels 32, and the outlet 25 of nozzle 26. The support structure can be a separate element, e.g., a grid placed in the casing below the filter.

[0045] At the inlet wall 22, the filter unit further comprises a gas inlet 34 for enabling supply of gas under pressure, e.g., compressed air, in the compartment 13. The gas inlet can be, as illustrated, an opening through the wall intersecting with the outlet conduit 33. Therefore, it should be noted that gas entering the unit will bypass the filter membrane 20 on its way to the nozzle 26 and will enter under pressure the compartment. Both the liquid inlet 24 and the gas inlet 34 are closed by the top membrane 4. Hence, the inlets are selectively openable by perforating the membrane 4 at the dedicated inlets. In particular, the top membrane 4 is sealed around the liquid inlet and gas inlet by seals 35, 36 (figure 1). Therefore, when the top membrane is perforated by the gas injector 7 of the fluid supply device, the tip of the perforator can only enter in contact with filtered liquid. As a result, there is a much lower chance of contamination of the perforator than if the gas and liquid inlet were the same entry. The gas perforator can so remain clean for the next preparation cycle.

[0046] The structure of the filter casing 19 can vary. However, in a preferred design, the casing is formed of two parts 37, 38 which are welded and/or clipped together. Figure 7 shows the filter unit 18 with a lower half casing 37 and an upper half casing 38. The lower half casing 37 has a protruding circular ridge/groove section 39 which delimits the contour of the inner compartment for fitting in a circular groove/ridge section 40 of the upper half casing 38. Similarly, the nozzle portion 28 of the unit is assembled by a second ridge/recess section 41 in the lower half casing that fits into a groove/ridge section 42 of the upper half casing 38. It could be as well that sections 39,41, respectively 40, 42 form continuous sections from the larger portion 27 of the racket to the narrowing portion 28 of the racket.

[0047] As illustrated in figures 10 and 11, the lower and upper half casings 37, 38 are assembled while pinching the circumference 30 of the filter membrane. The parts 37, 38 can be designed in such a way to bend the circumference and pinch it at a circular point 43. The filter might not be necessary welded to the casing if the pinch point is sufficient to maintain the filter firmly in place and therefore successfully avoid bypass effect during operation. The unit can thus be assembled by welding at the groove/ridge sections by suitable welding lines 44, 45 for instance. The benefit of welding the casing parts but pinching the filter resides in the possibility to choose amongst a larger material choice for the filter without having to care for welding compatibility with the material of the casing. Another benefit is to simplify assembly by using ultrasonic welding for the thicker elements of the unit and avoid damaging the thinner element (i.e., filter membrane).

[0048] As shown in figure 8, the structure of the filter unit may be optimized. For example, the filter unit can comprise a reinforcing structure 46, in particular, at the narrowing portion 28 to enable the conduit to be formed in the lower wall but while still maintaining rigidity of the unit, in particular, in view of fluidic and/mechanical constraints. For instance, the reinforcing structure forms a series of ribs extending, for instance, in the transversal direction of the racket. Of course, many different reinforcing patterns are possible. In particular, the ratio rigidity-to-weight should be optimized to promote cost reduc-

K-FEE SYSTEM GMBH, EX2009, page 1389
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

tion and lower impact on environment.

[0049] In order to reduce the risk of damaging the filter membrane during opening of the liquid inlet 24 when perforating the membrane 4 in the area 47 just above the inlet, as illustrated in figure 12, a perforation-resistant deflector 48 is provided between the inlet and the filter membrane 20. The deflector 48 can be made integral with the inlet wall of the casing. It can be designed as a transversal bridge crossing the inlet opening and inset relative to the opening. Therefore liquid may pass by side passages 49 formed in the inlet between the bridge and the wall. Of course, the deflector could take various forms provided it creates a protection against perforation along inlet axial direction I. The deflector could also be a separate piece interposed between the filter and the inlet wall.

[0050] In another embodiment illustrated in figures 13 and 14, the capsule 1B of the invention differs in different aspects. First of all, a filter unit 18 is provided which comprises an outlet wall 23 onto which is applied the filter membrane 20. Contrary to the previous embodiment, the filter membrane 20 is placed between the outlet wall 23 and the bottom of the filter receiving seat 21 of the body. A liquid inlet 24 is provided on the side of the unit which communicates with the lower compartment 50 placed upstream of the filter but below the outlet wall 23. A second upper compartment 51 is formed between the outlet wall 23 and the top membrane (not shown) 4 which is sealed on the flange-like rim 5 of the body of the capsule. In order to avoid the top membrane 4 from collapsing in the upper compartment 51 and partially blocking the flow coming out of the filter membrane, the outlet wall 23 of the filter is provided with several support elements 52. The outlet wall is further provided with a multitude of openings 53 for allowing filtered liquid to properly distribute through the filter membrane placed upstream. Therefore, the liquid supplied in the capsule through liquid inlet 24 flows under the unit in the lower compartment 50 then through the filter membrane 20 in the upward direction. The filtered liquid is thus collected in the upper compartment and flows through the outlet nozzle 26 comprising a small-size outlet 25. For emptying capsule 1B, a gas inlet can be provided independently from the filter unit. In particular, an indentation 54 can be formed in the flange like rim, e.g., beside the filter unit. For gas to be supplied in the ingredients compartment 13, the top membrane is perforated at the site of the indentation. Perforation of the membrane can be carried out by a mechanical element of the fluid supply device or by gas under pressure. Of course, the gas inlet could also be provided in the filter unit. The product delivery system can be the same as described in the first mode.

[0051] The description will now be focused, in relation to figures 15 to 20, on the fluid supply device according to the invention adapted for receiving a capsule for preparation of a nutritional composition as described.

[0052] The fluid supply device 55 of the invention typically comprises a capsule holder 56 adapted in size to receive the capsule 1. The capsule holder fits with a fluid supply group 57 comprising liquid and gas supply means. The fluid supply group 57 comprises a capsule holder insertion base 58 for offering a stable position of reference for the capsule holder. In particular, complementary guiding means 59 on the capsule holder 56 and base 58 are provided for enabling easy assembling and removal of the capsule holder from the base such as along a longitudinal sliding direction B.

[0053] It should be noted that the filter unit 18 of the invention could as well be a separate part which is associated with the capsule at the time of use, e.g., during insertion of the capsule in the fluid supply device. For instance, the filter unit can be a part which is associated to the liquid injector or integrated in the liquid injector.

[0054] The fluid supply group 57 further comprises a liquid injection plate 60 bearing the liquid injector 6 by itself. The liquid injection plate 60 can be positioned to rotate along an axle 61 mounted on the top part of the base 58 such that the plate can take at least a first position at which the injector is placed away from the liquid inlet opening of the capsule and a second position at which the injected is engaged in opening of the liquid inlet 24. The first position is illustrated on figure 17 whereas the second position is illustrated in figure 18. The injection plate moves from the first position to the second position, and vice versa, by a cam mechanism 62 which is also mounted in rotation along a second axle 63 on the base. Similarly, a gas injector 7 is provided which can take a first position where it maintained away from the gas inlet of the capsule (figure 19) and a second position where it is engaged in opening of the gas inlet (figure 20). Again the change from first to second position of the gas injector 7 is controlled by the cam mechanism 62. In an advantageous manner, the cam mechanism 62 is common to control both the positions of the liquid and gas injectors in such a manner that the gas injector moves from its first to second position at a time the liquid injector has already moved from first to second position. The cam mechanism 62 in particular comprise at least one first cam portion 64 acting on the injection plate and at least one second cam portion 65 acting on the gas injector. The two cam portions are linked to the same cam mechanism so that they always act on their respective injectors in a coordinated manner. Figures 17 and 18 show the first cam portion 64 acting to change the position of the liquid injector 6 by pushing the plate 60. The cam portion 64 forming an eccentric surface relative to axle 63 which pushes the plate 60 downwards in direction of the capsule. It should be noted that sealing means such as an O-ring (not shown) may be associated to the injection plate for locally creating a liquid seal around the liquid inlet. Figures 19 and 20 show the second cam portion 65 also forming an eccentric surface pushing on the gas injector 7 in direction of the gas inlet. For clarity, the device does not show all the detail, in particular, the elastic return means for replacing the liquid injection plate in its first position and similar means for replacing the gas injector in its first

K-FEE SYSTEM GMBH, EX2009, page 1390
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

position. Such elastic return means can be in the form of springs or equivalents.

[0055] In a different mode, the filter unit 18 can separate from the capsule and be a disposable part of the fluid supply device.

Claims

1. Capsule for the preparation of a nutritional product in a device adapted to supply liquid into the capsule, said capsule comprising:

   at least one compartment (13) containing nutritional ingredients (14) for the preparation of the nutritional product in combination with the supplied liquid,
   a filter (18, 20) adapted for removing contaminants contained in the liquid,
   characterized in that:

   the filter (18, 20) has a filtering surface (F) smaller than the cross section (C) of the mouth of the compartment.

2. Capsule according to claim 1; **characterized in that** at least a part of its filtering surface (F) is offset relative to the cross section (C) of the mouth of the compartment when viewed in the axial projection of the capsule.

3. Capsule according to claim 2, **characterized in that** more than 50% of the filtering surface (F) of the filter (18, 20) is placed outside the cross section (C) of the mouth of the compartment when viewed in the axial projection of the capsule.

4. Capsule according to any one of claims 1 to 3, **characterized in that** the filtering surface of the filter is at least two times smaller than the larger cross section (C) of the compartment (13).

5. Capsule according to any of the preceding claims, **characterized in that** the filter (18, 20) is placed in a filter-receiving seat (21) which has a smaller depth (d) than the depth (D) of the compartment (13).

6. Capsule according to claim 5, **characterized in that** it comprises at least one flange-like rim (5a) of the filter-receiving seat for cooperating with the liquid supply device which extends beyond the flange-like rim (5) bordering the compartment (13) as a lateral extension (11) of the capsule.

7. Capsule according to any of claims 6, **characterized in that** the flange-like rim (5a) merges on the same plane with the flange-like rim (5) bordering the compartment (13).

8. Capsule according to any of the preceding claims, **characterized in that** the filter comprises a microporous filter membrane (20).

9. Capsule according to any of the preceding claims, **characterized in that** the filter membrane (20) is supported by an outlet wall (23) in which is provided at least one conduit (33) terminating by an injection nozzle (26) directed towards the compartment (13).

10. Capsule according to claim 9, **characterized in that** the filter comprises an inlet wall (22) comprising a liquid inlet (24) of smaller cross section than the filtering surface (F) of the filter membrane (20).

11. Capsule according to any of the preceding claims 8 to 10, **characterized in that** the filter (18, 20) is formed as a relatively rigid filter unit (18) comprising the flexible microporous membrane (20) inserted in a pressure resistant, handleable, relatively rigid casing (19) .

12. Capsule according to claim 11, **characterized in that** the casing (19) is formed of two half-casings (37, 38) which are welded together, which pinch and/or weld the filter membrane (20) at its circumference (30).

13. Capsule according to claims 11 or 12, **characterized in that** a plurality of ridges/studs is protruding from the outlet wall (23) or a grid is provided between the outlet wall (23) and the filter membrane for supporting the filter membrane (20).

14. Capsule according to claims 12 or 13, **characterized in that** the filter unit (18) comprises an outlet nozzle extending from the filter-receiving seat towards and above the first compartment.

15. Capsule according to any of the preceding claims 8 to 14, **characterized in that** it comprises a selectively openable gas inlet (34) which is placed in bypass of the filter membrane (20) to allow gas introduction from the exterior of the capsule into the compartment (13) without passing through the filter membrane (20).

16. Capsule according to any of the preceding claims, **characterized in that** the nutritional ingredients are in the form of a liquid concentrate, a paste, a gel or powder.

Patentansprüche

1. Kapsel zur Herstellung eines Nahrungsproduktes in einer Vorrichtung, die Flüssigkeit in die Kapsel leitet, wobei die Kapsel folgendes aufweist:

K-FEE SYSTEM GMBH, EX2009, page 1391
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

mindestens eine Kammer (13) mit Nahrungsbestandteilen (14) für die Herstellung des Nahrungsproduktes in Verbindung mit der zugeführten Flüssigkeit,
einen Filter (18, 20) zur Entfernung der in der Flüssigkeit enthaltenen Schadstoffe,
dadurch gekennzeichnet, dass:

der Filter (18, 20) eine Filterfläche (F) besitzt, die kleiner ist als der Querschnitt (C) der Öffnung des Segmentes.

2. Kapsel nach Anspruch 1, **dadurch gekennzeichnet, dass** mindestens ein Teil ihrer Filterfläche (F) in der axialen Projektion der Kapsel gegenüber dem Querschnitt (C) der Öffnung der Kammer versetzt ist.

3. Kapsel nach Anspruch 2, **dadurch gekennzeichnet, dass** mehr als 50% der Filterfläche (F) des Filters (18, 20) in der axialen Projektion der Kapsel außerhalb des Querschnittes (C) der Öffnung des Segmentes angeordnet sind.

4. Kapsel nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die Filterfläche des Filters mindestens zwei Mal kleiner ist als der größere Querschnitt (C) der Kammer (13).

5. Kapsel nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Filter (18, 20) in einer Filteraufnahme (21) angeordnet ist, die eine geringere Tiefe (d) als die Tiefe (D) der Kammer (13) besitzt.

6. Kapsel nach Anspruch 5, **dadurch gekennzeichnet, dass** sie mindestens einen flanschähnlichen Rand (5a) der Filteraufnahme besitzt, um mit der Vorrichtung zur Flüssigkeitszufuhr zusammenzuwirken, der über den flanschähnlichen Rand (5) hinaus verläuft, und als seitliche Verlängerung (11) der Kapsel an die Kammer (13) angrenzt.

7. Kapsel nach Anspruch 6, **dadurch gekennzeichnet, dass** der flanschähnliche Rand (5a) auf derselben Ebene mit dem flanschähnlichen Rand (5) zusammenkommt, der an die Kammer (13) angrenzt.

8. Kapsel nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Filter eine mikroporöse Filtermembran (20) aufweist.

9. Kapsel nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Filtermembran (20) durch eine Austrittswand (23) gehalten wird, in der mindestens eine Leitung (33) vorhanden ist, an deren Ende sich eine Einspritzdüse (26) befindet, die auf die Kammer (13) gerichtet ist.

10. Kapsel nach Anspruch 9, **dadurch gekennzeichnet, dass** der Filter eine Eintrittswand (22) mit einem Flüssigkeitseintritt aufweist, der einen kleineren Querschnitt als die Filterfläche (F) der Filtermembran (20) besitzt.

11. Kapsel nach einem der vorhergehenden Ansprüche 8 bis 10, **dadurch gekennzeichnet, dass** der Filter (18, 20) als eine relativ starre Filtereinheit (18) gebildet ist, die die elastische, mikroporöse Membran (20) aufweist, welche in ein druckfestes, handliches, relativ starres Gehäuse (19) eingeschoben ist.

12. Kapsel nach Anspruch 11, **dadurch gekennzeichnet, dass** das Gehäuse (19) aus zwei Gehäusehälften (37, 38) gebildet ist, die zusammengeschweißt sind, welche die Filtermembran (20) an ihrem Umfang (30) einklemmen oder festschweißen.

13. Kapsel nach Anspruch 11 oder 12, **dadurch gekennzeichnet, dass** eine Vielzahl von Stegen/Stiften aus der Austrittswand (23) hervorsteht, oder ein Gitter zwischen der Austrittswand (23) und der Filtermembran vorhanden ist, um die Filtermembran (20) zu halten.

14. Kapsel nach Anspruch 12 oder 13, **dadurch gekennzeichnet, dass** die Filtereinheit (18) eine Austrittsdüse besitzt, die sich von der Filteraufnahme bis über die erste Kammer erstreckt.

15. Kapsel nach einem der vorhergehenden Ansprüche 8 bis 14, **dadurch gekennzeichnet, dass** sie einen Gaseintritt (34) besitzt, der gezielt geöffnet werden kann, welcher in Umgehung der Filtermembran (20) angeordnet ist, um eine Gaszufuhr von außerhalb der Kapsel in die Kammer (13) zu ermöglichen, ohne dass diese durch die Filtermembran (20) führt.

16. Kapsel nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Ernährungsbestandteile die Form eines Flüssigkeitskonzentrats, einer Paste, eines Gels oder eines Pulvers besitzen.

Revendications

1. Capsule pour la préparation d'un produit nutritionnel dans un dispositif adapté à alimenter du liquide dans la capsule, la capsule comportant:

au moins un compartiment (13) comprenant des ingrédients nutritionnels (14) pour la production du produit nutritionnel en combinaison avec le liquide alimenté,
un filtre (18, 20) pour l'élimination des contaminants contenus dans le liquide,
caractérisé en ce que:

K-FEE SYSTEM GMBH, EX2009, page 1392
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

le filtre (18, 20) comporte une surface de filtre (F) inférieure à la section transversale (C) de l'ouverture du compartiment.

2. Capsule selon la revendication 1, **caractérisé en ce qu'**au moins une partie de sa surface de filtre (F) est décalée relatif à la section transversale (C) de l'ouverture du compartiment vue en projection axiale de la capsule.

3. Capsule selon la revendication 2, **caractérisé en ce que** plus de 50% de la surface de filtre (F) du filtre (18, 20) sont agencés à l'extérieur de la section transversale (C) de l'ouverture du compartiment vue en projection axiale de la capsule.

4. Capsule selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** la surface de filtre du filtre est au moins deux fois inférieure à la section transversale (C) supérieure du compartiment (13).

5. Capsule selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le filtre (18, 20) est agencé dans un siège de réception de filtre (21) présentant une profondeur inférieure (d) à la profondeur (D) du compartiment (13).

6. Capsule selon la revendication 5, **caractérisé en ce qu'**elle comporte au moins un bord semblable à une bride (5a) du siège de réception de filtre pour coopérer avec le dispositif de l'alimentation de liquide s'étendant au-delà du bord semblable à une bride (5) et attenant au compartiment (13) en tant que l'extension latérale de la capsule.

7. Capsule selon la revendication 6, **caractérisé en ce que** le bord semblable à une bride (5a) se rejoint sur le même plan avec le bord semblable à une bride (5) attenant au compartiment (13).

8. Capsule selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le filtre présente une membrane filtrante microporeuse (20).

9. Capsule selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la membrane filtrante (20) est maintenue par une paroi de sortie (23) dans laquelle est prévue au moins un conduit (33) aboutissant à un injecteur (26) qui est orienté vers le compartiment (13).

10. Capsule selon la revendication 9, **caractérisé en ce que** le filtre comporte une paroi d'entrée (22) comportant une entrée de liquide (24) d'une section transversale inférieure à la surface de filtre (F) de la membrane filtrante (20).

11. Capsule selon l'une quelconque des revendications 8 à 10, **caractérisé en ce que** le filtre (18, 20) est formé en tant qu'unité de filtre (18) relativement rigide présentant la membrane (20) élastique microporeuse insérée dans un carter (19) relativement rigide, résistante à la pression et maniable.

12. Capsule selon la revendication 11, **caractérisé en ce que** le carter (19) est formé en deux demi-carters (37, 38) soudés entre eux qui pincent et/ou soudent la membrane filtrante (20) à sa circonférence (30).

13. Capsule selon la revendication 11 ou 12, **caractérisé en ce qu'**une pluralité des âmes/chevilles fait saillie de la paroi de sortie (23), ou une grille est prévue entre la paroi de sortie (23) et la membrane filtrante pour maintenir la membrane filtrante (20).

14. Capsule selon la revendication 12 ou 13, **caractérisé en ce que** l'unité de filtre (18) comporte une buse de sortie s'étendant du siège de réception de filtre vers et au-delà du premier compartiment.

15. Capsule selon l'une quelconque des revendications précédentes 8 à 14, **caractérisé en ce qu'**elle comporte une entrée de gaz (34) sélectivement ouvrable qui est agencée en bypass de la membrane filtrante (20) pour permettre une introduction de gaz de l'extérieur de la capsule dans le compartiment (13) sans passer par la membrane filtrante (20)

16. Capsule selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les ingrédients nutritionnels sont en forme de concentré liquide, d'une pâte, d'un gel ou d'une poudre.

K-FEE SYSTEM GMBH, EX2009, page 1393
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

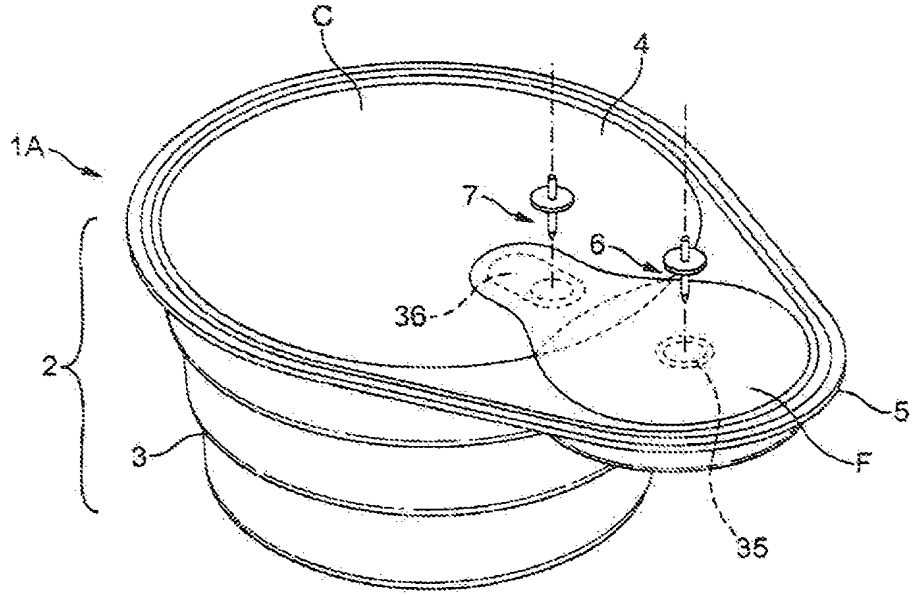


FIG. 1

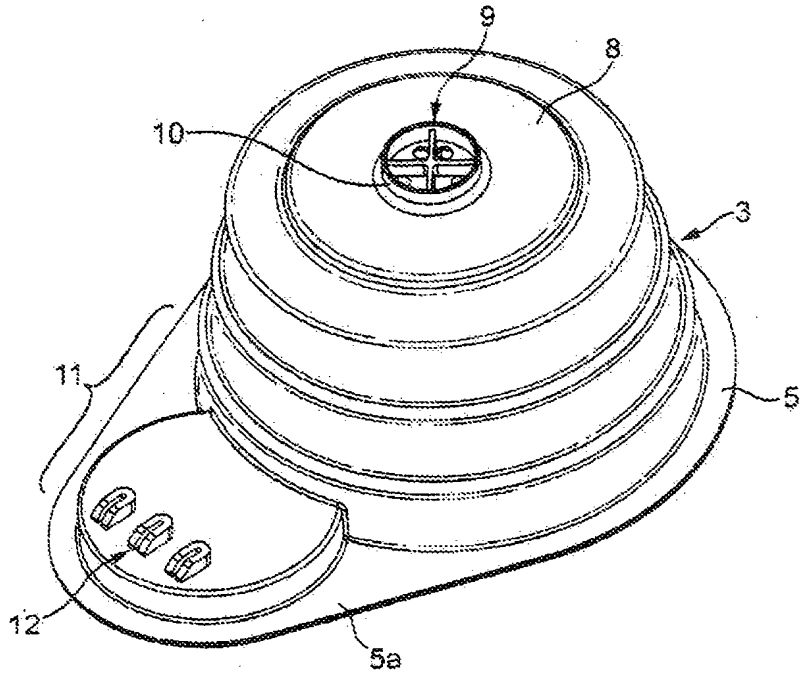


FIG. 2

K-FEE SYSTEM GMBH, EX2009, page 1394
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

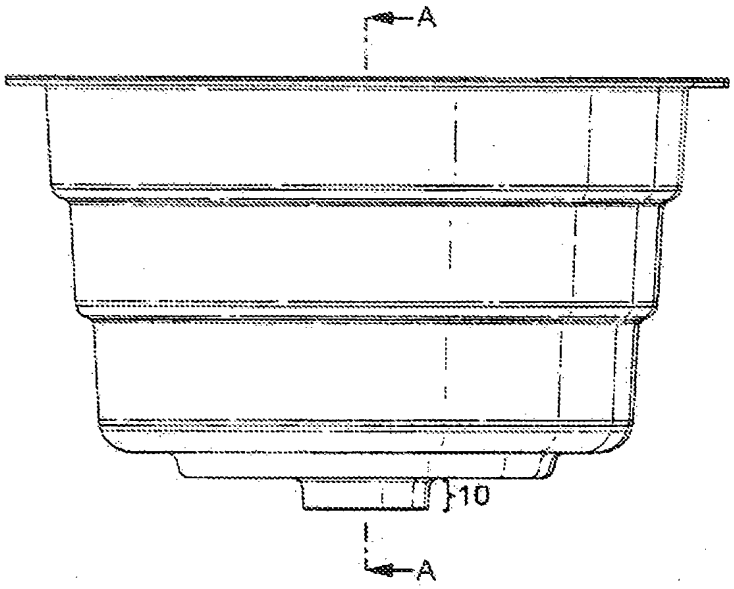


FIG. 3

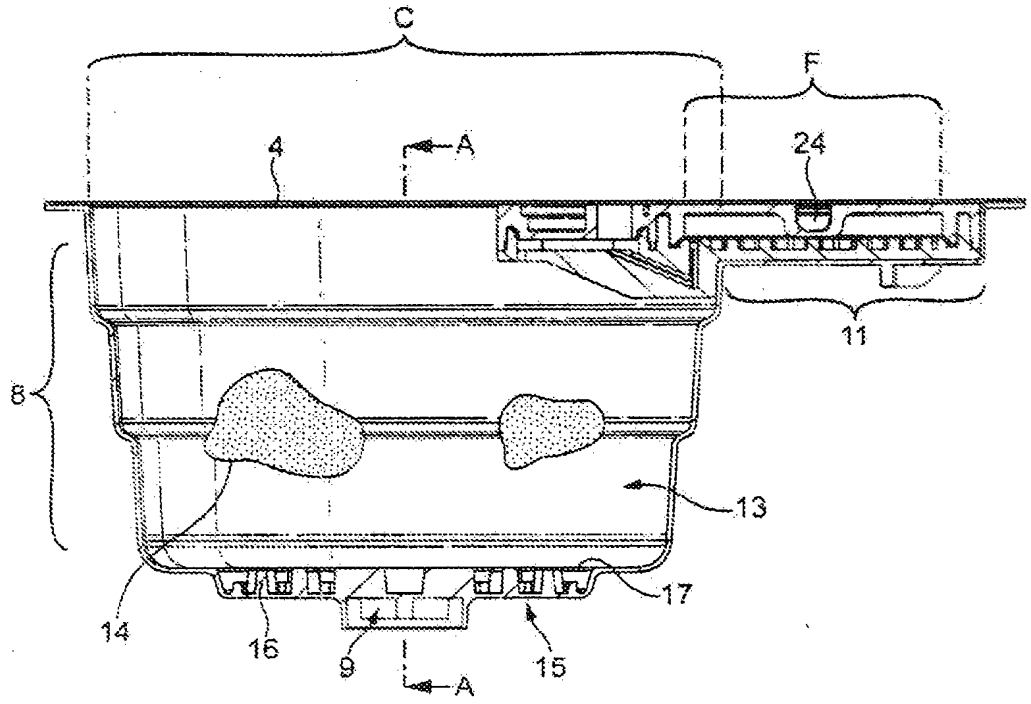


FIG. 4

K-FEE SYSTEM GMBH, EX2009, page 1395
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

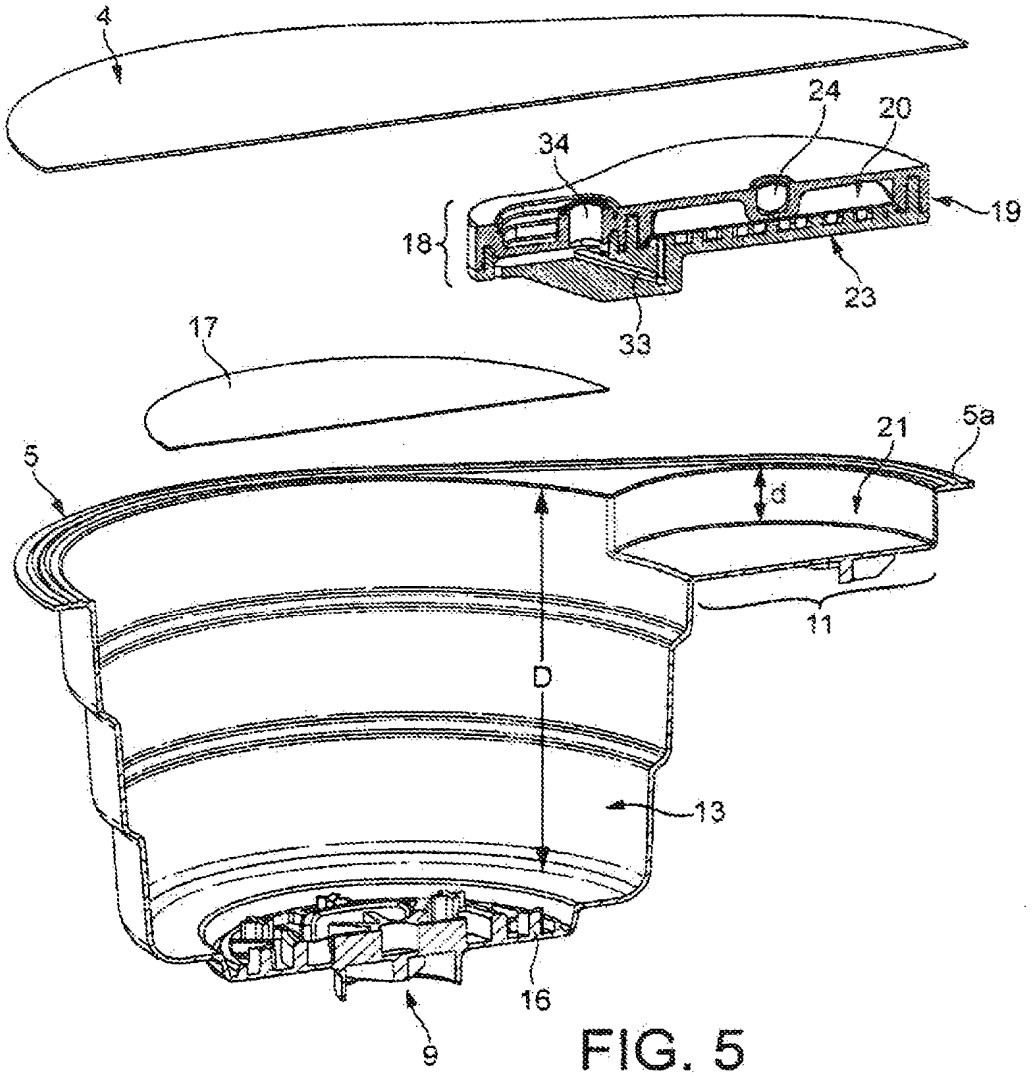


FIG. 5

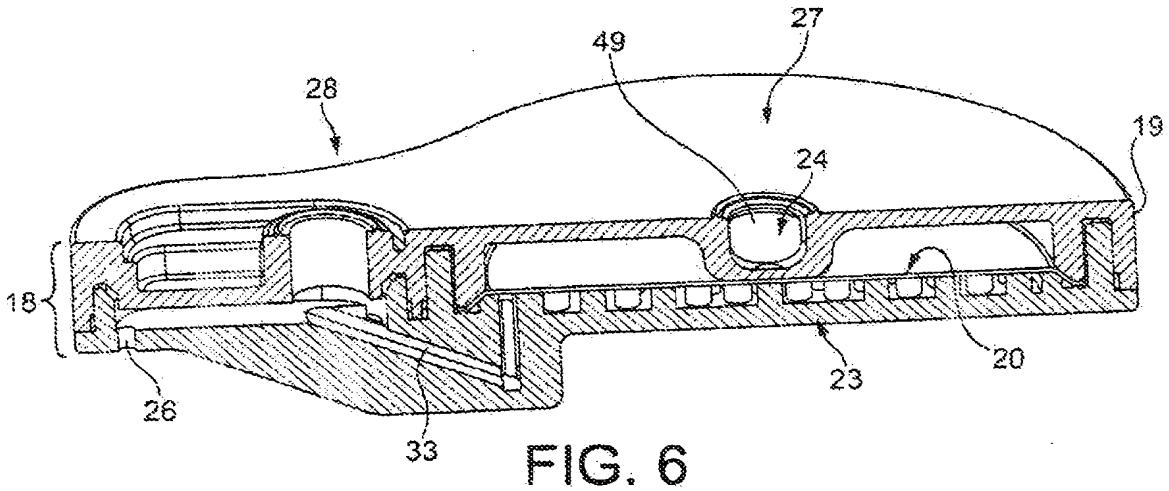


FIG. 6

K-FEE SYSTEM GMBH, EX2009, page 1396
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

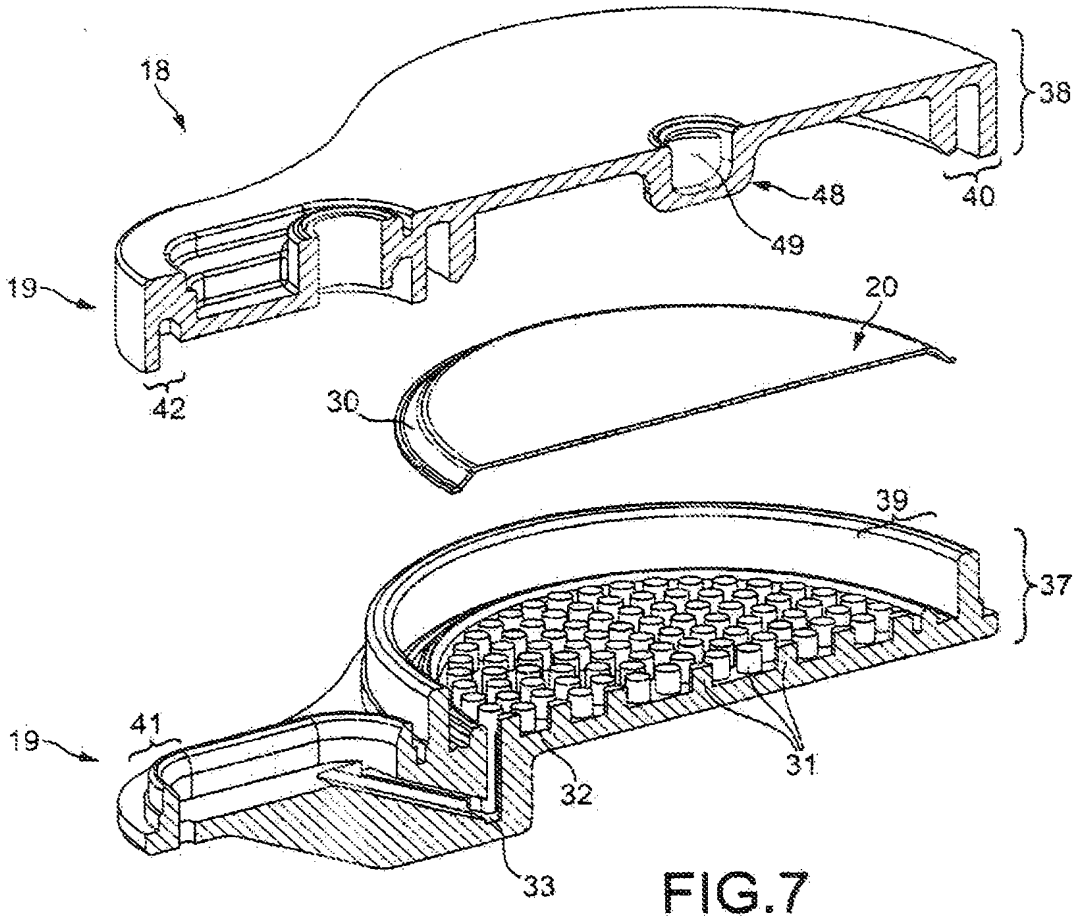


FIG.7

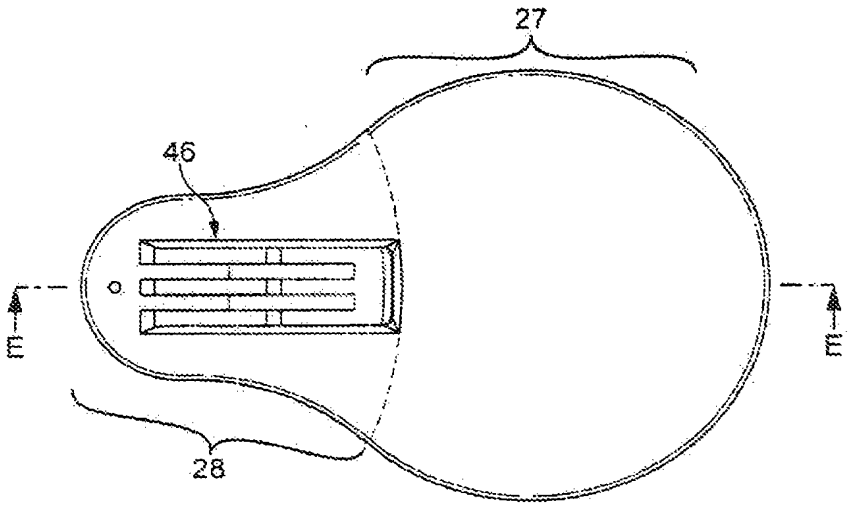


FIG.8

K-FEE SYSTEM GMBH, EX2009, page 1397
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

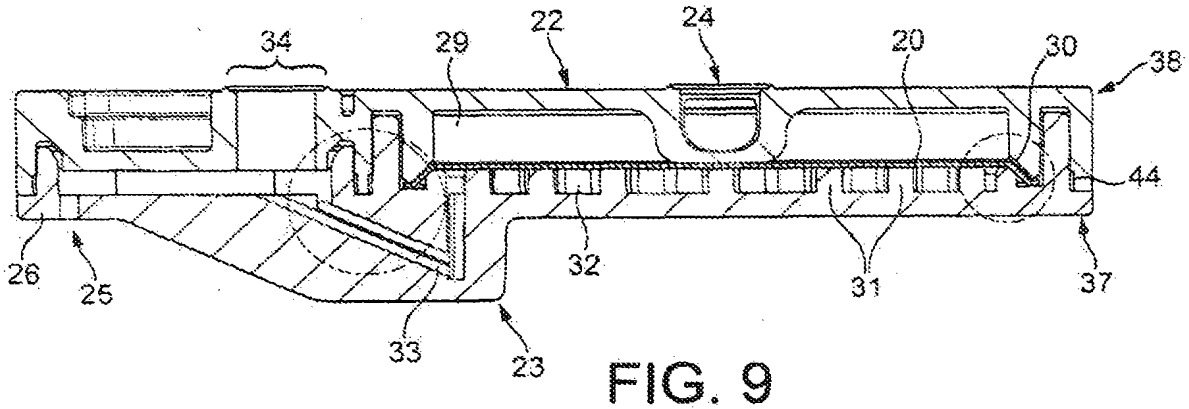


FIG. 9

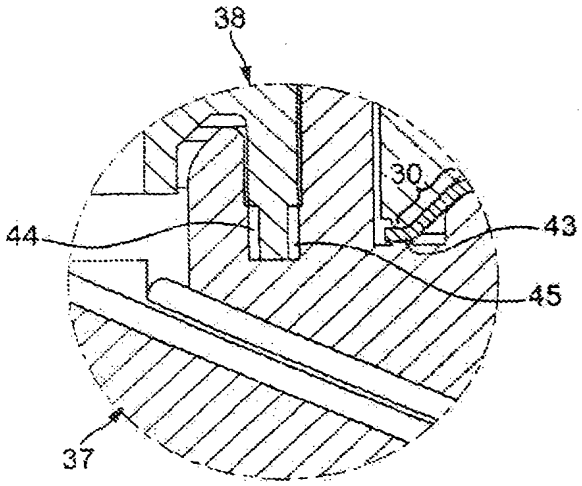


FIG. 10

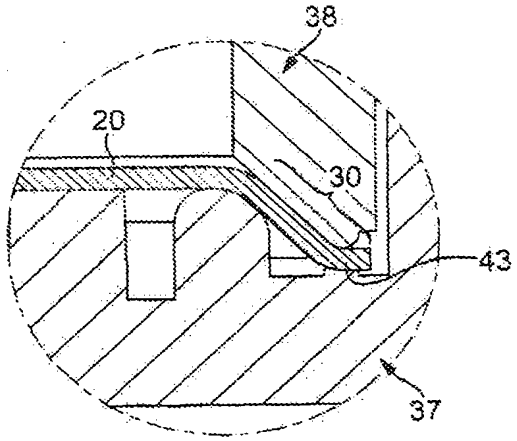


FIG. 11

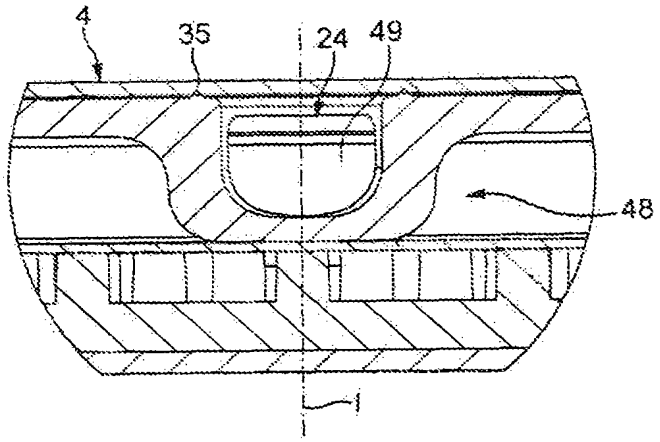


FIG. 12

K-FEE SYSTEM GMBH, EX2009, page 1398
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

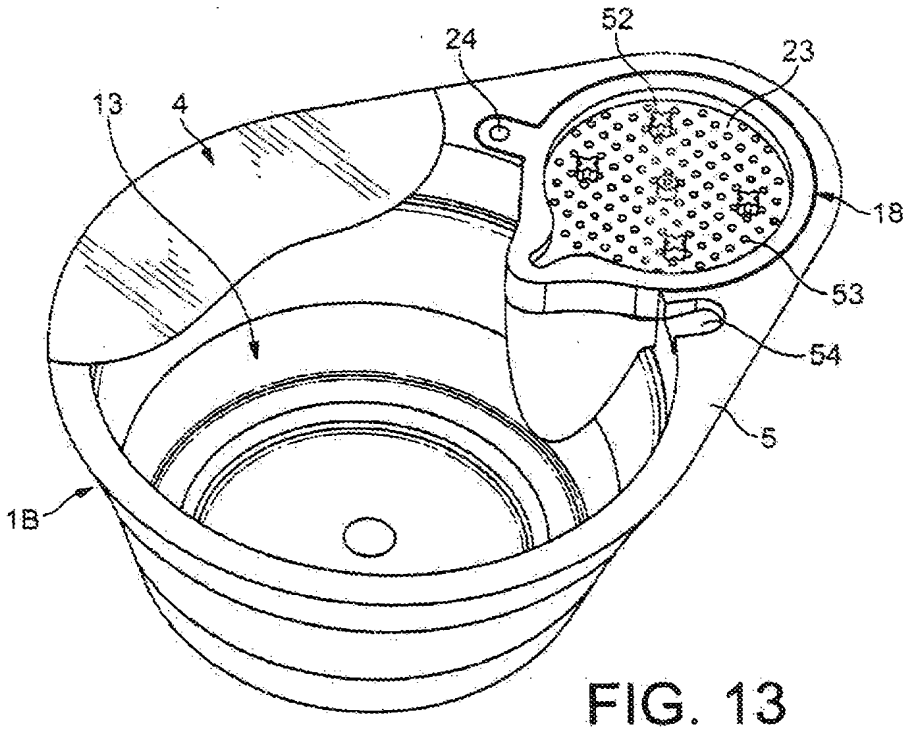


FIG. 13

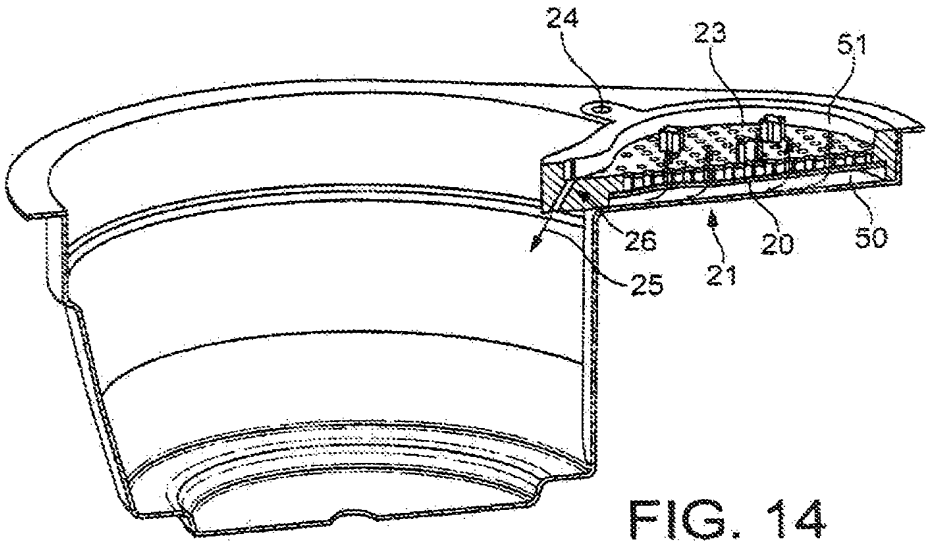


FIG. 14

K-FEE SYSTEM GMBH, EX2009, page 1399
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

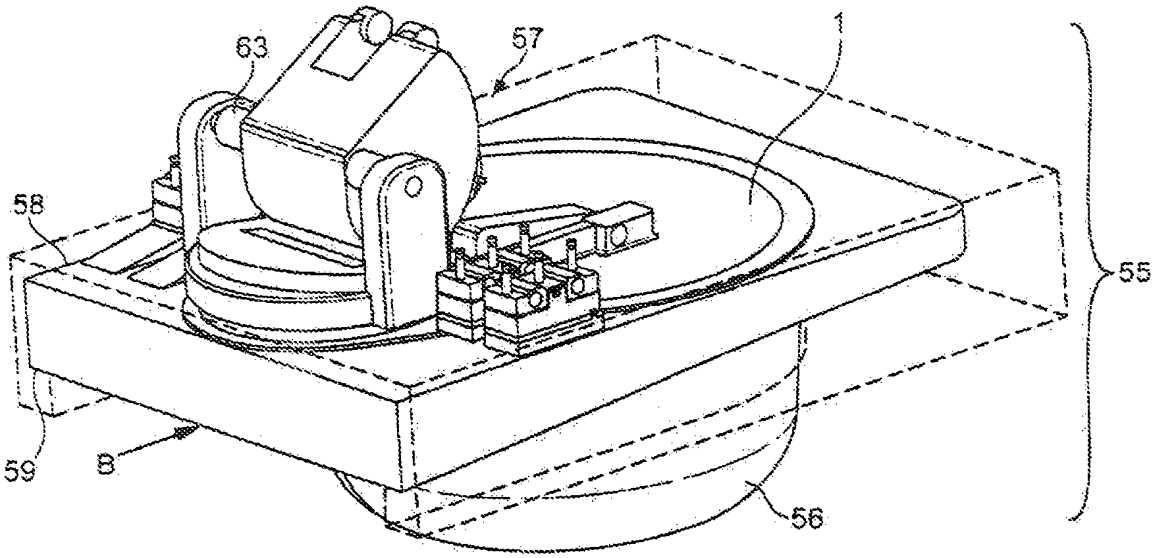


FIG. 15

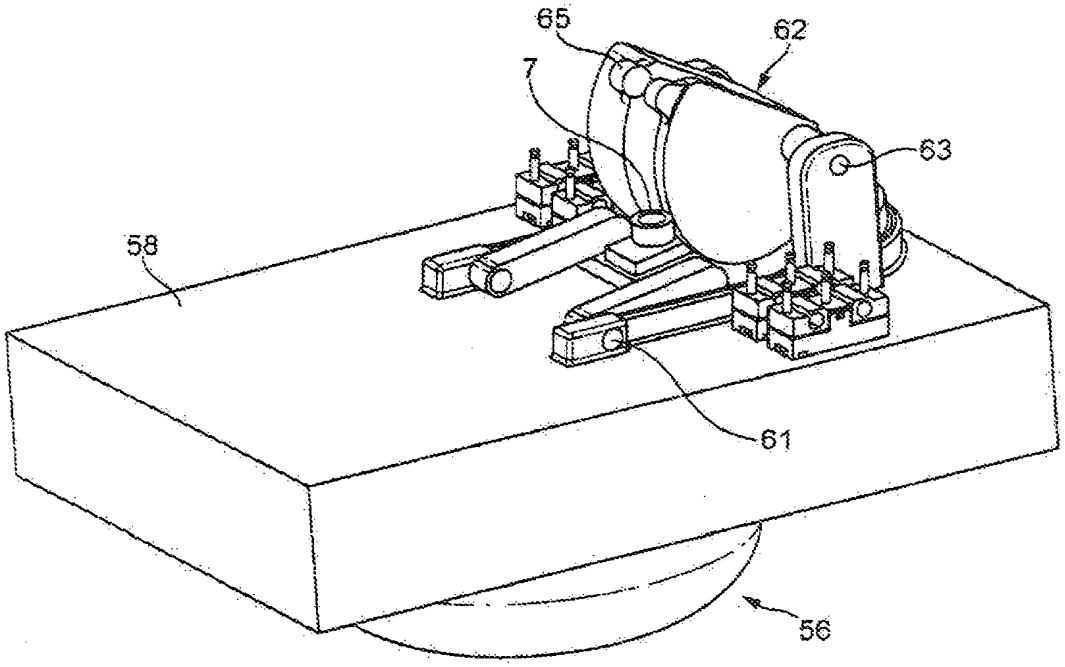


FIG. 16

K-FEE SYSTEM GMBH, EX2009, page 1400
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

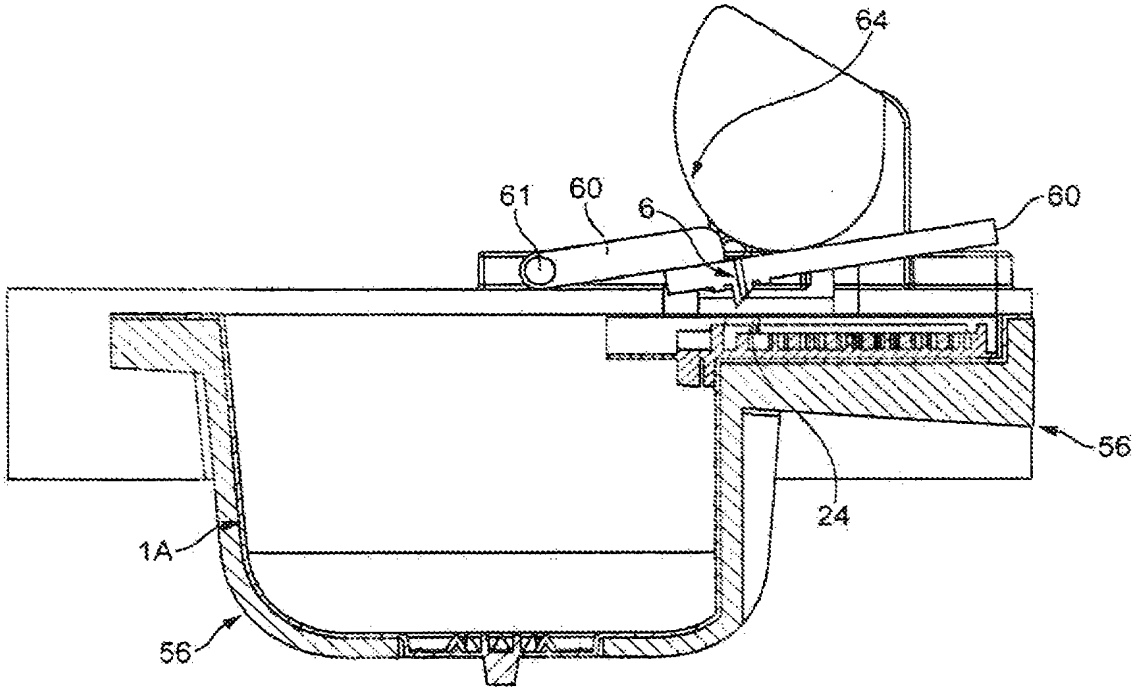


FIG. 17

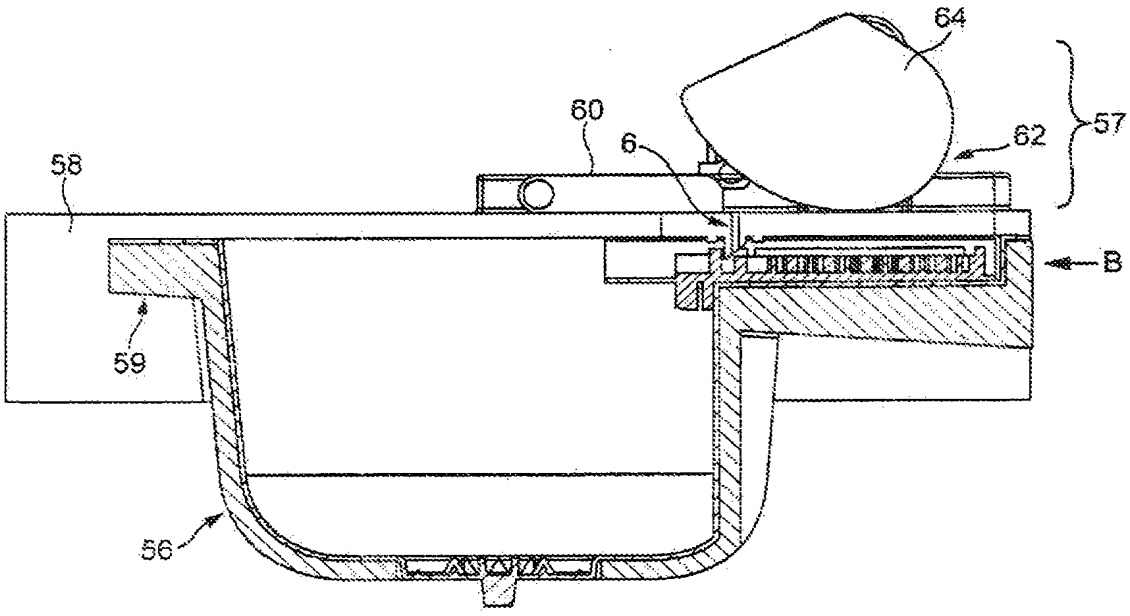


FIG. 18

K-FEE SYSTEM GMBH, EX2009, page 1401
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

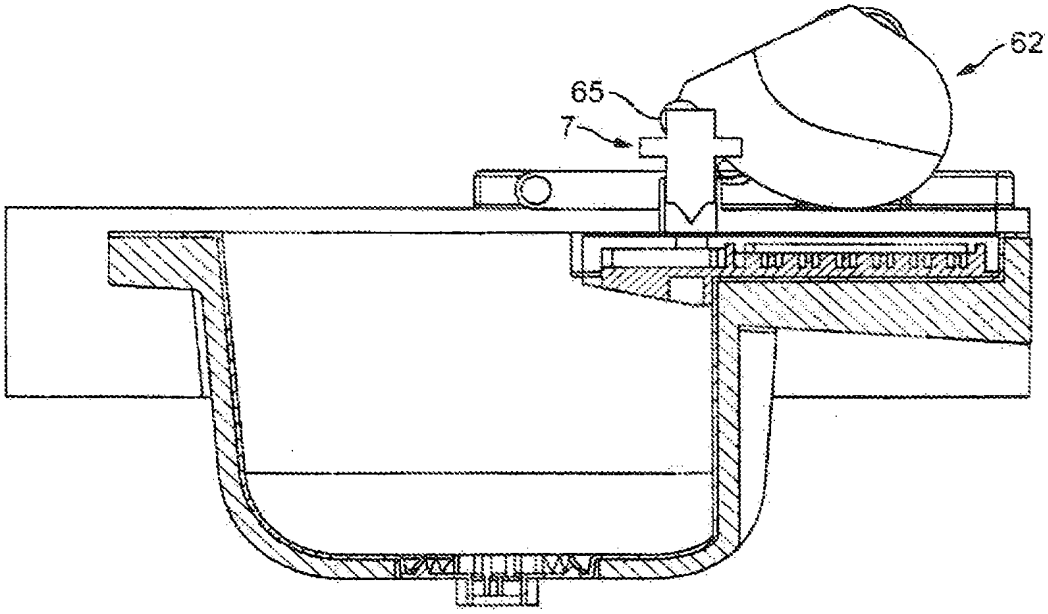


FIG. 19

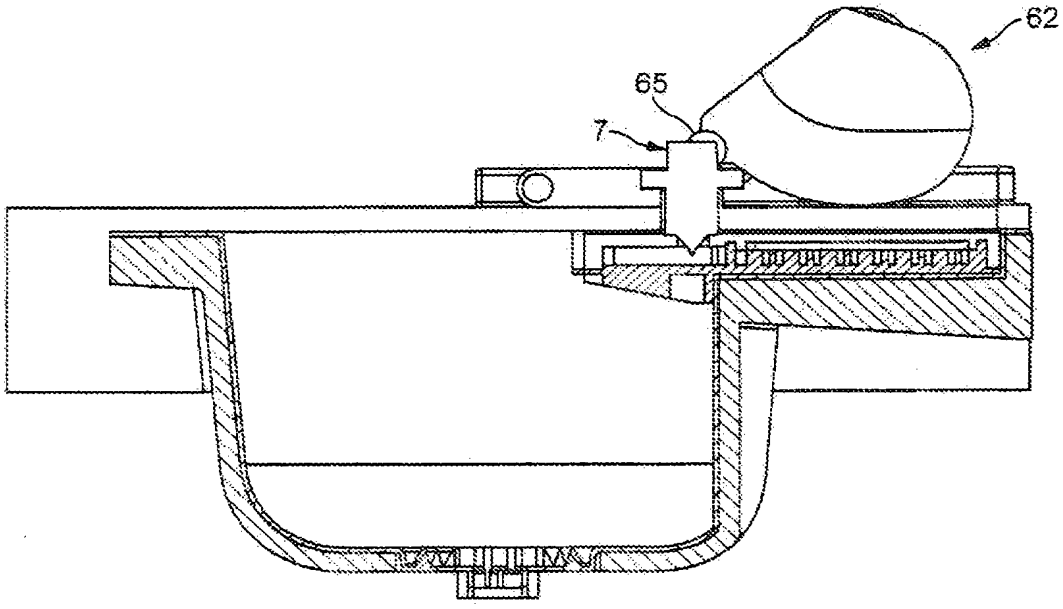


FIG. 20

K-FEE SYSTEM GMBH, EX2009, page 1402
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

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

- WO 2006077259 A **[0004]**
- WO 2008012314 A **[0005]**
- WO 2008148834 A **[0006]**
- WO 2009092629 A **[0007]**
- WO 09156782 A **[0007]**
- EP 09053033 W **[0038]**

K-FEE SYSTEM GMBH, EX2009, page 1403
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19)日本国特許庁（ＪＰ）　(12) **公開特許公報**（Ａ）　(11)特許出願公開番号

特開平7－125750

(43)公開日　平成７年(1995)５月16日

(51)Int.Cl.[6]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｂ６５Ｄ　25/20		Ｑ		
85/32		Ｊ　2330－3Ｅ		

審査請求　未請求　請求項の数２　ＦＤ　（全　３　頁）

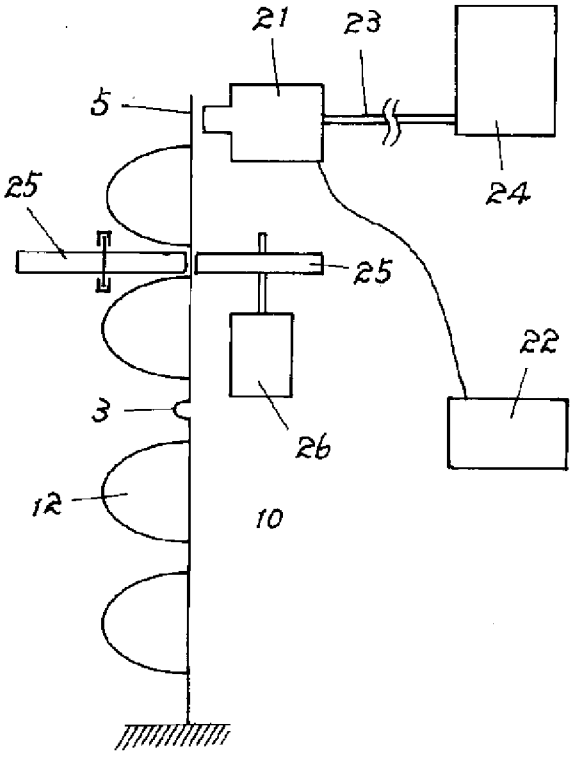
(21)出願番号　特願平5－288828

(22)出願日　平成５年(1993)10月26日

(71)出願人　000124166
加茂　守
大阪府池田市旭丘１丁目３番31号
(72)発明者　加茂　守
大阪府池田市旭丘一丁目３番31号
(74)代理人　弁理士　役　昌明　（外１名）

(54)【発明の名称】　熱可塑性合成樹脂で印字する装置

(57)【要約】
【目的】　ヒート・シール性を有する容器を得ることができ、しかも、ヒート・シール部に生産者、品質、注意書、バーコード（ＰＯＳマーク）、図形などを表示できる装置を提供すること。
【構成】　品物を入れる凹部12と周縁のフランジ部５を有する容器10のフランジ部５に対して、着色して溶剤に溶かした熱可塑性合成樹脂を噴出して印字するインク・ジェット方式の印字装置21を備え、コンピュータ22の制御により、フランジ部５に印字する。



K-FEE SYSTEM GMBH, EX2009, page 1404
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

【特許請求の範囲】
【請求項１】　品物を入れる凹部と周縁のフランジ部を有する容器の上記フランジ部に対して、溶剤に溶かした熱可塑性合成樹脂を噴出して印字するインク・ジェット方式の印字装置を具備することを特徴とする熱可塑性合成樹脂で印字する装置。
【請求項２】　容器が、隔壁によって仕切られた複数の鶏卵を入れる凹部と周縁のフランジ部をそれぞれ有する身部分および蓋部分と、該身部分および蓋部分を屈曲自在に連結するヒンジ部とを備えた卵容器であることを特徴とする請求項１に記載の熱可塑性合成樹脂で印字する装置。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】この発明は、品物を入れる凹部と周縁のフランジ部を有する容器のフランジ部に対して、熱可塑性合成樹脂で印字する装置に関する。
【０００２】
【従来の技術】図３の斜視図に示すように、従来の卵容器10は、身部分１と、蓋部分２と、これら身部分１および蓋部分２を屈曲自在に連結するヒンジ部３とからなり、合成樹脂シートを真空成型またはブロー成型して一体に成型したものであり、身部分１および蓋部分２には、隔壁11によって仕切られた複数の鶏卵を入れる凹部12と周縁のフランジ部５とを備えている。
【０００３】このような従来の卵容器においては、卵容器10の身部分１の凹部12に卵を入れたのち、身部分１の上に蓋部分２を折り重ね、フランジ部５をホッチキスまたは超音波溶着により封緘していた。
【０００４】そして、封緘された卵容器10の開封を容易ならしめるために、身部分１と蓋部分２とのヒンジ部３に糸状体を添設しておき、この糸状体を摘まんで横方向に引っ張ることにより、ヒンジ部３を破断して開封できるように構成した卵容器が、特公昭５８－５２９０３号公報などにより従来より提案されている。
【０００５】
【発明が解決しようとする課題】このような従来より提案されている容器は、封緘する際にホッチキスにより複数箇所止めなければならず、しかも、ホッチキスの針の補充が面倒であった。また、超音波溶着装置は、高価な装置であって、どこにでも設置できるものではなかった。
【０００６】そこで、この発明は、容器の封緘に際して、ホッチキスの針のような補充を必要とするものを使用しないで、かつ、廉価な装置を使用して封緘が可能で、かつ、容器に生産者、品質、注意書、バーコード（ＰＯＳマーク）、図形などを表示することを目的として考えられたものである。
【０００７】
【課題を解決するための手段】この発明の熱可塑性合成樹脂で印字する装置は、品物を入れる凹部と周縁のフランジ部を有する容器のフランジ部に対して、溶剤に溶かした熱可塑性合成樹脂を噴出して印字するインク・ジェット方式の印字装置を具備している。
【０００８】
【実施例】この発明の熱可塑性合成樹脂で印字する装置は、図１に示すように、合成樹脂シートを真空成型またはブロー成型した卵容器などのフランジ部５を有する容器10を紙面と垂直方向に搬送するために、パルス・モータ26によって駆動される送りローラ25よりなる搬送装置と、トルエンなどの溶剤に溶かされた熱可塑性ポリウレタン樹脂を貯えるタンク24と、このタンク24とパイプ23を介して接続されたインク・ジェット方式の印字ヘッド21を有する印字装置と、この印字装置を制御するコンピュータ22とを備えている。
【０００９】なお、印字装置の印字ヘッド21をフランジ部５に沿って移動させるように構成すれば、容器10を静止させた状態で印字することができる。
【００１０】そして、容器10のフランジ部５と印字ヘッド21とを相対的に移動させながら、コンピュータ22の制御により、図２に示すように、生産者、品質、注意書、バーコード（ＰＯＳマーク）、図形などを印字４する。
【００１１】容器10のフランジ部５の表面に印字する接着性を有する熱可塑性ポリウレタン樹脂４には、例えば、三洋化成工業株式会社より商品名「ＴＩ－７１２１Ｄ」、「ＴＩＭ－２０１１Ａ」、「ＴＩ－８５５０」で発売されているトルエンなどの溶剤に溶かされた黄色透明液状のものが適し、顔料または染料を混合して着色したものを印字に使用する。
【００１２】この着色された液状の熱可塑性ポリウレタン樹脂は、印字後、短時間に乾燥して接着性を有しないが、熱軟化温度が７０～８０℃程度であり、８０℃程度に加熱すると軟化して接着性を呈するもので、いわゆるヒート・シール性を有している。
【００１３】次に、このようにフランジ部５に印字された容器10を封緘する要領を説明する。例えば、卵を凹部12に入れたのち、身部分１および蓋部分２を閉じてフランジ部５を重ね合わせ、８０℃程度に加熱したローラによってフランジ部５を押圧すると、印字されていた熱可塑性ポリウレタン樹脂４が軟化して接着することができ、印字されたパターンは潰れることはなく、透明なフランジ部５を通して読み取ることができる。
【００１４】なお、従来の超音波溶着装置によって封緘することも可能である。超音波溶着装置は、超音波振動によりフランジ部５の合成樹脂のシートを軟化温度まで加熱して溶着するものであるが、容器10のフランジ部５には、熱可塑性ポリウレタン樹脂４で印字されているので、低い温度で溶着できるから、少ないエネルギーで封緘することができる。
【００１５】以上で説明した卵容器の実施例において

は、身部分１のフランジ部５のみに熱可塑性ポリウレタン樹脂４で印字しているが、身部分１および蓋部分２の両フランジ部５に印字してもよい。また、熱可塑性ポリウレタン樹脂４をフランジ部５の全長にわたって隙間なく帯状のパターンとして形成することもできる。

【００１６】

【発明の効果】以上の実施例に基づく説明から明らかなように、この発明の熱可塑性合成樹脂で印字する装置によると、ヒート・シール性を有する容器を得ることができ、しかも、ヒート・シール部に生産者、品質、注意書、バーコード（ＰＯＳマーク）、図形などを表示することができる。

【００１７】さらに、この発明の装置で印字した容器は、消耗品を必要とせず、廉価なヒートシール装置によって容易に封緘することができ、しかも、封緘部は不用意に開封することはない。

【図面の簡単な説明】

【図１】この発明の熱可塑性合成樹脂で印字する装置の一実施例を示す側面図、

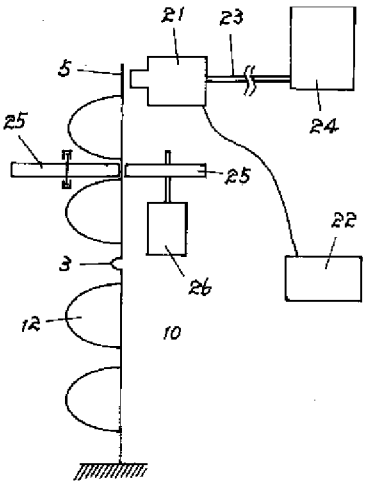
【図２】この発明の装置で印字した卵容器の斜視図、

【図３】従来の卵容器の一例を示す斜視図である。

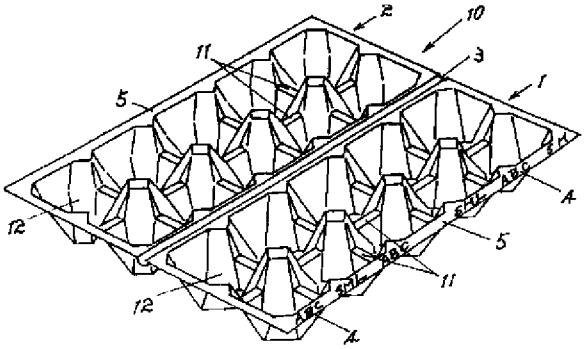
【符号の説明】

1　身部分
2　蓋部分
3　ヒンジ部
4　印字された熱可塑性ポリウレタン樹脂
5　フランジ部
10　卵容器
11　隔壁
12　凹部
21　インク・ジェット方式の印字ヘッド
22　コンピュータ
24　タンク
25、26　搬送装置

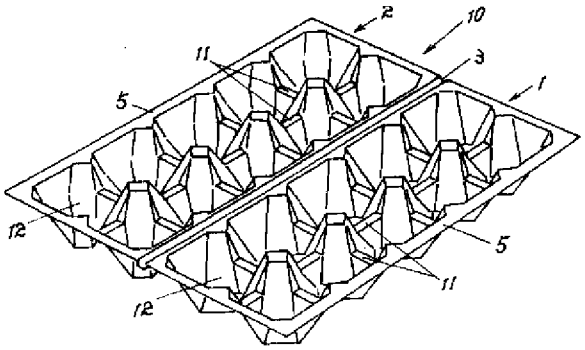
【図１】



【図２】



【図３】



(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 586 534 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
19.10.2005 Bulletin 2005/42

(51) Int Cl.[7]: **B67D 1/00**

(21) Application number: **04076206.4**

(22) Date of filing: **21.04.2004**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL HR LT LV MK

(30) Priority: **18.02.2004 EP 04075524**

(71) Applicant: **MDS Global Holding Ltd.**
Valetta VLT 10 (MT)

(72) Inventors:
- **Evers, Lucas Alphonsus Maria**
3707 CL Zeist (NL)
- **Sterngold, Edouard**
2018 Antwerpen (BE)

(74) Representative: **Iemenschot, Johannes Andreas**
Exter Polak & Charlouis B.V.,
P.O. Box 3241
2280 GE Rijswijk (NL)

Remarks:
Claim 11 to 52 is deemed to be abandoned due to non-payment of the claims fee (Rule 31 (2) EPC).

(54) Dispensing of a substance

(57) The invention proposes to dispense a substance from a container (1) filled with a single portion of a substance. The container comprises a deformable body, preferably made of sheet material, defining a filling cavity which body has an opening (6) and an integral planar circumferential rim (5) surrounding said opening (6), which opening is closed by a cover sheet of foil material (7) which is sealed to the circumferential rim (5) by means of a circumferential sealing seam (10). The container (1) with the substance is opened by making use of the deformability of the cover sheet. A support surface supports the cover sheet (7) except at the position of a recess. The recess (10b) is positioned at least over a part of the circumferential sealing seam. Upon compression of the container body the substance is pressurized and the cover sheet bulges out into the recess (10b) such that the sealing seam (10) is broken at the location where the bulge is formed resulting in the container being open.

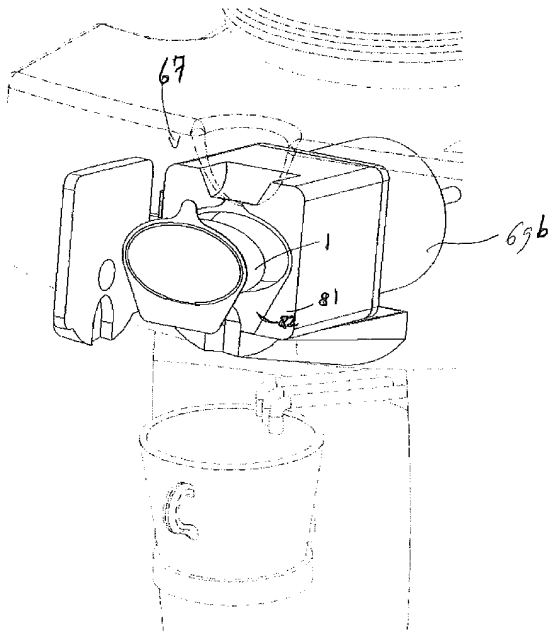


fig.9

EP 1 586 534 A1

Printed by Jouve, 75001 PARIS (FR)

K-FEE SYSTEM GMBH, EX2009, page 1407
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Description

[0001] The present invention relates to dispensing of a substance from a container by means of a dispensing apparatus.

[0002] This is for example known from EP 278 773, where a beverage dispensing apparatus is shown. The dispensing apparatus is adapted to empty a bag containing a flavouring constituent for the preparation of a carbonated beverage. The bag is inserted into a receiving and actuating unit, which has means to compress the bag and expel the content out of it into a discharge nozzle. The discharge nozzle is also connected to a feed conduit for feeding carbonated water. The feed conduit is provided with a closing valve which can be opened by operating a lever by pressing a serving cup against it. The flavouring constituent and the carbonated water are thus mixed in the discharge nozzle before they are dispensed in the serving cup. When different bags with different flavours are inserted subsequently in the receiving unit, a cross contamination between different flavours can occur. Next to the part for serving carbonated drinks the known dispensing apparatus has also separate spigots for hot water and cold water.

[0003] The present invention proposes to dispense a substance from a container filled with a single portion of a substance. The container comprises a deformable body, preferably made of sheet material, defining a filling cavity which body has an opening and an integral planar circumferential rim surrounding said opening, which opening is closed by a cover sheet of foil material which is sealed to the circumferential rim by means of a circumferential sealing seam.

[0004] Such a container as such is known. For example EP 299 571 shows a container for a small quantity of milk, cream or the like. The container has a bottom and a wall of rigid plastic defining a filling cavity. Further, the container is provided with a channel which is in communication with the filling cavity. A cover sheet covers the filing cavity and the channel. The cover sheet has a pulling tab by means of which it can be pulled away at the channel for forming an opening through which the content of the container can be dispensed.

[0005] According to the invention the substance, e.g. syrup for a soft drink is dispensed directly from the container into a serving cup or a bottle. Also the water is dispensed into the cup such that mixing takes place in the cup thereby preventing the contamination of the dispensing apparatus with the substance.

[0006] The invention proposes to open the container with the substance by making use of the deformability of the cover sheet. The container is held in receiving means and the cover sheet is engaged with a support surface provided with a recess. The support surface supports the cover sheet except at the position of the recess. The recess is positioned at least over a part of the circumferential sealing seam. Then the container body is compressed whereby the substance is pressurized and the cover sheet bulges out into the recess such that the sealing seam is broken at the location where the bulge is formed resulting in the container being open. This way of opening the container requires no cutting means or other means adapted to open the container that could get contaminated with the substance, which is advantageous in view of hygiene.

[0007] Preferably the container is manufactured by a vacuum or thermo forming process. A flat sheet, preferably of plastic or aluminium, is placed in a vacuum or thermo forming apparatus with a forming die and multiple container bodies are formed simultaneously in the sheet by vacuum forming the filling cavities into the die. Then the sheet with the filling cavity is placed in a filling machine and filled with substance. The sheet with the container bodies is covered by a sheet of covering foil that is sealed over it. Finally, the sheet with the closed containers is placed in a punch machine, where the perimeter of the circumferential rim of the body is formed by punching out waste material between the containers.

[0008] Preferably the sheet of covering foil is manufactured of aluminium or another material, preferably a multilayer material. In an advantageous embodiment the covering sheet is provided with identification means. The identification means correspond to the substance contained in the container so as to allow automatic identification of the container. This container can be placed in a dispensing apparatus comprising identification recognition means for automatically identifying the container and the substance therein.

[0009] The invention will become more apparent from the following description with reference to the drawing, in which:

Fig. 1 shows a view in perspective of a preferred embodiment of a container according to the invention,
Fig. 2a shows a front view of the container of Fig. 1,
Fig. 2b shows a top view of the container of Fig. 1,
Fig. 2c shows a side view of the container of Fig. 1,
Fig. 3 shows a view in perspective of the container of Fig. 1 in a compressed state,
Fig. 4a shows a front view of the container of Fig. 3,
Fig. 4b shows a top view of the container of Fig. 3,
Fig. 4c shows a side view of the container of Fig. 3,
Fig. 5 shows a perspective front view of an embodiment of a drink dispensing apparatus with receiving means for the container of Fig. 1,
Fig. 6 shows a perspective front view of another embodiment of a drink dispensing apparatus with receiving means for the container of Fig. 1,
Fig. 7 is a schematic cross section of the dispensing apparatus of Fig. 6,
Fig. 8 shows a perspective front view of the dispensing apparatus of Fig. 6 with an opened lid of the receiving means,
Fig. 9 shows how the container of Fig. 1 is inserted in the dispensing apparatus of Fig. 6,

K-FEE SYSTEM GMBH, EX2009, page 1408
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Fig. 10 shows the container of Fig. 1 is in the full inserted state in the dispensing apparatus of Fig. 6,
Fig. 11 shows how the compressed container of Fig. 3 is removed from the dispensing apparatus of Fig. 6,
Fig. 12 shows an alternative embodiment of a container,
Fig. 13 shows another alternative embodiment of a container,
Fig. 14a shows a further embodiment of a container with a dispensing channel with a closed end,
Fig. 14b shows a detail of the container of Fig. 14a,
Fig. 14c shows the dispensing channel of the container of Fig. 14a after the channel has been opened,
Fig. 15 shows a top view of an alternative embodiment of a container,
Fig. 15a shows part of the top of another alternative embodiment of a container,
Fig. 15b shows part of the top of still another embodiment of a container,
Fig. 15c shows an alternative embodiment of a covering lid for a dispensing apparatus which can be used with containers of Figs. 15, 15a and 15b,
Fig. 15d shows how the container of Fig. 15a or 15b is compressed and its content is mixed with a mixing fluid,
Fig. 16 shows a perspective view of an embodiment of a container with two filling cavities,
Fig. 17 shows a cross section of a container with two filling cavities with different heights,
Fig. 18 shows a top view of the container of Fig. 16,
Fig. 19 shows a top view of a container with two filling cavities with each a different cross section,
Fig. 20 shows a cross section of an embodiment of the receiving means provided with heating elements,
Fig.21a shows a cross section of an embodiment of the receiving means with a certain piston form before compression of the container,
Fig. 21b shows the cross section of the receiving means of Fig. 21a after compression of the container,
Fig.22a shows a cross section of an embodiment of the receiving means with another piston form before compression of the container,
Fig. 22b shows the cross section of the receiving means of Fig. 22a after compression of the container,
Fig. 23a shows a perspective view of the dispensing apparatus of Fig. 6 with a bottle placed in it,
Fig. 23b shows a front view of the dispensing apparatus of Fig. 23b,
Fig. 24 shows a cross section of an embodiment of the receiving means with yet another piston form before compression of the container,
Figs. 25a and 25b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a first state,
Figs. 26a and 26b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a second state,
Figs. 27a and 27b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a third state,
Figs. 28a and 28b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a fourth state,
Figs. 29a and 29b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a fifth state,
Figs. 30a and 30b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a sixth state,
Figs. 31a and 31b show a perspective view and a cross section respectively of a preferred embodiment of the receiving means in a seventh state,
Fig. 32 shows a perspective view of a preferred embodiment of a container that can be used with the receiving means of Figs. 25-31,
Fig. 33 shows a top view of an alternative embodiment of a container,
Figs. 34a-d show a preferred embodiment of a bottle that can be used in the dispensing apparatus of the invention,
Figs. 35a-e show steps of the connecting of a CO2 bottle with a connecting arrangement, and
Fig. 36 shows in more detail a part of Fig. 35d.

[0010] Figs. 1, 2a-2c show a container 1 for containing a substance. The container 1 comprises a deformable body preferably made of plastic sheet material. The body can also be made of another material, e.g. aluminium or laminated cardboard paper. Preferably the body has a bottom 3 and a side wall 4 extending from the bottom 3, which define a filling cavity. On the side opposite the bottom 3 a planar circumferential rim 5 is integral with the side wall 4 and extends outwardly therefrom. The circumferential rim 5 surrounds an opening 6. A cover sheet 7 of foil material is sealed to the circumferential rim 5 by means of a circumferential sealing seam 10 and closes the opening 6. The foil material can be a multilayer material.

[0011] In Fig. 2b is shown a top view of the container 1 without the cover sheet. The circumferential rim 5 has an extending tab 8 with a dispensing channel 9 formed by a depression in the tab 8. Further, the circumferential rim has a gripping tab 11 diametrically opposite the extending tab 8. The cover sheet 7 is also sealed to the extending tab 8 and preferably also to the gripping tab 11.

[0012] The dispensing channel 9 has an open end 9a at the edge of the extending tab 8. The extending tab 8 with the channel 9 is covered by the cover sheet 7. As can be seen in figs. 2b and 2c, the dispensing channel 9 is separate of the filling cavity, that is, it does not join

K-FEE SYSTEM GMBH, EX2009, page 1409
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

the filling cavity. When the filling cavity is filled with substance and the covering sheet is applied to the container, zone 10b of sealing seam 10 near the dispensing channel 9 forms a barrier for the substance between the cavity and the dispensing channel 9.

[0013] Preferably, the zone 10b of the circumferential sealing seam 10 at the location of the dispensing channel 9 is weakened. This can be done by giving the sealing seam 10 a smaller width near the dispensing channel 9 than at the rest of the circumference (see Fig. 2b). Another possibility is to heat the sealing seam 10 locally near the dispensing channel 9, such that it is weakened locally.

[0014] When in use the container body can be compressed, thereby pressurizing the content of the container 1. By the increasing pressure on the inside of the container 1, the sealing seam 10 breaks at that zone 10b and a passage is formed between the cover sheet 7 and the area of the tab surface that connects the filling cavity with the dispensing channel, so as to allow substance to pass through the passage from the cavity into the channel 9. This is illustrated with arrows 90 in Fig. 2b.

[0015] Figs. 6-8 show a drink dispensing apparatus 61 with a housing 62. On top of the housing 62 is placed a water tank 63, for feeding water. In another embodiment it is also possible to provide the apparatus with an internal water storage tank. It is also possible to connect the apparatus to a water supply line. From the housing 62 is extending a platform 65 for placing a cup 64 on which is to be filled with a drink. Above the cup 64 are arranged three dispensing pipes 66a, 66b and 66c, through which can be dispensed cold water, warm water and carbonated water respectively. At the underside a platform 70 is arranged. The platform 70 can be formed as a grid with a collecting receptacle 71 underneath for collecting spilled water. The collecting receptacle 71 can be removable so that it can be cleaned. In a further embodiment an evaporator can be arranged in the collection receptacle to evaporate spilled fluid, such that the receptacle does not have to be emptied too often.

[0016] It is also possible to place bottles or glasses and the like in the apparatus. The bottle can be placed on the platform 70. In Fig. 23a and 23b the dispensing apparatus 61 is shown with a specially designed bottle 230 in it. The bottle 230 has a top part 231 which is adapted to fit in a sealing manner under the receiving means 67 such that dispensed substrate and water cannot be spilled during dispension. To that end the receiving means 67 can be provided with sealing means like a sealing gasket or the like.

[0017] In Figs. 34a-d a further embodiment of a bottle 430 for the dispensing apparatus 61 is shown. In this embodiment the bottle 430 has a plug-like closing member 431. Around the bottle neck a rotatable ring 433 is arranged. In the ring 433 are provided two slots 434 that extend helically through the ring 433. On the ring 433 is provided a gripping fin 436.

[0018] The closing member 431 is coupled to the ring 433 by a bracket 432 with two legs 432a en 432b. Each leg 432a, 432b has a protrusion 435 that extends inwardly and are each inserted in one of the slots 434. In each of the legs 432a and 432b of the bracket 432 is provided a guiding slot 437 comprising an upper straight slot portion 437a and a lower curved portion 437b. On the bottle neck are on diametrically opposite sides provided guiding pins 438 which each are received in one of the guiding slots 437.

[0019] In use the bottle is closed by the closing member 431 as is shown in Fig. 34a. A person can open the bottle 430 by gripping the gripping fin 436 and rotating the ring 433. By this rotation the helical form of the slots 434 force the protrusions 435 on the brackety legs 432a and 432b upwards as can be seen in Fig. 34b. The covering member 431 is thus lifted from the bottle 430 guided by the guiding pins 438 in the straight portions 437a of the guiding slots 437.

[0020] At a certain point the bracket 432 is lifted such a distance that the curved portions 437b of the guiding slots 437 reach the guiding pins 438. By rotating the ring 433 further the bracket 432 will start to tilt due to the cooperation of the guiding pins 438 and the curved portions 437b of the guiding slots as can be seen from Fig. 34c. The closing member 431 is tilted away from the bottle 430 until the end position is reached, i.e. the position in which the curved portions 437b of the guiding slots 437 engage the guiding pins 438 as is shown in Fig. 34d. In the state shown in Fig. 34d the user can place the bottle in the dispensing apparatus to fill it or can poor drinks from the bottle 430.

[0021] For closing of the bottle 430 the ring 433 is rotated in the opposite direction and the opposite sequence as described with reference to Figs. 34a-d is followed.

[0022] The dispensing apparatus comprises receiving means 67 for receiving a container 1 as is described hereabove, filled with a single portion of a substance, e. g. coffee concentrate or syrup for a soft drink.

[0023] In Fig. 7 is shown a schematic cross section of the apparatus 61. The water from the tank 63 can be directed by means of a control system 75 through feed lines 74a to a cooling system 73, a heating system 72 and a carbonating system 71, which are connected with the three dispensing pipes 66a, 66b and 66c respectively by feed lines 74b. The carbonating system 71 preferably comprises a bottle filled with CO_2 which will be described below.

[0024] It is also possible to have four lines 51-54 that are all connected to one central dispensing pipe 50 as is shown in Fig. 5. The dispensing pipe 50 is directed such that the water is ejected in the beam of substance that is dispensed from the container 1, such that a good mixing between the two is secured. The four lines 51-54 are for feeding hot water, cooled water, water with an ambient temperature and carbonated water to the dispensing pipe 50.

K-FEE SYSTEM GMBH, EX2009, page 1410
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

[0025] In Fig. 35a is shown how a CO2 bottle 360 is positioned under a valve arrangement 351.

[0026] The CO2 bottle 360 is provided with a closing valve 361. The closing valve 361 has a housing 366 with an outlet 362 which is closed of by a preferably spring loaded closing member 363 that has to be pushed down such that the outlet 362 is opened. On the upper side of the valve housing 366 is provided a circumferential flange 367 with two straight edges 367a.

[0027] The connecting arrangement 351 comprises a substantially cylindrical housing 352. Within the housing 352 a connecting means 354 is slideably arranged. The connecting means 354 can slide between a released position and a connected position within the housing 352. In Figs. 35a-c the connecting means 354 is in the released position in Figs. 35d, 35e and 36 the connecting means 354 is in the connected position.

[0028] The connecting means 354 has an outlet 355 to which a pipe or a hose can be connected. The connecting means 354 fits on the closing valve 361 on the CO2 bottle 350 and comprises a protruding member (not shown) which is suitable for pushing down the closing member 363 and opening the valve 361. The protruding member is circumvented by a sealing ring (not shown) so as to prevent the escape of CO2 gas from the bottle 360 during use.

[0029] The cylindrical housing 352 of the connecting arrangement 351 has an opening 356 at the lower end which has a form complementary with the flange 367 of the valve 361. In use the cylindrical housing 352 is placed over the flange 367 and the valve as is shown in Fig. 35b. Next, the bottle 360 is rotated over 90° as is shown in Fig. 35b. The lower end of the connecting means 354 is provided with two lips 357 (see also Fig. 36) which fit over the straight edges of the flange 367. These lips 357 are in Fig. 35c just above the straight edges of the flange 367. Next the connecting means is moved downwards by pushing a lever 358 down as is shown in Figs. 35d and 36. The lever 358 rotates about an axis 359 which is provided with a cam 370. The cam 370 engages the top surface 354a of the connecting means 354. The rotation of the cam 370 results in the connecting means 354 being pushed down to the connected position (see Fig. 35e). In this connected position the lips 357 are positioned over the straight edges 367a. This prevents that the bottle is rotated with respect to the connecting means 354 during use, which could lead to damaging of sealing means and/or the leakage of CO2 gas.

[0030] The receiving means 67 have a compression chamber 68 with a variable volume. The compression chamber 68 is delimited by a piston 69 with a screw spindle 69a that is driven by a linear electric motor 69b. The piston is adapted to engage the bottom 3 of the container 1. In other possible embodiments (not shown) the drive means can comprise pneumatic means, hydraulic means or can be adapted to be hand driven.

[0031] The piston can have a form adapted to deform the container in a specific form. In Fig. 7 is schematically shown that the piston 69 has a flat front face 69c with a diameter that corresponds substantially with the inner diameter of the compression chamber 68.

[0032] In Fig. 21a is shown another piston 210 with a rear portion 210b with a constant diameter that substantially corresponds to the inner diameter of the compression chamber 68, and with a substantially cone shaped front portion 210a with a front face 210c which has substantially the same diameter as the bottom 3 of the container 1. The cone shaped portion 210 has a surface 210d with a convex curved form. This form of the piston 210 allows the container 1 to deform and wrinkle in the area between the surface 210d of the cone shaped portion 210a and the wall 68a of the compression chamber 68, as can be seen in Fig. 21b.

[0033] In Fig. 22a is shown a piston 220 with a cone shaped portion 220a with a linear decreasing surface 220d. The front face 220c has a smaller diameter than the diameter of the bottom 3 of the container 1. The form of the piston 220 allows the container 1 to deform and fold in the area between the surface 220d of the cone shaped portion 220a and the wall 68a of the compression chamber 68, as can be seen in Fig. 22b.

[0034] The pistons 210 and 220 can advantageously be used to compress the container 1 such that almost all substance in the filling cavity is dispensed. This means that there are only small losses which is advantageous from an economic view point.

[0035] In Fig. 24 a piston 240 is shown with a scraping edge 241. The scraping edge 241 prevents that during compression of the container no container material gets stuck between the inner surface 68a of the compression chamber 68 and the piston 240, which could cause jamming of the piston.

[0036] The receiving means 67 have a covering lid 80 which hinged and can be opened (see Fig. 8) and closed (see Fig. 6). Further, the receiving means 67 have a front plate 81. The front plate 81 is provided with a recess 82 with a depth substantially corresponding to the thickness of the circumferential rim 5 with the extending tab 8 and the gripping tab 11 of the container 1. The bottom of the recess 82 forms a stop face engaging the back side of the circumferential rim 5. Further, there is provided in the recess 82 a deeper recess 83 in which the dispensing channel 9 of the container 1 can be received. This deeper recess 83 has the advantage that the container 1 can only be placed in one manner in the receiving means, thereby securing a proper functioning and use of the apparatus.

[0037] The covering lid 80 is provided with a recess 84 which, when a container 1 is received in the receiving means, is placed over the zone 10b of the circumferential rim 10 near the dispensing channel 9.

[0038] In Fig. 9 is shown how a container 1 is placed in the receiving means 67. The perimeter of the recess 82 preferably fits around the perimeter of the circumferential rim 5 of the container 1 with the tabs 8 and 11 as

K-FEE SYSTEM GMBH, EX2009, page 1411
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

is best seen in Fig. 10. In this way the container 1 can be placed only in one manner in the receiving means 67 and it is the dispensing channel 9 of the container 1 is always directed downwards such that the substance is always correctly dispensed in the cup 64 or another container positioned in the dispensing apparatus 61.

[0039] Then the covering lid 80 is closed such that the recess 84, is positioned over the zone 10b of the circumferential sealing seam 10 near the dispensing channel 9. The inside of the covering lid 80 forms a support surface which supports the cover sheet 7. At the position of the recess 84 the circumferential sealing seam 10 is of course not supported. Upon compression of the container body, whereby the substance is pressurized, the cover sheet 7 bulges out into the recess 84 such that the sealing seam 10 is broken at the zone 10b where the bulge is formed resulting in the container 1 being open as is described hereabove.

[0040] By further compression of the container body all the substance is dispensed into the cup 64 or another container. Then cold, warm or carbonated water can be added through the pipes 66a-66c. This can be done automatically as will be described further below. Then the covering lid 80 can be opened (Fig. 11) and the container 1 can be removed from the receiving means 67. Preferably there is provided a waste container 110 arranged under the receiving means 67, which can be opened by sliding it forward. The empty container 1 can fall into the waste container 110 after which the latter can be closed again.

[0041] In Fig. 11, but also in figs. 3, 4a-4c the container 1 is shown after compression. The bulge is indicated with reference numeral 7a. In figs. 4b and 4c is for clarity again indicated by arrows how the substance flows through the bulge 7a from the filling cavity into the dispensing channel 9.

[0042] Preferably the dispensing apparatus 61 comprises identification recognition means for automatically identifying the container 1 and the substance therein. To this end also the container 1 preferably comprises identification means. Preferably the identification means are applied to the cover sheet 7 of the container 1. The identification means could be visual identification means, e. g. a bar code or the like. Also electronic identification means are possible, more specifically comprising a resonance circuit or a transponder. The identification means applied to the container correspond to a specific substance contained in the container.

[0043] The identification recognition means could be a sensor 79 that is provided at the front plate 81 of the receiving means 67 as is shown in Fig. 7. Preferably a sensor 85, e.g. an optical sensor, a mechanical or an electronic sensor is provided on the covering lid 80 (see Fig. 8), such that when the covering lid 80 is closed the recognition means can detect if there is a container 1 present in the receiving means 67 and can recognize which container 1 with what specific substance is in the receiving means 67. The sensor 79 or 85 transfers the information from the identification means to the control system 75 (see Fig. 7) which for instance is provided with an electronic memory in which the recipes for several drinks can be stored. Another possibility is that the identification means on the container 1 contain the information for the recipe which is then transferred to the control system 75.

[0044] For example, if a container 1 with concentrated coffee substance is placed in the receiving means 67 the dispensing apparatus 61 will automatically know that there has to be added a certain predetermined amount of hot water to the cup 64.

[0045] Preferably the dispensing apparatus 61 has a control panel or control buttons 78 with which a consumer can dispense water of his choice (hot, cooled, carbonated, ambient) in the cup without placing a container 1 in the receiving means 67.

[0046] Preferably the dispensing apparatus has a display 76 connected to the control system 75. On the display 76 the drink can be displayed of which the corresponding container with the substance is placed in the receiving means 67. Also a start button can be provided by operation of which the dispensing of the substance and the water starts. In this way the consumer is allowed a last check on the display 75 if he has placed the right container 1 in the receiving means 67.

[0047] The identification means could also correspond to the amount of substance in the container. There can be containers with different amounts of the same substance. Thus it is possible to have a container for the preparation of one glass of a drink, but it is also possible to have a container for the preparation of a whole bottle of that drink. The dispensing apparatus can determine by means of the identification means and the identification recognition means what amount of water has to be added to the substance to get the right concentration for the drink.

[0048] With regard to this aspect the apparatus is preferably able not only to recognize the container that is placed in the receiving means, but also to recognize the serving container. For example a sensor is arranged which can detect whether there is placed a bottle 230 in the apparatus 61. This sensor can be connected to the control system 75. The control system 75 can determine whether a bottle 230 is placed in the dispensing apparatus 61 if a container 1 for the preparation of a bottle is placed in the receiving means 67. If not, the control system will block the dispensing of water. In this way the spilling of fluid can be prevented in case a too small serving container is placed in the dispensing apparatus. In a preferred embodiment the top part 231 of the bottle 230 (see Fig. 23) can be provided with identification means, e.g. a certain form which fits exactly in a corresponding receiving member in the dispensing apparatus. In this manner the dispensing apparatus only works with this bottle and can be guaranteed that no spilling of the drinks can take place.

[0049] With the present apparatus 61 in combination

K-FEE SYSTEM GMBH, EX2009, page 1412
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

with the container 1 the substance is directly dispensed from the container 1 in a serving container like the cup 64, a glass, a jug, a decanter, a bottle or the like. The substance is treated by mixing it in the serving container with a certain amount of water. The advantage of this is that the dispensing apparatus is not contaminated with the substance. Therefore, there cannot occur a cross-contamination between substances if different drinks are prepared subsequently. The water can be added to the substance afterward, but it is also possible to dispense water into the serving container before the substance is dispensed into it. Also a simultaneous dispensing of substance and water is possible.

[0050] In a further embodiment of the dispensing apparatus a heating element is provided as is shown in Fig. 20. In the figure is shown a container 1 with part of the body arranged in the compression chamber 68 of the receiving means 67. The covering lid 80 is closed and supports the covering sheet 7 of the container 1. At the recess 84 in the covering lid 80 is arranged a heating element 200, which is biased against the covering sheet 7 on the extending tab 8 of the container 1 by a spring element 201 between the dispensing channel 9 and the filling cavity. Emerging from the front plate 81 of the receiving means 67 under the compression chamber 68 is arranged another heating element 202 that is biased against the backside of the extending tab 8 by a spring element 203. The heating elements 200 and 202 are used to heat the covering sheet 7 and the extending tab 8 at the zone 10b of the sealing seam 10 near the dispensing channel 9 of the container 1 before the container is compressed. In this way the sealing seam 10 is weakened at the zone 10b and will break at that zone 10b when the container body is compressed. It is also possible that one of the heating elements 200 and 202 is omitted.

[0051] In Figs. 25-31 is shown a receiving means 67 of a preferred embodiment of the dispensing apparatus. For clarity the covering lid 80 is not shown in these figures. For the same reason also the covering sheet of the container 1 is omitted in these figures.

[0052] Figs. 25a-31b show receiving means 567 which comprise a housing 590 with a substantially cylindrical bore 591. In the bore 591 a compression cylinder 580 is slidingly arranged. In the compression cylinder 580 a piston 569 is slidingly moveable. Thus a compression chamber 568 is formed and delimited by the inner surface of the compression cylinder and the piston 569. The piston 569 is coupled to a a screw spindle 569a that is driven by an electric motor 569b. At a rear side the housing 590 has a back plate 583. The screw spindle 569a and part of the motor 569b extend through an opening 584 in the back plate 583.

[0053] The cylinder 580 is provided with a pair of guiding bores 540, 541 which extend parallel to the axis through the cylinder 580 over its entire length. A pair of guiding rods 530 and 531 is arranged slideable within the guiding bores 540 and 541. The guiding rods 530 and 531 have an end portion 530a and 531a which is attached to the back plate 583 of the housing 590.

[0054] Between a rear end of the compression cylinder 580 and the back plate 583 of the housing 590 a pair of compression springs 585 and 586 is arranged around the guiding rods 530 and 531. The compression springs 585, 586 force the compression cylinder 580 to a front position within the housing 590 as is shown in Figs. 25 and 26. In the front position, the front face 581 of the compression cylinder 580 is in the same plane as the front face 591 of the housing 590. The front face 581 of the compression cylinder 580 is provided with a recess 582 similar to the embodiment of the receiving means 67 shown in Figs. 8-10. The form of the recess 582 is best seen in Figs. 29a and 30a where the container 1 is removed.

[0055] Advantageously the circumferential rim 5 of the container 1 is provided with a pair of positioning projections 601 (see Fig. 32) which fit into the guiding bores 540, 541 as can be seen in Fig. 25a. In this way the container 1 can be placed in the receiving means only in one way.

[0056] The bore 591 in the housing 590 has in a front part an opening 592 towards the bottom side. A receptacle 510 is arranged directly under the opening 592 for receiving empty containers 1 as will be described later.

[0057] The working of the embodiment shown in Figs. 25-31 will be explained in the following.

[0058] In Figs. 25a and 25b the receiving means are in a first state in which a full container 1 is placed in the receiving means 567. The compression cylinder 580 is in a front position within the housing 590. The circumferential rim 5 of the container is arranged within the recess 582 and the projections 601 are arranged within the guiding bores. The piston 569 is in a rear position within the compression cylinder 580.

[0059] Next, the container 1 is compressed by moving the piston towards a front psoition in the cylinder 580 as is shown in Figs. 26a and 26b. The container 1 is of course supported by a covering lid which is not shown in these figures.

[0060] After compression of the container 1 the piston 569 is retracted towards the rear position within the compression cylinder 580. Then the rear side of the piston abuts a rear abutment face arranged on the cylinder. By retracting the piston 569 further, the cylinder 580 moves along with the piston 569 as is shown in Figs. 27a and 27b.

[0061] By moving the piston 569 even further rearwardly the cylinder 580 is moved rearwardly towards a position in which the guiding rods 530, 531 within the guiding bores 540, 541 will abut the positioning projections 601 on the circumferential rim 5 of the container 1. By retracting the piston 569 and the cylinder 580 even further the stationary guiding rods 530, 531 will eject the positioning projections 601 from the guiding bores 540, 541. Thus the container 1 is ejected from the receiving means 567 as is shown in Figs. 28a and 28b. The guid-

K-FEE SYSTEM GMBH, EX2009, page 1413
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ing rods 530, 531 thus have the function of ejection means.

[0062] The container will fall down through the opening 592 into the receptacle 510 as is shown in Figs. 29a and 29b. It must be noted that the ejection of the container 1 takes place while the covering lid (not shown) of the receiving means 567 is still closed.

[0063] Next the piston 569 is moved forward again. The springs 585 and 586 force the cylinder 580 forwardly (see Figs. 30a and 30b) towards its front position (see Figs. 31a and 31b). In the state shown in Figs. 31 a and 31b the receiving means 567 are ready to receive a new filled container 1.

[0064] The positioning projections 601 on the circumferential rim 5 (see Fig. 32) can be formed in the rim during the thermo forming process used to manufacture the container 1. This has the advantage that the position of the projections 601 with respect to the cavity and the rest of the container 1 can be formed accurately, such that its proper functioning as positioning means can be assured.

[0065] The projection 601 can be used to establish whether the container is placed in the receiving means 567. To this end a sensor can be arranged within one or both of the guiding bores 540, 541. As can be seen from the embodiment of the container 1 shown in Fig. 33 the circumferential rim 5 can have more than two, in this specific example four, projections 602. The projections 601 can be used for identifying the container 1, and more specifically the content of the container 1. By providing the receiving means with four guiding bores in which the positioning projections 602 fit preferably tightly and by providing the guiding bores with sensors the projections could be used as identification means. To this end an identification code could be composed by varying the number of projections 602 and the length of the projections, which can be determined by the sensors. The sensors used can be optical sensors, but also any other suitable type of sensor.

[0066] In Fig. 32 can be seen that the container body has a substiantially cilindrical side wall 4 with a flat wall portion 41. This flat wall portion 41 can be used to provide a label with a bar code on, such that the bar code can be read properly from a flat surface by a bar code reader (not shown). The bar code is used as identification means as described hereabove. The bar code can be oriented such that it is read in the axial direction of the container body. The label with the bar code can be applied to the flat portion 41 by a per se known in-mold labeling method.

[0067] In the above description the container 1 has a smooth side wall. It is however also possible to have a corrugated side wall as is shown in Fig. 12 or stepped as is shown in Fig. 13. This allows an easier compression of the respective containers 121 and 131.

[0068] Another embodiment of a container is shown in Fig. 14a. The container corresponds substantially with the container 1 shown in figs. 1-2. Therefore the corresponding elements are designated with the same reference numerals and will not be further described here.

[0069] The difference with the container from Fig. 1 is that the extending tab 8 has a dispensing channel 9 formed in it that does not end at the edge of the extending tab 8. The dispensing channel 9 thus has a closed end 9b. The extending tab 8 is provided with a transverse line of rupture 128. The line of rupture 128 crosses the dispensing channel 9b substantially perpendicular. The line of rupture 128 can be formed during production of the container 1 by applying a cross cut 130 at the underside of the extending tab 8. The cross cut 130 is shown in more detail in Fig. 14b. The cut 130 extends partly through the thickness of the tab 8. The covering sheet 7 can be provided with a prescore at the location corresponding to the line of rupture 128.

[0070] In use a consumer can separate the end part 8b of the extending tab 8 from the rest by pulling it upwards, as is illustrated in Fig. 14a by the arrows 129. The extending tab 8 will break at the rupture line 128 and the part 8b with the piece of covering sheet applied thereto will be separated which leaves the dispensing channel 9 with an opened end 9a, as is shown in Fig. 14c. The container 1 can then be placed into the dispensing apparatus 67 for further use. The advantage of this container 1 is that the dispensing channel 9 is sealed from the environment until the moment of actual use, whereby the risk of contamination with dirt or the like is eliminated. A hygienic container is thus provided which is well adapted for the use with food products.

[0071] In another embodiment of the container is shown in Fig. 15 in a top view. The circumferential rim 5 has a flat extending tab which is covered by the cover sheet. In the figure the cover sheet is not shown, to make the sealing seams visible. The cover sheet is sealed to the extending tab 8 by at two substantially parallel sealing seams 135 which extend outwardly from the circumferential sealing 10 seam to the edge of the extending tab 8. When in use the circumferential seal 10 breaks at the zone 10b the substance will flow from the filling cavity through the dispensing passage formed by the tab surface and the covering sheet, between the two sealing seams 135 as is indicated by the arrows. At the edge of the extending tab 8 there can be provided an extra seal 136, but this end could also be open, i.e. not sealed to the tab 8, as is shown in Fig. 15a. In an especially advantageous embodiment of the container shown in Fig. 32 the weakened zone 10b has a middle portion 10c pointing in the direction of the cavity of the container as is best shown in Fig. 15b. This has the effect that the seal will break first at the middle portion 10c and then will develop towards the sealing seams 135 where the breaking of the seal will stop.

[0072] Preferably the covering lid 80 of the dispensing apparatus has a recess 84a with an elongated form (see Fig. 15c) which is adapted to cooperate with the passage between the seals 135 of the container shown in

K-FEE SYSTEM GMBH, EX2009, page 1414
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Fig. 15, Fig. 15a or Fig. 15b. In use the covering sheet of the container of Figs. 15-15b, which is compressed in an apparatus with a covering lid 80 as is shown in Fig. 15c will bulge out in the form of a channel 150 as is shown in Fig. 15d. Result of this is that a film jet 151 of substance is expelled from the container. Preferably a film jet 152 of water is expelled from a flat nozzle head 153 that is provided on the central dispensing pipe 50 of the dispensing apparatus. A good mixing of substance and water takes place due to the large contact surface between the water film jet 152 and the substance film jet 151. Another advantage is that a well defined jet of substance is provided without splashing and thus possible contamination of the dispensing apparatus. A further advantage of the thus formed passage 150 between the seals 135 is that if after compression of the container 1 the pressure is relieved, the residue of substance in said passage 150 will be retracted due to an underpressure in the cavity of the container 1, which underpressure also results in sucking the covering sheet of the container 1 onto the rim 8. These effects, which can be characterized by the term "inhaling" effect, result in that after compression of the container 1 no substance is spilled anymore from the container 1, such that no contamination of the dispensing apparatus takes place.

[0073] Fig. 16 shows still another embodiment of a container. In the figure only the container body is shown. The elements of the container 161 that correspond to the elements of container 1 of Fig. 1 are indicated with the same reference numerals to which 160 is added. These elements will not be described here. The difference with the embodiment from Fig. 1 is that this embodiment has two filling cavities. The two filling cavities can contain different substances which have to be mixed. This can be useful in preparing certain drinks or food products, e.g. yogurt with syrup, coffee with cream but also an application where epoxy has to be prepared is possible.

[0074] The filling cavities can have the same volume as is shown in fig 16 and Fig. 18, but it is also possible that the filling cavities have a different volume as is shown in Fig. 17 and Fig. 19.

[0075] In Fig. 17 a container 170 is shown that has filling cavities with the same cross section, but with a different height. When this container 170 is compressed by a dispensing apparatus 67, the piston will first engage the bottom 173a corresponding to the filling cavity with the largest height and later the bottom 173b of the filling cavity with the smaller height. This is for example practical if yogurt has to be served with syrup or a sauce on top.

[0076] In Fig. 19 a container 191 is shown that has filling cavities with different cross sections.

[0077] Of course it is also possible to have a container with filling cavities with a different height and with a different cross section.

[0078] In all embodiments of figs. 16-19 the substances from the two filling cavities are dispensed through one dispensing channel 169, 189, 199.

[0079] The containers filled with substance hereabove described are preferably manufactured by a method, wherein the containers are formed from a sheet of plastic material. First a flat sheet of plastic material is placed in a vacuum forming apparatus with a forming die. By vacuum forming the filling cavities into the die, multiple container bodies are formed simultaneously in the sheet. Possibly also dispensing channels 9 of the containers 1 are depressed by the vacuum forming machine in an extension tab, which is subsequently to be formed in the punch machine. The sheet with the filling cavity is placed in a filling machine and filled with substance. Subsequently a sheet 7 of covering foil is sealed over the sheet with the container bodies. Finally, the sheet with the closed containers is placed in a punch machine, where the perimeter of the circumferential rim of the body is formed by punching out waste material between the containers 1.

[0080] In the above described manner is also possible to manufacture two different types of containers simultaneously from one sheet. This is advantageous when two containers are to be used together. A possible application is that one container is like the container 1 already described, whereas the other container contains an additional food product. As an example one can think of a container with substance for soup that is placed in the receiving means 67 of the dispensing apparatus 61, and a second container filled with croutons that have to be added to the soup by the consumer after the apparatus 61 has prepared the soup.

[0081] In the above description the use for dispensing food products is mentioned. The container can be filled with concentrate for coffee, tea, chocolate, soup, dairy products like milk or yogurt drinks, fruit and vegetable juices, soft drinks and sport drinks.

[0082] The use of dispensing a substance from a container in the manner, as is described hereabove is however not only delimited to applications with food products. It is also possible to use this principle in non-food applications, e.g. in medical applications for dispensing a dose of a medicament.

Claims

1. In combination:

   - a container filled with a single portion of a substance, comprising a deformable body defining a filling cavity which body has an opening and an integral planar circumferential rim surrounding said opening, which opening is closed by a cover sheet of foil material which is sealed to the circumferential rim by means of a circumferential sealing seam, wherein the container is provided with identification means correspond-

K-FEE SYSTEM GMBH, EX2009, page 1415
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ing to the substance contained in the container so as to allow automatic identification of the container,

- a dispensing apparatus comprising receiving means for receiving the container, which apparatus is adapted to open the container and comprises identification recognition means for automatically identifying the container and the substance therein.

2. Combination according to claim 1, wherein the identification means are applied to the cover sheet of the container.

3. Combination according to claim 1, wherein the identification means are applied to the deformable body.

4. Combination according to claim 2 or 3, wherein the identification means are visual identification means, for example a bar code.

5. Combination according to claim 2 or 3, wherein the identification means comprise electronic identification means.

6. Combination according to claim 5, wherein the electronic identification means comprise a resonance circuit.

7. Combination according to claim 5, wherein the electronic identification means comprise a transponder.

8. Combination according to any of the preceding claims, wherein the dispensing apparatus comprises compression means for compressing the container body and wherein the sealing seam of the container on a predetermined location has a weak spot such that the seal breaks at that weak spot upon pressurizing the content of the container by compressing the container body.

9. Combination according to any of the preceding claims, wherein the dispensing apparatus comprises treatment means for treating the substance dispensed from the container.

10. Combination according to claim 9, wherein the treatment means comprise liquid dispensing means for a liquid to be mixed with the substance from the container.

11. Combination according to claim 10, wherein the liquid dispensing means for liquid comprise means for dispensing cooled water and/or hot water and/or water with ambient temperature.

12. Combination according to claim 9 or 10, wherein the dispensing means for liquid comprise means for dispensing carbonated water.

13. Combination according to claim 12, wherein the means for dispensing carbonated water comprise in combination a connecting arrangement for connecting a CO2-bottle to the dispensing apparatus and a CO2 bottle.

14. Combination according to claim 13, wherein the CO2 bottle is provided with a closing valve and the connecting arrangement is provided with connecting means for opening the closing valve.

15. Combination according to claim 13, wherein the closing valve has a valve housing with a circumferential flange and the connecting means has engagement means for engaging said flange such that in a connected state a rotation of the valve housing with respect to the the connecting means is prevented.

16. Combination according to any of the above claims, wherein the receiving means of the dispensing apparatus have a compression chamber with a variable volume for receiving the container body, a stop face engaging the back side of the circumferential rim and a covering lid with a supporting face for engaging the cover sheet of the container.

17. Combination according to claim 16, wherein the receiving means are provided with ejection means for ejecting a container from the receiving means.

18. Combination according to claim 17, wherein the ejection means comprise one or more ejection rods, the ejection rods being movable with respect to the stop face towards a position wherein they project with respect to the stop face and engage the circumferential rim of the container.

19. Combination according to claim 18, wherein the ejection rods are stationary and the stop face is movable with respect to the ejection rods between a front position near the covering lid and a rear position distant from the covering lid.

20. Combination according to claim 16-19, wherein the covering lid is provided with a recess arranged such that when the covering lid is closed it is positioned over a part of the sealing seam, so as to allow the cover sheet to bulge out into the recess upon compression of the container body and the sealing seam to break.

21. Combination according to any of the above claims, wherein the compression chamber is provided with a piston coupled to drive means, which piston is adapted to engage the container body.

K-FEE SYSTEM GMBH, EX2009, page 1416
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

22. Combination according to claim 21, wherein the drive means comprise a screw spindle and an electric motor.

23. Combination according to claim 21, wherein the drive means comprise pneumatic means.

24. Combination according to claim 21, wherein the drive means comprise hydraulic means.

25. Combination according to claim 21, wherein the drive means are adapted to be hand driven.

26. Combination according to any of the preceding claims, wherein the covering layer of the container is made of a multilayer material.

27. Combination according to any of the preceding claims, wherein the dispensing apparatus has dispensing means for different sorts of water, e.g. hot water, cooled water and carbonated water, which are positioned such that the different sorts of water can be dispensed at one point in a serving container like e.g. a cup or a bottle.

28. Container for containing a substance, comprising a deformable body defining a filling cavity which body has an opening and an integral planar circumferential rim surrounding said opening, which opening is closed by a cover sheet of foil material which is sealed to the circumferential rim by means of a circumferential sealing seam, wherein the circumferential rim has an extending tab with a dispensing channel formed by a depression in the tab which is covered by the cover sheet, the dispensing channel being closed off from the filling cavity by the circumferential sealing seam.

29. Container according to claim 28, wherein the circumferential sealing seam at the location between the channel and the filling cavity is weakened, e.g. by a decreased seam width, such that upon pressurizing the content of the container by compressing the container body the seal breaks at that location and a passage is formed between the cover sheet and the rim so as to allow substance to pass through the passage from the cavity into the channel.

30. Container according to claim 28 or 29, wherein the channel has an end at the edge of the extending tab.

31. Container according to claim 30, wherein the end at the edge of the extending tab is open.

32. Container according to claim 30, wherein the end of the channel at the edge of the extending tab is sealed.

33. Container for containing a substance, comprising a deformable body defining a filling cavity which body has an opening and an integral planar circumferential rim surrounding said opening, which opening is closed by a cover sheet of foil material which is sealed to the circumferential rim by means of a circumferential sealing seam, wherein the circumferential rim has a flat extending tab which is covered by the cover sheet, which cover sheet is sealed to the extending tab by at least two substantially parallel sealing seams which extend outwardly from the circumferential sealing seam to the edge of the extending tab.

34. Container according to claim 33, wherein the circumferential sealing seam at the location between the two parallel sealing seams has a weakened portion, e.g. by a decreased seam width, such that upon pressurizing the content of the container by exerting a compression force on the wall the seal breaks at that location and a dispensing passage is formed between the two parallel sealing seams, the cover sheet and the surface of the extending tab.

35. Container according to claim 34, wherein the weakened portion of the circumferential sealing seam at the location between the two parallel sealing seams has a pointed portion of which the point is directed towards the filling cavity such that upon compression of the container the seal starts to break a the pointed portion.

36. Container according to any of the claims 28-35, wherein a gripping tab is provided at the circumferential rim.

37. Container according to claim 36, wherein the gripping tab is situated diametrically opposite the extending tab.

38. Container according to any of the claims 28-37, wherein the container wall is formed of a plastic material.

39. Container according to any of the claims 28-38, wherein the covering layer is made of a multilayer material.

40. Container according to any of the claims 28-39, wherein the container body is formed by vacuum forming and/or thermo forming.

41. Container according to any of the claims 28-40, wherein the deformable body comprises a bottom and a side wall extending upwardly from the bottom.

42. Container according to claim 28-41, wherein the container body is corrugated so as to facilitate com-

K-FEE SYSTEM GMBH, EX2009, page 1417
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

pression of the container.

43. Container according to claim 28-42, wherein the circumferential rim is provided with one or more positioning protrusions formed by a depression in the rim.

44. Method for manufacturing containers according to one of the above claims, wherein

- a flat sheet is placed in a vacuum or thermo forming apparatus with a forming die and multiple container bodies are formed simultaneously in the sheet by vacuum forming the filling cavities into the die,
- the sheet with the filling cavity is placed in a filling machine and filled with substance,
- a sheet of covering foil is sealed over the sheet with the container bodies,
- the sheet with the closed containers is placed in a punch machine, where the perimeter of the circumferential rim of the body is formed by punching out waste material between the containers.

45. Method according to claim 44, wherein in the vacuum or thermo forming machine also dispensing channels of the containers are depressed in an extension tab which is subsequently to be formed in the punch machine.

46. Method according to claim 44 or 45, wherein wherein in the vacuum or thermo forming machine positioning protrusions are depressed in the circumferential rim which is subsequently to be formed in the punch machine.

47. Method according to any of the claims 44-47, wherein the sheet of covering foil is manufactured and provided with identification means.

48. Method according to any of the claims 44-47, wherein identification means are applied to the container bodies by in-mold labeling in the vacuum or thermo forming apparatus.

49. Method for opening a container containing a substance, comprising a deformable body (made of sheet material) defining a filling cavity which body has an opening and an integral planar circumferential rim surrounding said opening, which opening is closed by a cover sheet of foil material which is sealed to the circumferential rim by means of a circumferential sealing seam,
the method comprising the steps of:

- holding the container,
- engaging the cover sheet with a support surface provided with a recess and adapted to support the cover sheet except at the position of the recess, wherein the recess is positioned at least over a part of the circumferential sealing seam,
- compressing the container body whereby the substance is pressurized and the cover sheet bulges out into the recess such that the sealing seam is broken at the location where the bulge is formed resulting in the container being open.

50. Method for opening a container containing a substance, comprising a deformable body (made of sheet material) defining a filling cavity which body has an opening and an integral planar circumferential rim surrounding said opening, which opening is closed by a cover sheet of foil material which is sealed to the circumferential rim by means of a circumferential sealing seam,
the method comprising the steps of:

- holding the container,
- engaging the cover sheet with a support surface provided with a recess and adapted to support the cover sheet except at the position of the recess, wherein the recess is positioned over at least a part of the circumferential sealing seam,
- heating the sealing seam at a position facing the recess, whereby the sealing seam is locally weakened,
- compressing the container body whereby the substance is pressurized and the cover sheet bulges out into the recess such that the sealing seam is broken at the location where the bulge is formed resulting in the container being open.

51. Serving bottle for use with the combination according to any of the claims 1-24.

52. CO2 bottle for use in a combination according to claim 13.

K-FEE SYSTEM GMBH, EX2009, page 1418
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

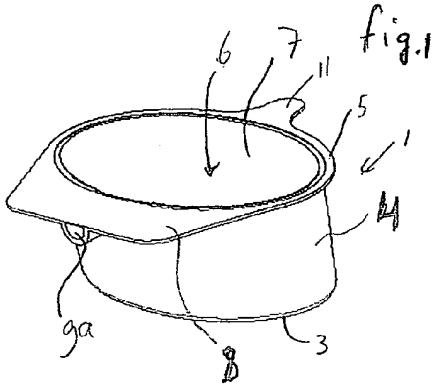


fig.1

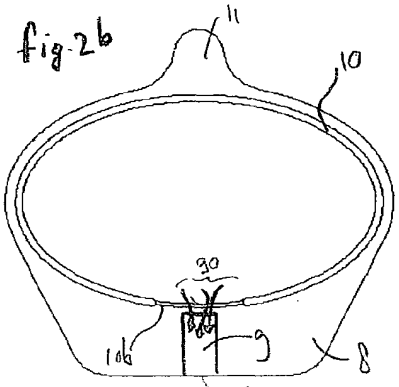


fig.2b

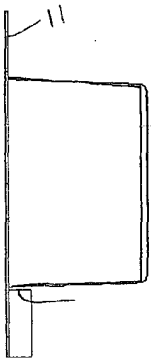


fig.2c

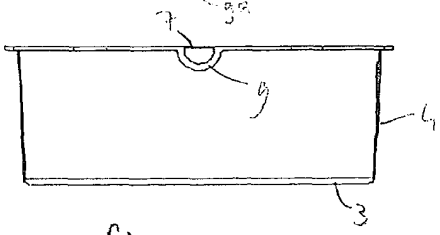


fig.2a

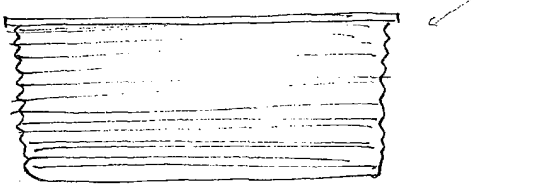


fig.12

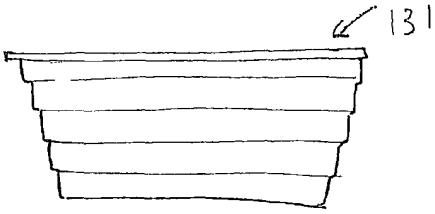


fig.13

K-FEE SYSTEM GMBH, EX2009, page 1419
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

fig. 3

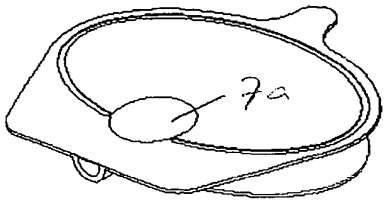


fig. 4b

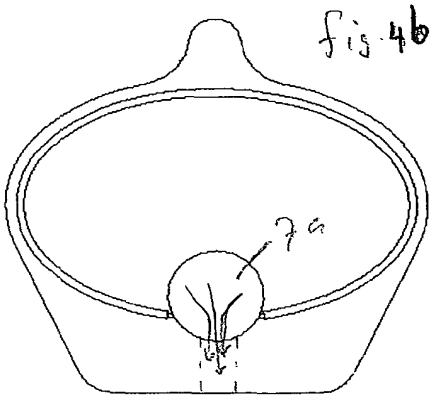
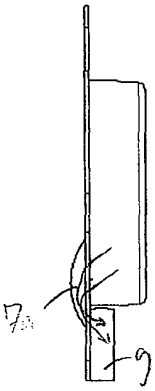


fig. 4c



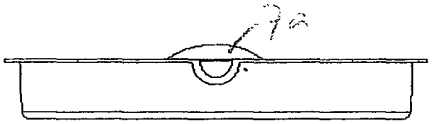


fig. 4a

K-FEE SYSTEM GMBH, EX2009, page 1420
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

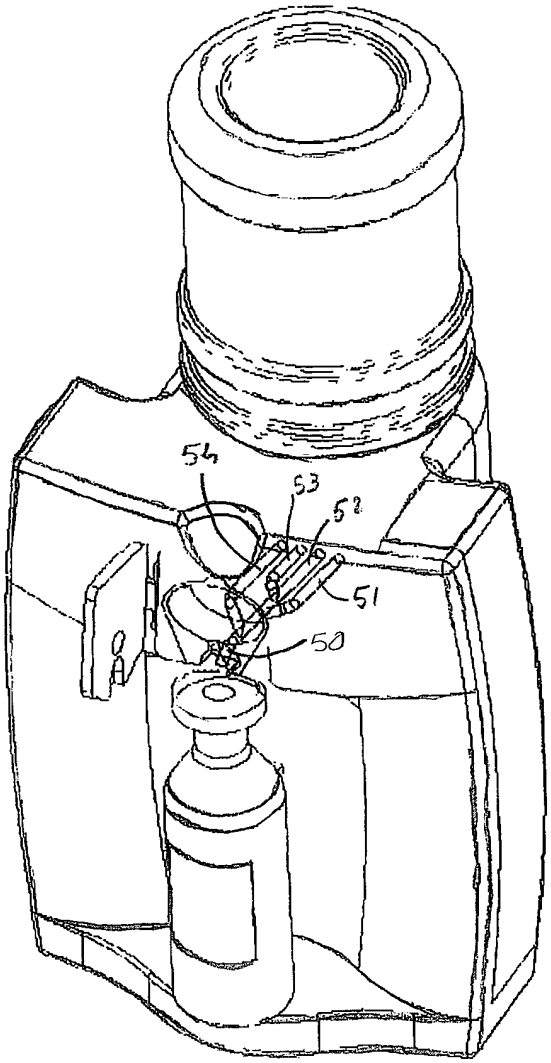
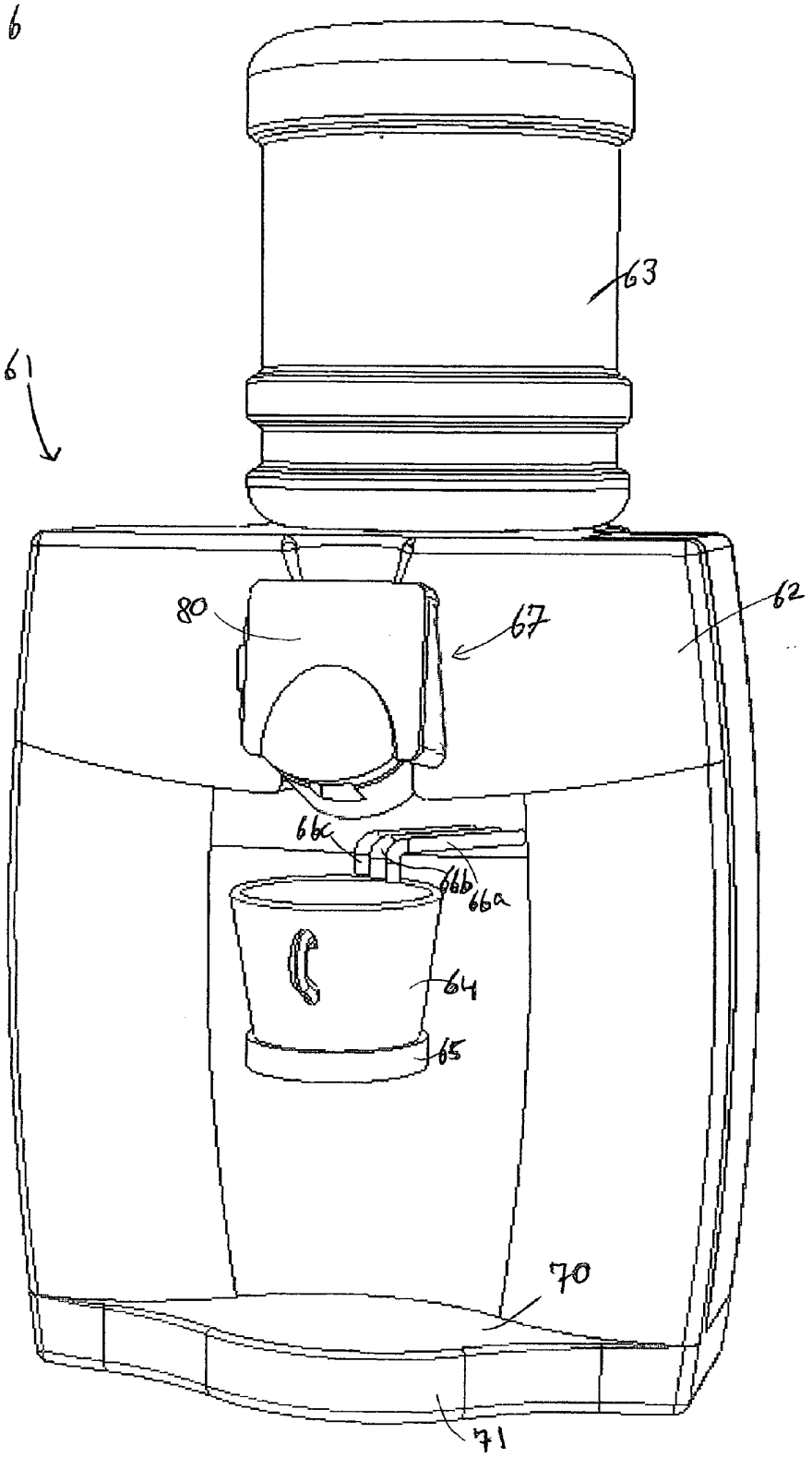


fig. 5

K-FEE SYSTEM GMBH, EX2009, page 1421
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

fig. 6



K-FEE SYSTEM GMBH, EX2009, page 1422
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

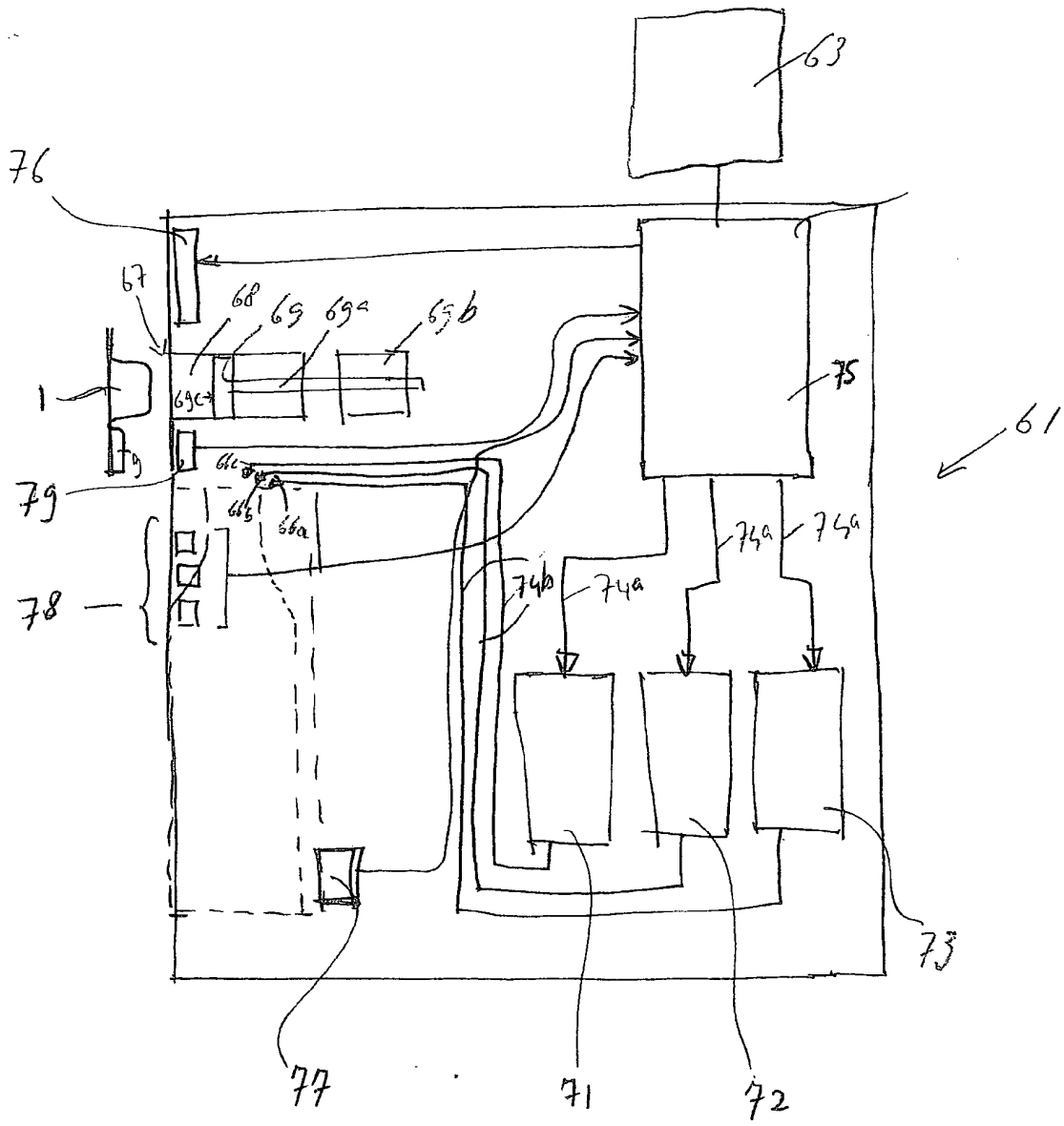
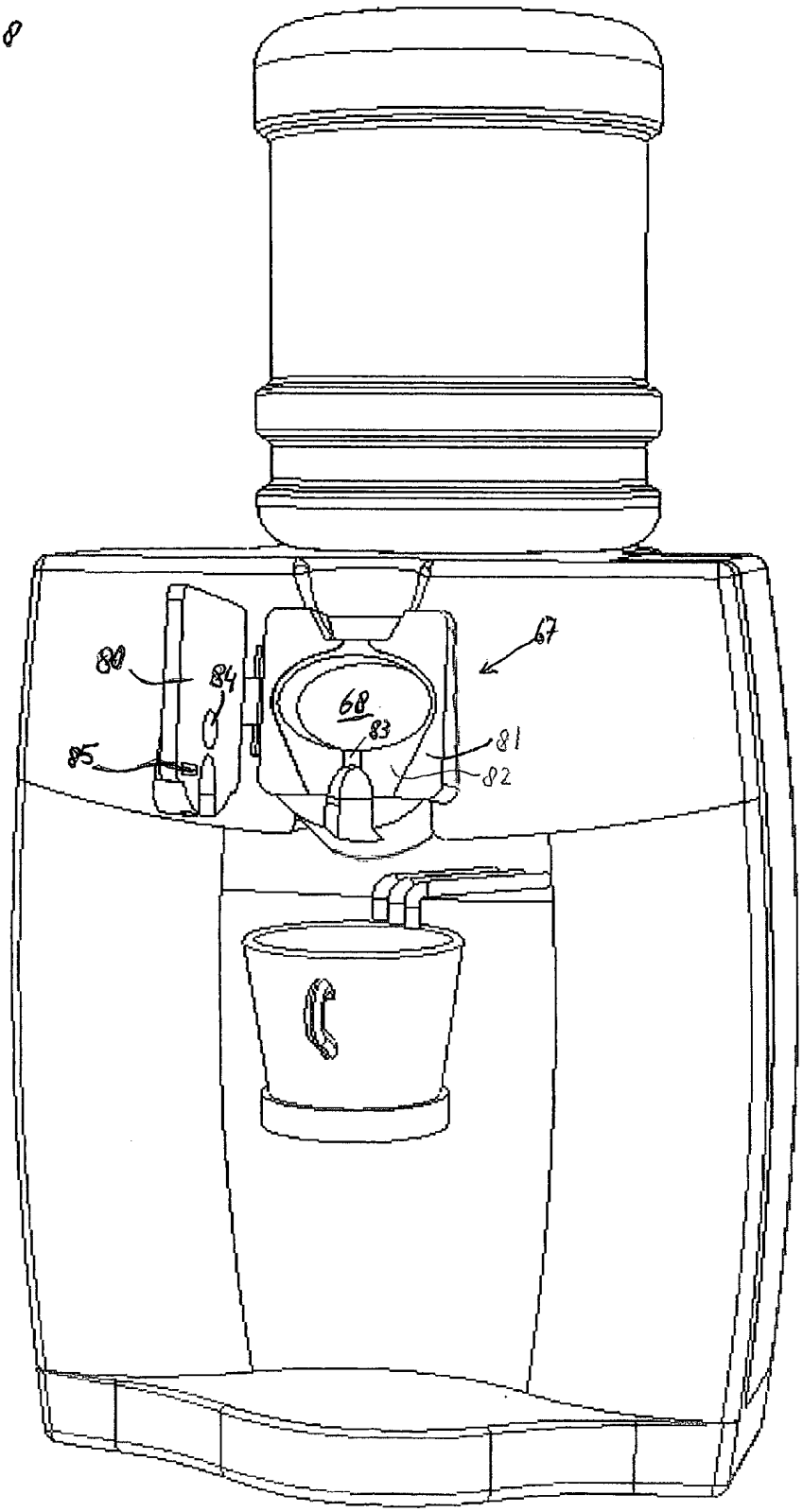


fig.7

K-FEE SYSTEM GMBH, EX2009, page 1423
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

fig.8



K-FEE SYSTEM GMBH, EX2009, page 1424
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

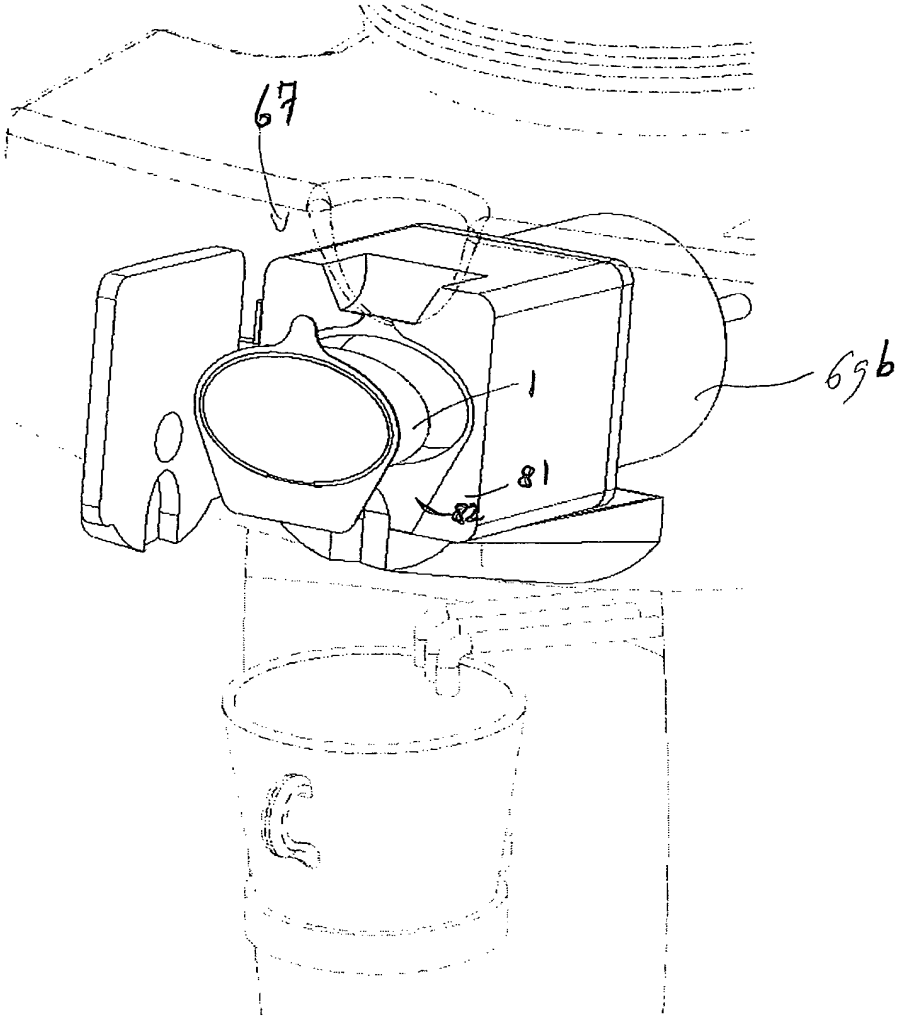


fig.9

K-FEE SYSTEM GMBH, EX2009, page 1425
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

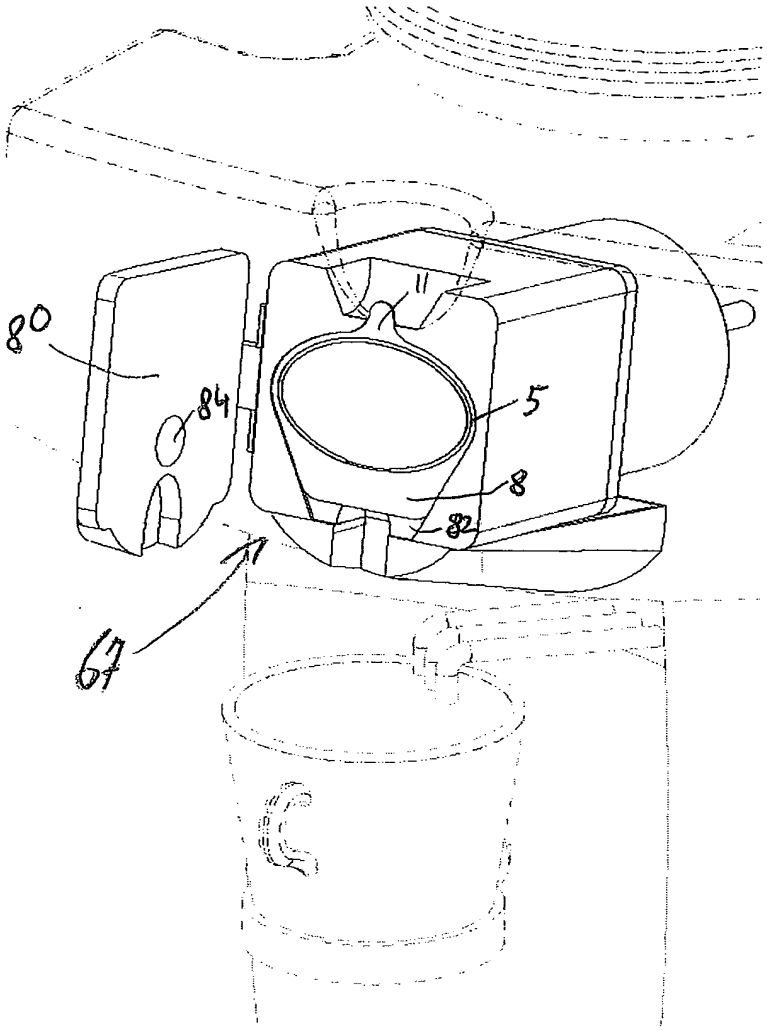


fig.10

K-FEE SYSTEM GMBH, EX2009, page 1426
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

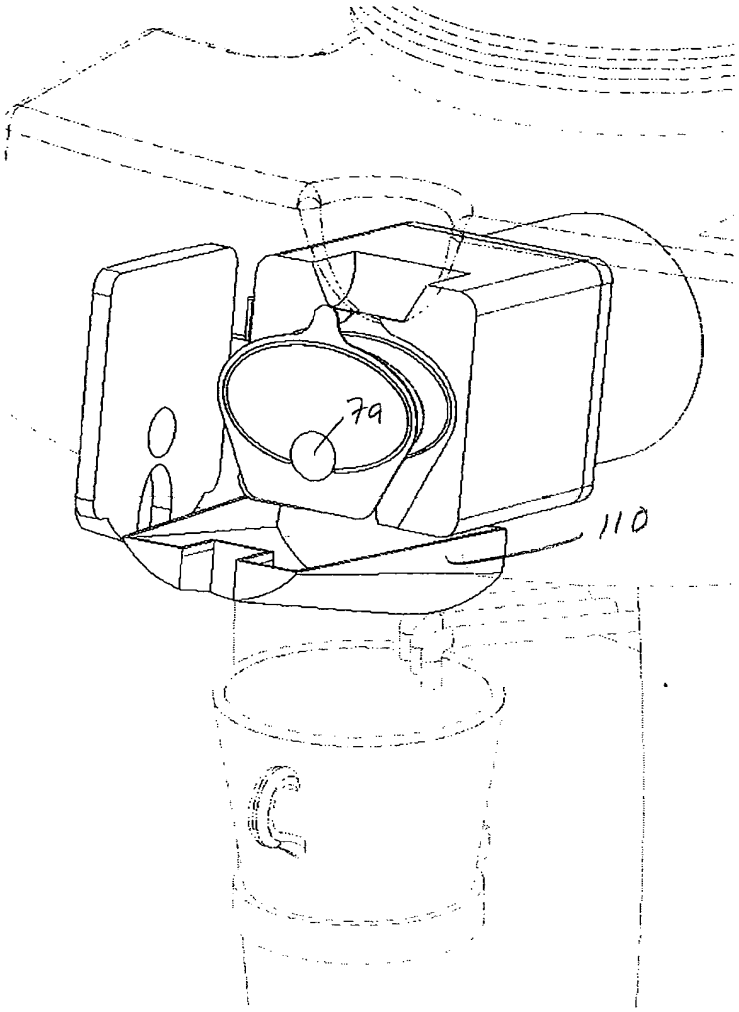


fig.11

K-FEE SYSTEM GMBH, EX2009, page 1427
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

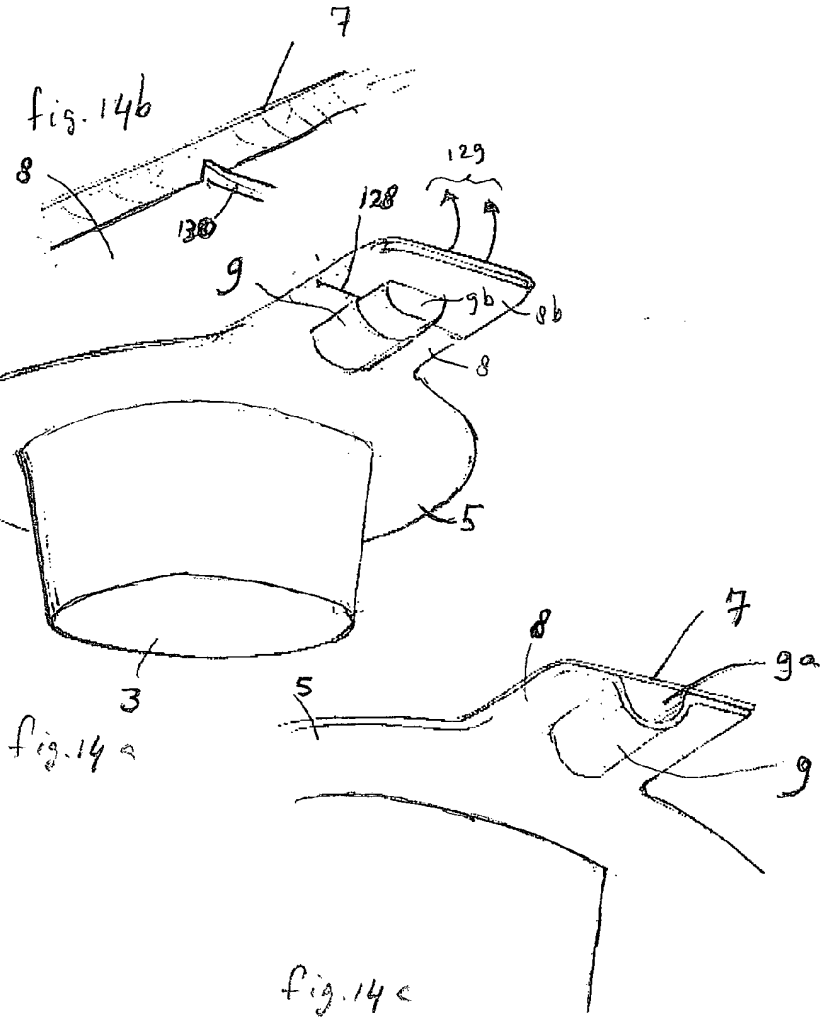


fig. 14b

fig. 14c

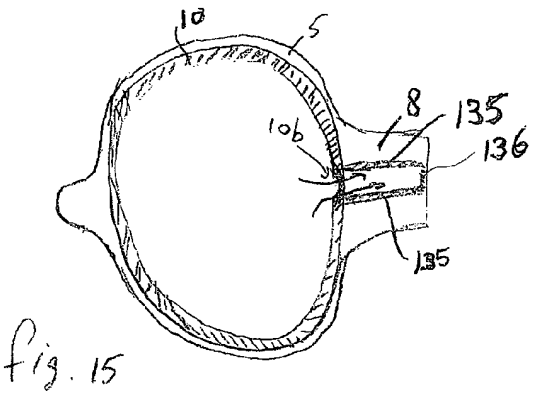


fig. 15

K-FEE SYSTEM GMBH, EX2009, page 1428
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

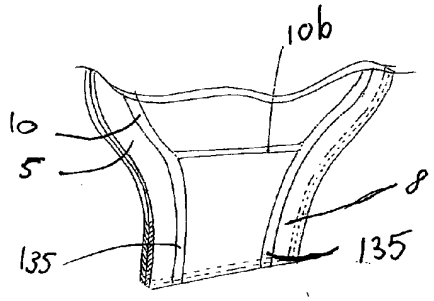


fig. 15a

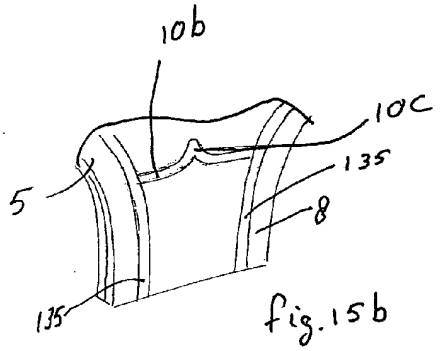


fig. 15b

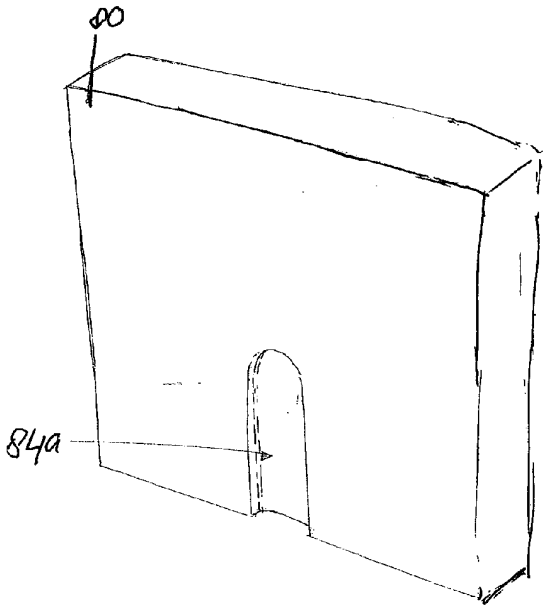


fig. 15c

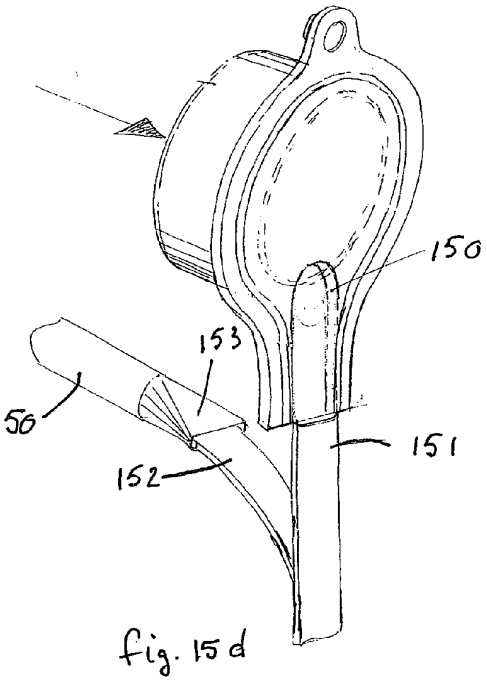


fig. 15d

K-FEE SYSTEM GMBH, EX2009, page 1429
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

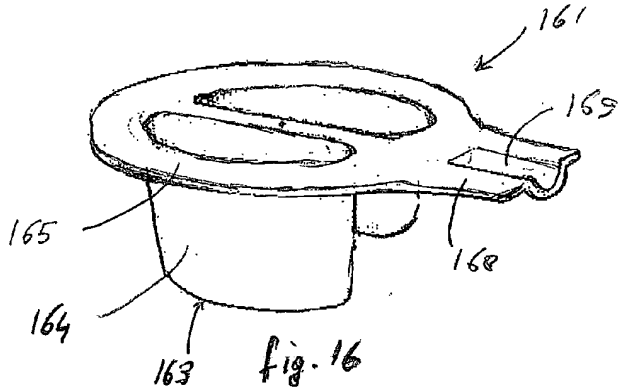


fig. 16

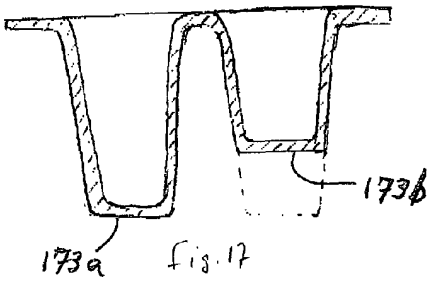


fig. 17

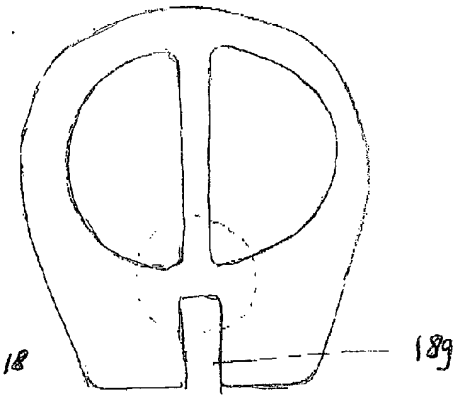


fig. 18

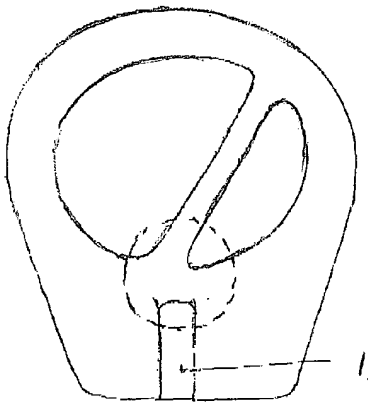


fig. 19

K-FEE SYSTEM GMBH, EX2009, page 1430
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

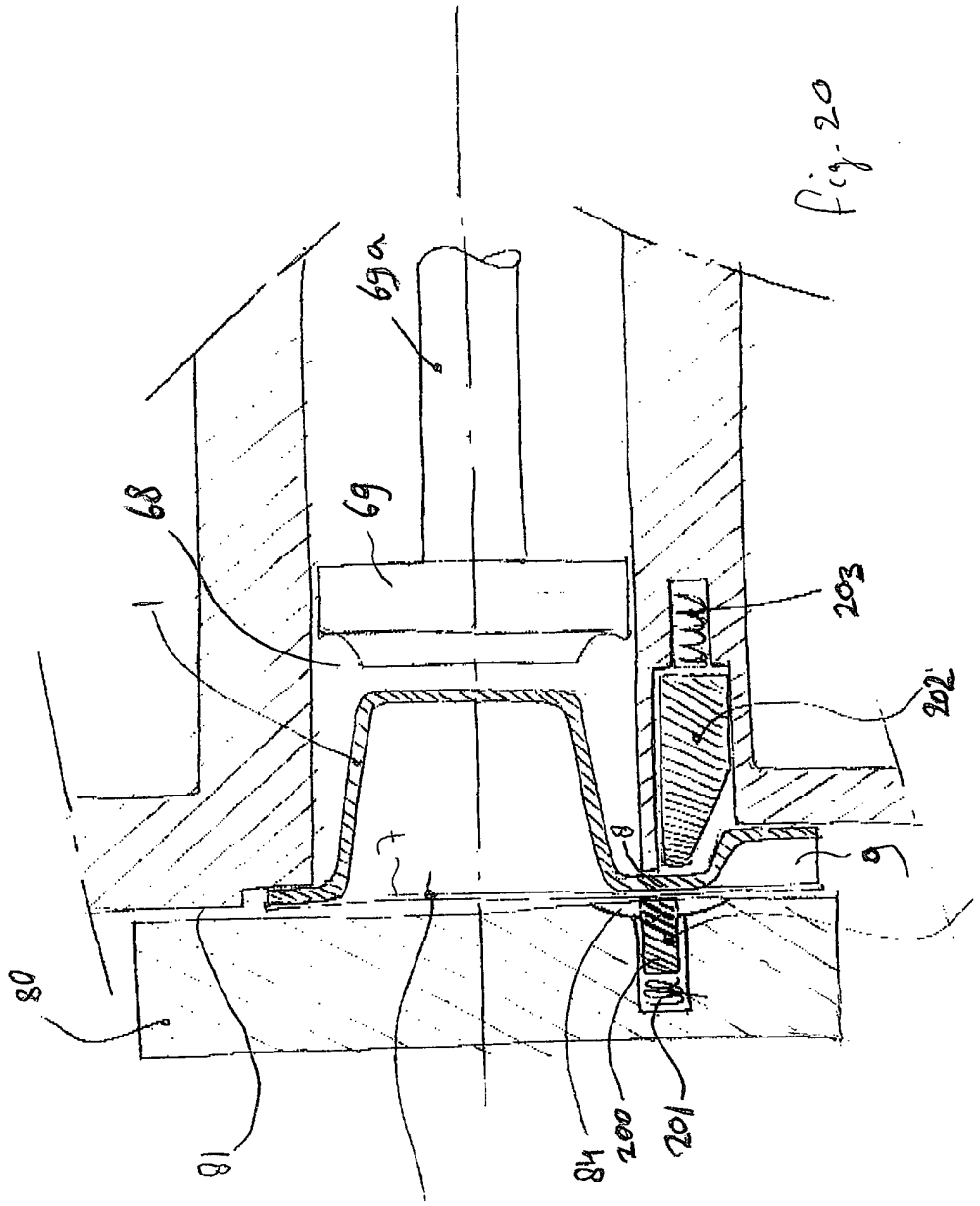


Fig. 20

K-FEE SYSTEM GMBH, EX2009, page 1431
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

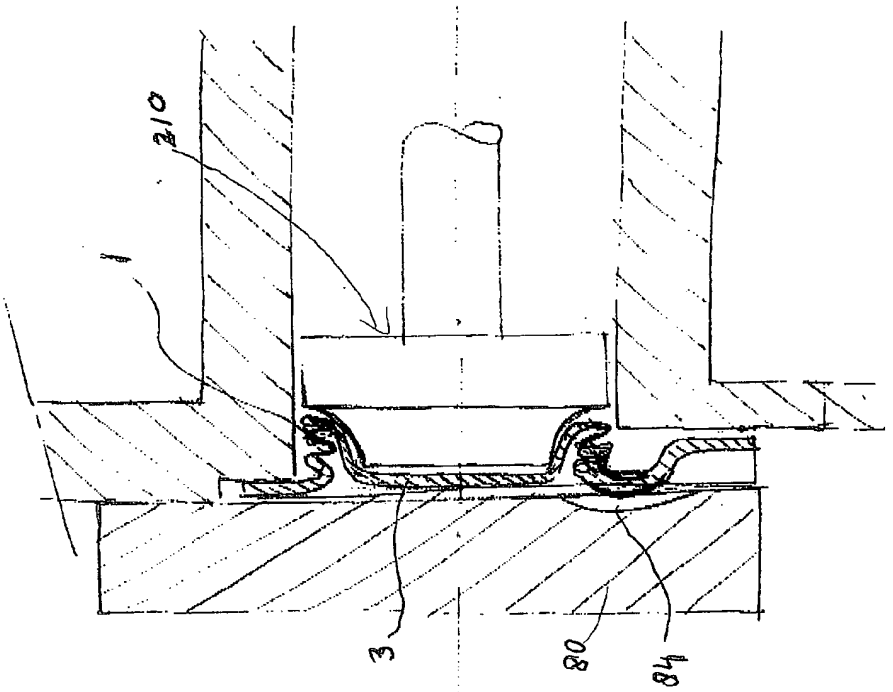


fig. 21b

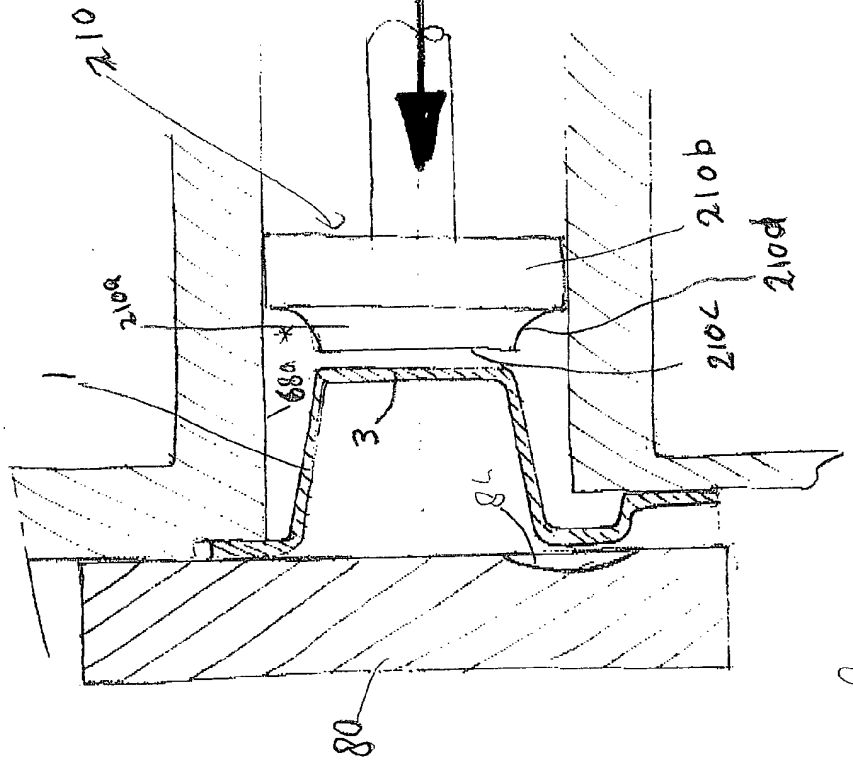


fig. 21a

K-FEE SYSTEM GMBH, EX2009, page 1432
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

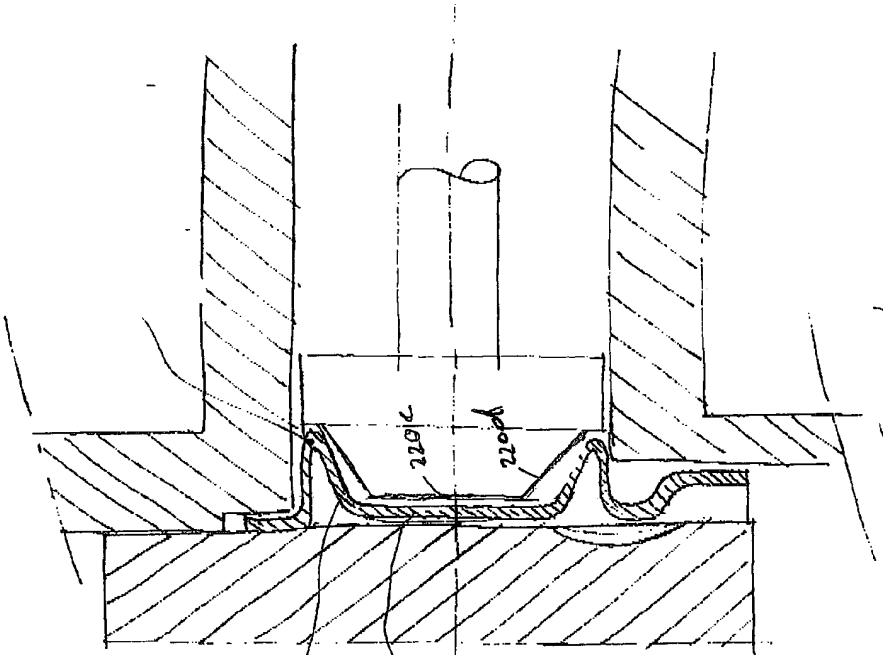


Fig. 22b

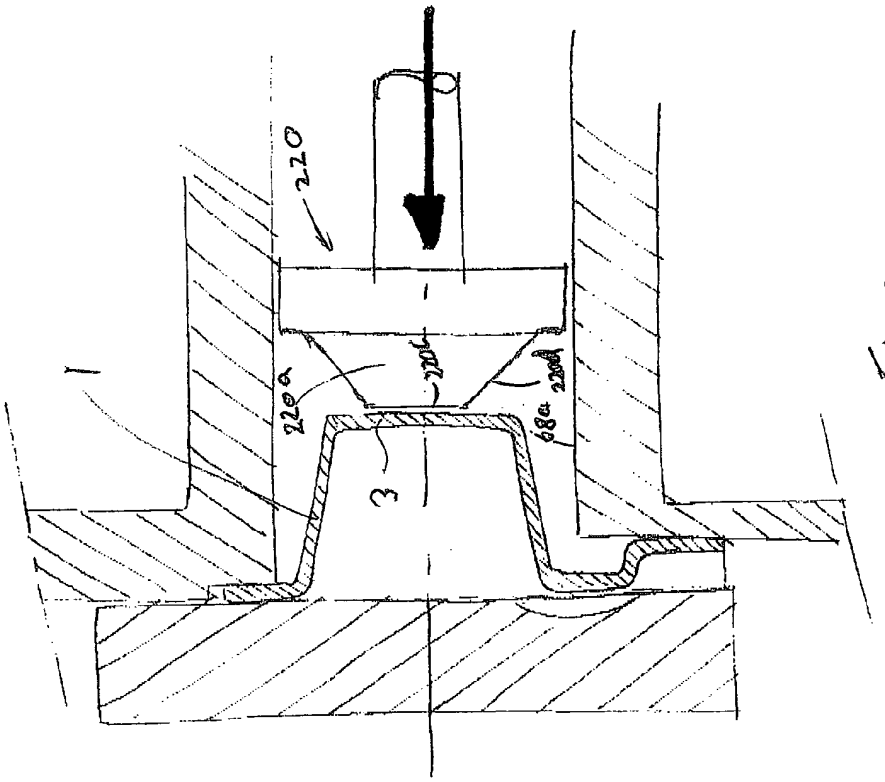


Fig. 22a

K-FEE SYSTEM GMBH, EX2009, page 1433
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

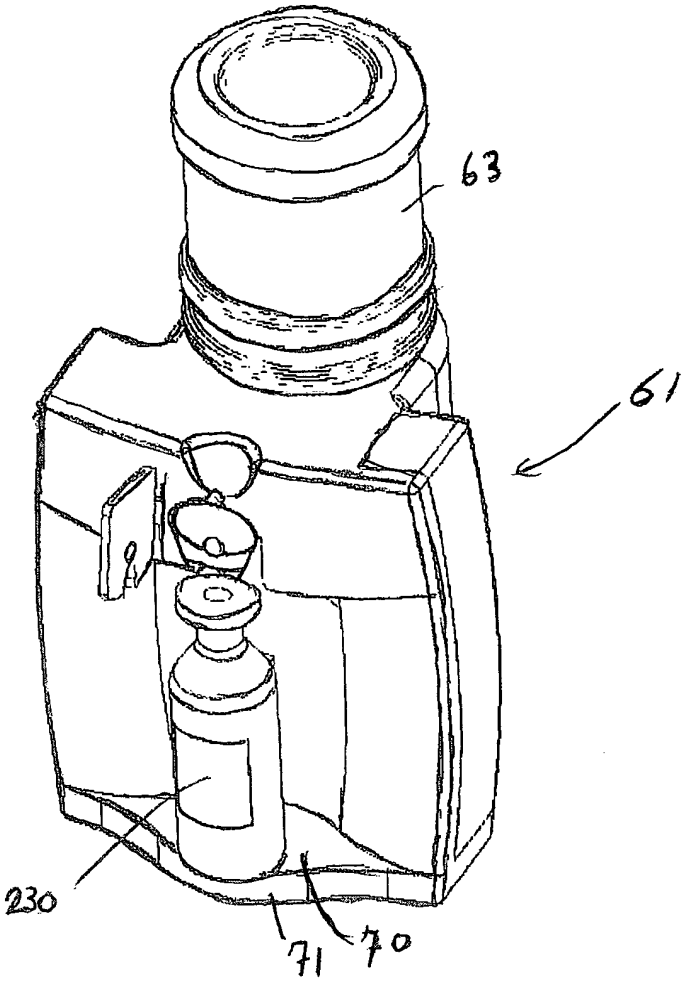


fig. 23a

K-FEE SYSTEM GMBH, EX2009, page 1434
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

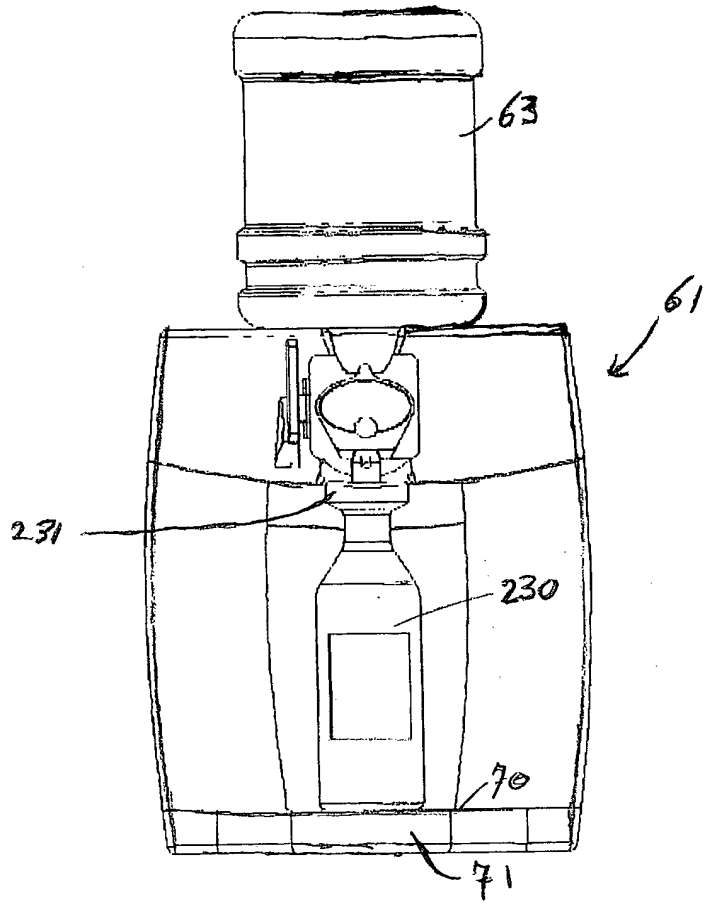


fig. 23b

K-FEE SYSTEM GMBH, EX2009, page 1435
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

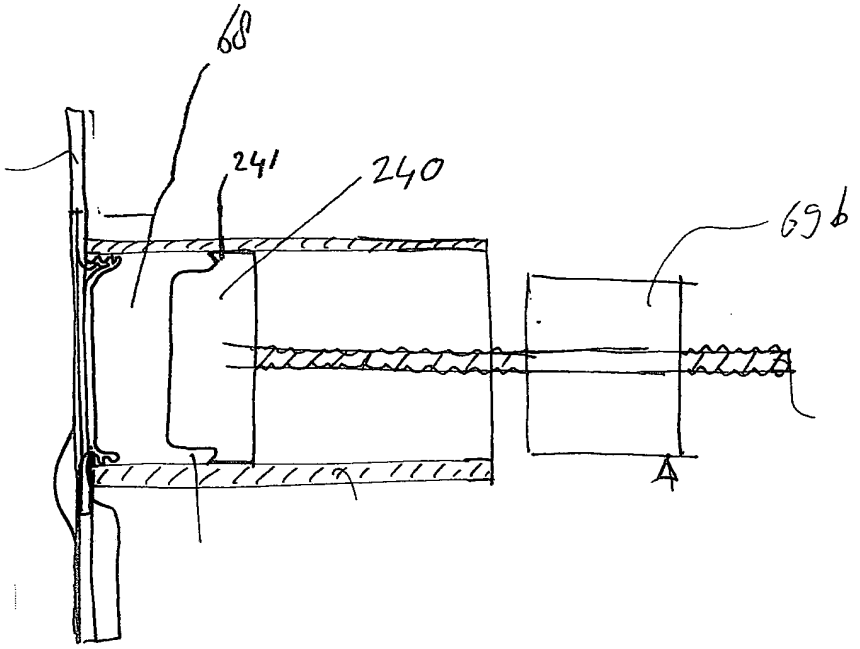
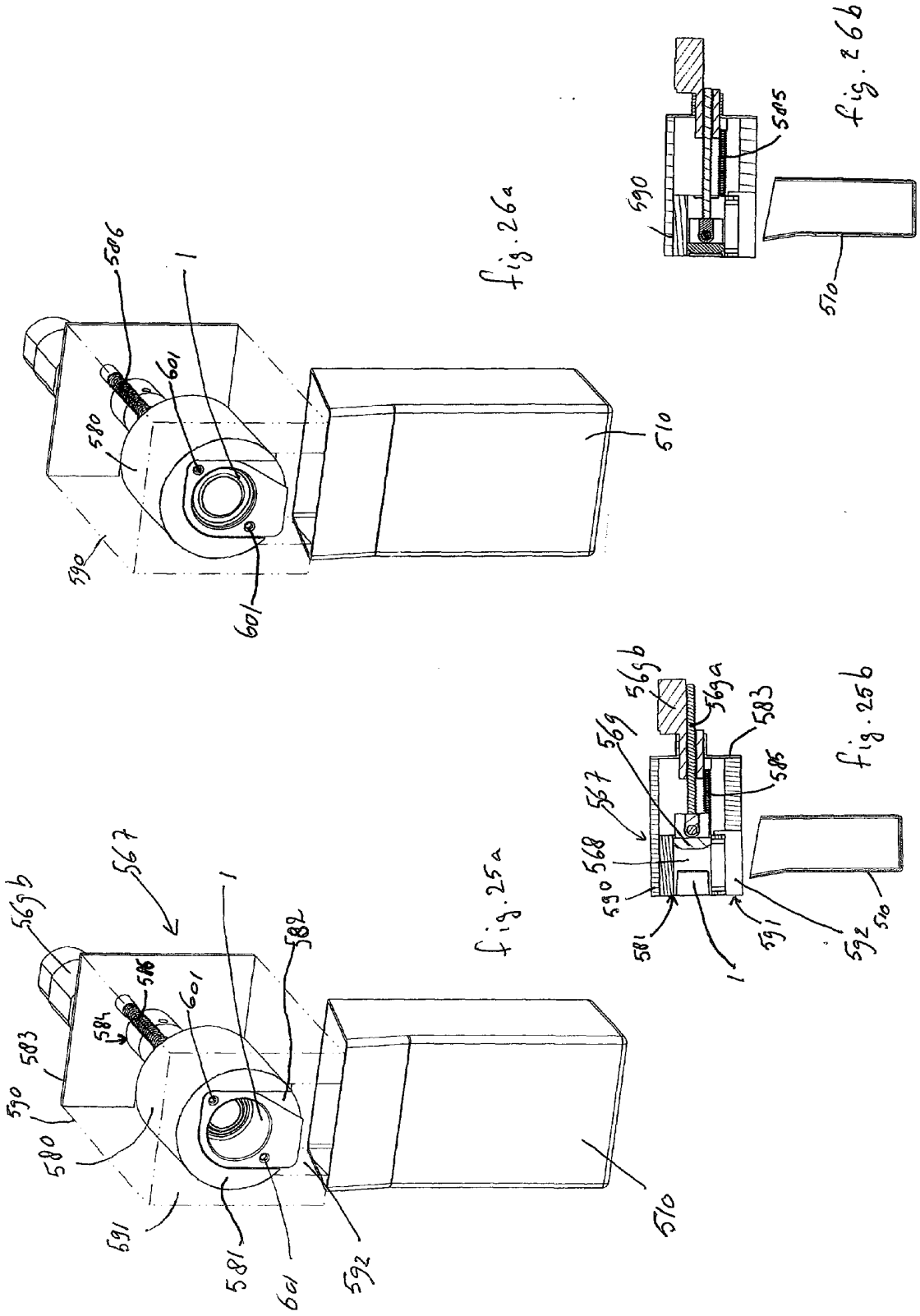


fig. 24

K-FEE SYSTEM GMBH, EX2009, page 1436
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923



K-FEE SYSTEM GMBH, EX2009, page 1437
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

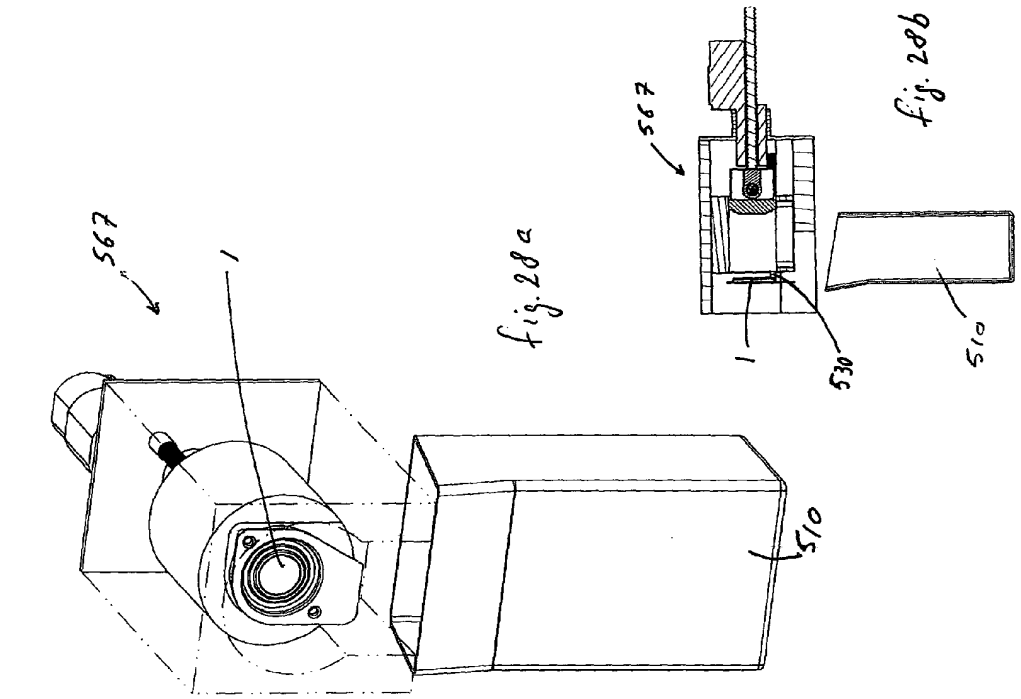


fig. 28a

fig. 28b

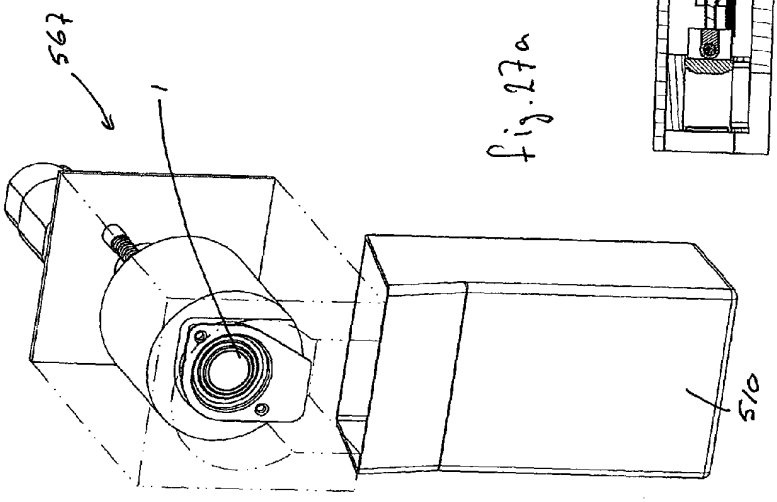


fig. 27a

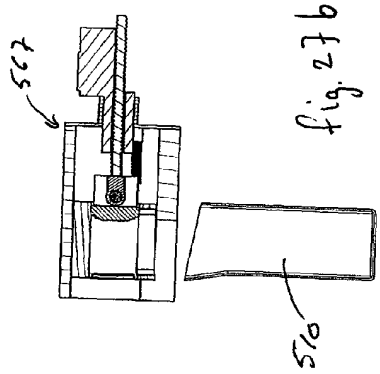
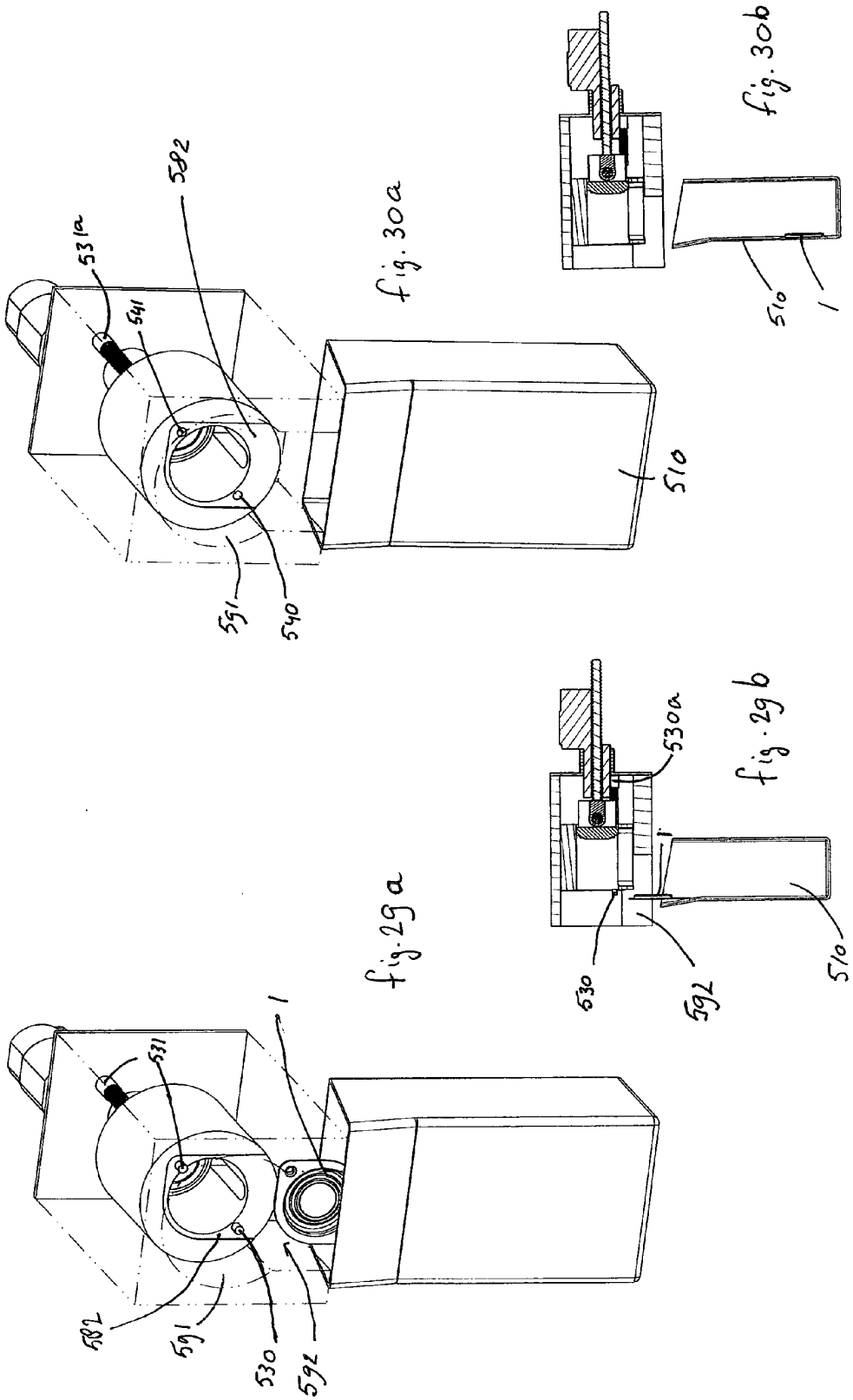
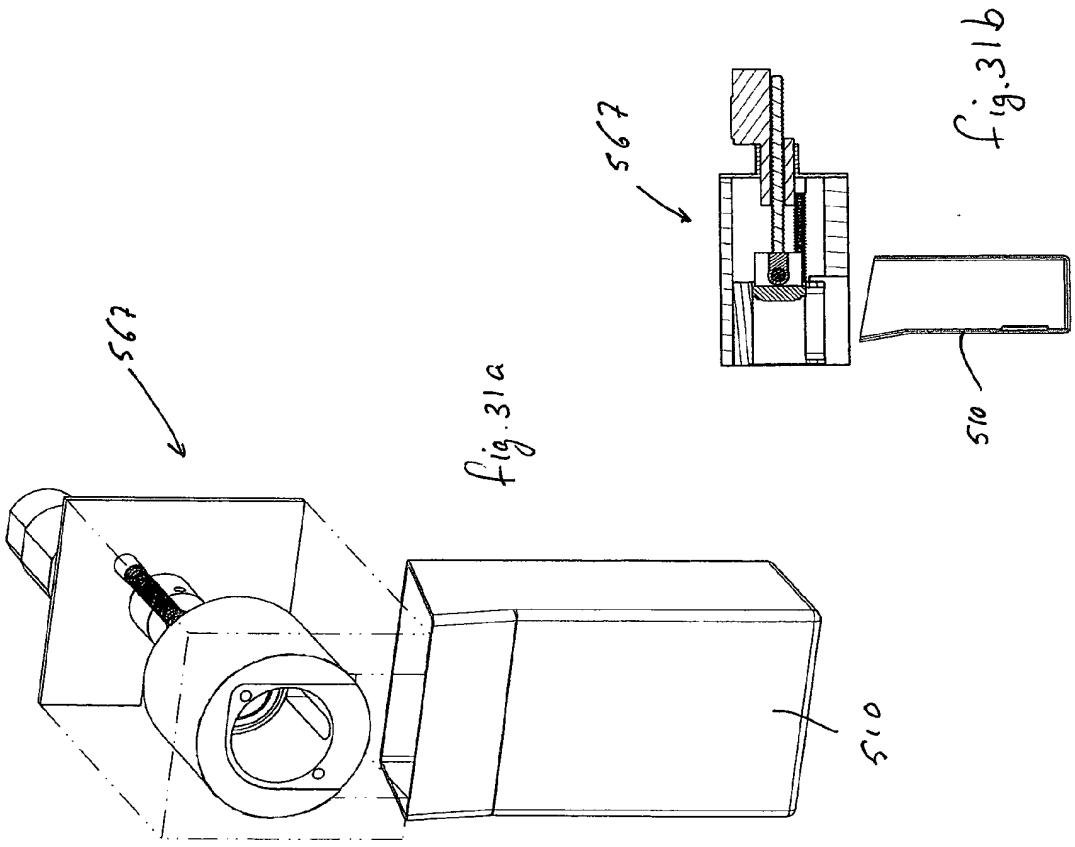


fig. 27b

K-FEE SYSTEM GMBH, EX2009, page 1438
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923



K-FEE SYSTEM GMBH, EX2009, page 1439
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923



K-FEE SYSTEM GMBH, EX2009, page 1440
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

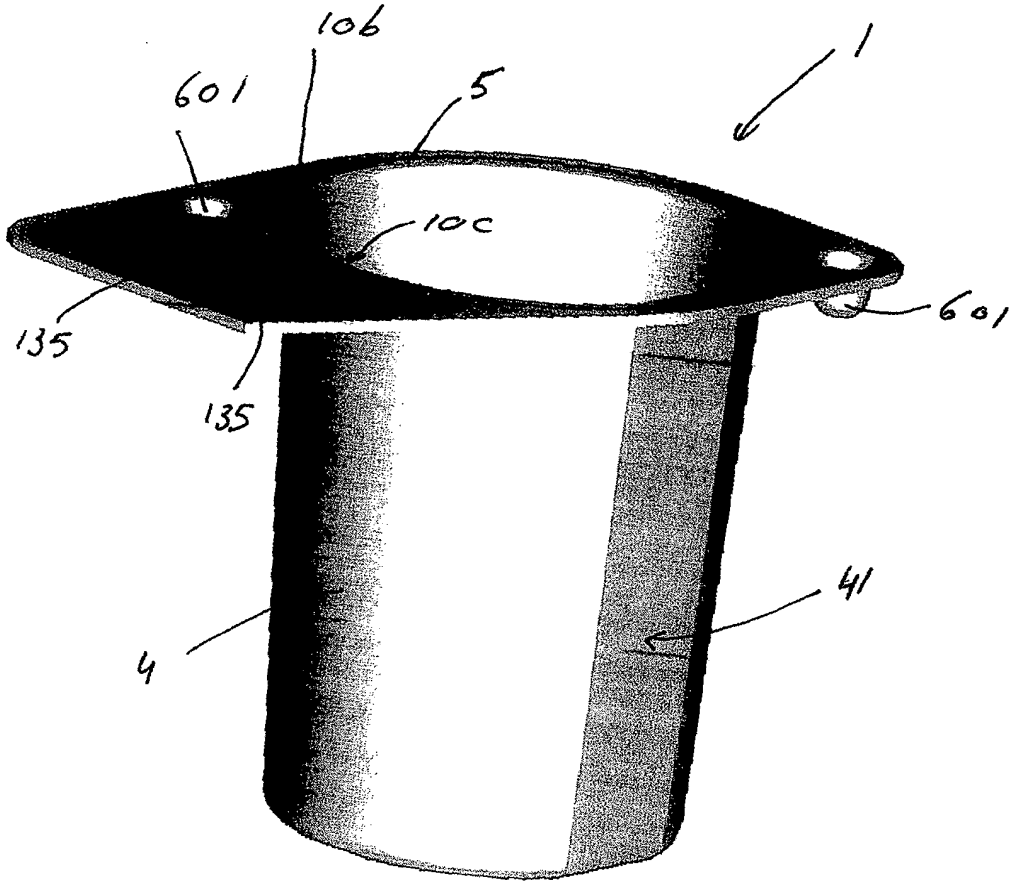


Fig. 32

K-FEE SYSTEM GMBH, EX2009, page 1441
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

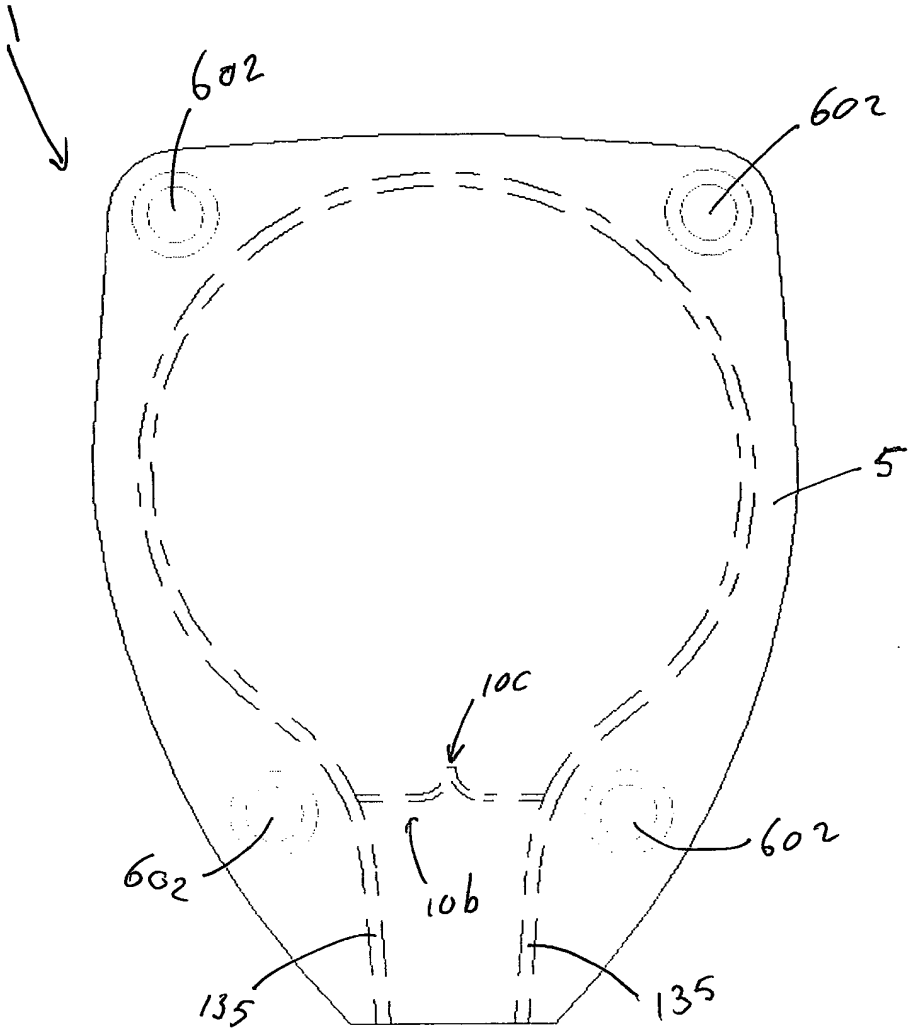


Fig. 33

K-FEE SYSTEM GMBH, EX2009, page 1442
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

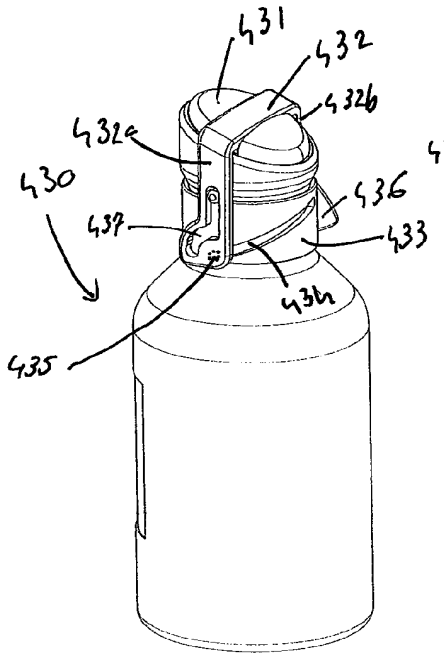


Fig. 34a

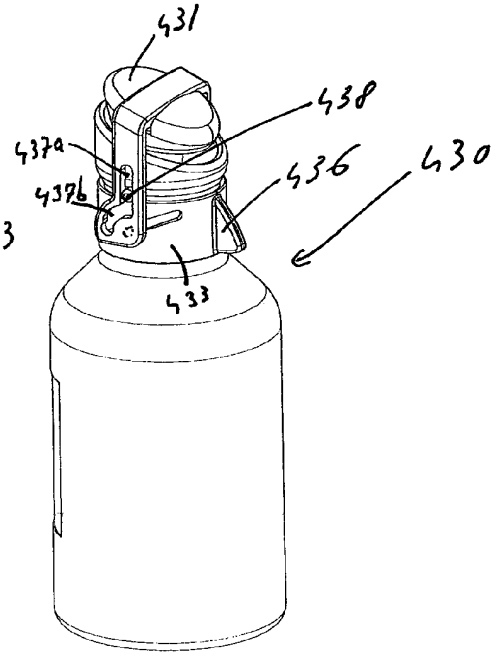


Fig. 34b

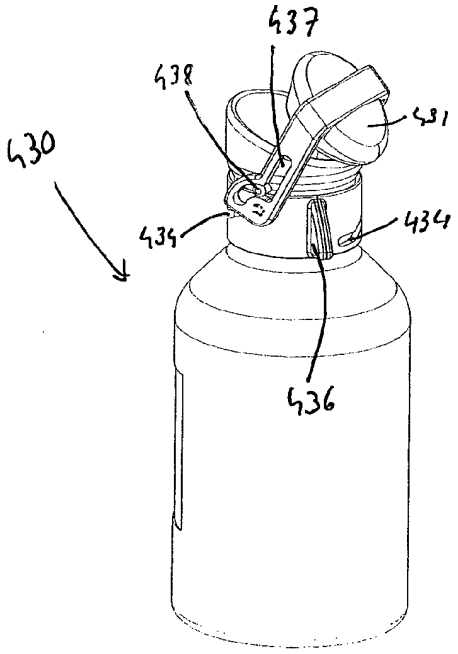


Fig. 34c

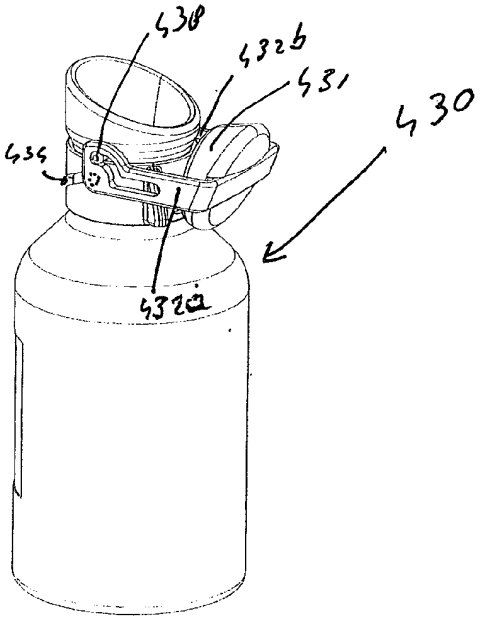


Fig. 34d

K-FEE SYSTEM GMBH, EX2009, page 1443
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

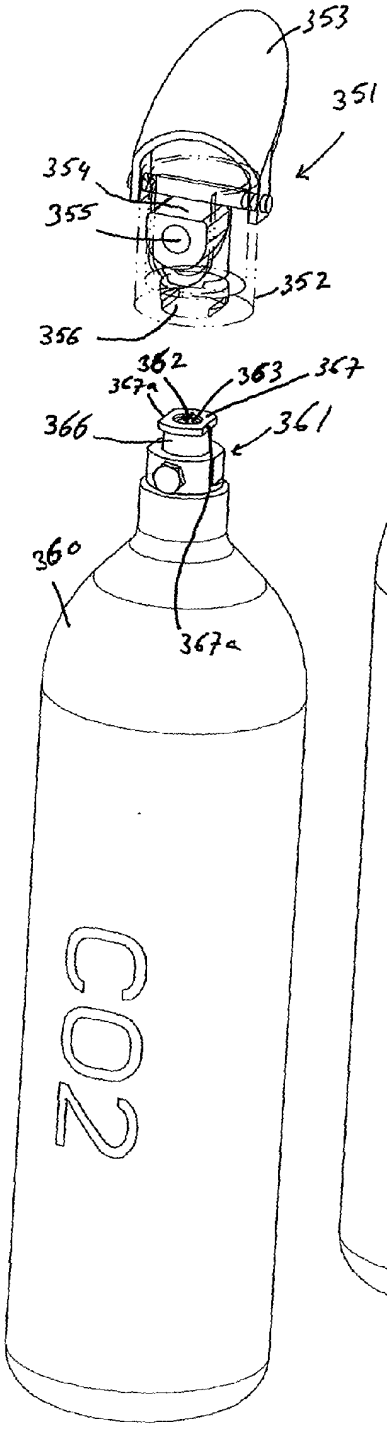


Fig.35a

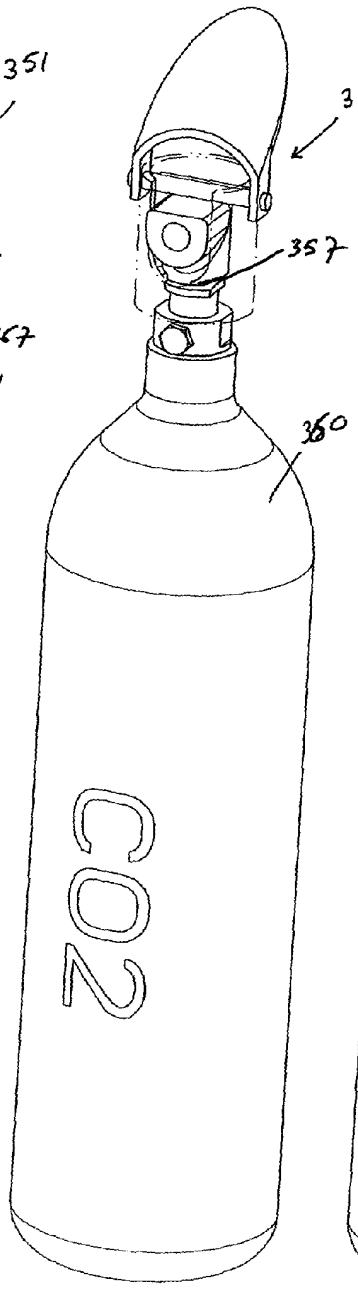


Fig.35b

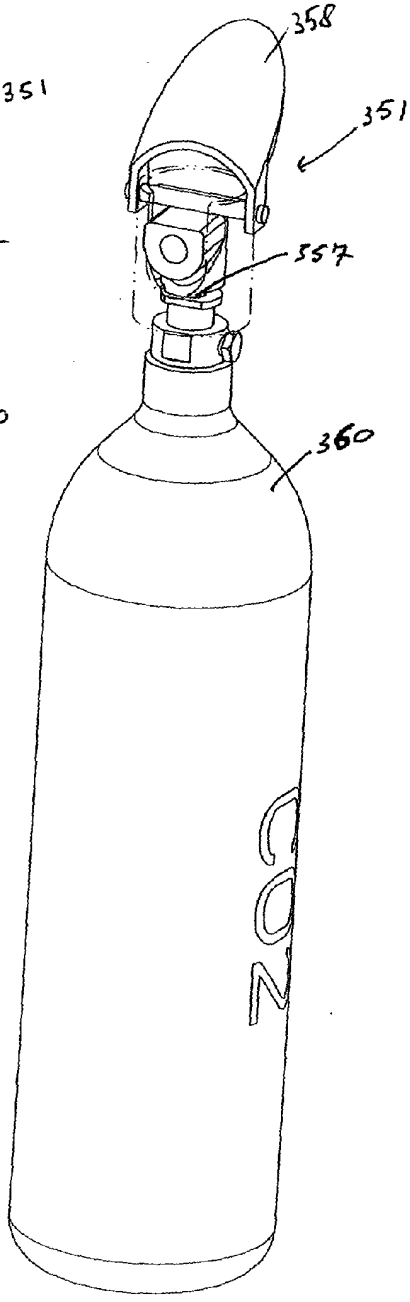


Fig.35c

K-FEE SYSTEM GMBH, EX2009, page 1444
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

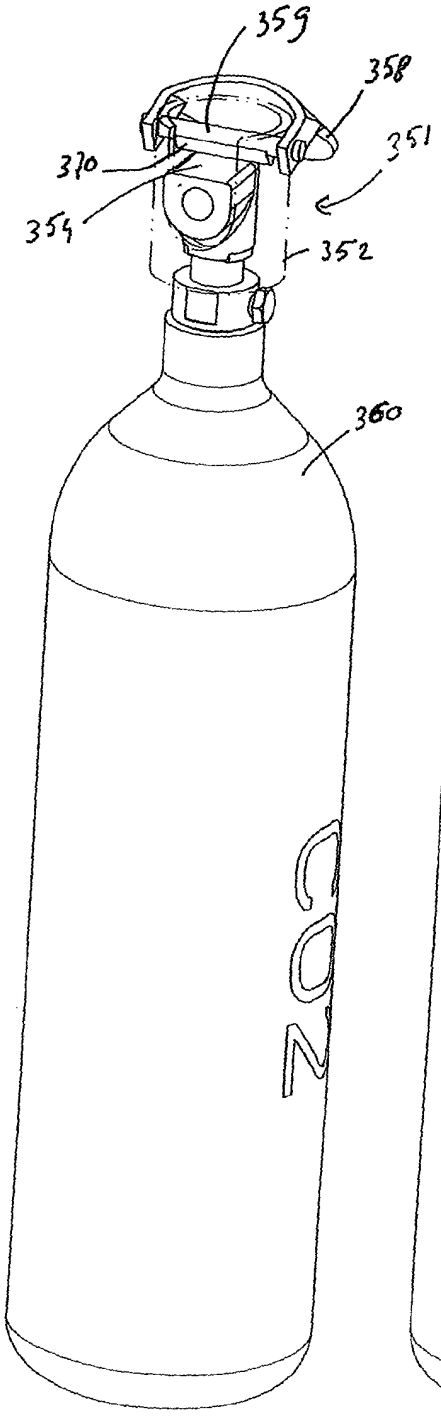


Fig. 35d

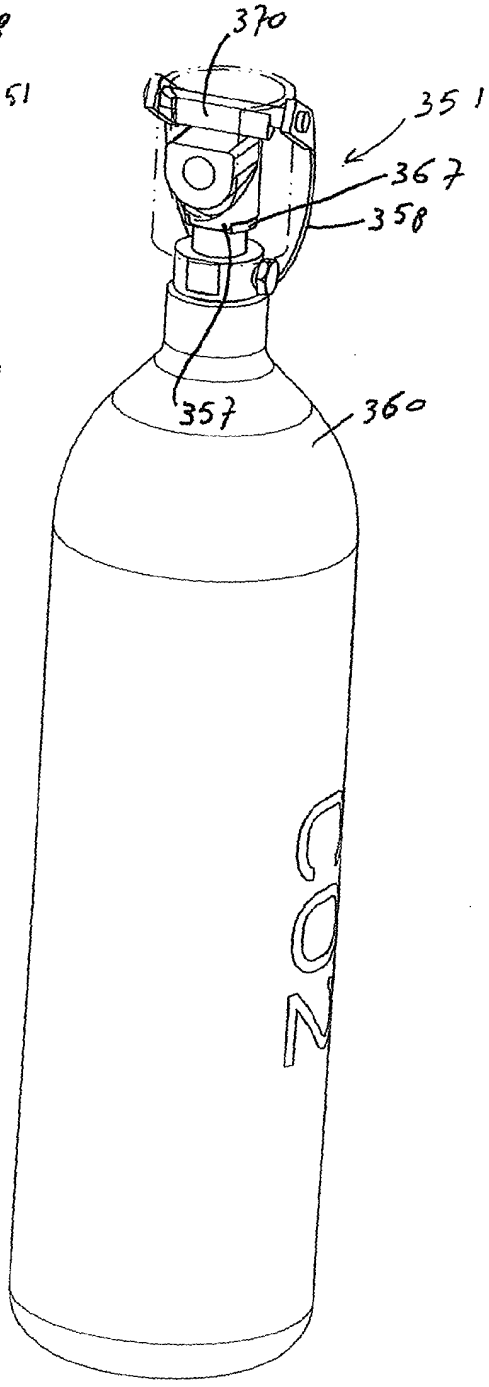


Fig. 35e

K-FEE SYSTEM GMBH, EX2009, page 1445
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

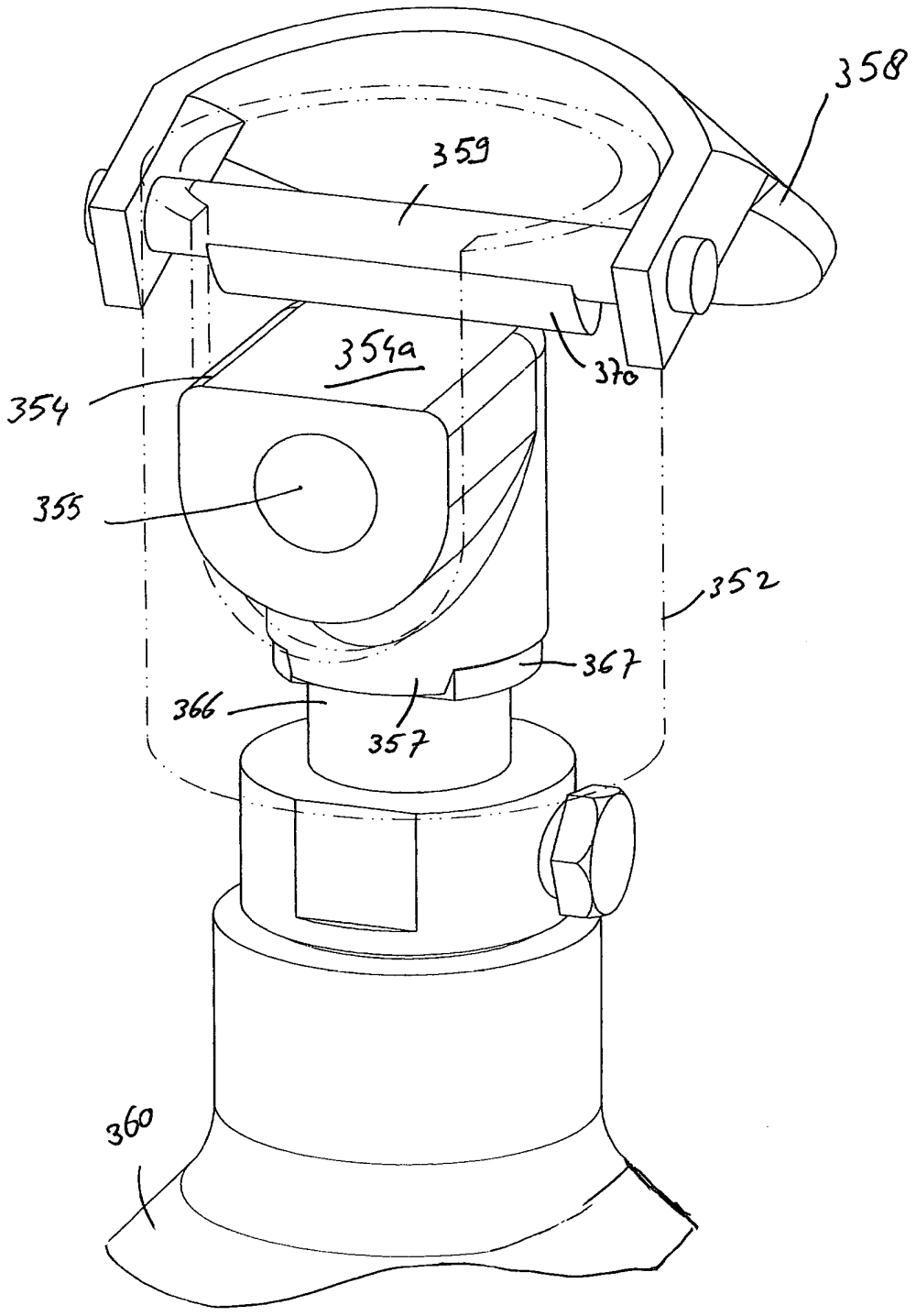


Fig.36

K-FEE SYSTEM GMBH, EX2009, page 1446
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 07 6206

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 02/078499 A (EUGSTER/FRISMAG AG; FISCHER, DANIEL) 10 October 2002 (2002-10-10) * page 12, line 6 - page 19, line 11; figures *	1-7	B67D1/00
Y	US 4 220 259 A (LAGNEAUX, JEAN) 2 September 1980 (1980-09-02) * column 3, line 7 - column 4, line 43; figures *	1-10	
Y	US 5 842 603 A (SCHROEDER ET AL) 1 December 1998 (1998-12-01) * abstract * * column 6, lines 12-51; figures *	1-10	
E	EP 1 489 042 A (WHITLENGE DRINK EQUIPMENT LIMITED) 22 December 2004 (2004-12-22) * column 8, lines 33-44 * * column 4, line 24 - column 9, line 31; figures 2A,2B,3C *	1,3,4,9, 10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	WO 02/28241 A (BOYD COFFEE COMPANY) 11 April 2002 (2002-04-11) * pages 4-12; figures *	1-7	B67D B65D A47J
A	US 4 915 261 A (STRENGER ET AL) 10 April 1990 (1990-04-10) * column 4, line 1 - column 17, line 46; figures *	1-10	

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	12 May 2005	De Terlizzi, M

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

K-FEE SYSTEM GMBH, EX2009, page 1447
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

European Patent Office

Application Number
EP 04 07 6206

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☒ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

K-FEE SYSTEM GMBH, EX2009, page 1448
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 07 6206

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-05-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 02078499 A	10-10-2002	DE 20105672 U1	13-09-2001
		CA 2442259 A1	10-10-2002
		WO 02078499 A1	10-10-2002
		EP 1379154 A1	14-01-2004
		JP 2004529693 T	30-09-2004
		NO 20034326 A	21-11-2003
		US 2004112222 A1	17-06-2004
		ZA 200307554 A	28-07-2004
US 4220259 A	02-09-1980	BR 7808603 A	28-08-1979
		CA 1103626 A1	23-06-1981
		EP 0002987 A1	11-07-1979
		ES 476448 A1	16-04-1979
US 5842603 A	01-12-1998	US 5494193 A	27-02-1996
		US 5305923 A	26-04-1994
		AU 6238096 A	29-11-1996
		WO 9636556 A1	21-11-1996
		US 2003000964 A1	02-01-2003
		US 6460734 B1	08-10-2002
		US 5615801 A	01-04-1997
		US 5735436 A	07-04-1998
		US 5312017 A	17-05-1994
		AU 2251992 A	12-01-1993
		BR 9206139 A	06-12-1994
		CA 2111478 A1	23-12-1992
		EP 0587803 A1	23-03-1994
		IE 921930 A1	16-12-1992
		JP 6508328 T	22-09-1994
		KR 203786 B1	15-06-1999
		WO 9222493 A1	23-12-1992
		AU 647805 B2	31-03-1994
		AU 8085091 A	31-12-1991
		BR 9106533 A	25-05-1993
		CA 2084646 A1	07-12-1991
		EP 0531423 A1	17-03-1993
		WO 9118826 A2	12-12-1991
EP 1489042 A	22-12-2004	EP 1489042 A1	22-12-2004
		GB 2404184 A	26-01-2005
		US 2005029287 A1	10-02-2005
WO 0228241 A	11-04-2002	AU 1148902 A	15-04-2002
		WO 0228241 A1	11-04-2002
		US 2002048621 A1	25-04-2002

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

K-FEE SYSTEM GMBH, EX2009, page 1449
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 07 6206

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-05-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4915261 A	10-04-1990	AR 200653 A1	29-11-1974
		AT 338605 B	12-09-1977
		AT 626673 A	15-12-1976
		AU 5784073 A	09-01-1975
		BE 801399 A1	15-10-1973
		CA 1007156 A1	22-03-1977
		CH 575343 A5	14-05-1976
		DE 2336877 A1	31-01-1974
		ES 415500 A1	16-06-1976
		FR 2193791 A1	22-02-1974
		GB 1441658 A	07-07-1976
		IT 985709 B	20-12-1974
		JP 49050172 A	15-05-1974
		NL 7308839 A	22-01-1974
		SU 617002 A3	25-07-1978
		US 4808346 A	28-02-1989
		ZA 7303022 A	27-03-1974

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

K-FEE SYSTEM GMBH, EX2009, page 1450
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 384 133 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
27.03.2013 Bulletin 2013/13

(21) Application number: **09795444.0**

(22) Date of filing: **22.12.2009**

(51) Int Cl.:
A47J 31/36 *(2006.01)* ***A47J 31/06*** *(2006.01)*

(86) International application number:
PCT/EP2009/067728

(87) International publication number:
WO 2010/076263 (08.07.2010 Gazette 2010/27)

(54) PROCESS OF BREWING TEA LEAVES CONTAINED IN A CAPSULE

VERFAHREN ZUM AUFBRÜHEN VON IN EINER KAPSEL ENTHALTENEM LOSEM TEE

PROCESSUS D'INFUSION DE FEUILLES DE THÉ RENFERMÉES DANS UNE CAPSULE

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **30.12.2008 EP 08173075**

(43) Date of publication of application:
09.11.2011 Bulletin 2011/45

(73) Proprietor: **Nestec S.A.**
1800 Vevey (CH)

(72) Inventor: **OZANNE, Matthieu**
74500 Champanges (FR)

(74) Representative: **Ducreux, Marie**
Avenue Nestlé 55
1800 Vevey (CH)

(56) References cited:
EP-A- 1 440 640
EP-A- 1 974 638
WO-A-02/28241
GB-A- 2 447 024
US-A1- 2007 261 564

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Printed by Jouve, 75001 PARIS (FR)

EP 2 384 133 B1

K-FEE SYSTEM GMBH, EX2009, page 1451
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Description

[0001] The present invention relates to a process for brewing tea leaves or other kinds of herbal leaves contained in a beverage producing capsule.

[0002] Different beverage capsules for brewing beverages in a suitable beverage machine are known. One commercially successful capsule system for extracting beverage from capsules consists in placing an air- and water-impermeable capsule into an extraction device, injecting hot water into the capsule and releasing the liquid extract out of the capsule. Most of the beverages produced by these capsules are coffee or beverages issued from the dissolution of soluble liquid or powder ingredients.

[0003] Concerning the production of tea beverage, WO 2007/042414 describes capsules more particularly suited for tea beverages produced from a capsule containing leaf tea product and the like. Quality of a tea beverage is highly dependent on the quality of the leaf tea ingredients, i.e., the tea origin used (soil, drying, blending, etc.) and their storage conditions. For instance, tea ingredients are usually sensitive to oxygen and light. Preferred tea ingredients are taken from loose leaves, chiselled or broken in small fragments. However, brewing conditions are also important to take full advantage of the quality of the ingredients used.

[0004] Usually beverage machines process all the capsules the same way because they process always the same product, coffee for example. Other machines have also been developed for producing different kinds of beverages : they are able to produce either coffee or chocolate or tea or cappuccino. For example EP 1 440 640 describes such a type of machine. This machine enables the production of different beverages (coffee, chocolate, milk, ...). It mentions that the operational parameters of the machine are adjusted according to the nature of the ingredients, yet no information are given concerning these parameters

[0005] Concerning the particular preparation of beverage from capsules comprising tea leaves, it has been noticed that the usual brewing steps used for coffee and other beverages could not lead to optimal preparation of a tea beverage. In particular it is known that the time for extracting tea leaves is quite longer than for extracting coffee from roast and ground coffee because tea leaves must hydrate and open themselves before extraction occurs. Then the process of extraction of roast and ground coffee does not lead to optimal brewing of tea leaves.

[0006] Besides, there exists a large variety of different tea leaves : black, green, white, red, herbal teas perfumed with a lot of different aromas. Each of these leaves can require specific extraction. On the contrary, roast and ground coffees of different origins are all extracted according to the same process.

[0007] Lastly the long time for extraction of tea leaves can be perceived as a disadvantage when a tea beverage is prepared by a machine compared to the classical preparation in a tea pot. Yet shorter preparation of tea beverage leads to lower quality of extraction. Then is there a need to optimize the tea extraction length time while maintaining the quality of the extraction.

[0008] The present invention aims at solving the problem of quality by improving the brewing process of tea leaves in a process of preparation of tea beverage from a capsule containing tea leaves.

[0009] The present invention aims also at solving the problem of brewing tea leaves in a process of preparation of tea beverage from a capsule containing tea leaves in the shortest time as possible while maintaining an optimal extraction of the tea extract from the tea leaves.

[0010] The present invention aims also at solving the problem of brewing tea leaves of very different types enclosed in a capsule with the same beverage machine by proposing a process adaptable to each type of tea leaves.

[0011] According to a first aspect, the invention concerns a process for the preparation of a tea beverage in a beverage machine with a capsule comprising an enclosure containing tea leaves comprising the steps of :

a) introducing water in the capsule to submerge the tea leaves in the capsule enclosure, then
b) introducing water at a soaking flow of at most 80 ml/min, then
c) introducing water in the capsule until the required volume of beverage is delivered,

wherein during at least one period of step b), water is introduced in the capsule at a stirring flow superior to the soaking flow to stir tea leaves.

[0012] The process of the present invention is adapted for the preparation of a tea beverage by introduction of hot water in a capsule containing tea leaves, the capsule presenting an inlet for introducing water and an outlet for evacuating the extracted tea beverage. The inlet and/or the outlet can be preformed or produced by puncturing means of the machine.

[0013] According to the invention, in the first step a), water is introduced in the capsule to at least submerge all the tea leaves in the capsule enclosure. According to a preferred embodiment of the invention, during step a), a volume equivalent to the volume tea leaves enclosure of the capsule is introduced so as to be sure that the leaves are submerged by water. During this step a), the tea leaves are wetted. Preferably, during step a), water is introduced at a flow of at least 150 ml/min. Such a flow value enables the rapid filling of the capsule to manage optimal beverage preparation time length. The value of this flow can also depend from the type of heater used to heat the water and its ability to provide hot water at high flow rates.

[0014] Immediately after step a) and the wetting of the leaves, step b) starts during which water is introduced at a soaking flow of at most 80 ml/min, preferably at most 50 ml/min, generally comprised between 20 and 80 ml/min. Such a soaking flow aims at leaving tea leaves

K-FEE SYSTEM GMBH, EX2009, page 1452
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

quiet so that they can unfold. According to a specific mode, the soaking flow can be null. If this soaking flow is not null, the introduction can either complete the filling of the a leaves enclosure or leads to the overflow of this enclosure ; in this last case, it produces a drip flow in the container or cup placed at the outlet of the capsule. During this step b), the extraction of tea begins. Generally the time length of step b) is at least 5 seconds, preferably at most 50 seconds. According to the invention, during step b) water is briefly introduced during at least one period (b') in the capsule at a stirring flow superior to the soaking flow to stir tea leaves. During this soaking step b) that corresponds to a quiet period during which tea leaves are at rest on account of no introduction of water or introduction of water at low flow, the short introduction of water at a stirring flow superior to the soaking flow creates a turbulent jet of water able to move and stir the tea leaves and to redistribute the leaves in the capsule before they are again left at rest. Due to this stirring and redistribution of the tea leaves, extraction of tea leaves is boosted because immobilization of tea leaves after step a) creates places where tea extract concentration is high and then inhibition of further extraction in the area near from these places. In order to provide a jet of water sufficient to stir tea leaves, the stirring flow is preferably at least greater than 150 ml/min. Several stirring jets of water can occur separated by rest periods during which the water flow rate stays inferior or equal to 80 ml/min or null. In step b), the number of periods during which water is introduced in the capsule to stir tea leaves, the time length of this/these period(s) and the total time length of step b) can be adjusted in function of at least :

- the nature of brewed tea leaves, in particular their size, their dryness, their flavour, and
- the desired strength of the final beverage.

[0015] Preferably in step b) of the process of the present invention, water is introduced in the capsule to stir tea leaves one or two times (corresponding to two stirring periods (b')). Generally, the time length of each period during which water is introduced in the capsule to stir tea leaves is inferior to 5 seconds. The time length between two periods during which tea leaves are stirred preferably lasts during 5 and 15 seconds.

[0016] Lastly during step c), the rest of the water necessary to provide the desired volume of beverage is introduced in the capsule. Preferably during step c) water is introduced at a flow of at least 150 ml/min in order to match the shortest beverage delivery time.

[0017] The different flow rates of water according to the different steps of the process can be set so that the total time for implementing steps a) to c) is comprised between 40 seconds and 2 min.

[0018] Generally water is introduced in the capsule with a temperature comprised between 30 and 95°C.

[0019] According to the preferred embodiment of the present invention, the process is implemented with a capsule comprising :

- an enclosure containing tea leaves,
- a filtering wall delimiting at least one filtering side of the enclosure,
- an overflow wall that is positioned in the path of the brewed liquid after the filtering wall and which comprises at least one overflow aperture or is associated with at least one puncture means or, respectively, puncture indication means capable of producing or, respectively, indicating at least one overflow aperture. Preferably the filtering wall extends from below a median horizontal plane passing through the enclosure when the capsule is oriented so that at least one overflow aperture or puncture means or, respectively the puncture indicating means, is placed above said plane. Such a capsule is more specifically described in WO 2007/042414.

[0020] According to a second aspect, the invention concerns a beverage production system comprising :

- beverage ingredient containing capsules comprising an identification member, and
- a beverage production machine for receiving said capsules, said machine comprising reading means for reading the capsule identification member in order to read information thereof and control means connected to the reading means and designed to control the operation of the beverage production machine in response to the read information,

characterized in that the identification member provides instructions to the machine for brewing tea leaves according to the process such as described above.

[0021] This identification member can be of any nature like bar code, colour code (identified by a visual sensor), RFID tag (identified by a RF sensor), indents, cut outs, protrusions, holes (identified by a mechanical sensor), magnetic code, electronic code, induction code, conduction code ... Preferably, the identification member is designed for being physically contacted from outside and is covered by a deformable, displaceable, removeable and/or puncturable cover. Capsules presenting this kind of identification member are described in EP 1 950 150. Generally, the machine-readable information are selected in the list of : the temperature of the water, the values of the water flows of steps a), b) and/or c), the number of stirring periods in step b), the time length of the steps a), b) and/or c) and combinations thereof. The beverage machine in which is used said capsule comprises control means designed to control : the values of the water flows of steps a), b) and c), the number of stirring periods in step b), the time length of the different steps in response to the read information. Based on the information provided by the identification member, the control unit can then vary the brewing parameters especially the water flow of steps a), b) and c), the number of stirring periods in step

K-FEE SYSTEM GMBH, EX2009, page 1453
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

b), the time length of the different steps flow rate for the brewing of different tea beverages according to capsules containing leaf tea ingredients having different characteristics and/or origins.

[0022] In the present application, the terms "capsule" means also "cartridge" or "package". The term "capsule" will be preferentially used. The words "brewing" or "infusion" are used as synonymous. The term "brewing fluid" generally refers to the liquid that serves to infuse the beverage ingredients, more generally, hot water.

[0023] In the present application, the term "tea" encompasses all type of leaf tea such as green tea, black tea, white tea, chai tea, flavoured tea and herbal or fruit tea. The term "leaf tea/tea leaves" or "leaf ingredient" refers to brewable tea or other ingredients in whatever form such as complete, cut or chiselled leaves, small fragments of leaves, powder or dust.

Brief description of the drawings

[0024] The characteristics and advantages of the invention will be better understood in relation to the figures which follow :

- Figure 1 is a diagram presenting the hot water flow introduced in the capsule according to each step of the brewing process according to a first embodiment of the invention ;
- Figure 2 is a diagram presenting the hot water flow introduced in the capsule according to each step of the brewing process according to a second embodiment of the invention ;
- Figure 3 is a schematic illustration of a capsule brewing system before brewing ;
- Figure 4 is a schematic illustration of a the capsule brewing system of figure 3 during brewing of the capsule.

Detailed description of the drawings

[0025] **Figure 1** illustrates the values of the hot water flows introduced in a capsule for each step of the process and the time length of introduction of these different flows according to a first embodiment of the invention.

[0026] As illustrated in Figure 1, in step a), the capsule is filled with hot water with a flow of water of 150 ml/min. The volume of water that is introduced in the capsule corresponds to the capsule teal leaves enclosure volume.

[0027] In **step b)** :

- the capsule is first filled with hot water again but at a lowest flow of 50 ml/min so as to not stir the tea leaves and let the leaves unfold,
- then capsule is filled with hot water at a greater flow of 150 ml/min (step b') during a short time of 3 seconds to stir the leaves in order to redistribute them,
- then capsule is finally filled with hot water again but at the lowest flow of 50 ml/min so as to not stir the tea leaves an let the redistributed leaves unfold.

[0028] During step b), when the volume of injected water overlaps the capsule tea leaves enclosure volume, water gently drips through the capsule outlet inside a final cup or container.

[0029] In **step c)**, the capsule is filled with hot water firstly at a flow of 150 ml/min and then rapidly at a flow of 225 ml/min until the total desired volume of tea beverage flows through the capsule outlet and fills the cup.

[0030] The process of preparation and dispensing of the tea beverage ready to be drunk lasts 51 seconds.

[0031] **Figure 2** illustrates the values of the hot water flows introduced in the capsule for each step of the process and the time length of introduction of these different flows according to a second embodiment of the invention.

[0032] In **step a),** the capsule is filled with hot water with a flow of water of 150 ml/min. The volume of water that is introduced in the capsule corresponds to the capsule volume.

[0033] In **step b) :**

- no hot water is introduced in the capsule so that the tea leaves can stay at rest and unfold. Yet, the pump is not stopped during this short period to avoid the stagnation of water in the pump and the development of scale ; hot water flow is just derived from capsule inlet and sent to waste.
- then capsule is filled with hot water at a flow of 150 ml/min (step b') during 3 seconds to stir the leaves and redistribute them,
- then the flow of hot water is derivated to waste so that no flow enters the capsule and that the redistributed leaves can stay at rest and unfold.

[0034] In **step c)**, the capsule is filled with hot water firstly at a flow of 150 ml/min and then rapidly at a flow of 225 ml/min until the total desired volume of tea beverage flows through the capsule and fills the cup.

[0035] The process of preparation and dispensing of the tea beverage ready to be drunk lasts only 51 sec.

[0036] Figures 3 and 4 illustrate a capsule system of which construction is particularly adapted for the implementation of the process of the present invention.

[0037] A capsule system 1 is provided that comprises a capsule 2 and a beverage brewing device 10. For simplicity, the beverage brewing device is only schematically depicted and may, in reality, comprise additional technical features within the normal knowledge of the person skilled in the art. The capsule comprises an enclosure 20 containing beverage ingredients such as leaf tea and the like. The enclosure is demarcated by a cup-shaped housing 21 and a filtering wall 22 that is fixedly attached to peripheral inner step 23 of the housing 21. The enclosure is preferably impermeable to gas and light. The housing may encompass different cross sections such as a circular, ellipsoid, square, rectangular or polygonal

K-FEE SYSTEM GMBH, EX2009, page 1454
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

section that determine as a matter of fact the general profile of the filtering wall 22. The enclosure is sized to accommodate a dose of leaf beverage ingredient of typically about between 1 to 10 grams, preferably 2 to 5 grams. The dose of leaf ingredient may depend on the final volume of beverage to produce. For an individual cup of tea, a typical dose can be of about 2 grams whereas for a tea pot, a typical dose can be of about 8 to 10 grams. As clearly apparent in figure 3, the capsule is positioned relative to the brewing device so that the filtering wall 22 extends substantially vertical and from substantially the bottom of the enclosure. For this, the capsule is preferably positioned in a "vertical" arrangement in the brewing device 1. The cup-shaped housing 21 can be so oriented with its large opening and its bottom oriented in a vertical position.

[0038] Importantly, the capsule comprises an overflow wall 3 with an overflow aperture 25 placed at least above the median horizontal plane P of the enclosure. The filtering wall 22 and the overflow wall 3 are spaced apart a short distance sufficient to create an interstitial space "s" that is supposed, without being bound by theory, to work as a sort of "siphon" that can promote the upward motion of the denser beverage portion that is predominantly localized in the bottom of the enclosure.

[0039] Both the sealing wall and the housing can be made of oxygen barrier materials and the enclosure can be substantially free of oxygen so that the freshness of the beverage ingredients can be preserved during an extended period of time. The sealing wall can be a flexible membrane or a semi-rigid plastic part. A puncturable sealing membrane is preferred such as a monolayer or a multi-layer membrane, typically, laminates of PET/Aluminium/PP, PE/EVOH/PP, PET/Metallised/PP, aluminum/PP. The enclosure is preferably oxygen free and may contain flushed inert gas such as N_2, N_2O or CO_2.

[0040] The capsule can further comprise a cover 4 that is also attached to the rim 24 of the housing 21 and overlaps the sealing wall 3. The cover forms an internal channel 40. An identification member 51 can be present on the cover (or even under the cover). This identification member contains information about the brewing parameters to be implemented to get the better brewing for the tea leaves present inside the capsule.

[0041] The shape of the housing of the capsule is not very critical. Preference is given to a trunconical, ellipsoidal or hemispherical shapes for different reasons. This allows a larger surface for the exit of the beverage through the sealing wall when perforated and a reduction of the inside pressure. The housing can also be manufactured industrially at lower cost by plastic thermoforming or aluminium deep drawing. This shape with smoother corners also favours the removal of the handling members and so ejection of the capsule.

[0042] Turning to the brewing device 10, it comprises capsule handling members 30, 31 that are configured to hold the capsule in the "vertical" arrangement as defined. These handling members 30, 31 can be machine jaws or any suitable mechanical enclosing means that can open and close about the capsule and can maintain it firmly in place. There is no need for providing high closing forces since the involved fluid pressure in the capsule remains relatively low and, preferably, as close as possible to the atmospheric pressure. Also, since the capsule can withstand the low brewing pressure therefore the capsule does not necessarily need to be entirely enclosed but simply held water tightly in place during brewing. This participates to a simplification of the machine and it reduces machine costs.

[0043] The brewing device comprises a water supply 32, such as a water tank, a water pump 33, a heater 34 and a hot water injection line 35 that is managed through the handling member 30. The brewing device may also comprise a controller 39 and a user interface board (not shown) to manage the beverage preparation cycles as known in the art. A backpressure valve 36 can be provided to lower the pressure at the entry side of injection member 38 such as a needle(s) or blade(s) creating a water inlet in the capsule. Of course, the backpressure valve could be omitted and a low pressure pump could be used that delivers fluid at low pressure. Medium to high pressure pump may however be preferred because of their robustness and reliability and so used in combination with a backpressure valve.

[0044] The brewing device may further comprise a means 37 for perforating the cover 4 and creating a beverage outlet. As shown in figure 3, the perforating means 37 can be activated after closing of the handling members 30, 31 about the capsule. The perforating means is forced or guided through the cover 4. The perforator can be driven by a solenoid or any other equivalent drive means or even manually.

[0045] The brewing device may further comprise a detection unit 50 to convert the information of the identification member 51 of the capsule into brewing instructions through the controller 39. In the present the invention, the information especially varies according to the tea leaves present inside the capsule. The information provide to the control unit 39 instructions so that the steps a), b) and c) of the process of the present invention is implemented with specific features adapted for each type of tea leaves that are : the values of water flow of steps a), b) and c), the number of stirring periods in step b), the time length of the different steps.

[0046] Preferably the information can be read from the capsule 1 in a non-optical manner, as the optical reading e.g. using a bar code has the disadvantages of having a negative impact on the aesthetic impression of the outer appearance of the capsule and of being prone to failure due to the legibility of the bar code in the environment of the beverage production process. Preferably the information is coded in a digital manner. The information can be coded by a modulation of the surface structure of a face of the capsule 1. E.g. a hole or a recession can represent one logical sate (e.g. "0"), while another surface state ("no recession" or "no hole") can represent the

K-FEE SYSTEM GMBH, EX2009, page 1455
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

other logical state (e.g. "1"). Replacing the bar code by a surface modulation which can then be detected in a non-optical manner (or even in an optical manner) enhances the reliability of the information reading from the capsule.

[0047] In relation to figure 4, the method of the invention works as follows. A capsule is inserted in the brewing device and the capsule handling members 30, 31 are closed about the capsule to position it with the sealing wall being substantially vertically oriented. An outlet aperture is created by the perforating means 37 that punctures the cover 4 and is withdrawn to leave the aperture opened. On the opposite side of the capsule, the fluid injection member 38 is introduced in the capsule's enclosure. Hot water is thus injected in the capsule at relatively low pressure, preferably, at a pressure not exceeding 0,2 bar. Hot water slowly fills the capsule in and submerges the beverage ingredients in the enclosure. The brewed beverage is filtered through the filtering wall 22. A denser portion 5 of the beverage may tend to settle in the bottom of the enclosure ; which portion is also filtered through the filtering wall since it is properly placed adjacent this portion. The denser beverage is evacuated through the interstitial space "s" as caused by the variation of pressure between the lower part of the space and the upper part of said space therefore acting similarly to a "siphon". The rest of the beverage is also filtered also by passing through the filtering wall at different vertical levels up to the upper level of the fluid in the enclosure and is evacuated to the overflow aperture 25.

[0048] It should be noted that the overflow aperture should preferably be placed above the 3/4 of the total height of the enclosure and even preferably be placed above the 4/5 of the total height of the enclosure ; thus ensuring a more complete submergence of the beverage ingredients and a slower evacuation of the beverage from the enclosure which favours a better infusion process.

[0049] The "total height" of the enclosure is meant to be the total distance separating the lowermost point of the enclosure to the uppermost point of the enclosure when the capsule is positioned in the beverage machine ready for the brewing operation. In a possible mode, the filtering wall can be substantially equal to the total height of the enclosure.

[0050] The principle of the brewing method according to figures 3 and 4 encompasses different variants and equivalences.

[0051] For instance, the overflow wall 3 may not be perforated but may be pre-opened by a pre-cut overflow aperture. The pre-cut overflow aperture means an aperture which has already been made at the manufacturing stage of the capsule. Freshness of the beverage ingredients may so be preserved by different means such as by an airtight closed cover with a sealed outlet that is unsealed just before brewing or by the use of an airtight overwrap package that encloses the capsule.

[0052] The capsule may also be conceived without the cover 4 and its channelling function. In which case, the front handling member 31 may be designed to collect the brewed liquid as it passes the overflow wall 3 and travels down to the recipient.

Claims

1. Process for the preparation of a beverage in a beverage machine with a capsule comprising an enclosure containing tea leaves comprising the steps of :

   a) introducing water in the capsule to submerge the tea leaves in the capsule enclosure, then
   b) introducing water at a soaking flow of at most 80 ml/min, then
   c) introducing water in the capsule until the required volume of beverage is delivered, wherein during at least one period of step b), water is introduced in the capsule at a stirring flow superior to the soaking flow to stir tea leaves.

2. Process according to Claim 1 wherein during step a), water is introduced at a flow of at least 150 ml/min.

3. Process according to any one of the precedent claims, wherein the time length of the art least one period during which water is introduced in the capsule at a stirring flow superior to the soaking flow to stirtea leaves is inferior to 5 seconds.

4. Process according to any one of the precedent claims, wherein the time length of step b) is at least 5 seconds, preferably at most 50 seconds.

5. Process according to any one of the precedent claims, wherein during step b) the stirring flow is at least greater than150 ml/min.

6. Process according to any one of the precedent claims, wherein during step c), water is introduced at a flow of at least 150 ml/min.

7. Process according to any one of the precedent claims, wherein water is introduced with a temperature comprised between 30 and 95°C.

8. Process according to any one of the precedent claims **characterized in that** it is implemented with a capsule (2) comprising :

   - an enclosure (20) containing tea leaves,
   - a filtering wall (22) delimiting at least one filtering side of the enclosure,
   - an overflow wall (3) that is positioned in the path of the brewed liquid after the filtering wall and which comprises at least one overflow aperture (25).

K-FEE SYSTEM GMBH, EX2009, page 1456
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

9. Process according to the precedent claim **characterized in that** the filtering wall extends from below a median horizontal plane (P) passing through the enclosure (20) when the capsule is oriented so that the overflow aperture (25) is placed above said plane (P).

10. Process according to any one of the precedent claims **characterized in that** it is implemented with a capsule (2) comprising an identification member (6) configured to be read by reading means (50) of the beverage machine (11) in order to read information thereof, the machine comprising control means connected to the reading means and designed to control the operation of the beverage machine in response to the read information,
characterized in that the identification member provides instructions to the machine for brewing tea leaves according to steps a) to d).

11. Process according to Claim 10 wherein the machine-readable information are selected in the list of the temperature of the water, the values of the water flows, of steps a), b) and/or c), the number of stirring periods in step b), the time length of the steps a), b) and/or c) and combinations thereof.

Patentansprüche

1. Verfahren zur Zubereitung eines Getränks in einer Getränkemaschine mit einer Kapsel, die eine Teeblätter enthaltende Umhüllung aufweist, mit den folgenden Schritten:

   a) Einführen von Wasser in die Kapsel, um die Teeblätter in der Kapselumhüllung einzutauchen,
   sodann
   b) Einführen von Wasser mit einem Durchtränkungsfluss von höchstens 80 ml/min, danach
   c) Einführen von Wasser in die Kapsel, bis das erforderliche Getränkevolumen abgegeben wird,
   wobei während mindestens einem Zeitraum von Schritt b) Wasser mit einem Durchrührfluss in die Kapsel eingeführt wird, der stärker ist als der Durchtränkungsfluss, um den losen Tee durchzurühren.

2. Verfahren gemäß Anspruch 1, wobei während Schritt a) Wasser mit einem Durchfluss von mindestens 150 ml/min eingeführt wird.

3. Verfahren gemäß einem der vorhergehenden Ansprüche, wobei die Zeitdauer des mindestens einen Zeitraums, während dem Wasser mit einem Durchrührfluss, der stärker als der Durchtränkungsfluss ist, zum Durchrühren des losen Tees in die Kapsel eingeführt wird, weniger als 5 Sekunden beträgt.

4. Verfahren gemäß einem der vorhergehenden Ansprüche, wobei die Zeitdauer von Schritt b) mindestens 5 Sekunden, vorzugsweise höchstens 50 Sekunden beträgt.

5. Verfahren gemäß einem der vorhergehenden Ansprüche, wobei während Schritt b) der Durchrührfluss zumindest größer als 150 ml/min ist.

6. Verfahren gemäß einem der vorhergehenden Ansprüche, wobei während Schritt c) Wasser mit einem Durchfluss von mindestens 150 ml/min eingeführt wird.

7. Verfahren gemäß einem der vorhergehenden Ansprüche, wobei Wasser mit einer Temperatur zwischen 30 und 95° eingeführt wird.

8. Verfahren gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** es mit einer Kapsel (2) durchgeführt wird, die Folgendes aufweist:

   - eine Teeblätter enthaltende Umhüllung (20),
   - eine Filterwand (22), die zumindest eine Filterseite der Umhüllung begrenzt,
   - eine Überlaufwand (3), die in dem Fließweg der gebrühten Flüssigkeit nach der Filterwand angeordnet ist und die mindestens eine Überlauföffnung (25) aufweist.

9. Verfahren gemäß dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** sich die Filterwand von unterhalb einer mittleren horizontalen Ebene (P) erstreckt, die durch die Umhüllung (20) hindurchgeht, wenn die Kapsel derart ausgerichtet ist, dass die Überlauföffnung (25) oberhalb dieser Ebene (P) liegt.

10. Verfahren gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** es mit einer Kapsel (2) durchgeführt wird, die ein Erkennungsteil (6) aufweist, das von einer Leseeinrichtung (50) der Getränkemaschine (11) gelesen wird, um Daten von dieser auszulesen, wobei die Maschine eine mit der Leseeinrichtung verbundene Steuereinrichtung umfasst, die zur Steuerung des Betriebes der Getränkemaschine in Abhängigkeit der ausgelesenen Daten ausgeführt ist,
dadurch gekennzeichnet, dass das Erkennungsteil der Maschine Anweisungen zum Brühen von Teeblättern nach den Schritten a) bis d) liefert.

11. Verfahren gemäß Anspruch 10, wobei die maschinenlesbaren Daten ausgewählt sind aus der Liste:

K-FEE SYSTEM GMBH, EX2009, page 1457
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

der Wassertemperatur, der Werte des Wasserdurchflusses der Schritte a), b) und/oder c), der Anzahl von Durchrührzeiten in Schritt b), der Zeitdauer der Schritte a), b) und/oder c) sowie Kombinationen aus diesen.

Revendications

1. Procédé pour la préparation d'une boisson dans une machine à boisson avec une capsule comprenant une enceinte contenant des feuilles de thé, comprenant les étapes consistant à :

   a) introduire de l'eau dans la capsule pour submerger les feuilles de thé dans l'enceinte de la capsule, puis
   b) introduire de l'eau à un débit de trempage de 80 ml/min au plus, puis
   c) introduire de l'eau dans la capsule jusqu'à ce que le volume de boisson requis est distribué,
   dans lequel au cours d'au moins une période de l'étape b), de l'eau est introduite dans la capsule à un débit de brassage supérieur au débit de trempage pour brasser les feuilles de thé.

2. Procédé selon la revendication 1, dans lequel au cours de l'étape a) de l'eau est introduite à un débit d'au moins 150 ml/min.

3. Procédé selon l'une quelconque des revendications précédentes, dans lequel la durée de ladite au moins une période au cours de laquelle de l'eau est introduite dans la capsule à un débit de brassage supérieur au débit de trempage pour brasser les feuilles de thé est inférieur à 5 secondes.

4. Procédé selon l'une quelconque des revendications précédentes, dans lequel la durée de l'étape b) est d'au moins 5 secondes, de préférence 50 secondes au plus.

5. Procédé selon l'une quelconque des revendications précédentes, dans lequel au cours de l'étape b) le débit de brassage est au moins supérieur à 150 ml/min.

6. Procédé selon l'une quelconque des revendications précédentes, dans lequel au cours de l'étape c) de l'eau est introduite à un débit d'au moins 150 ml/min.

7. Procédé selon l'une quelconque des revendications précédentes, dans lequel de l'eau ayant une température comprise entre 30 et 95°C est introduite.

8. Procédé selon l'une quelconque des revendications précédentes **caractérisé en ce qu'**il est mis en oeuvre avec une capsule (2) comprenant :
   - une enceinte (20) contenant des feuilles de thé,
   - une paroi de filtrage (22) délimitant au moins un côté de filtrage de l'enceinte,
   - une paroi de trop-plein (3) qui est positionnée dans le trajet du liquide infusé après la paroi de filtrage et qui comprend au moins une ouverture de trop-plein (25).

9. Procédé selon la revendication précédente **caractérisé en ce que** la paroi de filtrage s'étend à partir du dessous d'un plan médian horizontal (P) passant à travers l'enceinte (20) lorsque la capsule est orientée de telle sorte que l'ouverture de trop-plein (25) est placée au-dessus dudit plan (P).

10. Procédé selon l'une quelconque des revendications précédentes **caractérisé en ce qu'**il est mis en oeuvre avec une capsule (2) comprenant un organe d'identification (6) configuré pour être lu par des moyens de lecture (50) de la machine à boisson (11) de manière à lire l'information de celui-ci, la machine comprenant des moyens de commande reliés aux moyens de lecture et conçus pour commander le fonctionnement de la machine à boisson en réponse à l'information lue,
    caractérisé en ce que l'organe d'identification fournit des instructions à la machine pour infuser des feuilles de thé selon les étapes a) à d).

11. Procédé selon la revendication 10, dans lequel les informations aptes à être lues par machine sont sélectionnées parmi la liste de : la température de l'eau, les valeurs des débits d'eau des étapes a), b) et/ou c), le nombre de périodes de brassage dans l'étape b), la durée des étapes a), b) et/ou c) et des combinaisons de ceux-ci.

K-FEE SYSTEM GMBH, EX2009, page 1458
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

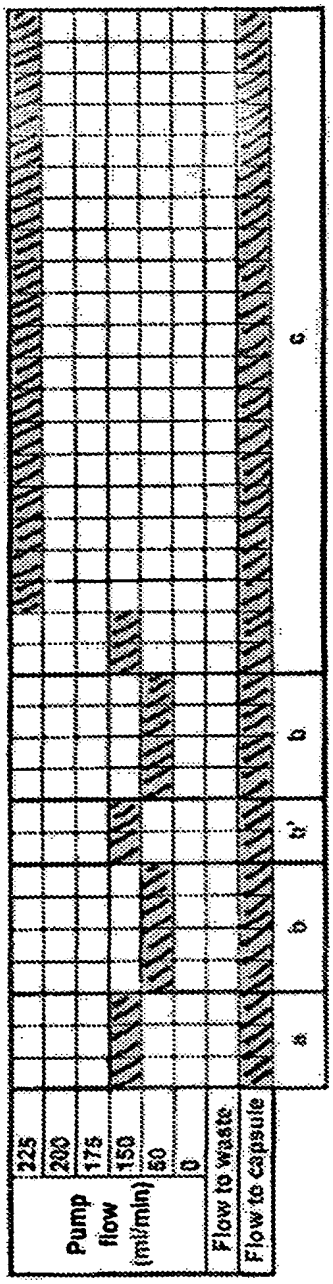


Figure 1

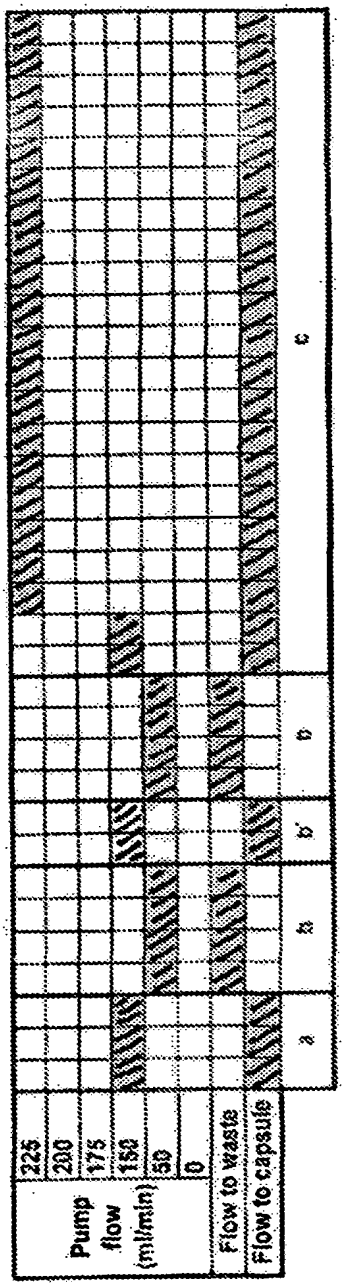


Figure 2

K-FEE SYSTEM GMBH, EX2009, page 1459
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

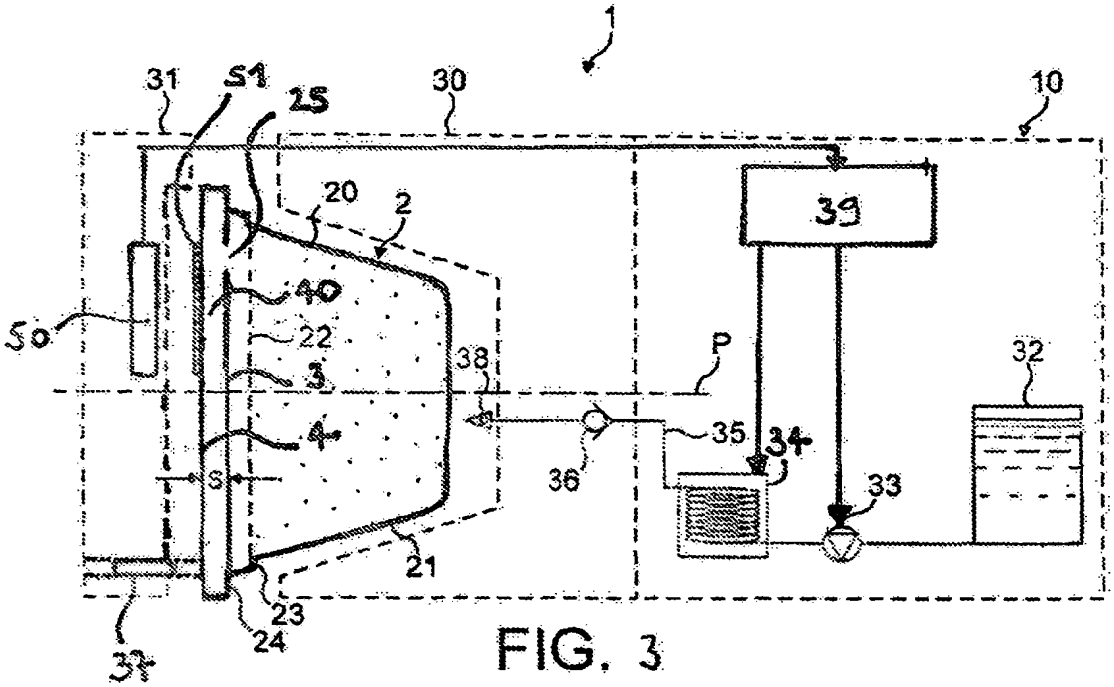


FIG. 3

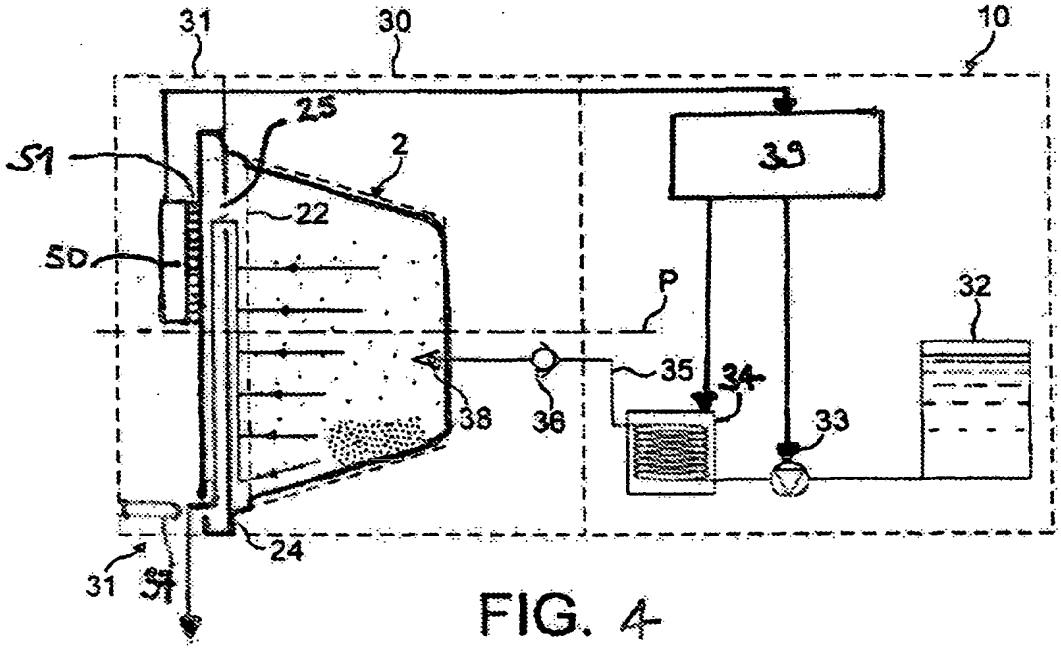


FIG. 4

K-FEE SYSTEM GMBH, EX2009, page 1460
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

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

- WO 2007042414 A **[0003] [0019]**
- EP 1440640 A **[0004]**
- EP 1950150 A **[0021]**

K-FEE SYSTEM GMBH, EX2009, page 1461
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 950 150 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
03.03.2010 Bulletin 2010/09

(51) Int Cl.:
B65D 85/804 *(2006.01)* ***A47J 31/40*** *(2006.01)*

(21) Application number: **07101087.0**

(22) Date of filing: **24.01.2007**

(54) Identification of beverage ingredient containing capsules

Identifizierung von Getränkezutaten enthaltenden Kapseln

Identification d'ingrédients de boissons contenant des capsules

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
HR

(43) Date of publication of application:
30.07.2008 Bulletin 2008/31

(73) Proprietor: **Nestec S.A.**
1800 Vevey (CH)

(72) Inventors:
- **Ozanne, Matthieu**
  1846 Chessel (CH)
- **Monceyron, Philippe**
  74970 Marignier (FR)

(74) Representative: **Rupp, Christian**
Mitscherlich & Partner
Patent- und Rechtsanwälte
Sonnenstraße 33
80331 München (DE)

(56) References cited:
WO-A-02/28241 **WO-A-2005/122851**

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 950 150 B1

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] The invention generally relates to the field of producing a liquid comestible or beverage from ingredients contained in a capsule.

[0002] In the recent past beverage ingredient containing capsules have found widespread application for producing different types of beverages, such as for example tea or coffee, and other liquid comestibles. These capsules are designed for a use in connection with a dedicated beverage production machine which is provided with means for feeding a liquid into the interior of the capsule such that the liquid interacts with the ingredients contained in the capsule, the result of the interaction being a produced beverage or other liquid comestibles.

[0003] Some of the known machines are provided with sophisticated control systems setting all kind of operation parameters for the beverage production process. These parameters can include (non-exhaustive list) e.g. the temperature and the volume of the liquid supplied to the interior of the capsule as well as the time duration of the interaction of the liquid with the ingredients contained to the capsule.

[0004] It is also known that the beverage production machine is provided with a user interface such that the user can set operational parameters according to his/her preferences. Once these parameters have been manually set, the beverage production machine will use the defined set of parameters for every following beverage production process.

[0005] In the state of the art, capsules can be found with identification elements in the form of several mechanical contacts which are selectively sensed by sensing means of the machine. Typically, the contacts are made visible and in relief at the surface of the capsule and are directly sensed by fixed sensing means of the machine. Such system has several disadvantages. External mechanical contacts are exposed and they can be damaged or altered either accidentally or on purpose. The modification of the contacts can create a severe disorder of the system and/or set incorrect beverage parameters.

[0006] For instance, EP 0 638 486 relates to a cartridge for the preparation of a beverage comprising a plurality of teeth moulded along one side edge of the cartridge. The teeth have recesses formed there between. The teeth are intended to enable the cartridge to be driven through a beverage preparation machine by the engagement of a cam. At the opposite side of the edge of the cartridge, are formed a plurality of pegs such that as the package is driven into the machine by the engagement of teeth with the cam, the presence or absence of the upstanding pegs is sensed by a sensing arm which thereby will identify a different type of cartridge. The sensing arm operates a switch which thereby transmits information concerning the presence or absence of the pegs on the package to the control mechanism for the beverage dispensing machine. The arrangement of pegs on the cartridge thus identifies the type of cartridge to a controller which then selects the appropriate beverage preparation conditions.

[0007] In the state of the art also capsules can be found which are provided at their outer face with a bar code such that the beverage production machine can read the information represented by the bar code and can thus identify the associated capsule. The provision of a bar code has several disadvantages: to start with, as the bar code has to be visible at the outer face of the capsule, this automatically has a negative impact on the aesthetic appearance of the capsule. On the other hand, there is always the risk that in the environment of the beverage production process the legibility of the bar code will be endangered e.g. by water/vapour deposited on the bar code or optical elements of the reader.

[0008] For instance, US 2002/0048621 relates to an encoded coffee packet and a beverage producing device comprising a sensor configured to detect encoded data stored on the beverage packet and a processor configured to interpret the encoded data and to direct production of a beverage according to the encoded data. The encoded data can be a visual code such as a barcode, a geometrical shape, a text string, glyph, a digital watermark, notches, grooves or holes.

[0009] EP 1 629 752 A2 discloses a beverage production system with a memory that stores information about the order of the beverage cartridges dispensed by the beverage preparation machine.

[0010] Therefore it is the object of the present invention to propose an inexpensive and reliable solution for the identification of beverage ingredient containing capsules.

[0011] In particular, one object of the invention is to reduce the risk of misuse or damages of the identification system. Another object is to provide a solution which works well in humid and hot conditions. Another object is to have a solution that can be implemented on a capsule by simple manufacturing operations.

[0012] Another object of the invention is to provide a more compact solution able to carry out detection operations in a volume limited environment of the machine.

[0013] It is an aspect of the present invention that the visible identification of the prior art is replaced by a "hidden" or less exposed identification.

[0014] It is also an aspect of the invention that the cumbersome detection of the prior art is replaced by a compact detection system on both the capsule and machine side.

[0015] According to a first aspect of the invention, a beverage ingredient capsule is proposed, the capsule being provided with an identification member designed for representing information upon mechanical contact from outside, characterized in that the capsule further comprises a deformable, displaceable, removeable and/or puncturable cover (7) covering the identification member.

[0016] The identification member of the capsule is covered in order to protect it and to reduce the risk of misuse

K-FEE SYSTEM GMBH, EX2009, page 1463
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

or deterioration of the identification system.

[0017] The capsule is provided with an identification member designed for being physically contacted from outside.

[0018] Thus the identification members code the information in a structural manner (in contrast to the visual bar code representation of the prior art). More precisely, the identification member can comprise a plurality of predetermined localized contact surface receivers, each of them constituting a choice amongst two different surface levels that correspond upon a contact being established or not, with an external probe member, a binary code state (0 or 1).

[0019] A surface level can correspond, for example, to a different in depth or height of a plurality of localized recesses/holes or protruding members.

[0020] In an embodiment, first and second contact receivers are provided. First contact receivers can be holes or recesses of a same depth whereas second contact receivers are holes or recesses of shorter depth or, alternatively, are filled or slightly in relief. In a possible variant, first contact receivers are protruding elements of same height whereas second contact receivers are protruding elements of greater height.

[0021] Preferably the identification member is not visible from outside and is not exposed to the exterior before being physically contacted by associated probe means of a beverage production machine.

[0022] To this regard the identification member can be covered to the outside by cover means, wherein the cover means and/or the identification member are designed to be transferable from a cover state to an identification reading state, e.g. by being penetrated, deformed, displaced etc. by probe means from an associated beverage production machine.

[0023] Hence, according to a further aspect of the present invention, a beverage ingredient capsule is proposed, the capsule being provided with an identification member designed for representing information upon mechanical contact from outside, characterized in that the capsule further comprises a cover, wherein the cover and/or the identification member can be transferred from a covered state to an identification information reading state.

[0024] Preferably the identification member is coded by modulating a surface structure of a face of the capsule, e.g. by providing holes or recesses in an identification face of the capsule.

[0025] The identification face of the capsule can be covered by a displaceable, deformable or puncturable membrane such as a plastic layer, an aluminium layer or a laminate of plastic-aluminium. The cover thus is designed to be selectively perforated from outside or deformed at portions overlapping the recessions or holes. On the other hand, the cover can resist at least a certain penetration or deformation by being supported at regions which are not overlapping recessions or holes.

[0026] (Alternatively also the cover member can remain unchanged, but the identification member will be manipulated (e.g. displaced) in order to transfer the capsule from the indetification-cover state to the identification-reading state.

[0027] In a preferred embodiment, the identification member can be formed in the front of a lid of the capsule which is associated to a cup-shaped body of the capsule to demarcate a cavity containing beverage forming ingredients.

[0028] The identification member can be formed as an integral part of the lid. For instance, the lid can be made of a moulded plastic onto which the identification means are moulded.

[0029] For limiting the space required for the detection system, the plurality of predetermined localized contact receivers is arranged on the front of the lid in a non-linear pattern. For instance, the receivers can be grouped in a substantially polygonal, star-shaped or curved pattern or a non-regular substantially closed pattern covering the surface of the lid.

[0030] The invention also relates to a beverage production system comprising a beverage production machine designed for producing a beverage from ingredients containing the capsule, as well as a capsule as defined above.

[0031] A further aspect of the present invention relates to a beverage production machine designed for use with a beverage ingredient containing capsule. The beverage production machine is equipped with means for physically contacting a capsule in order to read information thereof. Further on, the beverage production machine is provided with control means which are functionally connected with the means and are designed to control operation parameters of the beverage production machine in response to the read information. The contact means preferably comprise at least one displaceable probe which mechanically contacts the capsule, wherein the control means are initially arranged with the at least one probe to detect an identification information in relation to the degree of displacement of the probe in response of its contact with the capsule.

[0032] More particularly, the at least one displaceable probe is resiliably positioned at a distance of a circuitry of the control means and is selectively moved into contact with said circuitry depending on its contact with the capsule wherein the contact of the probe and circuitry constitutes a predetermined binary coded state (0 or 1) and the non-contact of the probe and circuitry constitutes the other binary coded state.

[0033] In order to significantly reduce the size of the identification system, the identification member can be associated to a printed circuitry. The printed circuitry can be of a width of a few millimeters only and inserted in a small space of the machine adjacent the housing of the capsule. For instance, thickness of the printed circuitry is of 0.5 to 3 mm.

[0034] The printed circuitry comprises for instance, a plurality of printed circuits which are selectively closed

K-FEE SYSTEM GMBH, EX2009, page 1464
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

or opened by a plurality of the probes to provide the coded state.

[0035] The at least one probe is preferably coupled or is at least part of a resilient support member and is associated to the circuitry for both providing the elasticity to the probe to enable its return into a non-contact position and the insulation of the circuitry from the humidity coming from the capsule.

[0036] The resilient support member can be, for instance, an elastomeric, preferably silicone member.

[0037] The probes can further be formed of pins which have a base embedded or inserted in a seat of the support member.

[0038] The control means can be designed to control, in response to the read information, a beverage production temperature such as for example the temperature of a liquid supplied to the interior of the capsule.

[0039] The beverage production machine can be designed to produce tea, coffee and/or other beverages.

[0040] The contacting means can comprise a plurality of movable pins forming a predetermined pattern which mechanically selectively contact the predetermined localized surface receivers of the capsule.

[0041] The control means can be designed to detect the identification information via the degree of displacement of the pin against the capsule.

[0042] The displacement of the pin can be made such that it selectively opens an associated contact of a circuitry of the control means.

[0043] The at least one pin is preferably electrically isolated from control means circuitry.

[0044] A further aspect of the present invention relates to a method for controlling the operation of a beverage production machine designed for producing a beverage from a beverage-ingredient containing capsule.

[0045] The method comprises the step of physically contacting the capsule by probe means of a beverage production machine in order to read identification information from a dedicated identification member of the capsule. In a further step, operation parameters of the beverage production machine are set in response to the read identification information.

[0046] Further advantages, features and objects of the present invention shall now be explained with reference to the figures of the enclosed drawing.

Figure 1 shows a schematic overview of a system according to the present invention designed for reading identification information from a beverage ingredient containing capsule.

Figure 2 shows a front view of a capsule according to the present invention.

Figure 3 shows a detailed view of the interaction part between probe means of the beverage production machine and identification member of the capsule.

Figure 4 shows elements of the interaction between the probe means and the capsule, i.e. the view of figure 3.

Figure 5 shows a printed circuit board which can associated with the probe means.

Generally it is an aspect of the present invention that a beverage production machine 11 is designed to produce a beverage from a capsule 1 positioned at a dedicated beverage production position of the beverage production machine 11. As shown in figure 1 the capsule has a dedicated compartment for containing beverage ingredients 5.

[0047] A liquid 3, controlled by a control unit 10 of the beverage production machine 11, is made to enter the capsule 1 in order to interact with the ingredients 5 contained therein. The result of the interaction, i.e. a produced beverage or liquid comestible, can then be obtained (reference 4) from the beverage production machine 11.

[0048] Typical examples for the nature of the interaction between the liquid 3 and the ingredients 5 is brewing, mixing, extracting, dissolving etc. Different types of ingredients can be present in the beverage compartment and different types of interactions can take place in the capsule.

[0049] The system as shown in figure 1 is provided with means for retrieving ("reading") identification data from the capsule 1 in order to transfer the read identification data to the control unit 10, such that the control unit 10 can control the operation of a following production cycle of the beverage production machine 11 depending on the content of the read identification data.

[0050] The identification data can refer to parameters of the capsule and/or the ingredients.

[0051] According to one aspect of the invention the identification information can be read from the capsule 1 in a non-optical manner, as the optical reading e.g. using a bar code has the disadvantages of having a negative impact on the aesthetic impression of the outer appearance of the capsule and of being prone to failure due to the legibility of the bar code in the environment of the beverage production process.

[0052] The capsule 1 according to the present invention is provided with an identification member 6 which carries, in a coded manner, identification information. Preferably the information is coded in a digital manner.

[0053] Preferably the information is coded by a modulation of the surface structure of a face of the capsule 1. E.g. a hole or a recession can represent one logical sate (e.g. "0"), while another surface state ("no recession" or "no hole") can represent the other logical state (e.g. "1").

[0054] Replacing the bar code by a surface modulation which can then be detected in a non-optical manner (or even in an optical manner) enhances the reliability of the information reading from the capsule.

K-FEE SYSTEM GMBH, EX2009, page 1465
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

[0055] Preferably the identification member 6 is arranged at the capsule 1 such that it is not exposed to and usually not visible from outside. To this regard a cover 7 can be provided for the identification member 6. The cover 7 serves for aesthetic and/or protective purposes with regard to the identification member 6.

[0056] (As a side remark, such cover 7 is also useful in combination with a bar code and a visual reading of information.)

[0057] The cover 7 and the identification member 6 are part of the capsule and arranged such that at the beginning the identification member is in a protected state. Probe means of the beverage production machine can then manipulate the system cover means/identification member such that the system cover means/identification member is transferred from a covered state to an identification reading state in which the probe means can read visually or through mechanical contact the information encoded in the identification member. The manipulation can take place with regard to the identification member and/or the cover means.

[0058] Preferably the cover 7 is only carrying out the complete covering function as long as no detection process has been carried out. Along with the detection process, as will be explained later on, the cover 7 can be e.g. at least partially removed, displaced, deformed or perforated.

[0059] Alternatively the cover 7, during the information reading process, is deflected in order to follow the surface contours of the identification member arranged below the cover. To this regard an flexible cover 7 can be foreseen which can be deflected from outside in order to read the surface structure of the identification member 6 arranged below the cover 7.

[0060] The beverage production machine 11 is provided with probe means 8 which are designed to read the information coded by modulating the surface structure of the identification member 6.

[0061] Preferably such detection is carried out by means of a physical mechanical contact or an electric contact, although as surface modulation can also be read optically.

[0062] To this regard the probe means 8 can preferably present a plurality of displaceable pins 17, which during the information reading process are biased against the identification member 6 of the capsule 1.

[0063] Depending on the specific shape of the surface structure of the identification member 6 at the contact area between a pin 17 in the identification member 6, a pin 17 will thus be allowed to protrude more or less towards the capsule 1.

In case the information is coded in digital manner by the surface structure of the identification member 6, correspondingly also there will be a digital encoding of the displacement positions of the pins 17, i.e. there will only be a more protruding and a less protruding position for the pins 17.

[0064] This relative displacement of the pins 17 is converted into electrical signals by a detection unit 9. The thus generated electrical detection signals can then be processed by the control unit 10.

[0065] The detection unit 9 thus is designed to convert a mechanically read information into electronic signals.

[0066] The control unit 10 will then set, as a function of the read identification data from the capsule, parameters of the beverage production process, such as for example (non-exhaustive list) the flow rate and temperature of the supplied liquid 3 as well as the interaction time etc..

[0067] Figure 2 shows a top view of the capsule 1. According to the embodiment shown in figure 2 the surface structure of the identification member is modulated by providing selectively a plurality of holes 12. Having a hole 12 at a predefined position represents one logical state, while not having the hole at the same position would represent respectively another digitally coded state.

[0068] Figure 3 illustrates the conversion of the mechanical reading of the digitally coded information of the identification member of the capsule 1 into electric signals.

[0069] As can be seen in figure 3, a pin 17 is isolated from an electronic circuitry board 15 by means of a resilient and electrically isolating material layer 14, such as e.g. silicone. The layer 14 will thus provide the necessary biasing force in order to slightly press the pin 17 towards the capsule and eventually perforate or deform any cover provided on top of the identification member of the capsule.

[0070] The rear end of each pin 17 has an enlarged section 21 which is embedded in a protruding section 21 of the layer 14. Each pin 17 can be provided with a flange 23 which flushed with the top surface 24 of the protruding section 21 of the layer 14.

[0071] In the state shown in figure 3 the two depicted pins 17 are respectively protruding into holes 12 of the identification member and have perforated the cover 7. Thus these two pins 17 are not pushed rearwards are thus not activating electrical micro-switches 25 designed to selectively produce electrical short circuits of dedicated portions of a printed circuit board 15. Further details of the PCB 15 will be explained with reference to figure 5.

[0072] Each pin 17 can be inserted in a recess of the elastic layer 14 such as by press-fitting or overmoulding. The pins are preferably more rigid than the support layer 14. The pins can be made of metal or hard plastic. The pins and layer 14 can also be made by co-injection of a rubber elastic material of different hardness.

[0073] In case due to the surface structure of the identification member the pin 17 is not allowed to further protrude into the surface structure of the identification member 3, it will thus be slightly pushed rewards (to the left inside figure 3) thus pushing silicone material to activate (i.e. transfer in the conducting state) a electrically conducting micro switch 25 towards the printed circuit board 15. To this regard the face of the silicone material facing

K-FEE SYSTEM GMBH, EX2009, page 1466
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

the printed circuit board 15 can be coated with an electrically conducting layer which can selectively produce a defined short circuit on the printed circuit board 15, the defined short circuit corresponding to closing a switch.

[0074] Figure 5 shows more details of the printed circuit board 15. The reference numeral 20 designates those areas which can be selectively short-circuited.

[0075] Thus the displacement of the pin 17 can selectively activate (close or open) a switch on the electronic circuitry 15.

[0076] In figure 4 the isolation and biasing member 14 preferably made from a resilient material such as for example silicone is further illustrated.

[0077] The invention thus allows setting operation parameters individually for each beverage production cycle upon reading of information from the capsule from which the beverage or liquid comestible shall be produced.

[0078] The beverage production system of the invention, in particular, the displaceable probe can utilize also capsules having a visible identification member (i.e., without a protective membrane).

Claims

1. A beverage ingredient capsule,
the capsule (1) being provided with an identification member (6) designed for representing information upon mechanical contact from outside, **characterized in that**
the capsule further comprises a deformable, displaceable, removeable and/or puncturable cover (7) covering the identification member (6).

2. A beverage ingredient capsule,
the capsule (1) being provided with an identification member (6) designed for representing information upon mechanical contact from outside, **characterized in that**
the capsule further comprises a cover (7), wherein the cover and/or the identification member can be transferred from a covered state to an identification information reading state.

3. The capsule (1) according to any of the preceding claims,
wherein the identification member (6) is not exposed to the exterior before being physically contacted.

4. The capsule (1) according to claim 3,
wherein the cover (7) is designed to be penetrated or deformed by probe means (8) from an associated beverage production machine (11).

5. The capsule according to claim 4,
wherein the cover is made of an aluminium and/or plastic membrane or foil to be perforated or deformed to match the surface structure of the identification member.

6. The capsule (1) according to any of the preceding claims,
wherein the identification member (6) comprises a plurality of predetermined localized contact receivers (12), each of them constituting a choice amongst two different surface levels that correspond upon a contact being established or not with an external probe member, to a predetermined binary coded state (0 or 1).

7. The capsule (1) according to claim 6,
wherein first contact receivers are holes or recesses of a same depth whereas second contact receivers are holes or recesses of shorter depth or, alternatively, are filled or slightly in relief.

8. The capsule (1) according to claim 6,
wherein first contact receivers are protruding elements of same height whereas second contact receivers are protruding elements of greater height.

9. The capsule according to any of claims 6 to 8,
wherein the identification member (6) is formed in the front of a lid of the capsule which is associated to a cup-shaped body of the capsule to demarcate a cavity containing beverage forming ingredients.

10. The capsule according to claim 9,
wherein the identification member (6) is formed as an integral part of the lid.

11. The capsule according to claim 10,
wherein the lid is integrally made of moulded plastic.

12. The capsule according to any one of claims 6 to 11,
wherein the plurality of predetermined localized contact receivers is arranged on the front of the lid in a non-linear pattern.

13. A beverage production system comprising beverage ingredient containing capsules (1) comprising an identification member (6) and a beverage production machine for receiving said capsules; said machine comprising

- means (8) for physically contacting a capsule (1) in order to read information thereof, and
- control means (10), functionally connected to the contacting means (8) and designed to control the operation of the beverage production machine (11) in response to the read information

characterized in that the contact means (8) comprise at least one displaceable probe which mechanically contacts the capsule (1), wherein the control means (10) are initially arranged with the at least one

K-FEE SYSTEM GMBH, EX2009, page 1467
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

probe to detect an identification information in relation to the degree of displacement of the probe in response of its contact with the capsule (1).

14. The system according to claim 13, wherein the at least one displaceable probe is resiliably positioned at a distance of a circuitry of the control means and is selectively moved into contact with said circuitry depending on its contact with the capsule
wherein the contact of the probe and circuitry constitutes a predetermined binary coded state (0 or 1) and the non-contact of the probe and circuitry constitutes the other binary coded state.

15. The system according to claim 13 or 14, wherein the identification member is associated to a printed circuitry.

16. The system according to claims 13 to 15, wherein the at least one probe is coupled or part of a resilient support member (14) and is associated to a circuitry.

17. The system of claim 16, wherein the resilient support member is an elastomeric, preferably silicone member.

18. The system of claim 17, wherein the probes are formed of pins which have a base embedded or inserted in a seat of the support member.

19. The system of any one of claims 13 to 18, wherein the contacting means comprise a plurality of identical displaceable pins for contacting a plurality of predetermined localized contact receivers (12) of the capsule.

20. The system of any one of claims 14 to 19, wherein the identification member (6) of the capsule is covered by a deformable and/or puncturable cover (7).

21. The system of any one of claims 14 to 20, wherein the identification member (16) comprises a plurality of predetermined localized contact receivers (12), each of them constituting a choice amongst two different surface levels that correspond upon a sufficient contact being established or not with the probes of the machine, to a predetermined binary coded state (0 or 1).

22. The system of claim 21, wherein the plurality of predetermined localized contact receivers are placed along a non-linear pattern of a wall of the capsule.

23. The system according to any one of claims 13 to 22, wherein the control means (10) are designed to control a beverage production temperature and/ or a brewing pause time in response to the read information.

24. The system according to any one of claims 13 or 23, which the control means are designed to vary water temperature parameters, flow rate and/or brewing pause time in the brewing of different brewed tea beverages according to capsules containing leaf tea ingredients having different characteristics and/or origins.

Patentansprüche

1. Getränkezutat-Kapsel,
wobei die Kapsel (1) mit einem Identifizierungselement (6) ausgestattet ist, das zur Wiedergabe von Information bei mechanischem Kontakt von außen ausgeführt ist, **dadurch gekennzeichnet, dass** die Kapsel ferner eine verformbare, umpositionierbare, ablösbare und/oder durchstechbare Abdeckung (7) aufweist, die das Identifizierungselement (6) bedeckt.

2. Getränkezutat-Kapsel,
wobei die Kapsel (1) mit einem Identifizierungselement (6) ausgestattet ist, das zur Wiedergabe von Information bei mechanischem Kontakt von außen ausgeführt ist, **dadurch gekennzeichnet, dass** die Kapsel ferner eine Abdeckung (7) aufweist, wobei die Abdeckung und/oder das Identifizierungselement von einem bedeckten Zustand in einen Zustand überführt werden können/kann, in dem die Identifizierungsinformation lesbar ist.

3. Kapsel (1) nach irgendeinem der vorstehenden Ansprüche,
wobei das Identifizierungselement (6) nicht nach außen exponiert ist, bevor es physisch kontaktiert wird.

4. Kapsel (1) nach Anspruch 3,
wobei die Abdeckung (7) ausgeführt ist, um von Tastmitteln (8) einer dazugehörigen Getränkeherstellungsvorrichtung (11) durchdrungen oder verformt zu werden.

5. Kapsel (1) nach Anspruch 4,
wobei die Abdeckung aus einer Aluminium- und/ oder Kunststoffmembran oder -folie hergestellt ist, die zu perforieren oder zu deformieren ist, um sich der Oberflächenstruktur des Identifizierungselements anzupassen.

6. Kapsel (1) nach einem der vorstehenden Ansprüche,

K-FEE SYSTEM GMBH, EX2009, page 1468
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

wobei das Identifizierungselement (6) eine Vielzahl von vorbestimmt lokalisierten Kontaktaufnehmern (12) aufweist, von denen jeder eine Auswahl zwischen zwei verschiedenen Oberflächenniveaus bildet, die bei einem Kontakt, der mit einem äußeren Tastelement aufgebaut oder nicht aufgebaut wird, einem vorbestimmten binär kodierten Zustand (0 oder 1) entsprechen.

7. Kapsel (1) nach Anspruch 6,
wobei erste Kontaktaufnehmer Löcher oder Ausnehmungen einer gleichen Tiefe sind, wohingegen zweite Kontaktaufnehmer Löcher oder Ausnehmungen einer geringeren Tiefe oder, alternativ, gefüllt sind oder ein flaches Relief aufweisen.

8. Kapsel (1) nach Anspruch 6,
wobei erste Kontaktaufnehmer vorstehende Elemente einer gleichen Höhe sind, wohingegen zweite Kontaktaufnehmer vorstehende Elemente von größerer Höhe sind.

9. Kapsel nach irgendeinem der Ansprüche 6 bis 8,
wobei das Identifizierungselement (6) in der Stirnseite eines Deckels der Kapsel gebildet ist, der mit einem becherförmigen Körper der Kapsel verbunden ist, um einen Hohlraum abzugrenzen, der Getränke bildende Zutaten enthält.

10. Kapsel nach Anspruch 9,
wobei das Identifizierungselement (6) als ein integraler Abschnitt des Deckels gebildet ist.

11. Kapsel nach Anspruch 10,
wobei der Deckel einstückig aus gegossenem Kunststoff hergestellt ist.

12. Kapsel nach einem der Ansprüche 6 bis 11, wobei die Vielzahl von vorbestimmten lokalisierten Kontaktaufnehmern auf der Stirnseite des Deckels in einem nichtlinearen Muster angeordnet ist.

13. Getränkeherstellungssystem, das Getränkezutat enthaltende Kapseln (1), die ein Identifizierungselement (6) aufweisen, und eine Getränkeherstellungsmaschine zum Aufnehmen der Kapseln aufweist; wobei die Maschine aufweist

- Mittel (8), um eine Kapsel (1) physisch zu kontaktieren, um Informationen davon abzulesen, und
- Steuerungsmittel (10), die operativ mit den Kontaktierungsmitteln (8) verbunden sind und die ausgeführt sind, den Betrieb der Getränkeherstellungsmaschine (11) als Reaktion auf die gelesene Information zu steuern,

dadurch gekennzeichnet, dass die Kontaktierungsmittel (8) zumindest ein umpositionierbares Tastelement aufweisen, das mechanisch die Kapsel (1) kontaktiert, wobei die Steuerungsmittel (10) anfänglich an dem zumindest einen Tastelement angeordnet sind, um eine Identifizierungsinformation in Bezug auf den Grad der Umpositionierung des Tastelements als Reaktion auf seinen Kontakt mit der Kapsel (1) zu erfassen.

14. System nach Anspruch 13,
wobei das zumindest eine umpositionierbare Tastelement elastisch in einem Abstand zu einem Schalter der Steuerungsmittel positioniert ist und wahlweise bewegt wird, um in Kontakt mit dem Schalter zu treten, abhängig von seinem Kontakt mit der Kapsel, wobei der Kontakt zwischen Tastelement und Schalter einen vorbestimmten binär kodierten Zustand (0 oder 1) bildet und der Nicht-Kontakt zwischen dem Tastelement und dem Schalter den anderen binär kodierten Zustand bildet.

15. System nach Anspruch 13 oder 14,
wobei das Identifizierungselement mit einer gedruckten Schaltung verbunden ist.

16. System nach Anspruch 13 bis 15,
wobei das zumindest eine Tastelement mit einem elastischen Stützglied (14) verbunden ist oder ein Teil davon ist und mit einer Schaltung verbunden ist.

17. System nach Anspruch 16,
wobei das elastische Stützglied ein elastomeres, vorzugsweise ein Silikonglied ist.

18. System nach Anspruch 17,
wobei die Tastelemente aus Stiften gebildet sind, die eine Basis haben, die in einen Sitz des Stützglieds eingebettet oder eingefügt ist.

19. System nach einem der Ansprüche 13 bis 18,
wobei die Kontaktierungsmittel eine Vielzahl von identischen umpositionierbaren Stiften aufweisen, um mit einer Vielzahl von vorbestimmt lokalisierten Kontaktaufnehmern (12) der Kapsel in Kontakt zu treten.

20. System nach einem der Ansprüche 14 bis 19,
wobei das Identifizierungselement (6) der Kapsel mit einer verformbaren und/oder durchstechbaren Abdeckung (7) bedeckt ist.

21. System nach einem der Ansprüche 14 bis 20,
wobei das Identifizierungselement (6) eine Vielzahl von vorbestimmt lokalisierten Kontaktaufnehmern (12) aufweist, von denen jeder eine Auswahl zwischen zwei verschiedenen Oberflächenniveaus bildet, die bei einem ausreichenden Kontakt, der mit den Tastelementen der Maschine aufgebaut oder

K-FEE SYSTEM GMBH, EX2009, page 1469
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

nicht aufgebaut wird, einem vorbestimmten binär kodierten Zustand (0 oder 1) entsprechen.

22. System nach Anspruch 21, wobei die Vielzahl von vorbestimmt lokalisierten Kontaktaufnehmern entlang einem nichtlinearen Muster an einer Wand der Kapsel angeordnet ist.

23. System nach einem der Ansprüche 13 bis 22, wobei die Steuerungsmittel (10) ausgelegt sind, um eine Getränkeherstellungstemperatur und/oder eine Wartezeit zum ziehen Lassen als Reaktion auf die abgelesene Information zu steuern.

24. System nach einem der Ansprüche 13 oder 23, wobei die Steuerungsmittel ausgelegt sind, um Wassertemperaturparameter, Durchflussgeschwindigkeit und/oder Wartezeit zum ziehen Lassen beim Kochen von verschiedenen aufgegossenen Teegetränken entsprechend der Kapseln, die Teeblätterzutaten mit verschiedenen Eigenschaften und/oder verschiedener Herkunft enthalten, zu variieren.

Revendications

1. Capsule d'ingrédient pour boisson, la capsule (1) étant pourvue d'un élément d'identification (6) conçu pour constituer une information lors d'un contact mécanique depuis l'extérieur, **caractérisée en ce que** la capsule comprend, en outre, un couvercle (7) déformable, déplaçable, amovible et/ou perforable, recouvrant l'élément d'identification (6).

2. Capsule d'ingrédient pour boisson, la capsule (1) étant pourvue d'un élément d'identification (6) conçu pour constituer une information lors d'un contact mécanique depuis l'extérieur, **caractérisée en ce que** la capsule comprend, en outre, un couvercle (7), le couvercle et/ou l'élément d'identification (6) pouvant être transféré(s) d'un état de couverture à un état de lecture d'information d'identification.

3. Capsule (1) selon l'une quelconque des revendications précédentes, dans laquelle l'élément d'identification (6) n'est pas exposé à l'extérieur avant d'être contacté physiquement.

4. Capsule (1) selon la revendication 3, dans laquelle le couvercle (7) est conçu pour être traversé ou déformé par un moyen formant sonde (8) depuis une machine (11) de production de boisson associée.

5. Capsule selon la revendication 4, dans laquelle le couvercle est fait d'une membrane ou pellicule en aluminium et/ou plastique destinée à être perforée ou déformée pour coïncider avec la structure de surface de l'élément d'identification.

6. Capsule (1) selon l'une quelconque des revendications précédentes, dans laquelle l'élément d'identification (6) comprend une pluralité de récepteurs de contact (12) localisés, prédéterminés, chacun constituant un choix parmi deux niveaux de surface différents qui correspondent, lorsqu'un contact est établi ou non, avec un élément formant sonde externe, à un état codé binaire (0 ou 1) prédéterminé.

7. Capsule (1) selon la revendication 6, dans laquelle des premiers récepteurs de contact sont des trous ou évidements d'une même profondeur tandis que des deuxièmes récepteurs de contact sont des trous ou évidements d'une plus petite profondeur ou, dans une variante, sont remplis ou légèrement en relief.

8. Capsule (1) selon la revendication 6, dans laquelle des premiers récepteurs de contact sont des éléments en saillie d'une même hauteur tandis que des deuxièmes récepteurs de contact sont des éléments en saillie d'une plus grande hauteur.

9. Capsule selon l'une quelconque des revendications 6 à 8, dans laquelle l'élément d'identification (6) est formé dans l'avant d'un couvercle de la capsule qui est associé à un corps en forme de coupelle de la capsule pour délimiter une cavité contenant des ingrédients de formation de boisson.

10. Capsule selon la revendication 9, dans laquelle l'élément d'identification (6) est formé en tant que partie d'un seul tenant du couvercle.

11. Capsule selon la revendication 10, dans laquelle le couvercle est fait, d'un seul tenant, de plastique moulé.

12. Capsule selon l'une quelconque des revendications 6 à 11, dans laquelle la pluralité de récepteurs de contact localisés, prédéterminés, est agencée sur l'avant du couvercle selon une configuration non-linéaire.

13. Système de production de boisson comprenant des capsules (1) contenant des ingrédients de boisson comprenant un élément d'identification (6) et une machine de production de boisson destinée à recevoir lesdites capsules ; ladite machine comprenant

- un moyen (8) pour venir physiquement au contact d'une capsule (1) afin de lire son information, et
- un moyen de commande (10), relié fonctionnellement au moyen de mise en contact (8) et conçu pour commander le fonctionnement de la machine de production de boisson (11) en réponse à l'information lue

K-FEE SYSTEM GMBH, EX2009, page 1470
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

caractérisé en ce que le moyen de mise en contact (8) comprend au moins une sonde déplaçable qui vient mécaniquement au contact de la capsule (1), le moyen de commande (10) étant agencé initialement avec l'au moins une sonde pour détecter une information d'identification relativement au degré de déplacement de la sonde en réponse à son contact avec la capsule (1).

14. Système selon la revendication 13, dans lequel l'au moins une sonde déplaçable est positionnée élastiquement à distance d'un ensemble de circuits du moyen de commande et est déplacée sélectivement en contact avec ledit ensemble de circuits en fonction de son contact avec la capsule, le contact de la sonde et de l'ensemble de circuits constitue un état codé binaire (0 ou 1) prédéterminé et l'absence de contact de la sonde et de l'ensemble de circuits constitue l'autre état codé binaire.

15. Système selon la revendication 13 ou 14, dans lequel l'élément d'identification est associé à un ensemble de circuits imprimés.

16. Système selon les revendications 13 à 15, dans lequel l'au moins une sonde est couplée à, ou fait partie de, un élément de support élastique (14) et est associée à un ensemble de circuits.

17. Système selon la revendication 16, dans lequel l'élément de support élastique est un élément élastomère, de préférence de silicone.

18. Système selon la revendication 17, dans lequel les sondes sont faites de tiges qui ont une base encastrée ou insérée dans un siège de l'élément de support.

19. Système selon l'une quelconque des revendications 13 à 18, dans lequel le moyen de contact comprend une pluralité de tiges déplaçables, identiques, pour venir au contact d'une pluralité de récepteurs de contact (12) localisés, prédéterminés, de la capsule.

20. Système selon l'une quelconque des revendications 14 à 19, dans lequel l'élément d'identification (6) de la capsule est recouvert par un couvercle (7) déformable et/ou perforable.

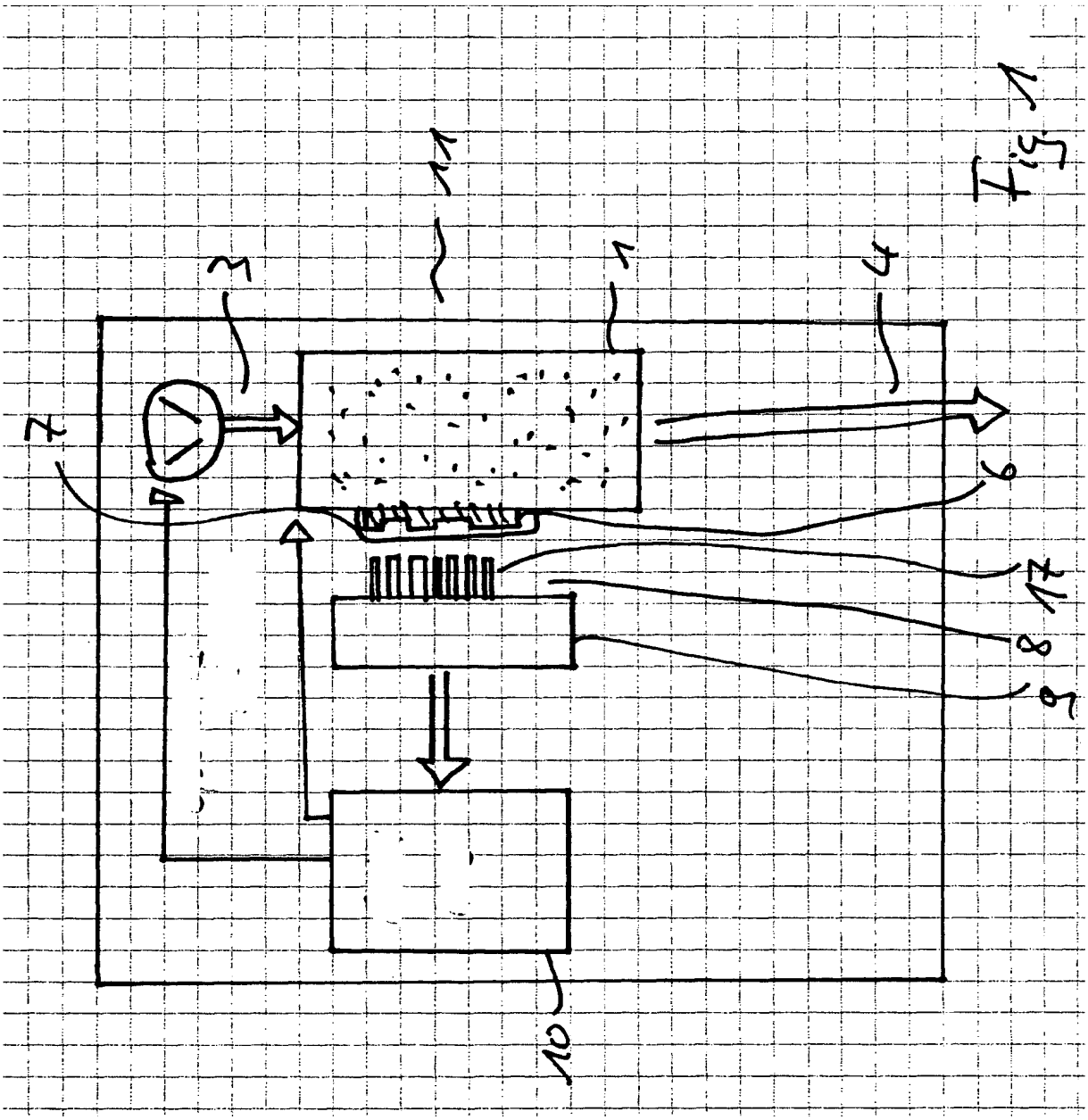
21. Système selon l'une quelconque des revendications 14 à 20, dans lequel l'élément d'identification (16) comprend une pluralité de récepteurs de contact (12) localisés, prédéterminés, chacun d'eux constituant un choix parmi deux niveaux de surface différents qui correspondent, lorsqu'un contact suffisant est établi ou non avec les sondes de la machine, à un état codé binaire (0 ou 1) prédéterminé.

22. Système selon la revendication 21, dans lequel la pluralité de récepteurs de contact localisés, prédéterminés, est placée le long d'une configuration non-linéaire d'une paroi de la capsule.

23. Système selon l'une quelconque des revendications 13 à 22, dans lequel le moyen de commande (10) est conçu pour commander une température de production de boisson et/ou un temps de pause d'infusion en réponse à l'information lue.

24. Système selon l'une quelconque des revendications 13 ou 23, dans lequel le moyen de commande est conçu pour faire varier des paramètres de température d'eau, débit et/ou temps de pause d'infusion au cours de l'infusion de différentes boissons de thé infusées suivant des capsules contenant des ingrédients de thé en feuilles ayant différentes caractéristiques et/ou origines.

K-FEE SYSTEM GMBH, EX2009, page 1471
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923



K-FEE SYSTEM GMBH, EX2009, page 1472
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

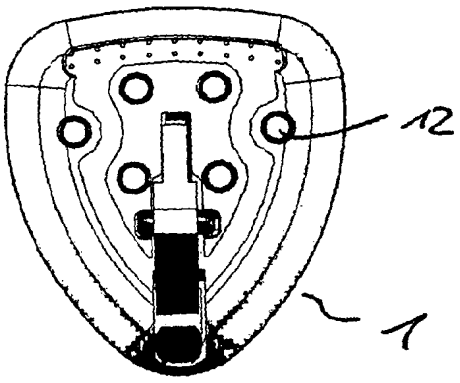


Figure 2

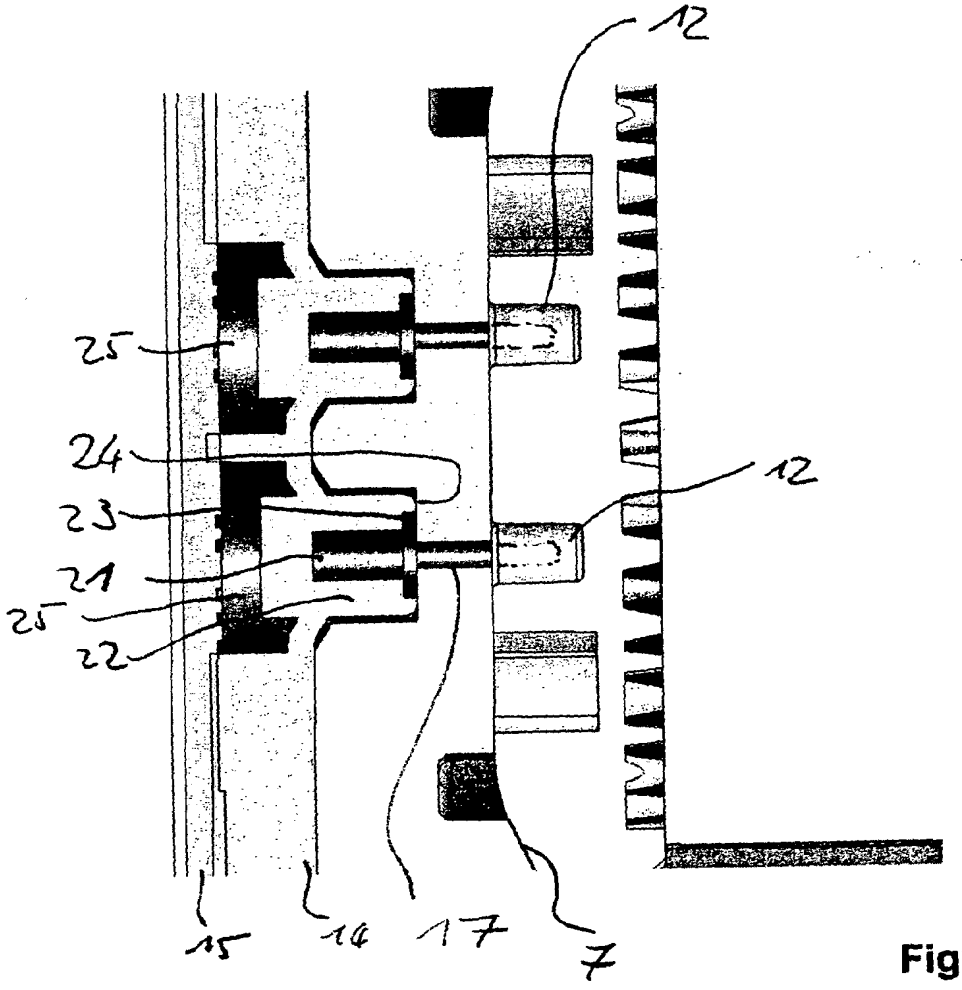


Figure 3

K-FEE SYSTEM GMBH, EX2009, page 1473
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

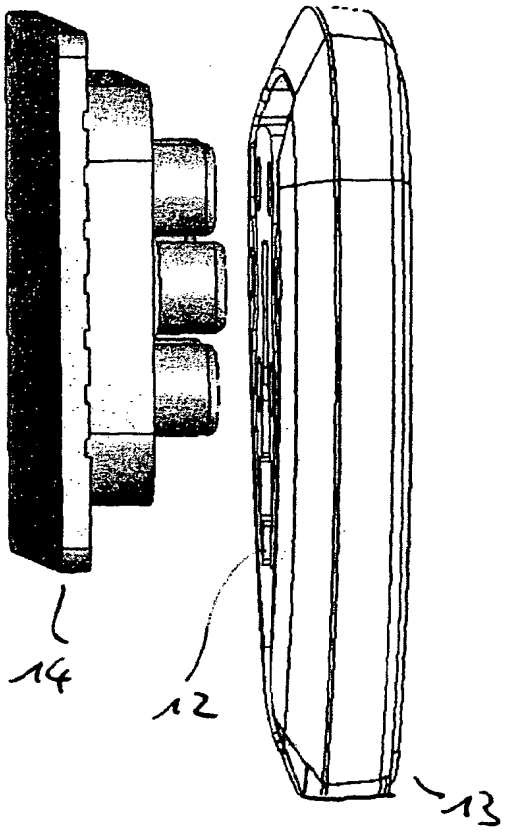


Figure 4

K-FEE SYSTEM GMBH, EX2009, page 1474
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

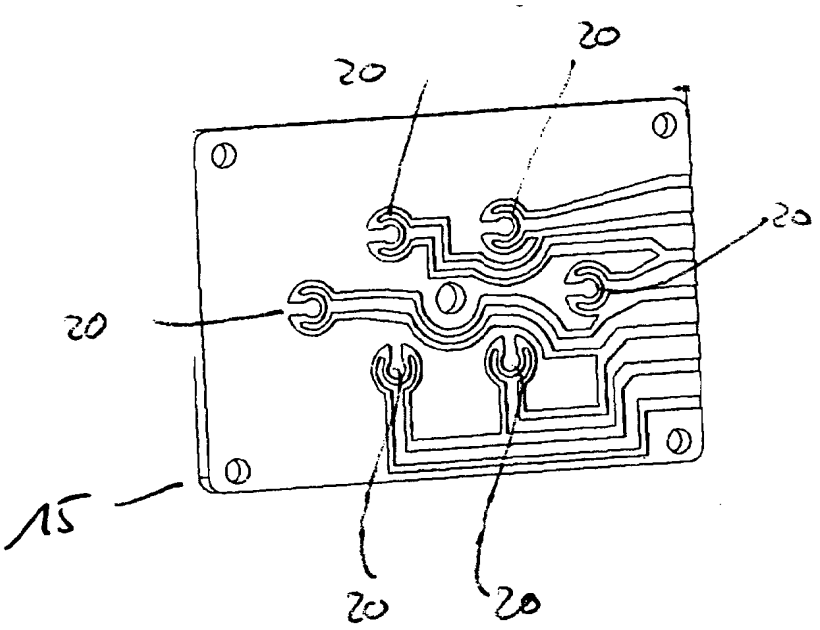


Figure 5

K-FEE SYSTEM GMBH, EX2009, page 1475
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

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

- EP 0638486 A **[0006]**
- US 20020048621 A **[0008]**
- EP 1629752 A2 **[0009]**

K-FEE SYSTEM GMBH, EX2009, page 1476
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 470 430 B1

(12) **EUROPÄISCHE PATENTSCHRIFT**

(45) Veröffentlichungstag und Bekanntmachung des Hinweises auf die Patenterteilung:
30.07.2014 Patentblatt 2014/31

(21) Anmeldenummer: **10741960.8**

(22) Anmeldetag: **11.08.2010**

(51) Int Cl.:
B65C 1/04 *(2006.01)* ***B65C 9/28*** *(2006.01)*
B65C 9/36 *(2006.01)*

(86) Internationale Anmeldenummer:
PCT/EP2010/061660

(87) Internationale Veröffentlichungsnummer:
WO 2011/023538 (03.03.2011 Gazette 2011/09)

(54) **VORRICHTUNG ZUM ZWEI- ODER MEHRSEITIGEN ETIKETTIEREN**

DEVICE FOR TWO-SIDED OR MULTI-SIDED LABELING

DISPOSITIF PERMETTANT UN ÉTIQUETAGE SUR DEUX CÔTÉS OU PLUS

(84) Benannte Vertragsstaaten:
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 SE SI SK SM TR

(30) Priorität: **28.08.2009 DE 102009039000**

(43) Veröffentlichungstag der Anmeldung:
04.07.2012 Patentblatt 2012/27

(73) Patentinhaber: **Espera-Werke GmbH**
47058 Duisburg (DE)

(72) Erfinder: **KORTHÄUER, Manfred**
45479 Mühlheim/Ruhr (DE)

(74) Vertreter: **Cohausz & Florack**
Patent- und Rechtsanwälte
Partnerschaftsgesellschaft
Bleichstraße 14
40211 Düsseldorf (DE)

(56) Entgegenhaltungen:
CA-A1- 1 007 604
DE-A1- 2 901 702
GB-A- 2 288 588
JP-A- 52 006 500
JP-A- 2002 154 509
US-A- 5 684 275
US-A- 6 155 322

Anmerkung: Innerhalb von neun Monaten nach Bekanntmachung des Hinweises auf die Erteilung des europäischen Patents im Europäischen Patentblatt kann jedermann nach Maßgabe der Ausführungsordnung beim Europäischen Patentamt gegen dieses Patent Einspruch einlegen. Der Einspruch gilt erst als eingelegt, wenn die Einspruchsgebühr entrichtet worden ist. (Art. 99(1) Europäisches Patentübereinkommen).

EP 2 470 430 B1

Printed by Jouve, 75001 PARIS (FR)

K-FEE SYSTEM GMBH, EX2009, page 1477
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Beschreibung

[0001] Die Erfindung betrifft eine Vorrichtung gemäß dem Oberbegriff des Anspruchs 1 zum zwei- oder mehrseitigen Anbringen mindestens eines selbsthaftenden Etiketts auf einen dreidimensionalen Gegenstand, der einen eine untere Kehle definierenden Vorsprung, insbesondere in Form eines stegförmigen Randes aufweist, mit einer den zu etikettierenden Gegenstand tragenden Transport- oder Auflagefläche, mindestens einer Appliziereinrichtung, mittels der das Etikett auf den Vorsprung des Gegenstandes applizierbar ist, und mit mindestens einer einen Andruckkörper oder eine Druckluftdüse aufweisenden Andruckeinrichtung zum Anschmiegen des Etiketts an die Kehle des Gegenstandes.

[0002] Eine gattungsgemäße Vorrichtung ist aus der JP 2002-154509 bekannt.

[0003] Insbesondere Lebensmittel werden heutzutage vielfach in Kunststoff- oder Aluminiumschalen verpackt, die einen umlaufenden, stegförmigen Rand oder Flansch aufweisen, welcher als Klebe- oder Fügefläche für eine daran anzuklebende bzw. anzuschweißende Verschlussfolie oder der formschlüssigen Befestigung eines Deckels dient. Die dabei verwendeten Kunststoff- bzw. Aluminiumschalen weisen häufig eine im Wesentlichen rechteckige Form mit Längsseiten und kürzeren Querseiten auf. Solche im Wesentlichen rechteckigen Verpackungsschalen ermöglichen eine hohe Raumausnutzung bei Anordnung mit gleichartigen Schalen in Behältnissen wie etwa einem Kühlfach. Es sind aber auch anders geformte Verpackungsschalen üblich, beispielsweise kreisrunde, ovale oder dreieckige Schalen, die ebenfalls einen umlaufenden, stegförmigen Rand oder Flansch zur Anbringung einer Verschlussfolie oder eines Deckels aufweisen können.

[0004] Üblicherweise werden solche Verpackungen, insbesondere Lebensmittelverpackungen zwei- oder mehrseitig etikettiert, wobei ein einzelnes Etikett auf die oberseitige Verschlussfolie bzw. den Deckel, die Vorderwand, die Unterseite und gegebenenfalls auch auf die Hinterwand der Verpackungsschale geklebt wird, so dass sich das angebrachte Etikett über den außenseitig vorstehenden, stegförmigen Rand erstreckt. Herkömmlicherweise liegt das so aufgebrachte Etikett nicht konturparallel an der Verpackung an, sondern überspannt mit Abstand die zwischen der äußeren Kante des stegförmigen Randes und der Vorderwand der Schale vorhandene Kehle (vgl. Fig. 9).

[0005] In der Praxis hat sich gezeigt, dass zwei- oder mehrseitig angebrachte Etiketten häufig im Bereich der Kehle solcher Verpackungen ein- oder durchgerissen sind. Zu einem Einreißen bzw. Durchtrennen des Etiketts kann es insbesondere beim Zusammenstellen und/oder Transport mehrerer derartiger Verpackungen in Umverpackungen kommen, wenn der stegförmige Rand einer Verpackung unter den stegförmigen Rand einer entsprechenden benachbarten Verpackung gegen das dort über die Kehle mit Abstand gespannte Etikett drückt bzw. schlägt. Ein eingerissenes oder durchtrenntes Etikett gibt der Verpackung nicht nur ein unschönes Aussehen; auch ist mitunter ein auf dem Etikett aufgedruckter Barcode aufgrund der Beschädigung des Etiketts nicht mehr einwandfrei lesbar, so dass die betreffende Ware mittels eines Scanners, beispielsweise an einer Kasse, nicht zuverlässig identifiziert werden kann. Darüber hinaus haben zwei- oder mehrseitig angebrachte Etiketten oft auch eine Verschluss- und Garantiefunktion. Man spricht diesbezüglich von Verschluss-, Siegel- oder Garantieetiketten. Ist ein solches Etikett eingerissen oder durchtrennt, so wird der Kunde annehmen, dass die Verpackung möglicherweise bereits geöffnet wurde und die Qualität und/oder Quantität des Inhaltes nicht mehr dem Sollzustand entspricht.

[0006] Aus der US 6 155 322 ist eine Etikettiervorrichtung bekannt, mit der sich selbsthaftende Etiketten auf Verpackungen applizieren lassen, die einen eine untere Kehle und eine obere Kehle definierenden Flansch aufweisen. Die Vorrichtung umfasst zwei teleskopartig ausgebildete Druckstangen, die oberhalb und unterhalb eines die Verpackungen transportierenden Bandförderers angeordnet sind. An ihrem freien Ende ist die jeweilige Druckstange mit einem Andruckkopf versehen, mittels dem das jeweilige Etikett an die untere Kehle bzw. die obere Kehle angeschmiegt wird. Die Funktionsweise der das Etikett an die untere Kehle anschmiegenden Druckstange erfordert eine Längsteilung des Bandförderers in zwei getrennte, quer zur Transportrichtung beabstandete Bänder, so dass die Druckstange zwischen den Bändern hindurchbewegt werden kann.

[0007] Die JP 2002 154509A offenbart ein Gerät zum Ankleben eines Etiketts an eine Verpackung, die komplexe Form aufweist, z.B. einen Eier-Karton. Das Etikettiergerät umfasst ein Transportband, eine erste Appliziereinrichtung, mittels der ein Abschnitt eines Etiketts an einer der Flächen der Verpackung angebracht wird, und eine in Bandfaufrichtung folgende zweite Appliziereinrichtung, mittels der der restliche Abschnitt des Etiketts an einer anderen Fläche der Verpackung angebracht wird. Die zweite Appliziereinrichtung ist seitlich des Transportbandes angeordnet und mit einer Bürste zum Andrücken des restlichen Abschnitts des Etiketts an die Verpackung versehen, wobei die Bürste im Wesentlichen vertikal entlang einer Seitenfläche der Verpackung bewegt wird.

[0008] Die DE 29 01 702 A1 zeigt eine Vorrichtung zum Verschließen eines schalenförmigen Behälters mittels eines Folienblattes, wobei der Behälter einen eine untere Kehle definierenden Flansch aufweist. Die Vorrichtung umfasst eine rahmenförmige Platte, deren Öffnung etwas größer als der Umfang des Behälterflansches ist. Die rahmenförmige Platte ist an Enden von vier Kurbelteilen angelenkt, wobei die anderen Enden der Kurbelteile an Wellen befestigt sind. Die Wellen werden mittels mehrerer Antriebseinrichtung gemeinsam gedreht. Die rahmenförmige Platte ist mit vier winkelförmig ausgebildeten Andruckstangen versehen, die unterhalb der Platte an

K-FEE SYSTEM GMBH, EX2009, page 1478
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

den vier Ecken der Öffnung angeordnet sind und diagonal nach innen und nach außen bewegt werden können, um das Folienblatt unterhalb des Behälterflansches an die Kehle anzudrücken. Die Andruckstangen sind einzeln oder paarweise mit einem zusätzlichen Antriebsmechanismus versehen, und zwar mit einem pneumatischen oder hydraulischen Zylinder, einer elektrischen Spule oder einem federbelasteten Schwenkhebelmechanismus, der eine Rolle umfasst, deren Welle zwei Schwenkhebel miteinander verbindet. Der Rolle ist eine stationäre Rolle zugeordnet ist, welche sie auf ihrer Bewegungsbahn umlenkt, so das der Schwenkhebelmechanismus betätigt wird.

[0009] Der vorliegenden Erfindung liegt die Aufgabe zugrunde, eine Vorrichtung zum zwei- oder mehrseitigen Etikettieren von Gegenständen, die jeweils einen eine untere Kehle definierenden stegförmigen Rand oder dergleichen aufweisen, bereit zu stellen, die das oben beschriebene Problem des Einreißens bzw. Durchtrennens des Etiketts im Bereich der Kehle beseitigt, auch in Kombination mit herkömmlichen, d.h. nicht zweigeteilten Transportbändern verwendbar ist, sich relativ einfach in eine vorhandene Etikettiervorrichtung integrieren und in kompakter Bauweise ausführen lässt sowie eine hohe Etikettierleistung ermöglicht.

[0010] Gelöst wird diese Aufgabe durch eine Vorrichtung mit den Merkmalen des Anspruchs 1.

[0011] Die erfindungsgemäße Vorrichtung ist durch die Merkmale des kennzeichnenden Teils des Anspruchs 1 gekennzeichnet.

[0012] Die erfindungsgemäße Andruckeinrichtung stellt sicher, dass das zwei- oder mehrseitig, quer über den vorstehenden Rand des Gegenstandes anzubringende Etikett nach dessen Applikation der Kontur des Gegenstandes im Wesentlichen dicht folgend an der Kehle anliegt. Insbesondere lässt sich mit der erfindungsgemäßen Andruckeinrichtung das Etikett auf die Unterseite des vorstehenden Randes anbringen. Das mittels der erfindungsgemäßen Andruckeinrichtung im Wesentlichen konturparallel auf die Kehle des Gegenstandes applizierte Etikett kann aufgrund seiner dichten Anlage entlang der Kehle nicht mehr oder kaum noch beschädigt werden, wenn es dort durch Schlag oder Druck beaufschlagt wird. Eine Beschädigung zum Beispiel eines dort aufgedruckten Barcodes ist somit weitestgehend ausgeschlossen. Ebenso wird hierdurch eine Verschluss- bzw. Garantiefunktion des Etiketts verbessert. Zudem ermöglicht die erfindungsgemäße Andruckvorrichtung eine Vergrößerung der seitlich applizierten Etikettenlänge, so dass bei Bedarf mit dem Etikett mehr Informationen und/oder größere und damit besser lesbare Buchstaben, Ziffern und Symbole auf der Seite des Gegenstandes angeordnet werden können. Dies ist insbesondere bei gestapelten Verpackungen von Vorteil.

[0013] Darüber hinaus lässt sich die erfindungsgemäße Vorrichtung in Kombination mit herkömmlichen Transportbändern implementieren. Eine Längsteilung des Transportbandes, wie es die aus der US 6 155 322 bekante Vorrichtung vorsieht, ist bei der erfindungsgemäßen Vorrichtung nicht erforderlich.

[0014] Der an dem Getriebe angebrachte Andruckkörper wird gleichzeitig mit der Bewegung des Getriebes aus der Ausgangsposition (Ruheposition) in die das Etikett an die Kehle anschmiegende Betriebsposition bewegt. Eine (zusätzliche) Bewegung des Andruckkörpers relativ zu dem Getriebe ist für das Anschmiegen des Etiketts an die Kehle des zu etikettierenden Gegenstandes bei der erfindungsgemäßen Vorrichtung nicht erforderlich.

[0015] Die Andruckvorrichtung der erfindungsgemäßen Vorrichtung lässt sich relativ einfach in eine vorhandene Etikettiervorrichtung integrieren, wobei durch das Getriebe eine genaue, auf den zu etikettierenden Gegenstand abgestimmte Führung eines Andruckkörpers bzw. einer Druckluftdüse sichergestellt werden kann. Insbesondere kann die Andruckeinrichtung so relativ einfach nahe einer Bewegungsbahn montiert werden, entlang welcher der zu etikettierende Gegenstand bewegt wird, wobei die Andruckeinrichtung in ihrer Ausgangs- oder Ruheposition aus der Bewegungsbahn entfernt ist und in ihrer Betriebsposition in die Bewegungsbahn hineingreift.

[0016] Erfindungsgemäß ist das Getriebe der Andruckeinrichtung als mehrgliedriges Gelenkgetriebe ausgebildet. Ein solches Getriebe lässt sich in relativ kompakter Bauweise ausführen und ermöglicht eine schnelle Bewegung der Andruckeinrichtung bzw. eines daran befestigten Andruckkörpers aus der Ausgangsposition (Ruheposition) in die Betriebsposition und umgekehrt, so dass insgesamt eine relativ hohe Etikettierleistung erzielt werden kann.

[0017] Eine vorteilhafte Ausgestaltung der Erfindung besteht darin, dass der Andruckkörper den zu etikettierenden Gegenstand während des Anschmiegens des Etiketts berührt, wobei das Getriebe den Andruckkörper bei der Bewegung aus der Ausgangsposition (Ruheposition) in die Betriebsposition und umgekehrt parallel ausgerichtet zu einer im Wesentlichen ebenen, den zu etikettierenden Gegenstand tragenden Transport- oder Auflagefläche führt. In dieser Ausgestaltung lässt sich die Andruckeinrichtung besonders kompakt ausführen. Darüber hinaus ergeben sich bei dieser Ausgestaltung konstruktive und funktionale Vorteile hinsichtlich einer Kombination der Andruckeinrichtung mit einer Justiereinrichtung, mittels der die Höhe bzw. Lage der Angriffsstelle der Andruckeinrichtung relativ zu dem zu etikettierenden Gegenstand eingestellt werden kann. Die Einstellung der Höhe bzw. Lage der Angriffsstelle, die der Anpassung der Andruckeinrichtung an unterschiedlich hohe Verpackungen bzw. unterschiedliche Höhenlagen des stegförmigen Randes bei verschiedenen Verpackungen dient, lässt sich bei der hier vorhandenen Parallelführung des Andruckkörpers relativ einfach durchführen, wobei das jeweilige Ergebnis der Höhen- bzw. Lageeinstellung gut vorhersehbar ist.

[0018] Alternativ zu dieser Parallelführung kann die

K-FEE SYSTEM GMBH, EX2009, page 1479
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Andruckeinrichtung auch mit einem Getriebe versehen sein, welches den Andruckkörper bei der Bewegung aus der Ausgangs- oder Ruheposition in die Betriebsposition und umgekehrt entlang einer bogenförmigen, insbesondere kreisbogenförmigen Bahn führt. Ein solches Getriebe lässt sich mitunter kostengünstiger realisieren als ein den Andruckkörper parallel führendes Getriebe.

[0019] Eine weitere vorteilhafte Ausgestaltung der Erfindung sieht vor, dass die Andruckeinrichtung mit verschiedenen gegeneinander auswechselbaren Andruckkörpern ausgestattet ist, von denen der jeweilige Andruckkörper im montierten Zustand den zu etikettierenden Gegenstand während des Anschmiegens des Etiketts berührt, und/oder mit verschiedenen gegeneinander auswechselbaren Getriebeelementen ausgerüstet ist. Durch eine Auswechslung des Andruckkörpers und/oder eines oder mehrerer Getriebeelemente lässt sich der Angriffspunkt der Andruckeinrichtung verstellen und somit an unterschiedliche Lagen und/oder Formen des vorspringenden Randes des zu etikettierenden Gegenstandes anpassen.

[0020] Alternativ oder ergänzend zu einem Andruckkörper, der den zu etikettierenden Gegenstand während des Anschmiegens des Etiketts berührt, kann die Andruckeinrichtung auch mit mindestens einer Druckluftdüse zum kontaktlosen Anschmiegen des Etiketts versehen sein. Das kontaktlose Anschmiegen des Etiketts an die Kehle des Gegenstandes kann insbesondere bei mechanisch empfindlichen Etiketten oder Produkten von Vorteil sein.

[0021] Um zu erreichen, dass die Längsachse eines rechteckigen bzw. länglichen Etiketts nach dessen Applizierung parallel zu den Längs- oder Querseiten des etikettierten Gegenstandes verläuft und letzterer somit ein einwandfreies Aussehen hat, weist die erfindungsgemäße Vorrichtung vorzugsweise mindestens eine Ausrichteinrichtung mit mindestens einer Führung auf, welche einen die Kehle definierenden länglichen Vorsprung des zu etikettierenden Gegenstandes parallel zu einer länglichen, das Etikett an die Kehle anschmiegenden Wirkkante des Andruckkörpers ausrichtet. Durch diese Führung wird der zu etikettierende Gegenstand in zuverlässiger Weise parallel zu dem anzubringenden Etikett sowie parallel zu dem das Etikett an die Kehle anschmiegenden Andruckkörper bzw. zu dem Wirkbereich der Andruckeinrichtung ausgerichtet. Vorteilhaft kann die Führung dabei aus Förderern, vorzugsweise aus Stetigförderern gebildet sein, die mit mindestens einem Antrieb versehen sind. Bei den Stetigförderern kann es sich insbesondere um Rollenförderer (Rollenbahnen) handeln, die eine oder mehrere angetriebene Rollen aufweisen.

[0022] Nach einer weiteren Ausgestaltung der Erfindung ist vorgesehen, dass die Höhe der Führung oder des Förderers relativ zu einer den zu etikettierenden Gegenstand tragenden Transport- oder Auflagefläche verstellbar ist. Hierdurch kann die Führung bzw. der Förderer an unterschiedlich hohe zu etikettierende Gegenstände, insbesondere an unterschiedlich hohe Lagen von umlaufenden stegförmigen Rändern der Gegenstände auf einfache Weise angepasst werden.

[0023] Um gegebenenfalls unterschiedlich breite Gegenstände der genannten Art in der erfindungsgemäßen Vorrichtung etikettieren zu können, ist nach einer weiteren Ausgestaltung der Erfindung vorgesehen, dass die Ausrichteinrichtung mindestens zwei parallel zueinander verlaufende Gurtförderer oder Rollenbänder (Rollenförderer) aufweist, die einen Transportweg für den zu etikettierenden Gegenstand begrenzen und aufeinander zu und voneinander weg verschiebbar sind.

[0024] Des Weiteren ist vorgesehen, dass mindestens einer der Gurte bzw. die Rollen mindestens eines der Rollenförderer mehrschichtig ausgebildet ist/sind und eine dem Transportweg zugewandte, relativ dicke Mitnehmerschicht aus Weichschaumstoff oder einem Material mit elastischem Rückstellvermögen aufweist/aufweisen. Die weiche, elastische Mitnehmerschicht stellt einen ausreichend starken Reibschluss zwischen dem Gurt bzw. den Rollen und dem zu etikettierenden Gegenstand sicher, so dass der Gegenstand zuverlässig festgehalten wird, wenn die Andruckeinrichtung zum Anschmiegen des Etiketts gegen den Gegenstand fährt. Zudem lässt die weiche, relativ dicke Mitnehmerschicht des jeweiligen Gurtes bzw. der Rollen übliche Maßtoleranzen der zu etikettierenden Gegenstände zu, so dass diese trotz ihrer Maßtoleranzen ohne eine Verstellung des Abstandes der parallel zueinander verlaufenden Gurtförderer bzw. Rollenförderer zuverlässig zur Andruckeinrichtung hingeführt werden. Alternativ oder ergänzend kann mindestens einer der Gurte oder mindestens eines der Rollenbänder federelastisch gelagert sein, so dass ohne eine Verstellung des Abstandes der parallel zueinander verlaufenden Gurtförderer bzw. Rollenförderer eine elastische Aufweitung des durch die Gurte bzw. Rollen begrenzten Transportweges innerhalb gewisser Grenzen möglich ist.

[0025] Eine weitere bevorzugte Ausgestaltung der Erfindung ist dadurch gekennzeichnet, dass die Andruckeinrichtung deaktivierbar ist, so dass das Anbringen selbsthaftender Etiketten mittels der Appliziereinrichtung auch ohne Einwirkung der Andruckeinrichtung durchführbar ist. Die Andruckeinrichtung kann somit je nach Bedarf zu- oder abgeschaltet werden. Bei deaktivierter Andruckeinrichtung können mittels der erfindungsgemäßen Vorrichtung auch quaderförmige Gegenstände, insbesondere Verpackungen etikettiert werden, die keinen vorspringenden Rand und somit keine Kehle aufweisen. Die erfindungsgemäße Vorrichtung kann in dieser Ausgestaltung somit auch flexibel für andere Etikettieraufgaben eingesetzt werden.

[0026] Nach einer weiteren Ausgestaltung der Erfindung kann die erfindungsgemäße Vorrichtung auch mehrere Andruckeinrichtungen der angegebenen Art aufweisen, mittels denen das Etikett oder mehrere Etiketten an die Kehle oder mehrere solcher Kehlen des zu etikettierenden Gegenstandes anschmiegbar ist/sind. Diese Ausgestaltung ermöglicht beispielsweise das kon-

K-FEE SYSTEM GMBH, EX2009, page 1480
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

turparallele Anbringen von Banderolen quer über einen umlaufenden stegförmigen Rand des Gegenstandes. Die mindestens zwei Andruckeinrichtungen zum Anschmiegen des Etiketts an die mindestens eine Kehle des Gegenstandes können dabei an gegenüberliegenden Seiten des Gegenstandes angreifen.

[0027] Das Anschmiegen des Etiketts an eine untere Kehle eines zu etikettierenden Gegenstandes kann auf verschiedene Weise gesteuert werden. Eine Ausgestaltung der erfindungsgemäßen Vorrichtung sieht eine Steuerungseinrichtung vor, mittels der ein die Andruckeinrichtung bewegender Antrieb und ein Förderer zum Transportieren des zu etikettierenden Gegenstandes derart ansteuerbar sind, dass der Gegenstand mittels des Förderers in einer Applizierposition fixiert und der Andruckkörper zum Anschmiegen des Etiketts an die Kehle des Gegenstandes gegen den Gegenstand bewegt wird. Bei dieser Ausgestaltung wird der Andruckkörper gegen den stillstehenden bzw. fixierten Gegenstand bewegt.

[0028] Nach einer anderen Ausgestaltung weist die erfindungsgemäße Vorrichtung eine Steuerungseinrichtung auf, mittels der ein die Andruckeinrichtung bewegender Antrieb und ein Förderer zum Transportieren des zu etikettierenden Gegenstandes derart ansteuerbar sind, dass der Gegenstand mittels des Förderers entlang eines Applizierbereichs bewegt wird und der Andruckkörper zum Anschmiegen des Etiketts an die Kehle des entlang des Applizierbereichs bewegten Gegenstandes gegen den Gegenstand bewegt wird, so dass das Anschmiegen des Etiketts an die Kehle während der Bewegung des Gegenstandes und der Bewegung der Andruckeinrichtung erfolgt.

[0029] In weiterer Ausgestaltung der Erfindung ist die Steuerungseinrichtung mit einer Dateneingabeeinrichtung und/oder einer Datenschnittstelle versehen, über welche Daten betreffend die Abmessungen und/oder Beschaffenheit des zu etikettierenden Gegenstandes, insbesondere die Lage des länglichen Vorsprungs, und/oder Daten betreffend die Beschaffenheit des anzubringenden Etiketts in einen Datenspeicher eingebbar sind. Die so ausgeführte Steuerungseinrichtung steuert dann in Abhängigkeit der eingegeben Daten die Andruckeinrichtung und/oder den Förderer, insbesondere deren/dessen Antrieb und/oder deren/dessen Justiereinrichtung. Diese Ausgestaltung ermöglicht die Einstellung und Auswahl verschiedener Parameter. Insbesondere kann dabei die Position des Etiketts ausgewählt und eingestellt werden. Zudem kann die Dicke des Etiketts und/oder die Stabilität und der Inhalt einer zu etikettierenden Verpackungsschale durch Eingabe entsprechender Daten in den der Steuereinrichtung zugeordneten Datenspeicher berücksichtigt werden. Diese Ausgestaltung der erfindungsgemäßen Vorrichtung gestattet eine automatische Steuerung und Kontrolle der Position des Etiketts sowie der Stärke des Andruckes, was zum Beispiel in Hinblick auf weiche und/oder empfindliche Verpackungen vorteilhaft ist. Alternativ können aber auch alle Einstellungen an der erfindungsgemäßen von Hand durchgeführt werden.

[0030] Weitere bevorzugte und vorteilhafte Ausgestaltungen der erfindungsgemäßen Vorrichtung sind in den Unteransprüchen angegeben. Vorteilhafte Ausgestaltungen der erfindungsgemäßen Vorrichtung umfassen insbesondere ein oder mehrere Elemente, die das Etikett auf der Oberseite und/oder Unterseite des zu etikettierenden Gegenstandes faltenfrei andrücken und/oder anblasen. Bei diesen Elementen handelt es sich vorzugsweise um Bürsten, Rollen und/oder Blasdüsen.

[0031] Nachfolgend wird die Erfindung anhand einer mehrere Ausführungsbeispiele darstellenden Zeichnung näher erläutert. Es zeigen in schematischer Darstellung:

- Fig. 1 eine Längsseitenschnittansicht einer erfindungsgemäßen Vorrichtung;
- Fig. 2 eine Draufsicht der Vorrichtung der Fig. 1;
- Fig. 3 eine in der Vorrichtung gemäß den Fig. 1 und 2 montierte Andruckeinrichtung in perspektivischer Ansicht;
- Fig. 4 eine Verpackung mit einem eine Kehle definierenden umlaufenden Rand und einem an die Kehle applizierten Etikett, in Längsschnittansicht;
- Fig. 5 die Verpackung gemäß Fig. 4 mit einer zugeordneten Bürstenleiste zum oberseitigen Umlegen bzw. Applizieren eines abstehenden Etikettenabschnitts;
- Fig. 6 eine weitere Ausführungsform der erfindungsgemäßen Vorrichtung mit einer Andruckeinrichtung zum kontaktlosen Anschmiegen eines Etiketts an eine Kehle einer Verpackungsschale, in Längsschnittansicht;
- Fig. 7 die Verpackung gemäß den Figuren 4 bis 6 mit einem erfindungsgemäß angebrachten Etikett, in Längsschnittansicht;
- Fig. 8 eine aus einer Schale und einem gewölbten Deckel bestehende Verpackung mit einem erfindungsgemäß angebrachten Etikett, in Seitenansicht; und
- Fig. 9 eine Verpackung gemäß den Figuren 4 bis 7 mit einem in herkömmlicher Art angebrachten Etikett, in Längsschnittansicht.

[0032] In den Figuren 1 und 2 ist eine Vorrichtung zum zwei- oder mehrseitigen Anbringen eines selbsthaftenden Etiketts 1 auf einen dreidimensionalen Gegenstand 2 schematisch dargestellt. Bei dem zu etikettierenden Gegenstand 2 handelt es sich um eine Verpackung, bei-

K-FEE SYSTEM GMBH, EX2009, page 1481
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

spielsweise eine ein Nahrungsmittel enthaltende Verpackung. Die Verpackung 2 besteht aus einer Schale 2.1, die einen länglichen Vorsprung 2.2 in Form eines stegförmigen Randes oder Flansches aufweist, auf den oberseitig eine Verschluss- oder Deckelfolie 2.3 aufgesiegelt bzw. aufgeklebt ist (vgl. Figuren 4 bis 7). Anstelle einer flachen oder ebenen Folie 2.3 kann auch ein dreidimensional geformter Deckel stoff- oder formschlüssig mit dem Rand 2.2 der Schale 2.1 verbunden sein (vgl. Fig. 8). Die Schale 2.1 bzw. deren vorstehender Rand 2.2 ist im Wesentlichen rechteckig ausgebildet. Der Rand 2.2 besitzt parallel zueinander verlaufende Längsseiten 2.4 und dazu im Wesentlichen rechtwinklig verlaufende Querseiten 2.5. Der Vorsprung oder Rand 2.2 der Schale 2.1 bildet mit ihrer umlaufenden Wand 2.6 eine Kehle 2.7.

[0033] Des Weiteren umfasst die in den Figuren 1 und 2 dargestellte Vorrichtung eine Appliziereinrichtung, mittels der ein Etikett 1, vorzugsweise ein längliches oder bandförmiges Etikett 1 über den Rand 2.2 der Schale auf die Verpackung 2 appliziert werden kann. Das applizierte Etikett 1 verläuft über den Rand 2.2 und quer zu diesem. Bei dem Etikett 1 kann es sich beispielsweise um ein Papier-, Kunststoff- oder Kunststofftransparentetikett handeln. Das Etikett 1 kann einen Aufdruck, insbesondere Farbaufdruck aufweisen, oder gegebenenfalls nach seiner Applizierung auf die Verpackung 2 noch bedruckt werden. Der Appliziereinrichtung ist eine Etikettenzuführeinrichtung zugeordnet, die in dem dargestellten Ausführungsbeispiel eine Halterung zur drehbaren Aufnahme einer Vorratsspule 3 umfasst, auf die ein Trägerband 4 mit einer Vielzahl daran anhaftender Etiketten 1 aufgewickelt ist.

[0034] Das zu applizierende Etikett 1 kann auch von einem mit Klebstoff beschichtetem Endlospapier, welches mit einer Papierschneidevorrichtung auf Länge geschnitten wird, stammen, bzw. von Endlospapier, welches auf bestimmte Abmessungen geschnitten und mit Kleber versehen wird.

[0035] Das Trägerband 4 ist von der Vorratsspule 3 über Umlenkrollen oder Umlenkachsen und eine dazwischen angeordnete Spendekante 5 zu einer Aufwickelspule 6 geführt, die durch einen nicht dargestellten diskontinuierlich aktivierten Motor intermittierend angetrieben wird. Aufgrund der relativ scharfen Umlenkung an der Spendekante 5 löst sich dort das am Trägerband 4 anhaftende Etikett 1 ab. Das Etikett 1 wird dabei quer zu einer vorgebbaren Bewegungsbahn der Verpackung 2 geführt und positioniert.

[0036] Die zu etikettierende Verpackung 2 wird mittels eines Förderers 7 transportiert, der vorzugsweise als Gurtförderer ausgeführt ist. Oberhalb des Förderers 7 ist eine Ausrichteinrichtung 8 angeordnet, mittels der die Verpackung 2 eine Grobausrichtung erfährt, so dass die im Wesentlichen geradlinigen Längsseiten 2.4 des Schalenrandes 2.2 oder - bei quertransportierten Verpackungen - die dazu rechtwinklig verlaufenden Querseiten 2.5 parallel oder nahezu parallel zur Förderrichtung 9 bzw. Längsachse des Förderers 7 ausgerichtet sind. Die Ausrichteinrichtung 8 weist hierzu zwei abgewinkelte Führungsschienen 8.1, 8.2 auf, die einen sich konisch verengenden Einlaufbereich begrenzen. Der horizontale Abstand der Führungsschienen 8.1, 8.2 zueinander ist variabel einstellbar.

[0037] In Förderrichtung 9 gesehen ist hinter den Führungsschienen 8.1, 8.2 eine weitere Führung 10 für die zu etikettierende Verpackung 2 vorgesehen, die eine Feinausrichtung der Verpackung 2 bewirkt, so dass die vordere, im Wesentlichen geradlinige Kante 2.8 des stegförmigen Randes 2.2 der Verpackung 2 parallel zu der Ebene ausgerichtet ist, welche das in der Bewegungsbahn der Verpackung 2 positionierte Etikett 1 definiert. Das anzubringende Etikett 1 und die geradlinige Vorderkante 2.8 der Verpackung 2 werden somit parallel zueinander ausgerichtet. Hierdurch wird sichergestellt, dass die Längs- oder Symmetrieachse des applizierten Etiketts 1 parallel Längsseite 2.4 bzw. bei quertransportierten Verpackungen 2 parallel zur Querseite 2.5 des Verpackungsrandes 2.2 verläuft.

[0038] Die Führung 10 ist durch zwei parallel zueinander verlaufende Gurtförderer 10.1, 10.2 gebildet, die jeweils mit einem eigenen Antrieb (Motor) 10.3 versehen sind. Die Antriebe 10.3 drehen gegensinnig, so dass die einander zugewandten Abschnitte 10.4, 10.5 der Gurte gleichsinnig in Richtung des anzubringenden Etiketts 1 laufen. Die Gurtförderer 10.1, 10.2 begrenzen den Transportweg für die zu etikettierende Verpackung 2 und stellen somit eine angetriebene Seitenführung 10 dar. Die Gurte sind vorzugsweise mehrschichtig ausgebildet und weisen an ihrer die Verpackung 2 kontaktierenden Außenseite eine Mitnehmerschicht 10.6, 10.7 aus Weichschaumstoff oder einem sich elastisch zurückstellen Material auf. Beispielsweise ist die Mitnehmerschicht 10.6, 10.7 aus einer geschäumten Gummischicht gebildet, während die damit stoffschlüssig verbundene innen liegende Schicht 10.8, 10.9 aus ungeschäumtem, gewebeverstärktem Gummi oder Kunststoff besteht.

[0039] Um unterschiedlich breite Verpackungen mit der Vorrichtung ausrichten und etikettieren zu können, können die Gurtförderer 10.1, 10.2 aufeinander zu und voneinander weg verschoben werden, was in Fig. 2 durch die beiden Doppelpfeile 11, 12 angedeutet ist. Die Vorrichtung ist somit sowohl für in Richtung ihrer Längsachse als auch für in Richtung ihrer Querachse transportierte Verpackungen 2 nutzbar. In der jeweils eingestellten Position sind die Gurtförderer 10.1, 10.2 gegen unbeabsichtigtes Verschieben gesichert. Darüber hinaus kann die Lage der Gurtförderer 10.1, 10.2 auch vertikal verstellt werden, so dass die Höhe der durch sie definierten Seitenführung 10 relativ zu der die Verpackung 2 tragenden Transport- oder Auflagefläche 13 variabel einstellbar ist. Die vertikale Verstellmöglichkeit ist durch den Doppelpfeil 30 in Fig. 1 angedeutet. Die Höhe der Gurtförderer 10.1, 10.2 relativ zu der Transport- oder Auflagefläche 13 wird in Abhängigkeit der Höhe der Verpackung 2, insbesondere der Höhe des stegförmigen Vorsprunges 2.2 eingestellt.

K-FEE SYSTEM GMBH, EX2009, page 1482
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

[0040] Ferner weist die Vorrichtung eine das Etikett 1 an die Kehle 2.7 der Verpackung 2 anschmiegende Andruckeinrichtung 14 auf. Die Andruckeinrichtung 14 umfasst ein Getriebe 14.1 und einen damit gekoppelten Antrieb 14.2. Das Getriebe 14.1 ist als mehrgliedriges Gelenkgetriebe ausgebildet und mit einem elektrischen Schrittmotor 14.2 versehen, wie am besten in Fig. 3 zu erkennen ist. Anstelle eines Schrittmotors bzw. elektromotorischen Antriebes 14.2 kann jedoch auch ein anderer geeigneter Antrieb verwendet werden, insbesondere ein pneumatischer Antrieb. Die Antriebswelle 14.3 des durch einen Motorsockel (nicht gezeigt) fest positionierten Schrittmotors 14.2 ist mit einer Welle 14.4 gekuppelt, die drehbar in parallel zueinander angeordneten Halterungen 14.5, 14.6 gelagert ist, welche ihrerseits starr mit einem Grundrahmen (nicht gezeigt) der Vorrichtung verbunden sind. An jeder der beiden Halterungen 14.5, 14.6 sind zwei Drehlager 15.1, 15.2, 16.1, 16.2 ausgebildet, wobei die Drehachse des einen Drehlagers 15.1, 15.2 mit der Drehachse des gegenüberliegenden Drehlagers 16.1, 16.2 an der anderen Halterung 14.6 fluchtet. An den Drehlagern 15.1, 15.2, 16.1, 16.2 sind vier Gelenkarme 17, 18, 19, 20 angelenkt, von denen zwei (17, 19) drehstarr mit der Welle 14.4 verbunden sind. Die Gelenkarme 17, 18, 19, 20 weisen an ihren den Halterungen 14.5, 14.6 abgewandten Enden Drehlager 15.3, 15.4, 16.3, 16.4 auf, wobei die Drehachse des einen Drehlagers 15.3, 15.4 wiederum mit der Drehachse des gegenüberliegenden Drehlagers 16.3, 16.4 fluchtet. An den Drehlagern 15.3, 15.4, 16.3, 16.4 sind zwei leistenförmige Halter 14.8, 14.9 angelenkt, die parallel zueinander verlaufen und an ihrem der Welle 14.4 abgewandten Ende einen C-förmigen Andruckkörper 14.10 halten. Der Andruckkörper 14.10 wird durch das Getriebe 14.1 parallel ausgerichtet zu der im Wesentlichen ebenen, die Verpackung 2 tragenden Transport- bzw. Auflagefläche 13 geführt.

[0041] Der mittlere Abschnitt 14.11 des Andruckkörpers 14.10 ist gegenüber den mit den Haltern 14.8, 14.9 verbundenen Befestigungsenden 14.12, 14.13 relativ flach ausgebildet. Die geradlinige Wirkkante 14.14 des Andruckkörpers 14.10 ist abgerundet und verläuft parallel zu der Ebene, in welcher das vom Trägerband 4 abgelöste Etikett 1 zur Applikation auf die Verpackung 2 angeordnet wird.

[0042] Die Andruckeinrichtung 14, insbesondere der leistenförmige Andruckkörper 14.10 wird mittels des Getriebes 14.1 und des zugehörigen Antriebes 14.2 aus einer Ausgangs- oder Ruheposition in eine Betriebsposition bewegt, wobei die Verpackung 2 unbewegt bzw. durch die Gurtförderer 10.1, 10.2 fixiert ist und das Etikett 1 durch die Bewegung des Andruckkörpers 14.10 in die Betriebsposition an die Kehle 2.7 der Verpackung 2 angeschmiegt wird. Hierdurch wird das Etikett 1 an die Kehle 2.7 appliziert, so dass es dort dicht anliegt. Das Andrücken bzw. Anschmiegen des Etiketts 1 an die Kehle 2.7 mittels des Andruckkörpers 14.10 ist in Fig. 4 schematisch dargestellt. Des Weiteren liegt es auch im Rahmen der Erfindung, die Andruckeinrichtung 14 und die Förderer 10.1, 10.2 so anzusteuern, dass das Anschmiegen des Etiketts 1 an die Kehle 2.7 der Verpackung 2 durch Bewegung der Andruckeinrichtung 14 bei gleichzeitiger Fortbewegung der Verpackung 2 erfolgt.

[0043] Anschließend wird die Andruckeinrichtung 14 durch den zugehörigen Antrieb 14.2 in ihre Ausgangs- oder Ruheposition zurückbewegt. Die Verpackung 2 kann dann unter der Andruckeinrichtung 14 hindurch weiter bewegt werden. Dabei wird das Etikett 1 oberhalb des stegförmigen Randes 2.2 durch eine Bürstenleiste 22 oder dergleichen umgelegt und an die Oberseite der Deckelfolie 2.3 gestrichen bzw. gedrückt (vgl. Fig. 5). Die Bürstenleiste 22 ist vorzugsweise an einem Mechanismus montiert, mittels dem sie in eine Betriebsposition abgesenkt und in eine Ruheposition, wie in Fig. 1 skizziert, angehoben werden kann. Anstelle einer Bürstenleiste 22 kann beispielsweise auch eine Rolle oder eine Anblaseinrichtung verwendet werden, um das Etikett 1 umzulegen und an die Oberseite der Deckelfolie 2.3 anzudrücken. Die Betriebsposition der Bürstenleiste 22 ist in dem dargestellten Ausführungsbeispiel diejenige, bei der sich die Unterkante der Bürstenleiste 22 auf gleicher Höhe oder unterhalb der Oberkante des zu etikettierenden Gegenstandes 2 befindet.

[0044] Unterhalb der Andruckeinrichtung 14 ist eine geneigte Gleitfläche 23 angeordnet, über die die etikettierte Verpackung 2 abgeführt bzw. auf einen Förderer (nicht gezeigt) weitergeleitet wird. Anstelle der Gleitfläche 23 kann unterhalb der Andruckeinrichtung 14 auch ein Gurtförderer oder eine geneigte Rollenbahn angeordnet sein.

[0045] In Fig. 6 ist ein Ausführungsbeispiel skizziert, bei dem die Andruckeinrichtung 14 das Etikett 1 kontaktlos an die Kehle 2.7 der Verpackung 2 appliziert. Hierzu ist das Getriebe 14.1 der Andruckeinrichtung 14 mit mindestens einer Druckluftleitung 24 mit einer oder mehreren Düsen 24.1 versehen. Das Anschmiegen des Etiketts 1 an die Kehle 2.7 erfolgt in diesem Fall durch Druckluftstrahlen.

[0046] In Fig. 8 ist eine Verpackung 2 dargestellt, die aus einer Schale 2.1 und einem dreidimensional geformten Deckel 2.3 besteht, wobei der Deckel 2.3 stoff- oder formschlüssig mit dem stegförmigen Rand (Flansch) 2.2 der Schale 2.1 verbunden ist. Die umlaufende Wand 2.6 der Schale 2.1 bildet wiederum mit dem stegförmigen Rand 2.2 eine Kehle 2.7. Ebenso weist auch der Deckel 2.3 eine umlaufende Kehle 2.7' auf. Auf die Verpackung 2 wurde mittels einer erfindungsgemäßen Vorrichtung ein einzelnes Etikett 1 in der Weise appliziert, dass das auf Schale 2.1 sowie Deckel 2.3 angebrachte Etikett 1 an die Kehlen 2.7, 2.7' angeschmiegt ist. Hierzu weist der Andruckkörper 14.10 der erfindungsgemäßen Vorrichtung vorzugsweise eine U-förmige bzw. gabelförmige Wirkkante auf, die den stegförmigen Rand 2.2 der Verpackung 2 beim Anschmiegen des Etiketts 1 an die Kehlen 2.7, 2.7' umgreift. Alternativ kann der Andruckkörper 14.10 auch zweiteilig ausgeführt sein, so dass er einen

K-FEE SYSTEM GMBH, EX2009, page 1483
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

eine obere Wirkkante definierenden ersten Teil und einen eine untere Wirkkante definierenden zweiten Teil aufweist. Ferner liegt es Rahmen der vorliegenden Erfindung einen einzelnen Andruckkörper 14.10 gemäß Fig. 3 zu verwenden, der mittels eines geeigneten Getriebes und einer speziellen Steuerung das Etikett 1 zunächst an der unteren Kehle 2.7 und anschließend an der oberen Kehle 2.7'-oder umgekehrt - anschmiegt.

[0047] Die erfindungsgemäße Andruckeinrichtung 14 ist vorzugsweise mit mindestens einer Justiereinrichtung (nicht gezeigt) versehen, mittels der die Angriffsstelle des Andruckkörpers 14.10 relativ zu der die Verpackung 2 tragenden Transport- oder Auflagefläche 13 und damit relativ zu der Verpackung 2 eingestellt werden kann. Die Justiereinrichtung weist hierzu vorteilhaft einen elektromotorischen, pneumatischen, hydraulischen und/oder piezoelektrischen Antrieb auf (nicht gezeigt). Alternativ oder ergänzend kann dieser Antrieb auch aus einem Handkurbelantrieb und/oder Schwerkraftantrieb bestehen bzw. gebildet sein.

[0048] Wie erwähnt, weist die erfindungsgemäße Vorrichtung verschiedene Antriebe für die Etikettenzuführeinrichtung, die Förderer 7, 10.1, 10.2, die Andruckeinrichtung 14 bzw. für die Verstelleinrichtungen zur Positionierung der Förderer 10.1, 10.2 und/oder der Bürstenleiste 22, und gegebenenfalls für die der Andruckeinrichtung 14 zugeordnete Justiereinrichtung auf. Zur Ansteuerung der genannten Antriebe ist eine Steuerungseinrichtung 25 vorgesehen. An der Steuerungseinrichtung 25 sind Sensoren, vorzugsweise optische Sensoren zur Erfassung der Positionen der Verpackung 2, des anzubringenden Etiketts 1, des Andruckkörpers 14.10 und/oder der Förderer 10.1, 10.2 angeschlossen. Des Weiteren ist die Steuerungseinrichtung 25 mit einer Dateneingabeeinrichtung und/oder einer Datenschnittstelle versehen, über welche in einen Datenspeicher Daten betreffend die Abmessungen und/oder Beschaffenheit der zu etikettierenden Verpackung 2, insbesondere die Lage des stegförmigen Randes 2.2, und/oder Daten betreffend die Beschaffenheit des anzubringenden Etiketts 1 eingegeben werden können. In Abhängigkeit der eingegebenen Daten sowie der über die Sensoren erfassten Größen bzw. Positionen steuert die Steuerungseinrichtung 25 die genannten Antriebe. Somit kann insbesondere die Position des Etiketts 1 sowie die Stärke des Andruckes des Andruckkörpers 14.10 über eine entsprechende Software gesteuert und kontrolliert werden, was zum Beispiel hinsichtlich weicher bzw. empfindlicher Verpackungen von Vorteil ist. Alternativ können alle Antriebe von Hand in die geforderten Positionen gebracht werden.

[0049] Die Ausführung der Erfindung ist nicht auf die vorstehend beschriebenen Ausführungsbeispiele beschränkt. So kann die Vorrichtung beispielsweise auch mit einer Etikettenzuführeinrichtung ausgestattet sein, die das anzubringende Etikett 1 in Bezug auf den Transportweg des zu etikettierenden Gegenstandes 1 zu der Appliziereinrichtung von oben zuführt. Die erfindungsgemäße Andruckeinrichtung 14 ist also sowohl für von unten als auch für von oben gespendete Etiketten 1 einsetzbar.

[0050] Auch können anstelle der Gurtförderer 10.1, 10.2 andere Stetigförderer, insbesondere Rollenförderer mit angetriebenen Rollen oder Kettenförderer mit Mitnehmern für den jeweiligen Packungstyp in der erfindungsgemäßen Vorrichtung vorgesehen sein.

[0051] Des Weiteren können auch mehrere Andruckeinrichtungen 14 der beschriebenen Art verwendet werden, um ein einzelnes Etikett 1, beispielsweise eine Banderole, oder mehrere Etiketten an eine Kehle 2.7 oder mehrere Kehlen des zu etikettierenden Gegenstandes anzuschmiegen. Die Andruckeinrichtungen können dabei insbesondere an gegenüberliegenden Seiten des Gegenstandes 2 angreifen, um das mindestens eine Etikett 1 an einer umlaufenden Kehle 2.7 des zu etikettierenden Gegenstandes 2 anzuschmiegen.

[0052] Grundsätzlich eignet sich die erfindungsgemäße Vorrichtung auch zum zwei- oder mehrseitigen Etikettieren von Verpackungen, die eine runde, insbesondere kreisrunde, ovale oder dreieckige Schale mit einem eine Kehle definierenden Rand aufweisen.

Patentansprüche

1. Vorrichtung zum zwei- oder mehrseitigen Anbringen mindestens eines selbsthaftenden Etiketts (1) auf einen dreidimensionalen Gegenstand (2), der einen eine untere Kehle (2.7) definierenden Vorsprung (2.2), insbesondere in Form eines stegförmigen Randes aufweist, mit einer den zu etikettierenden Gegenstand (2) tragenden Transport- oder Auflagefläche (13), mindestens einer Appliziereinrichtung, mittels der das Etikett (1) auf den Vorsprung (2.2) des Gegenstandes (2) applizierbar ist, und mit mindestens einer einen Andruckkörper (14.10) oder eine Druckluftdüse (24.1) aufweisenden Andruckeinrichtung (14) zum Anschmiegen des Etiketts (1) an den Gegenstand (2), wobei der Andruckkörper (14.10) oder die Druckluftdüse (24.1) mittels eines einzigen Antriebs (14.2) aus einer vertikal von der Transport- oder Auflagefläche (13) beabstandeten Ausgangsposition, die sich oberhalb der Transport- oder Auflagefläche (13) befindet, in eine Betriebsposition hin und zurück bewegbar ist, wobei, nachdem die Andruckeinrichtung (14) durch den zugehörigen Antrieb (14.2) in ihre Ausgangsposition zurückbewegt ist, der etikettierte Gegenstand (2) unter der Andruckeinrichtung (14) hindurch bewegt wird, **dadurch gekennzeichnet, dass** das Etikett (1) an die untere Kehle (2.7) des Gegenstandes (2) angeschmiegt wird; dass der Andruckkörper (14.10) oder die Druckluftdüse (24.1) an einem mit dem einzigen Antrieb (14.2) gekoppelten mehrgliedrigen Gelenkgetriebe (14.1) angebracht ist; und dass in der Betriebsposition der Andruckkörper (14.10) oder die

K-FEE SYSTEM GMBH, EX2009, page 1484
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Druckluftdüse (24.1) den die untere Kehle (2.7) definierenden Vorsprung (2.2) des zu etikettierenden Gegenstandes (2) untergreift, und zumindest teilweise unterhalb dieses Vorsprungs (2.2) angeordnet ist.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Andruckkörper (14.10) den zu etikettierenden Gegenstand (2) während des Anschmiegens des Etiketts (1) berührt, wobei das mehrgliedrige Gelenkgetriebe (14.1) den Andruckkörper (14.10) bei der Bewegung aus der Ausgangsposition in die Betriebsposition und umgekehrt parallel ausgerichtet zu einer im Wesentlichen ebenen, den zu etikettierenden Gegenstand (2) tragenden Transport- oder Auflagefläche (13) führt.

3. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Andruckkörper (14.10) den zu etikettierenden Gegenstand (2) während des Anschmiegens des Etiketts berührt, wobei das mehrgliedrige Gelenkgetriebe den Andruckkörper (14.10) bei der Bewegung aus der Ausgangsposition in die Betriebsposition und umgekehrt entlang einer bogenförmigen, insbesondere kreisbogenförmigen Bahn führt.

4. Vorrichtung nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die Andruckeinrichtung (14) mit mindestens einer Justiereinrichtung versehen ist, mittels der ihre Angriffsstelle an dem zu etikettierenden Gegenstand (2) relativ zu demselben und/oder der Transport- oder Auflagefläche (13) einstellbar ist.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Andruckeinrichtung (14) mit verschiedenen gegeneinander auswechselbaren Andruckkörpern (14.10), von denen der jeweilige Andruckkörper (14.10) im montierten Zustand den zu etikettierenden Gegenstand (2) während des Anschmiegens des Etiketts (1) berührt, und/oder verschiedenen gegeneinander auswechselbaren Getriebeelementen (17, 18, 19, 20, 14.8, 14.9) ausgestattet ist.

6. Vorrichtung nach einem der Ansprüche 1 bis 5, **gekennzeichnet durch** mindestens eine Ausrichteinrichtung mit mindestens einer Führung (8, 10), die den die Kehle (2.7) definierenden länglichen Vorsprung (2.2) des zu etikettierenden Gegenstandes (2) parallel zu einer länglichen Wirkkante (14.14) des Andruckkörpers (14.10) ausrichtet.

7. Vorrichtung nach Anspruch 6, **dadurch gekennzeichnet, dass** die Führung aus Förderern (10.1, 10.2), vorzugsweise Stetigförderern gebildet ist, die mit mindestens einem Antrieb (10.3) versehen sind.

8. Vorrichtung nach Anspruch 6 oder 7, **dadurch gekennzeichnet, dass** die Höhe der Führung (10) oder der Förderer (10.1, 10.2) relativ zu der Transport- oder Auflagefläche (13) verstellbar ist.

9. Vorrichtung nach einem der Ansprüche 6 bis 8, **dadurch gekennzeichnet, dass** die Ausrichteinrichtung mindestens zwei parallel zueinander verlaufende Gurtförderer (10.1, 10.2) aufweist, die einen Transportweg für den zu etikettierenden Gegenstand (2) begrenzen und aufeinander zu und voneinander weg verschiebbar sind.

10. Vorrichtung nach Anspruch 9, **dadurch gekennzeichnet, dass** mindestens einer der Gurte mehrschichtig ausgebildet ist und eine dem Transportweg zugewandte Mitnehmerschicht (10.6, 10.7) aus Weichschaumstoff oder einem sich elastisch zurückstellenden Material aufweist.

11. Vorrichtung nach einem der Ansprüche 1 bis 10, **gekennzeichnet durch** mindestens eine Etikettenzuführeinrichtung (3, 5, 6), die das Etikett (1) in Bezug auf einen Transportweg des zu etikettierenden Gegenstandes (2) zu der Appliziereinrichtung von oben oder unten zuführt.

12. Vorrichtung nach einem der Ansprüche 1 bis 11, **dadurch gekennzeichnet; dass** die Andruckeinrichtung (14) deaktivierbar ist, so dass das Anbringen selbsthaftender Etiketten (1) mittels der Appliziereinrichtung auch ohne Einwirkung der Andruckeinrichtung (14) durchführbar ist.

13. Vorrichtung nach einem der Ansprüche 1 bis 12, **gekennzeichnet durch** mehrere Andruckeinrichtungen (14) der angegebenen Art, mittels denen das Etikett (1) oder mehrere Etiketten an die Kehle (2.7) oder mehrere solcher Kehlen des zu etikettierenden Gegenstandes (2) anschmiegbar ist/sind.

14. Vorrichtung nach Anspruch 13, **dadurch gekennzeichnet, dass** die Andruckeinrichtungen zum Anschmiegen des mindestens einen Etiketts (1) an die mindestens eine Kehle (2.7) an gegenüberliegenden Seiten des Gegenstandes (2) angreifen.

15. Vorrichtung nach einem der Ansprüche 1 bis 14, **gekennzeichnet durch** eine Steuerungseinrichtung (25), mittels der der die Andruckeinrichtung (14) bewegende Antrieb (14.2) und ein Förderer (10.1, 10.2) zum Transportieren des zu etikettierenden Gegenstandes (2) derart ansteuerbar sind, dass der Gegenstand (2) mittels des Förderers (10.1, 10.2) in einer Applizierposition fixiert und der Andruckkörper (14.10) zum Anschmiegen des Etiketts (1) an die Kehle (2.7) des Gegenstandes (2) gegen den Gegenstand (2) bewegt wird.

K-FEE SYSTEM GMBH, EX2009, page 1485
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

16. Vorrichtung nach einem der Ansprüche 1 bis 15, **gekennzeichnet durch** eine Steuerungseinrichtung (25), mittels der der die Andruckeinrichtung (14) bewegende Antrieb (14.2) und ein Förderer (10.1, 10.2) zum Transportieren des zu etikettierenden Gegenstandes (2) derart ansteuerbar sind, dass der Gegenstand (2) mittels des Förderers (10.1, 10.2) entlang eines Applizierbereichs bewegt wird und der Andruckkörper (14.10) zum Anschmiegen des Etiketts (1) an die Kehle (2.7) des entlang des Applizierbereich bewegten Gegenstandes (2) gegen den Gegenstand (2) bewegt wird, so dass das Anschmiegen des Etiketts (1) an die Kehle (2.7) während der Bewegung des Gegenstandes (2) und der Bewegung der Andruckeinrichtung (14) erfolgt.

17. Vorrichtung nach einem der Ansprüche 15 bis 16, **dadurch gekennzeichnet, dass** die Steuerungseinrichtung (25) mit einer Dateneingabeeinrichtung und/oder einer Datenschnittstelle versehen ist, über welche Daten betreffend die Abmessungen und/oder Beschaffenheit des zu etikettierenden Gegenstandes (2), insbesondere die Lage des Vorsprungs (2.2), und/oder Daten betreffend die Beschaffenheit des anzubringenden Etiketts (1) in einen Datenspeicher eingebbar sind, und dass die Steuerungseinrichtung (25) die Andruckeinrichtung (14) und/oder den Förderer (10.1, 10.2), insbesondere deren/dessen Antrieb (10.3, 14.2) und/oder deren/dessen Justiereinrichtung, in Abhängigkeit der eingegeben Daten steuert.

Claims

1. Device for two-sided or multi-sided application of at least one self-adhesive label (1) to a three-dimensional object (2), which has a protrusion (2.2) defining a lower fillet (2.7), in particular in the form of a web-shaped rim, comprising a transport or support surface (13) supporting the object (2) to be labelled, at least one applicator means, by means of which the label (1) can be applied to the protrusion (2.2) of the object (2), and at least one pressing means (14), comprising a pressing body (14.10) or a compressed air nozzle (24.1), for smoothing the label (1) onto the object (2), the pressing body (14.10) or the compressed air nozzle (24.1) can be moved back and forth from an initial position, which is vertically spaced from the transport or support surface (13) and located above the transport or support surface (13), to an operating position by means of a single drive (14.2), wherein, after the pressing means (14) is moved back to its initial position by the associated drive (14.2), the labelled object (2) is moved through beneath the pressing means (14), **characterised in that** the label (1) is smoothed onto the lower fillet (2.7) of the object (2); that the pressing body (14.10) or the compressed air nozzle (24.1) is mounted on a many-membered articulated transmission (14.1), which is coupled to the single drive (14.2); and that in the operating position the pressing body (14.10) or the compressed air nozzle (24.1) reaches under the protrusion (2.2) of the labelled object (2) defining the lower fillet (2.7) and is arranged at least in part below said protrusion (2.2).

2. Device according to claim 1, **characterised in that** the pressing body (14.10) contacts the object (2) to be labelled while the label (1) is smoothed on, the many-membered articulated transmission (14.1) guiding the pressing body (14.10) in the movement from the initial position to the operating position and back, orientated parallel to a substantially planar transport or support surface (13) which carries the object (2) to be labelled.

3. Device according to claim 1, **characterised in that** the pressing body (14.10) contacts the object (2) to be labelled while the label is smoothed on, the many-membered articulated transmission guiding the pressing body (14.10) along a curved, in particular arced path in the movement from the initial position to the operating position and back.

4. Device according to any one of claims 1 to 3, **characterised in that** the pressing means (14) is provided with at least one adjustment means, with which the engagement point thereof on the object (2) to be labelled can be adjusted relative to said object and/or to the transport or support surface (13).

5. Device according to any one of claims 1 to 4, **characterised in that** the pressing means (14) is equipped with various mutually exchangeable pressing bodies (14.10), of which the respective pressing body (14.10) in the mounted state contacts the object (2) to be labelled while the label (1) is smoothed on, and/or is provided with various mutually exchangeable transmission elements (17, 18, 19, 20, 14.8, 14.9).

6. Device according to any one of claims 1 to 5, **characterised by** at least one alignment means, comprising at least one guide (8, 10) which aligns the elongate protrusion (2.2), defining the fillet (2.7), of the object (2) to be labelled parallel to an elongate working edge (14.14) of the pressing body (14.10).

7. Device according to claim 6, **characterised in that** the guide is formed from conveyors (10.1,10.2), preferably continuous conveyors, which are provided with at least one drive (10.3).

8. Device according to either claim 6 or claim 7, **characterised in that** the height of the guide (10) or the

K-FEE SYSTEM GMBH, EX2009, page 1486
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

conveyor (10.1, 10.2) is adjustable relative to the transport or support surface (13).

9. Device according to any one of claims 6 to 8, **characterised in that** the alignment means comprises at least two belt conveyors (10.1, 10.2), which extend mutually parallel, define a transport path for the object (2) to be labelled, and can be displaced towards and away from one another.

10. Device according to claim 9, **characterised in that** at least one of the belts is formed in a plurality of layers, and comprises an entrainment layer (10.6, 10.7), which is made of flexible foam or a material having resilient restoration properties and faces towards the transport path.

11. Device according to any one of claims 1 to 10, **characterised by** a label introduction means (3, 5, 6) which introduces the label (1) to the applicator means from above or below in relation to a transport path of the object (2) to be labelled.

12. Device according to any one of claims 1 to 11, **characterised in that** the pressing means (14) can be deactivated, in such a way that it is also possible to apply self-adhesive labels (1) using the applicator means without the effect of the pressing means (14).

13. Device according to any one of claims 1 to 12, **characterised by** a plurality of pressing means (14) of the specified type, with which the label (1) or a plurality of labels can be smoothed onto the fillet (2.7) or a plurality of these fillets of the object (2) to be labelled.

14. Device according to claim 13, **characterised in that** the pressing means for smoothing the at least one label (1) onto the at least one fillet (2.7) engage on opposite sides of the object (2).

15. Device according to any one of claims 1 to 14, **characterised by** a control means (25), by means of which the drive (14.2), which moves the pressing means (14), and a conveyor (10.1, 10.2) for transporting the object (2) to be labelled can be controlled in such a way that the conveyor (10.1, 10.2) fixes the object (2) in an application position and the pressing body (14.10) is moved against the object (2) to smooth the label (1) onto the fillet (2.7) of the object (2).

16. Device according to any one of claims 1 to 15, **characterised by** a control means (25), by means of which the drive (14.2), which moves the pressing means (14), and a conveyor (10.1, 10.2) for transporting the object (2) to be labelled can be controlled in such a way that the conveyor (10.1, 10.2) moves the object (2) along an application region and the pressing body (14.10) for smoothing the label (1) onto the fillet (2.7) of the object (2) moved along the application region is moved against the object (2), in such a way that the label (1) is smoothed onto the fillet (2.7) while the object (2) is moving and while the pressing means (14) is moving.

17. Device according to any one of claims 15 to 16, **characterised in that** the control means (25) is provided with a data input means and/or a data interface, via which data regarding the dimensions and/or constitution of the object (2) to be labelled, in particular the position of the protrusion (2.2), and/or data regarding the constitution of the label (1) to be applied can be inputted into a data storage unit, and **in that** the control means (25) controls the pressing means (14) and/or the conveyor (10.1, 10.2), in particular the drive (10.3, 14.2) thereof and/or the adjustment means thereof, as a function of the inputted data.

Revendications

1. Dispositif d'application d'au moins une étiquette (1) autoadhésive sur deux ou plusieurs côtés d'un l'objet (2) tridimensionnel qui est doté d'une saillie (2.2), en particulier en forme de patte définissant une gorge inférieure (2.7), ledit dispositif comprenant une surface de transport ou de support (13) qui porte l'objet (2) à étiqueter, au moins un dispositif d'application au moyen duquel l'étiquette (1) peut être appliquée sur la saillie (2.2) de l'objet (2), et avec au moins un dispositif de pression (14), qui, doté d'un corps de pression (14.10) ou d'une buse à air comprimé (24.1), est destiné à amener l'étiquette à épouser le contour de l'objet, sachant que le corps de pression (14.10) ou la buse à air comprimé (24.1) peut, au moyen d'une seule commande (14.2), être déplacé en avant et en arrière, d'une position de départ, verticalement distancée de la surface de transport ou de support (13) et située au-dessus de la surface de transport ou de support (13), dans une position de travail, sachant que l'objet (2) étiqueté est déplacée en passant sous le dispositif de pression (14), après que ledit dispositif de pression (14) ait été ramené dans sa position de départ par la commande (14.2), **caractérisé en ce que** l'étiquette (1) est amenée à épouser le contour de la gorge inférieure (2.7) de l'objet (2), que le corps de pression (14.10) ou la buse à air comprimé (24.1) est installé sur un mécanisme articulé (14.1) qui est couplé avec la commande (14.2) unique, et que, dans la position de travail, le corps de pression (14.10) ou la buse à air comprimé (24.1) s'engage par en dessous dans la saillie (2.2) qui définit la gorge inférieure (2.7) de l'objet (2) à étiqueter et est disposé, au moins partiellement, sous cette saillie (2.2).

K-FEE SYSTEM GMBH, EX2009, page 1487
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

2. Dispositif selon la revendication 1, **caractérisé en ce que** le corps de pression (14.10) touche l'objet (2) à étiqueter pendant l'application adaptée de l'étiquette (1), sachant que, lors du déplacement entre la position de départ et la position de travail et inversement, le mécanisme articulé en plusieurs parties (14.1) conduit le corps de pression (14.10), parallèlement orienté, à une surface de transport ou de support (13) sensiblement plane, qui porte l'objet (2) à étiqueter.

3. Dispositif selon la revendication 1, **caractérisé en ce que** le corps de pression (14.10) touche l'objet (2) à étiqueter pendant l'application adaptée de l'étiquette, sachant que, lors du déplacement de la position de départ dans la position de travail et inversement, le mécanisme articulé en plusieurs parties conduit le corps de pression (14.10) le long d'un chemin arqué ou en forme d'arc de cercle.

4. Dispositif selon l'une des revendications 1 à 3, **caractérisé en ce que** le dispositif de pression (14) est doté d'au moins un dispositif d'ajustage, au moyen duquel son point d'attaque peut être ajusté par rapport à l'objet (2) à étiqueter et / ou à la surface de transport ou de support (13).

5. Dispositif selon l'une des revendications 1 à 4, **caractérisé en ce que** le dispositif de pression (14) est doté de différents corps de pression (14.10) interchangeables, sachant que l'un desdits corps de pression (14.10) contacte, à l'état monté, l'objet (2) à étiqueter pendant l'application adaptée de l'étiquette (1), et / ou est doté de différents éléments d'engrenage (17, 18, 19, 20, 14.8, 14.9) interchangeables.

6. Dispositif selon l'une des revendications 1 à 5, **caractérisé en ce que** un système d'orientation qui est doté d'au moins un dispositif de guidage (8, 10) qui oriente, parallèlement à un bord actif (14.14) longitudinal du corps de pression (14.10), la saillie (2.2) allongée qui définit la gorge (2.7) de l'objet (2) à étiqueter.

7. Dispositif selon la revendication 6, **caractérisé en ce que** le dispositif de guidage est formé par des transporteurs (10.1, 10.2), de préférence par des transporteurs continus, qui sont dotés d'au moins un entraînement (10.3).

8. Dispositif selon revendication 6 ou 7, **caractérisé en ce que** la hauteur du dispositif de guidage (10) ou des transporteurs (10.1, 10.2) peut être réglée par rapport à la surface de transport ou de support (13).

9. Dispositif selon l'une des revendications 6 à 8, **caractérisé en ce que** le dispositif d'orientation est doté d'au moins deux transporteurs à sangle (10.1, 10.2) qui, s'étendant parallèlement l'un par rapport à l'autre, limitent un chemin de transport de l'objet (2) à étiqueter et peuvent être déplacés l'un vers l'autre et à l'opposé l'un de l'autre.

10. Dispositif selon la revendication 9, **caractérisé en ce que** l'une des sangles, au moins, est formée de plusieurs couches et est dotée d'une couche d'entraînement (10.6,10.7) qui, réalisée en mousse souple ou en matière reprenant élastiquement sa forme initiale, est orientée vers le chemin de transport.

11. Dispositif selon l'une des revendications 1 à 10, **caractérisé en ce que** au moins un dispositif d'alimentation en étiquettes (3, 5, 6), qui amène l'étiquette (1) au dispositif d'application d'en haut ou d'en bas par rapport à un chemin de transport de l'objet (2) à étiqueter.

12. Dispositif selon l'une des revendications 1 à 11, **caractérisé en ce que** le dispositif de pression (14) peut être désactivé de sorte que l'application de l'étiquette (1) au moyen du dispositif d'application puisse être aussi effectuée sans agissement du dispositif de pression (14).

13. Dispositif selon l'une des revendications 1 à 12, **caractérisé par** plusieurs dispositifs de pression (14) du genre indiqué, au moyen desquels l'étiquette (1) ou plusieurs étiquettes peut / peuvent être appliquée(s) sur la gorge (2.7) ou sur plusieurs telles gorges de l'objet (2) à étiqueter en en épousant le contour.

14. Dispositif selon la revendication 13, **caractérisé en ce que** les dispositifs de pression, destinés à appliquer l'étiquette (1) au moins prévue sur une gorge (2.7) au moins prévue, en en épousant le contour, agissent sur des côtés opposés de l'objet (2)

15. Dispositif selon l'une des revendications 1 à 14, **caractérisé par** un dispositif de commande (25) au moyen duquel la commande (14.2), qui meut le dispositif de pression (14), et un transporteur (10.1, 10.2), qui transporte l'objet (2) à étiqueter, peuvent être commandés de telle manière que l'objet (2) à étiqueter soit fixé dans une position d'application au moyen du transporteur (10.1, 10.2) et que le corps de pression (14.10), destiné à appliquer l'étiquette (1) sur la gorge (2.7) de l'objet (2), en en épousant le contour, soit déplacé vers ledit objet (2).

16. Dispositif selon l'une des revendications 1 à 15,

K-FEE SYSTEM GMBH, EX2009, page 1488
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

caractérisé par un dispositif de commande (25) au moyen duquel la commande (14.2), qui déplace le dispositif de pression (14), et / ou un transporteur (10.1, 10.2), qui transporte l'objet (2) à étiqueter, sont commandés de telle manière que l'objet (2) soit déplacé, au moyen du transporteur (10.1,10.2), le long d'une zone d'application et que le corps de pression (14.10), pour l'application de l'étiquette (1) sur la gorge (2.7) de l'objet (2) en en épousant le contour, soit déplacé le long de la zone d'application, à l'encontre dudit objet (2), de telle manière que l'application de l'étiquette (1) sur la gorge (2.7) en en épousant le contour s'effectue pendant le déplacement de l'objet (2) et le déplacement du dispositif de pression (14).

17. Dispositif selon l'une des revendications 15 à 16, **caractérisé en ce que** le dispositif de commande (25) est pourvu d'un système d'introduction de données et / ou d'une interface de données par l'intermédiaire desquels des données concernant les dimensions et / ou la constitution de l'objet (2) à étiqueter, en particulier la position de la saillie (2.2), et / ou des données concernant la conception de l'étiquette (1) à appliquer, peuvent être mémorisées dans une mémoire de données, et que le dispositif de commande (25) commande le dispositif de pression (14) et / ou le transporteur (10.1, 10.2), en particulier l'entraînement (10.3, 14.2) de celui-ci / de ceux-ci, et / ou le dispositif d'ajustage de celui-ci / de ceux-ci, en fonction des données introduites.

K-FEE SYSTEM GMBH, EX2009, page 1489
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

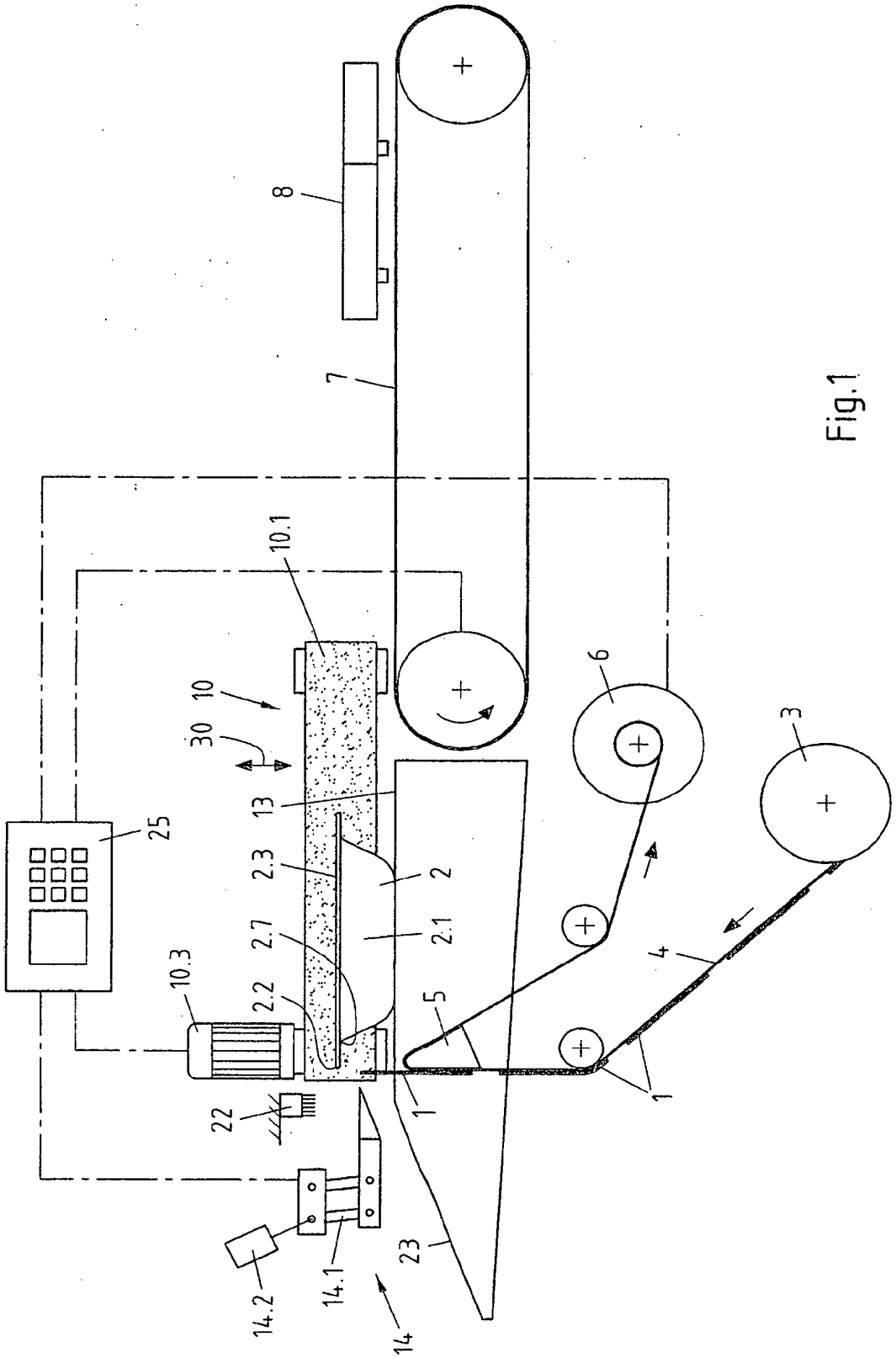


Fig.1

K-FEE SYSTEM GMBH, EX2009, page 1490
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

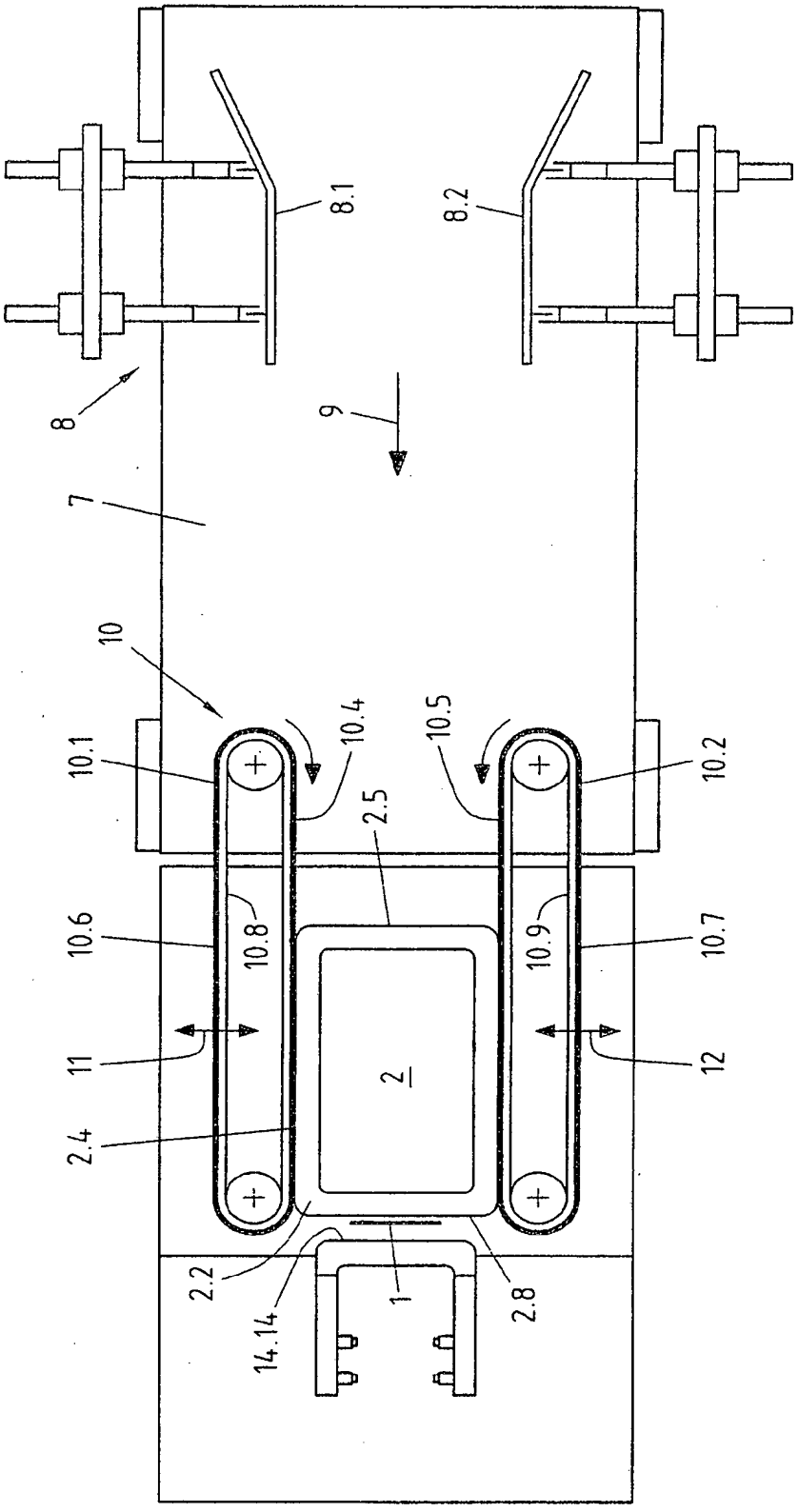


Fig. 2

K-FEE SYSTEM GMBH, EX2009, page 1491
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

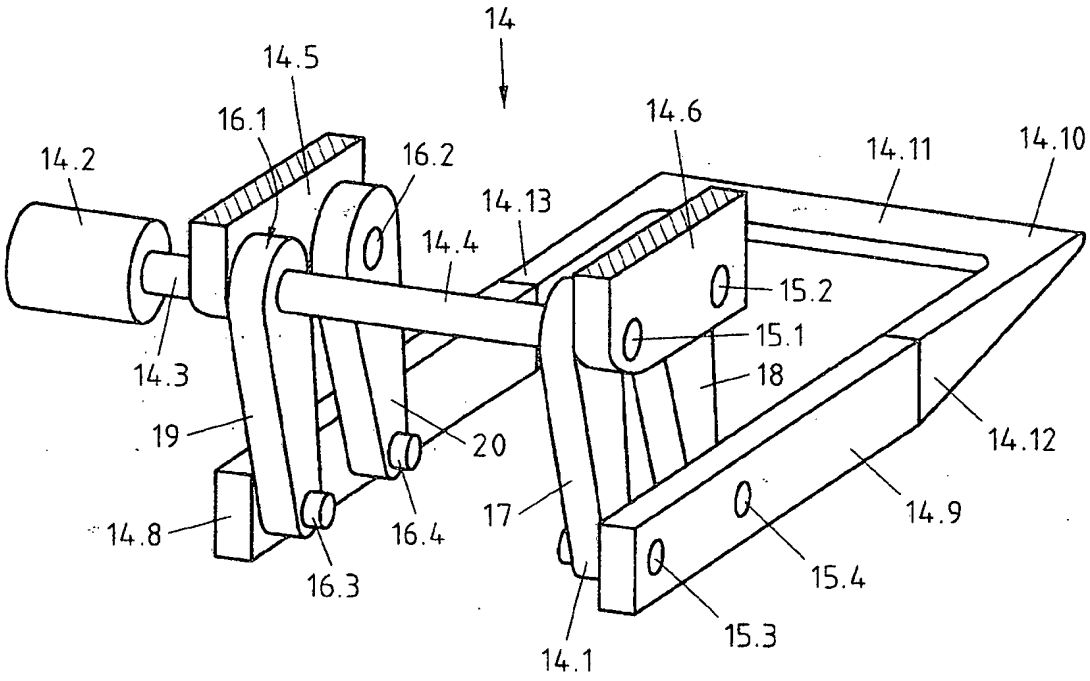


Fig.3

K-FEE SYSTEM GMBH, EX2009, page 1492
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

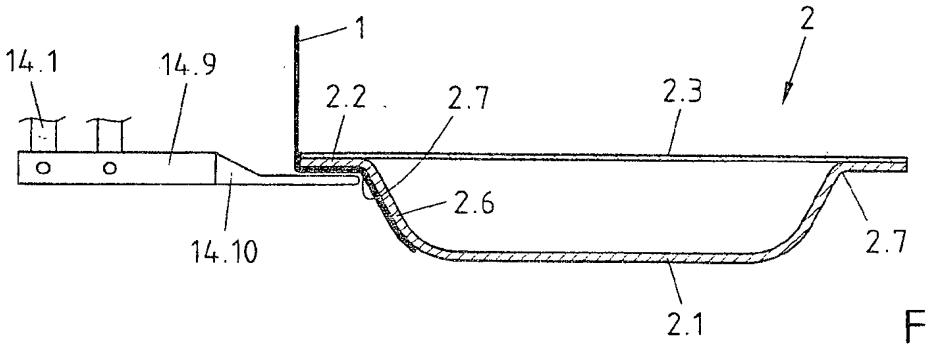


Fig.4

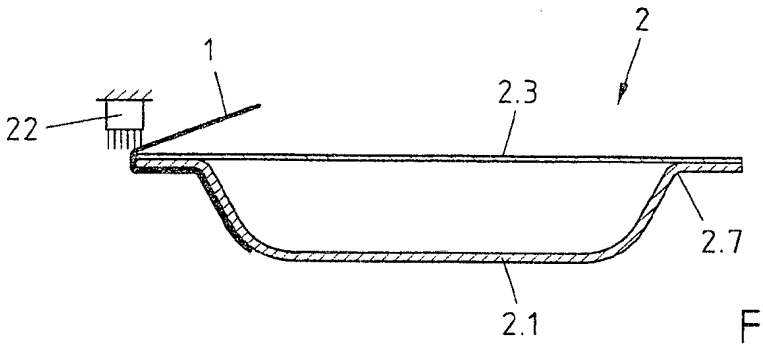


Fig.5

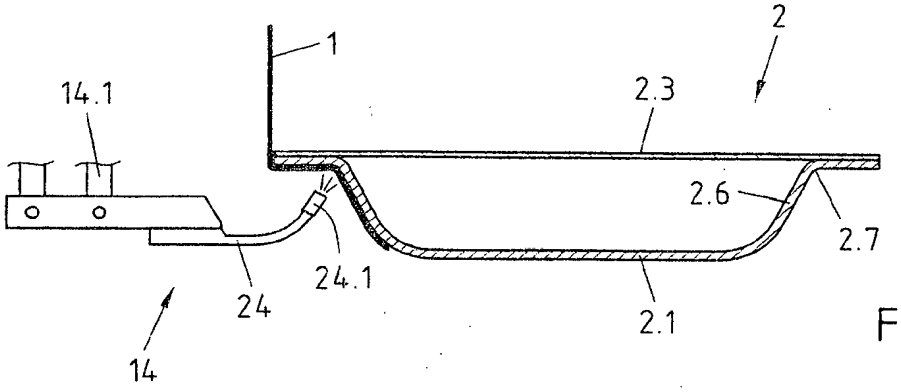


Fig.6

K-FEE SYSTEM GMBH, EX2009, page 1493
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

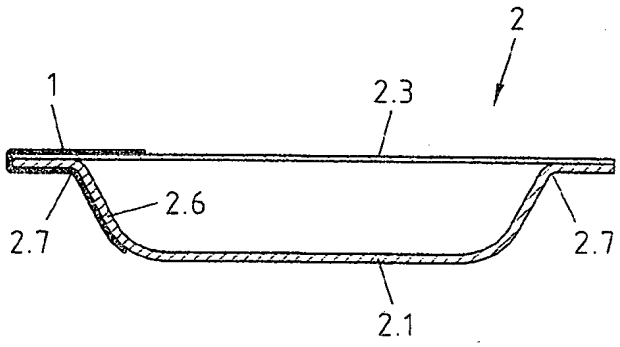


Fig.7

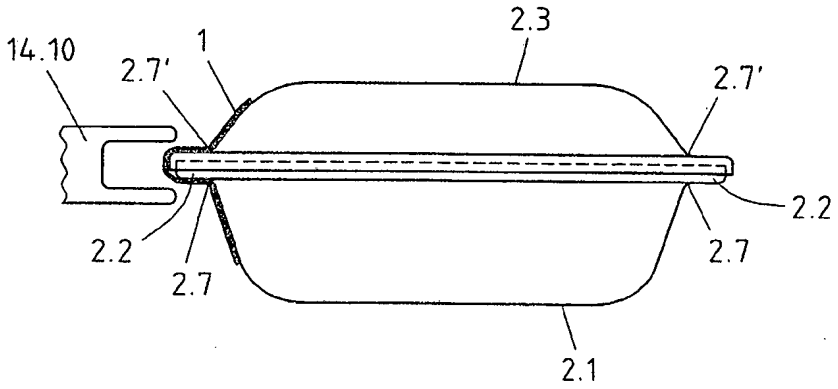


Fig.8

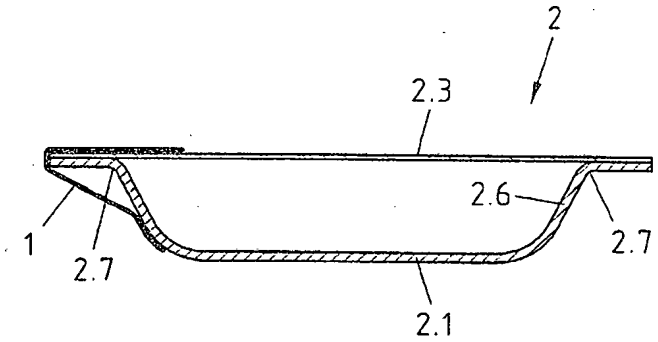


Fig.9 Stand der Technik

K-FEE SYSTEM GMBH, EX2009, page 1494
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

IN DER BESCHREIBUNG AUFGEFÜHRTE DOKUMENTE

Diese Liste der vom Anmelder aufgeführten Dokumente wurde ausschließlich zur Information des Lesers aufgenommen und ist nicht Bestandteil des europäischen Patentdokumentes. Sie wurde mit größter Sorgfalt zusammengestellt; das EPA übernimmt jedoch keinerlei Haftung für etwaige Fehler oder Auslassungen.

In der Beschreibung aufgeführte Patentdokumente

- JP 2002154509 A **[0002] [0007]**
- US 6155322 A **[0006] [0013]**
- DE 2901702 A1 **[0008]**

K-FEE SYSTEM GMBH, EX2009, page 1495
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 637 457 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
14.09.2011 Bulletin 2011/37

(21) Application number: **03817199.7**

(22) Date of filing: **19.06.2003**

(51) Int Cl.:
B65D 1/00 *(2006.01)*

(86) International application number:
PCT/JP2003/007804

(87) International publication number:
WO 2004/113180 (29.12.2004 Gazette 2004/53)

(54) IN-MOLD LABEL SYSTEM PLASTIC CONTAINER

ETIKETTENSYSTEM IM WERKZEUG FÜR KUNSTSTOFFBEHÄLTER

RECIPIENT EN MATIERE PLASTIQUE A SYSTEME D'ETIQUETTE EN MOULAGE INCORPORE

(84) Designated Contracting States:
CH DE FR GB LI SE

(43) Date of publication of application:
22.03.2006 Bulletin 2006/12

(73) Proprietor: **DAI NIPPON PRINTING CO., LTD.**
Tokyo 162-8001 (JP)

(72) Inventor: **SHINOGI, Norikazu**
Tokyo 162-8001 (JP)

(74) Representative: **Needle, Jacqueline**
Beck Greener
Fulwood House
12 Fulwood Place
London
WC1V 6HR (GB)

(56) References cited:

JP-A- 8 132 477	**JP-A- 02 052 712**
JP-A- 07 137 109	**JP-A- 08 132 477**
JP-A- 08 197 574	**JP-A- 09 174 595**
JP-A- 11 105 067	**JP-A- 57 064 530**
JP-A- 2000 142 747	**JP-A- 2000 177 784**
JP-A- 2000 178 364	**JP-A- 2001 010 677**
JP-A- 2002 211 575	**JP-A- 2003 128 037**
JP-A- 2003 170 920	**JP-U- 60 154 216**

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 637 457 B1

Printed by Jouve, 75001 PARIS (FR)

K-FEE SYSTEM GMBH, EX2009, page 1496
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Description

[0001] The present invention relates to an inmold labeled plastic container.

[0002] There are a variety of methods of labeling a side part of a plastic container including one by which the rear face of a label is glued and the label is stuck to the plastic container and another by which a seal type label to whose rear face an adhesive is already applied is stuck.

[0003] Among others, the inmold labeling system by which a label is inserted at the same time as molding of a plastic container to form the container and the label integrally has come to be frequently used in recent years. Since a plastic container formed by this inmold labeling system uses neither glue nor adhesive and accordingly its label and resin are melt-joined, the label does not come off even in a state of high temperature and high humidity. Therefore, such plastic containers are in very high demand for use in humid places such as bathrooms and toilets and as containers whose contents are to be used together with water, such as shampoo and detergent.

[0004] Furthermore, a container of the inmold labeling type, because of the absence of a level gap between the label and the container, can be designed to manifest aesthetic excellence as a whole, and many of this type are used as plastic containers for beverages and foods including juice, coffee and yoghurt.

[0005] However, where such an inmold labeling system was used, there arose a problem that the inmold label fitted within the female mold was shoved by molten resin, when it was extruded, to give rise to wrinkles or molten resin flowed into the gap between the female mold and the inmold label.

[0006] Such problems can be solved to some extent by eliminating dimensional fluctuations of the inmold label and fix to the inside of the female mold by some devices or other, but it is all but impossible to eliminate errors in every dimension of inmold labels which are mass-produced, and the installation of a label fixing device inside the female mold would complicate the fitting of the label in itself and invite a drop in yield, which is undesirable.

[0007] Incidentally, inmold labeled type plastic containers have aesthetic excellence (more specifically, this refers to characteristics that the whole container can be covered with a level, there is no level gap between the label and the plastic, and the label can be printed by gravure or offset process and accordingly can well represent the design) as mentioned above, and the inmold label can be given such functions as light interception and barriering, with the result that they are often used as cups for food, especially as beverage cups, and general consumers often would directly bring their mouths into touch with the openings of inmold labeled type plastic containers to drink or eat the contents.

[0008] Therefore, the opening of an inmold labeled type plastic container is required to be agreeable and safe to touch.

[0009] JP 2000 177784 describes an injection molded container provided with a label made up by laminating a base layer having a specific barriering property which is adhered close to the external wall face of the container, and a lid material made up by laminating the base layer having the same barriering property is stuck close to the surface of the flange of the container.

[0010] The present invention seeks to provide an inmold labeled plastic container which, even where there are slight dimensional errors in the inmold label, can be manufactured unaffected in aesthetic design or yield.

[0011] According to the present invention, there is provided an inmold labeled plastic container according to claim 1.

[0012] When an inmold labeled plastic container is formed by using a female metal mold and a male metal mold, a deviation may arise in assembling the metal molds. For example, even if there is no deviation between the metal molds at the beginning, the metal molds become worn and may give rise to a deviation during the production of containers. If molten resin is injected to form a container in the presence of a deviation between metal molds, a level gap may occur in the deviated part, not only marring the aesthetic design but also causing the user to feel an awkward mouth touch when drinking from the container. However, as in the invention, it is arranged that the flange width of the flange part formed by the female mold is smaller than the flange width of the flange part formed by the male mold, even if the male mold and the female mold deviate from each other, the deviation can be concealed by the side part on the back of the flange (the face reverse to the face to which the lid member is to be stuck), with the result that neither the overall aesthetic design be marred nor the user is caused to feel an awkward mouth touch.

[0013] Since, in an embodiment, the flange width of the flange part is 2 mm or more, it is possible to make the seal sufficiently strong when the lid member to be stuck to the opening in the upper part of the container is to be sealed, and the user will feel nothing awkward even if he or she directly touches it with his or her own mouth. Also, as the flange thickness is not less than 0.5 mm, the flange part is enabled to bear the damage it is subjected to when the lid member is to be stuck.

[0014] Preferably, a bottom rim is formed in the bottom part of the container, with a dimension of not less than 0.3 mm but not more than 20 mm, and the bottom rim is labeled in a similar way to the side part of the container.

[0015] With such an embodiment, when molten resin is injected from the part constituting the bottom of the container, the molten resin flowing from the bottom part to the side part flows not only toward the side part but also toward the bottom rim part, and is therefore prevented from being peeled off or flowing over the front surface of the label (between the inner surface of the female mold and the label).

[0016] Even if there is any error in the inmold label, as the container has the bottom rim, the bottom rim performs the

K-FEE SYSTEM GMBH, EX2009, page 1497
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

role of an "escape" to adjust the dimensional error, with the result that the container is unaffected in aesthetic design.

[0017] In an embodiment, the relationships among the wall thickness (A) of the intersection between the bottom rim and the side part of the container, the wall thickness (B) of the side part of the container and the wall thickness (C) of the side part of the container may be $A \leq 2 \times B$ and $A \leq 2 \times C$.

[0018] Embodiments of the present invention enable the provision of an inmold labeled plastic container which, when molten resin is injected, is free from peeling of the label during injection molding and floating of the label after the injection molding, and excels in aesthetic design.

[0019] In an embodiment, the thickness of the label does not exceed 150 μm.

[0020] When the thickness of the label increases, the width of the gap in which injected molten resin flows significantly differs between where the label is present and where it is absent, and this would inevitably invite a difference in the flowing velocity of the molten resin according to the presence or absence of the label. When a substantial difference in the flowing velocity of the molten resin occurs in this way, there will arise differences in the time taken by the resin to different parts of the container, and a so-called weld will occur in the flange part of the part where an earlier arriving part of the resin and a later arriving part of the resin meet, which might invite a fatal defect of splitting of the flange when the lid member is to be sealed.

[0021] However, since the thickness of the label is not more than 150 μm, there will arise no significant difference in the flowing velocity of the molten resin between where the label is present and where it is absent, with the result the occurrence of a so-called weld can be prevented.

[0022] Preferably, the label may have a configuration in which a plurality of thin films are stacked, the thin film positioned on the front face and the thin film positioned on the rear face consist of thin films of the same material, and further at least a resin film layer and a barrier layer having a defined strength or barrier layers having a defined strength are stacked between these thin films.

[0023] Furthermore, the thin film positioned on the front face and the thin film positioned on the rear face of the label may consist of biaxially oriented polypropylene resin film layers or polyethylene resin film layers; the resin film layers having the defined strength may consist of biaxially oriented polyethylene terephthalate film layers, biaxially oriented polyamide film layers or biaxially oriented polypropylene film layers; and the barrier layers may consist of metal foil layers, vapor-depositedmetal film layers or inorganic vapor-deposited oxide film layers.

[0024] By using such a label, the label can be prevented from curling when the container is formed, the label can be given a barriering function and, depending on the layer configuration of the label, the container can be made usable in a microwave oven.

[0025] Preferably, the relationship between the fluid length (L) of the injected molten resin and the average wall thickness (t) of the container may be $L/t \leq 250$.

[0026] With embodiments of the invention, the pressure of the molten resin is sufficiently transmitted to the flange part to provide an inmold labeled type plastic container which is highly accurate and free from unintended unlabeling or wrinkling, and excels in aesthetic design.

[0027] Embodiments of the present invention will hereinafter be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a schematic illustrative diagram illustrating one example of a molding method for an inmold labeled plastic container of the invention;
FIG. 2 shows an enlarged section of a bottom rim 20 encircled at (i) in FIG. 1;
FIG. 3 shows an enlarged section of a flange part 30 encircled at (ii) in FIG. 1;
FIGS. 4, (a) and (b) show front views of a label for use on a side part, and (c) shows a front view of a label for use on a bottom part of a container;
FIGS. 5 (a) and (b) show enlarged sectional views of the shape of a flange part in a container of the invention;
FIG. 6 shows a sectional view of an embodiment of an inmold labeled plastic container where the content is to be a retort food compatible with a microwave oven; and
FIG. 7 shows a sectional view of an example of an inmold labeled plastic container without a bottom rim.

[0028] A molding method for inmold labeled plastic containers is described below, followed by a description of specific parts of the formed container.

[1] Method of forming the inmold labeled type plastic container

[0029] FIG. 1 illustrates one example of a molding method for an inmold labeled plastic container of the invention. The molding method depicted in FIG. 1 is merely one typical example, but the method by which an inmold labeled plastic container is molded is not limited to this method.

[0030] The molding method illustrated is a method of simultaneous labeling with the molding of a container using

K-FEE SYSTEM GMBH, EX2009, page 1498
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

female and male metal molds. An inmold label is fitted within a gap resulting from the joining of the female mold and the male mold and then molten resin is extruded into the gap. The method uses an metal mold for injection molding comprising a male metal mold 1 (hereinafter sometimes referred to as simply "male mold"), a female metal mold 2 (hereinafter sometimes referred to as simply "female mold"), a runner 3, a gate opening 4, a vacuum suction device 5a fitted to the male mold 1, vacuum suction devices 5b and 5b fitted to the female mold 2 and so forth; first, a label R1 for the side part is so fitted onto the inner wall surface of the female mold 2 as to be tightly stuck to a position corresponding to the whole outer wall surface of the side part of the molded container while fixing it by vacuum suction utilizing the vacuum suction devices 5b and 5b and the like, and similarly a label R2 for the bottom part is so fitted onto the surface in a position corresponding to the bottom part of the male mold 1 while fixing it by vacuum suction utilizing the vacuum suction device 5a. Then, the male mold 1 is fixed to the female mold 2; after that, molten resin 6 is injected from the gate opening 4 with a heating cylinder (not shown) into the gap formed by the female mold 2 and the male mold 1 by way of the runner 3 to form a container 7 matching the shape of the gap and to tightly adhere the label R1 for the side part and the label R2 for the bottom part in a molten-integrated form to all over the outer wall surface of the body part an all over the inner bottom wall surface of the bottom constituting that container 7; after that the molded product, which has been hardened by cooling, is taken out, thereby enabling the inmold labeled type molded container according to the invention to be produced.

[0031] And, first the inmold labeled type plastic container 7 according to the invention formed by this method is characterized in that the relationship between the fluid length L of the injected molten resin and the average wall thickness 5 (not shown) of the container 7 is $L/t \leq 250$.

[0032] By keeping the fluid length L of the molten resin 6 and the average wall thickness 5 of the container 7 in such a relationship, the pressure of the molten resin is sufficiently transmitted to the flange part to obtain an inmold labeled type plastic container which is highly accurate and free from unintended unlabeling or wrinkling, and excels in aesthetic design.

[2] First characteristic feature of the inmold labeled type plastic container

[0033] FIG. 2 is a diagram for describing the inmold labeled type plastic container 7 in a mode for carrying out the invention formed by the inmold labeled type plastic container moldingmethod shown in FIG. 1, and more specifically a diagram showing an enlarge section of a bottom rim 20 (sign (i) in FIG. 1)

[0034] As shown in FIG. 2, the bottom rim 20 is formed in the lower part of the inmold labeled type plastic container 7 according to the invention and, with its dimension x being not less than 0.3 mm but not more than 20 mm, the bottom rim too is characterized by being labeled with a label R1 similar to that on the container's side part 8.

[0035] Setting the dimension x of the bottom rim 20 not less than 0.3 mm but not more than 20 mm and labeling it with the label R1 similar to that on the container's side part 8 as in the present invention causes the molten resin to be fluid as indicated by arrow 100 in the diagram prevents the molten resin from flowing over the surface of the label R1.

[0036] The reason is that, if the dimension x of the bottom rim 20 is shorter than 0. 3 mm (the bottom rim 20 is absent), the tip portion of the label R1 will be positioned in the vicinity of the joint portion between the container's side part 8 and the container' s bottom part 9, the molten resin will flow over the surface of the label R1 at the time of molding and adversely affect the aesthetic design of the container 7. On the other hand, if the dimension x of the bottom rim 20 is longer than 20 mm, there will be no problem in its relationship to the label R1, but eventually the wall thickness (a) of the intersection between the bottom rim 20 and the container's bottom part 9 will increase, sometimes giving rise to a problem, such as the label coming off in the container after injection molding.

[0037] The inmold labeled type plastic container 7 according to the invention is also characterized by relationships of $A \leq 2 \times B$ and $A \leq 2 \times C$ among the wall thickness (a) of the intersection between the bottom rim 20 and the container's bottom part 9, the wall thickness (b) of the container's bottom part and the wall thickness (c) of the container's side part.

[0038] By keeping the above-stated relations among these wall thicknesses, the flow of the molten resin can be smoothened, with the result that the labels R1 and R2 from coming or floating.

[0039] It is preferable for the wall thickness (a) of the intersection to be in a range of 1.0 to 3.0 mm, and 1.5 mm is particularly preferable in this range. It is preferable for the wall thickness (b) of the container's bottom part to be in a range of 0.5 to 1.5 mm, and 1.0 mm is particularly preferable in this range. Further, it is preferable for the wall thickness (c) of the container's side part to be in a range of 0.5 to 1.5 mm, and 0.7 mm is particularly preferable in this range.

[3] Second characteristic feature of the inmold labeled type plastic container

[0040] FIG. 3 is a diagram for describing the inmold labeled type plastic container 7 in another mode for carrying out the invention formed by the inmold labeled type plastic container molding method shown in FIG. 1, and more specifically a diagram showing an enlarge section of a flange part 30 (sign (ii) in FIG. 1).

[0041] As shown in FIG. 3, the inmold labeled type plastic container 7 according to the invention has the flange part

K-FEE SYSTEM GMBH, EX2009, page 1499
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

30 formed at the upper end of its side part 8, and is characterized by its dimensions which are not less than 2 mm in flange width y and not less than 0.5 mm in flange thickness z.

[0042] By setting the flange width y of the flange part 30 to not less than 2 mm as in the present invention, it is made possible to make the seal sufficiently strong when the lid member to be stuck to the opening part of the container 7 is to be sealed, and the user will feel nothing awkward even if he or she directly touches it with his or her own mouth. According to the invention, no particular upper limit is prescribed to the flange width y of the flange part 30, and the width can be set as desired. However, considering the case in which the user directly drinks or eats the content with his or her mouth in direct contact with the container 7, too great a width would not be preferable; in specific terms about 2.0 mm is preferable, and a width greater than 10.0 mm would pose an obstacle and therefore be undesirable when the content is to be drunk or eaten.

[0043] Also, by setting the flange thickness z to not less than 0.5 mm as in the invention, the flange part is enabled to bear the damage it is subjected to when the lid member is to be sealed. The invention prescribes no particular upper limit to this flange thickness z either, and the thickness can be set as desired. However, considering the case in which the user directly drinks or eats the content with his or her mouth in direct contact with the container 7, too great a thickness would conceivably make him or her feel awkward, and therefore about 1.0 mm is preferable.

[0044] Further, the inmold labeling type plastic container 7 according to the invention is characterized in that the female mold 2 and the male mold 1 are joined at the flange part 30 in the formed container 7 (see reference sign 31 in FIG. 3), and the container is fabricated by using the female mold 2 and the male mold 1 so designed that the flange width y' of a flange part 32 formed by the female mold 1 is smaller than the flange width y of a flange part 33 formed by the male mold 1.

[0045] The use in this way of the female mold 2 and the male mold 1 so designed that the flange width y' of the flange part 32 formed by the female mold 1 is smaller than the flange width y of the flange part 33 formed by the male mold 1 results in the formation of the lower side of the flange shown in FIG. 3 (reference sign 32) in a smaller size, even if any deviation, either back and forth or right and left, arises between the female mold 1 and the male mold 2, the lower side 32 of the flange will not protrude, with the result that the overall aesthetic design of the container 7 is not adversely affected.

[0046] In this case, though the metal molds will be so designed as to create an intentionally disposed level gap S on the flange part 30 as shown in FIG. 3, the lower side 32 of the flange is invisible when viewed from above the container, and accordingly no problem will arise; the user is likely to have no awkward feeling even when his or her mouth is brought into direct touch with the flange.

[0047] The dimension of the level gap S intentionally disposed to tolerate the deviation arising when the metal molds are combined, if it is substantially equal to the deviation arising when the metal molds are combined, can be set as desired according to the accuracy of the formation apparatus that is actually used. If it is a usual formation apparatus for inmold labeled type plastic containers, the dimension of S will be sufficient if it is set to about 0.05 mm.

[0048] Further at the reference 31 of the flange part 30 of the container 7 according to the invention, its tip 34 may as well be rounded as illustrated because the female mold 2 and the male mold 1 are combined.

[4] Other characteristic features

[0049] Other characteristic features of the inmold labeling type plastic container according to (various modes for carrying out) the present invention will be described in specific terms.

(Molten resin)

[0050] First, as the molten resin 6 for use in molding the container 7 according to the invention as described above, one of various polyethylene resins for molding use such as high density polyethylene, medium density polyethylene, low density polyethylene or some other kind, polypropylene, polystyrene, polyethylene terephthalate, polycarbonate or the like can be used.

(Labels)

[0051] On the other hand, for the label R1 for the side part and the label R2 for the bottom part for use in molding the inmold labeled type plastic container 7 according to the invention as described above, there is no particular restriction if the thickness is not greater than 150 μm, any of all the already known inmold labels having various functions can be used for the purpose.

[0052] However, it is preferable to use as labels for the inmold labeled type plastic container according to the invention labels each having a configuration in which a plurality of thin films are stacked, the thin film positioned on the front face and the thin film positioned on the rear face consist of thin films of the same material, and further at least a resin film layer and a barrier layer having the defined strength or barrier layers having the defined strength are stacked between these thin films; it is further preferable that the thin film positioned on the front face and the thin film positioned on the

K-FEE SYSTEM GMBH, EX2009, page 1500
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

rear face of the label consist of biaxially oriented polypropylene resin film layers or polyethylene resin film layers, the resin film layers having the defined strength consist of biaxially oriented polyethylene terephthalate film layers, biaxially oriented polyamide film layers or biaxially oriented polypropylene film layers, and the barrier layers consist of metal foil layers, vapor-deposited metal film layers or inorganic vapor-deposited oxide film layers.

[0053] As materials to constitute the thin films positioned on the front face and the rear face of the label, for instance one of various polyethylene resins for molding use such as high density polyethylene, medium density polyethylene, low density polyethylene, linear (straight chain) polyethylene or some other kind, polypropylene resins, polyester resins, polyamide resins or some other resin films or sheets. Among the aforementioned polyethylene resins, co-extruded films or sheets of these resins can also be used. As films or sheets of the aforementioned resins, unoriented or oriented films oriented in the monoaxial or biaxial direction can be used, and their desirable thickness is about 6 to 100 μm, more preferably about 12 to 50 μm. By configuring in this way the thin film positioned on the front face and the thin film positioned on the rear face of the label consist of thin films of the same material, the fabricated label can be prevented from curling. Further, it is desirable to use as the material to constitute the thin film positioned on the rear face of the label a heat-sealable material which has a property, when the polyethylene resin for molding use constituting the container is injected and extruded to come into contact with it, to melt together and tightly adhere to each other; it is desirable to use as the material to constitute the thin film positioned on the front face of the label a material which can keep the resilience, strength and other characteristics of the label, more desirably what has a rigidity of 5.000 Kg/cm2 in Young's modulus.

[0054] Next, as materials for the resin film layers having the defined strength to constitute part of the label according to the invention, for instance polyester resin (polyethylene terephthalate resin), polyamide resin, polyaramid resin, polypropylene resin, polycarbonate resin, polyaracetal resin or some other tough resin films or sheets can be used. And film or sheet of any of the resins stated above performs a function of further reinforcing the function of the material constituting the aforementioned outermost layer, and preferably should have, for instance, rigidity and be excellent in mechanical, physical, chemical and other properties. It is preferable to use as the aforementioned resin films or sheets oriented films oriented in biaxial directions. Further according to the invention, the thickness of the resin films or sheets need not be greater than the minimum required to provide them with sufficient strength, rigidity and other properties; too great a thickness would entail a disadvantage of boosting the label cost or, conversely, too small a thickness would entail poor strength, rigidity and other properties and therefore be undesirable. According to the present invention, it is preferable for the reasons stated above to use a thickness of about 10 μm to 50 μm, most desirably about 12 μm to 25 μm.

[0055] Then, as materials for the barriering base layer to constitute part of the label, a material having a property to intercept light including sunlight or a material having a property not to allow permeation of water vapor, water, gas or the like can be used, and this may be a single-component base material, a composite base material combining two or more kinds of base materials, or the like. More specifically, what can be used may be, for instance, an aluminum foil having light-intercepting and barriering properties or a resin film on which such a foil is vapor-deposited, a resin film having a vapor-deposited film of an inorganic oxide such as silicon oxide having a barriering property or aluminum oxide, a resin film or sheet of low density polyethylene, medium density polyethylene, high density polyethylene, straight chain low density polyethylene, polypropylene, ethylene-propylene copolymer or the like, a resin film or sheet having a gas-barriering property of polyester resin, polycarbonate resin, nylon resin (polyamide resin), acryl nitrile resin, polyvinyl alcohol, saponified ethylene-acetic vinyl copolymer or the like, or a film or sheet of one or another of various colored resins, which have a property to intercept light, formed by adding a coloring agent such as a pigment augmented with a desired additive or the like to the resin, and mixing and kneading them into a film. Any one of these materials singly or in combination with another or more can be used. Any of the aforementioned resin films or sheets may have any desired thickness, but it is usually about 6 μm to 100 μm, and more preferably about 7 μm to 30 μm. Further in the foregoing, an aluminum foil of about 6 μm to 50 μm in thickness or a resin film on which an aluminum foil is vapor-deposited of about 100 Å to 1000 Å in thickness can be used. As a resin film to support the aforementioned vapor-deposited film, for instance a polyester film, polyamide film, polyolefin film, polycarbonate film, polyvinyl alcohol film, saponified ethylene-acetic vinyl copolymer film or some other film can be used.

[0056] Incidentally, since a label is usually placed under severe conditions both physically and chemically, the laminated materials to constitute the label are subject to stringent requirements regarding strength against deformation, strength against drop impact, resistance to pin holes, thermal resistance, sealing performance, qualitative stability, working ease, sanitariness and in other respects, and for this reason other materials satisfying these conditions can be used as desired besides the materials enumerated above; they can be selected from the films or sheets of, for instance, low density polyethylene, medium density polyethylene, high density polyethylene, linear low density polyethylene, polypropylene, ethylene-propylene copolymer, ethylene-acetic vinyl copolymer, ionomer resin, ethylene-ethyl acrylate copolymer, ethylene-acrylic acid copolymer or methacrylic acid copolymer, methyl pentene polymer, polybutene resin, vinyl polychloride resin, vinyl polyacetate resin, polyvinylidene chloride resin, vinyl chloride-vinylidene chloride copolymer, poly (meta) acryl resin, polyacryl nitrile resin, polystyrene resin, acrylonitrile-styrene copolymer (AS resin), acrylonitrile-butadiene-styrene copolymer (ABS resin), polyester resin, polyamide resin, polycarbonate resin, polyvinyl alcohol resin, saponified

K-FEE SYSTEM GMBH, EX2009, page 1501
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ethylene-acetic vinyl copolymer, fluorine resin, diene resin, polyaracetal resin, polyurethane resin, nitrocellulose and other known resins. Besides them, for instance films such as cellophane or synthetic paper or the like can also be used. In the present invention, the aforementioned resin films or sheets can be used unoriented or oriented in uniaxial or biaxial directions . Their thickness can be selected as desired from a range of about a few μm to 150 μm and used. Further according to the invention, the resin films or sheets may be in any state, such as extruded film, inflation film or coating film.

[0057] Next to describe the fabrication method for the above-mentioned laminated materials to be stacked to fabricate a label according to the invention, applicable methods include one or another of laminating methods for use in fabricating a usual wrapping material including, for instance, the extrusive laminate method, sand laminate method, co-extrusion laminate method, dry laminate method, solvent-free dry lamination method or some other method. And in performing the above-described lamination according to the invention, for instance, pretreatment such as corona treatment, ozone treatment or frame treatment can be applied to the film and, for example, one or another of isocyanate (urethane), polyethylene imine, polybutadiene, organic titanium and other anchor coating agents, or one or another of known anchor coating agents, adhesives and the like including polyurethane, polyacryl, polyester, epoxy, vinyl polyacetate, cellulose or some other adhesive for use with laminates can be used.

[0058] Incidentally, in any of the above-mentioned fabrication methods for laminated materials to be stacked to fabricate a label according to the invention, as an adhesive extrusion resin to constitute the adhesive layer in performing extrusion lamination, for instance any of polyethylene, ethylene-(-ethyl acrylate copolymer, polypropylene, polybutene, polyisobutene, polyisobutylene, polybutadiene, polyisoprene, ethylene-methacrylic acid copolymer, copolymers of ethylene and unsaturated carbonic acid such as ethylene-acrylic acid copolymer or acid-denatured polyolefin resin obtained by denaturing one or another of them, ethylene-ethyl acrylate copolymer, ethylene-methyl acrylate copolymer, ionomer resin, ethylene-vinyl acetate copolymer or the like can be used. Further, as the adhesive to constitute the adhesive layer for dry lamination according to the invention, in specific terms a two-part hardening type urethane adhesive used in dry lamination or the like, polyester urethane adhesive, polyether urethane adhesive, acryl adhesive, polyester adhesive, polyamide adhesive, vinyl polyacetate adhesive, epoxy adhesive, rubber adhesive or some other adhesive can be used.

[0059] Next will be described the shape of the label for use in the inmold labeled type plastic container according to the invention.

[0060] FIGS. 4 (a) and (b) show front views of the label R1 for the side part and FIG. 4 (c), a front view of the label R2 for the bottom part.

[0061] As shown in FIG. 4 (a), the label R1 for the side part is in a fan shape, and cuts 42 and 42 may be formed in lower parts of two side edges 41 and 41 of the label R1 for the side part. These cuts 42 and 42, at their maximum length, extend to the parts of the side part 8 (see FIG. 1) matching the bottom rim 20, and as a result the height h of the cuts 42 and 42 also is substantially equal to the distance from the bottom end of the label R1 for the side part to the top end of the bottom rim 20.

[0062] By providing the label R1 for the side part with the cuts 42 and 42 in this way, when the label R1 for the side part is fitted into the female metal mold 2, the lower parts of the two side edges 41 and 41 of the label R1 for the side part are prevented from coming into contact with the protruding portion 2a of the female metal mold 2 (see FIG. 1), which would peel off the lower part of this label R1 for the side part. For this reason, there is no possibility for the injected resin 6 to be caused to flow outside the label R1 for the side part by the peeling-off of the label R1 for the side part, and instead the label R1 for the side part can be arranged in its due position outside the side part 8.

[0063] On the other hand, the label R1 for the side part is in a fan shape as shown in FIG. 4 (b), and its four corners may form curved cuts. In this case, the cuts 42 need not be formed. The reason is that, by forming the four corners of the label R1 for the side part in a curved form, even if it comes into contact with the protruding portion 2a of the metal mold 2 (see FIG. 1), the label R1 will slide and reach its regular position.

[0064] Also, as shown in FIG. 2, the diameter of the label R2 for the bottom part may be smaller than the outer diameter D of the side part 8 on the plane of arrangement of the label R2 for the bottom part and greater than the outer diameter E of the bottom part 9 on the plane of arrangement of the label R2 for the bottom part. Thus, a relationship of E < the diameter of the label R2 for the bottom part 0 D can be adopted. Further, it is preferable for the periphery 43 (see FIG. 4 (c)) of the label R2 for the bottom part to protrude outward from the bottom part 9 and to descend.

[0065] By setting the diameter of the label R2 for the bottom part larger than the outer diameter E of the bottom part 9 in this way, when the label R2 for the bottom part is fitted into the female metal mold 2 (see FIG. 1), even if the label R2 for the bottom part somewhat deviates, the bottom part 9 of the container 7 can be sufficiently covered by the label R2. As a result, the gas barriering and other functions of the bottom part 9 can be enhanced. Also, by setting the diameter of the label R2 for the bottom part smaller than the outer diameter D of the side part 9, the injected resin 6 can be let smoothly flow around the bottom rim 20.

[0066] Also, in the inmold labeling type plastic container 7 according to the invention shown in FIGS. 1 through 3 for instance, the label R2 for the bottom part need not be used in every case, and its use can be dispensed with where it is unnecessary (for instance where the container's bottom part requires no aesthetic design or the container's bottom part needs no gas barriering).

K-FEE SYSTEM GMBH, EX2009, page 1502
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(Lid member)

[0067] One or another of various known materials can be used as the material of the lid member for sealing the inmold labeling system type plastic container according to the invention. More specifically, any film or sheet of polyester resin, polyamide resin,polyaramid resin,polypropylene resin, polycarbonate resin, polyaracetal resin, fluorine resin or some other tough resin, or of various paper base materials can be used. As films or sheets of the aforementioned resins, unoriented or oriented films oriented in the uniaxial or biaxial direction can be used. Also, like the aforementioned inmold labels R1 and R2, the lid member can be formed in a laminated structure. For instance, where the lid member is to be provided with a property to intercept light including sunlight or a material having a property not to allow permeation of water vapor, water, gas or the like, materials having such properties can be stacked; what can be used may be, for instance, an aluminum foil having light-intercepting and barriering properties or a resin film on which such a foil is vapor-deposited, a resin film with a barriering property having a vapor-deposited film of an inorganic oxide such as silicon oxide or aluminum oxide, a resin film or sheet of low density polyethylene, medium density polyethylene, high density polyethylene, straight chain low density polyethylene, polypropylene, ethylene-propylene copolymer or the like, a resin film or sheet having a gas-barriering property of polyester resin, polycarbonate resin, nylon resin (polyamide resin), acryl nitrile resin, polyvinyl alcohol, saponified ethylene-acetic vinyl copolymer or the like, or a film or sheet of one or another of various colored resins having a barriering property such as water formed by adding a coloring agent such as a pigment augmented with a desired additive or the like to the resin and mixing and kneading them into a film.

[0068] The foregoing description refers to only one mode for implementing the inmold labeled type plastic container according to the invention, and therefore the invention is not limited by the foregoing description, but can be adapted to various purposes according to the way in which the container is to be used.

(For microwave oven (retort food) use)

[0069] The inmold labeled type plastic container according to the invention can be suitably used as a container applicable to microwave ovens, and in this case the flange part can as well be shaped not only as shown in FIG. 3 but also as shown in FIGS- 5 (a) and (b).

[0070] As shown in FIG. 5 (a), a seal protruding part 50 is disposed on the upper face of the flange part 30 and a reinforcing protruding part 51 hanging from the outer tip of the flange part 30 may also be provided. Incidentally, the seal protruding part 50 need not be provided in some cases. Also, as shown in FIG. 4 (b), the flange part 30 may be inclined downward at a fixed angle $\alpha°$ to a horizontal line 52, which is an extension of a horizontal line linking the opening of the container and indicated by a dotted line. It is preferable for this fixed angle $\alpha°$ to be about 1° to 10° and more preferably 2° to 5°. Such a flange part facilitates the opening and closing of the container, and therefore is suitable for a container whose content is to be a retort food compatible with a microwave oven.

[0071] FIG. 6 shows a sectional view of the inmold labeled type plastic container according to the invention where its content is to be a retort food compatible with a microwave oven.

[0072] As shown in FIG. 6, a container body 60 comprises a circumferential side wall part 61 constituting the barrel of the container, a flange part 62 continuous outward from the top end of the circumferential side wall part 61, a bottom wall part 63 continuous laterally from the bottom end of the circumferential side wall part 61, and a bottom rim 64 continuous in the perpendicular direction from the bottom end part of the circumferential side wall part 61. Incidentally, the flange part 62 has a configuration in which the flange part 62 constituting the container body 60 is inclined downward from the horizontal line indicated by dotted line L from the top end of the circumferential side wall part 61 and is continuous outward as shown in FIGS. 5.

[0073] In such an inmold labeled type plastic container 60 for retort food use, an annular stacking rib 65 can be disposed on the inner circumferential face of the circumferential side wall part 61 constituting the container body 60. And according to the invention, by disposing the annular stacking rib 65 as stated above, it is made possible to stack such containers 60 and provides a reinforcing effect to increase the strength of its barrel. A container to contain a retort food and to be applied to a microwave oven requires a certain strength (namely it has to bear retorting or boiling); further with a view to ensuring a sufficient drop strength and other properties required of the container, regarding the wall thicknesses of the circumferential side wall part 61, the flange part 62 and the bottom wall part 63 constituting the container body 60, it should desirably be such a container injection molded with adjustment to keep the wall thickness T1 of the circumferential side wall part 61 in a range of 0.6 to 1.2 mm, the wall thickness T2 of the bottom wall part 3, 0.7 to 1.3 mm, and the wall thickness T3 of the flange part 62, 0.9 to 1.5 mm.

(What has no bottom rim)

[0074] Although a bottom rim (30 or 64) is formed in every one the inmold labeled type plastic containers described above, the bottom rim is not necessarily indispensable, but a form shown in FIG. 7 is also acceptable.

K-FEE SYSTEM GMBH, EX2009, page 1503
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

[0075] An inmold labeled type plastic container 70 shown in FIG. 7 comprises a flange part 71, a side wall part 72 hanging from the flange part 71 and a bottom part 73 continuous to the side wall part 72. Further the outer bottom face of the bottom part 73 constitutes a grounding face. Further, an annular stacking rib 74 erecting from the bottom part 73 of the container is disposed on the inner circumferential face of the side wall part 72. To describe in further detail the configuration of the corner parts of the container bottom with respect to the above-described inmold labeled type plastic container 70 according to the invention, the thickness of the side wall part 72 in the vicinity of the upper part of the annular stacking rib 74 being represented by U1, the thickness of the side wall part 72 between the bottom part 73 and the annular stacking rib 74 being represented by U2 and further the thickness of the bottom part 73 being represented by U3, it is preferable that they have a relationship of U3 > U2 > U1. Further in the most desirable mode of the invention, it is preferable for them to have relationships of U3 = U1 + 0.4 mm and U2 = U1 +0.2 mm. In the container 70, regarding the configuration of the corner parts of the container bottom, it is preferable for the curve of the inner face P1 of the intersection between the bottom part 73 and the side wall part 72 to have its radius r1 in a range of 1.5U1 to 3U1 and the curve of the outer face P2 of the intersection between the bottom part 73 and the side wall part 72 to have its radius r2 in a range of 1/2U3 to 1/4U3. Further, in more specific terms, in the most desirable mode of the invention, it is preferable for the curve of the inner face P1 to have its radius r1 in a range around 2.0U1, from 1.7U1 to 2.3U1 and the curve of the outer face P2 to have its radius r2 in a range around 1/3U3. In the foregoing, U1, U2 and U3 are in mm units.

[0076] In the foregoing, by adjusting the thickness U1 of the side wall part 72 in the vicinity of the upper part of the annular stacking rib 74, the thickness U2 of the side wall part 72 between the bottom part 73 and the annular stacking rib 74, and the thickness U3 of the bottom part 73 as described above, namely by increasing the thickness of the side wall part 72 toward the bottom and giving a greater thickness to the bottom part than the thickness of the side wall part, the drop strength of the inmold labeled type plastic container according to the invention is increased. Further by adjusting the radius r1 of the curve of the inner face P1 of the intersection between the bottom part 73 and the side wall part 72 and the radius r2 of the curve of the outer face P2 of the intersection between the bottom part 73 and the side wall part 72, namely by making curvilinear the inner face P1 of the intersection between the bottom part 73 and the side wall part 72 and the outer face P2 of the intersection between the bottom part 73 and the side wall part 72 and keeping smaller the radius r1 of the curve of the inner face P1 of the intersection between the bottom part 73 and the side wall part 72 to increase the thickness of the inner face P1 part, together with the adjustment of the thickness U1 of the side wall part 72 in the vicinity of the upper part of the annular stacking rib 74, the thickness U2 of the side wall part 72 between the bottom part 73 and the annular stacking rib 74 and the thickness U3 of the bottom part 73, the drop strength of the inmold labeled type plastic container according to the invention is further enhanced. In the foregoing, if the radius r1 of the curve of the inner face P1 of the intersection between the bottom part 73 and the side wall part 72 surpasses 3U1, dents in the molded resin of the bottom part will become too great, which is undesirable; or if it is less than 1.5U1, it will become difficult to keep its strength, which also is undesirable. Further in the foregoing, if the radius r2 of the curve of the outer face P2 of the intersection between the bottom part 73 and the side wall part 72 is less than 1/4U3, the bottom part of the container will become close to an angular face to the curve, which could trigger cracking when the container is dropped and would be undesirable. Or if it surpasses 1/2U3, it will become easier for the molded resin to flow toward the outer face of the label at the time of injection molding, and this again is undesirable. In the foregoing, r1 and r2 are in mm units.

[0077] To add, it is preferable to use the aforementioned laminated label as the label R1 in this case, and the preferable position in which the label R1 is to be disposed is a gap configured as a gap X in a range of 0 < X < 1/2U3 between the bottom face constituting the grounding face of the bottom part 73 of the container and the bottom end of the label R2 disposed on the outer wall face of the side wall part 72 as shown in FIG. 7; in more specific terms, the most desirable form is around X = 1/3U3. In the foregoing, if X surpasses 0, namely if the label becomes longer that the bottom face of the bottom part, the label will be rolled onto that bottom face from the bottom part and tend to become wrinkled, which is not undesirable, or if X surpasses 1/2U3, namely if the length of the bottom end of the label decreases, it will become easier for the molded resin to flow toward the outer face of the label at the time of injection molding, and this also is undesirable. In the foregoing, X is in mm units.

[0078] According to the invention so far described, an inmold labeled type plastic container excelling in aesthetic design and whose label is prevented from being peeled off or rolling onto the surface side of the label (between the inner surface of the female mold and the label) can be provided.

Examples

[0079] The present invention will be described in further detail with reference to examples thereof.

(Example 1)

[0080] As the resin for the plastic container body, HDPE (M.F.R.: 40 g/10 min) was used (resin temperature: 220° C) ;

K-FEE SYSTEM GMBH, EX2009, page 1504
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

this resin and a label of 90 μm in thickness were integrally molded by the molding method for inmold labeled type plastic containers illustrated in FIG. 1 to fabricate an inmold labeled type plastic container of Embodiment 1, and it was filled with a content.

[0081] Details of the parts of the inmold labeled type plastic container of this Embodiment 1 including the dimensions are as follows:

Dimension of the bottom rim: 0.9 mm
Thickness of the intersection between the bottom rim and the container's bottom part: 1.0 mm
Thickness of the container's bottom part: 1.1 mm
Thickness of the container's side part: 0.77 mm
Flange width: 4.0 mm
Flange thickness: 1.0 mm
Relationship between the fluid length (L) of the injected molten resin and the average wall thickness (t) of the container (L/t): About 175
Configuration of the label: oriented polypropylene (30 μm), adhesive, polyethylene terephthalate (printing base) (12 μm), adhesive, aluminum foil (barrier layer) (7 μm), adhesive, polypropylene (heat seal layer) (30 μm)
Configuration of the lidmember: Aluminum foil (45 μm), sealant film (30 μm)
Overall height of the container: 110 mm
Capacity of the container: 300 cc
Content: Coffee-flavored milk
Volume of the content: 240 cc (the content was sterilized with a mist of hydrogen peroxide before the container was filled with it, and the inside of the container was dried).

[0082] The inmold labeled type plastic container of Embodiment 1 was found to be a plastic container excelling in aesthetic design, whose label is prevented from being peeled off or wrinkled. When a container similar to Embodiment 1 by using a label whose dimensions involved more errors than the side part label used in Embodiment 1, a plastic container excelling in aesthetic design, whose label was prevented from being peeled off or wrinkled, was successfully obtained.

[0083] The inmold labeled type plastic container of Embodiment 1, excelling in suitability for being filled with and packaging the content, suitability for distribution, preservability and other respects, was not destroyed when it was dropped five times from a height of 50 cm, and found excelling in light interception and, moreover in respects of permeation of oxygen and permeation of humidity.

(Eample 2)

[0084] As the injected resin material for the plastic container body, polypropylene was used and, as the label material a film formed by stacking three layers of polyethylene terephthalate film (12 μm)/aluminum foil (15 μm)/polypropylene film (60 μm) was used. This label material, after characters and pictures were printed on the PET film as the thin layer positioned on its front (outermost) side and the aluminum foil as the barrier layer was laminated by using an adhesive, was formed into a three-layered film with the polypropylene film as the thin layer positioned on its rear (innermost) side being laminated by using an adhesive, and punched into prescribed shapes (a fan shape for the side label and a round having a gate hole at the center for the bottom label).

[0085] Then, as shown in FIG. 1, these labels (the side label R1 and the bottom label R2) were arranged on the side face and the bottom face of the female mold 2 and, after the male mold 1 was pressed in from above, the resin 6 was injected into the cavity through the gate 4 to perform usual injection molding of inmold labels.

[0086] Measuring the barriering performance of the molded container thereby obtained gave the values of oxygen permeability and water vapor permeability shown in Table 1.

[0087] Since the innermost layer of this label material is the same material as the resin of the container body, the label material and the container body can be integrated without using an adhesive.

[0088] To add, while using polypropylene as the injected resin material to constitute the container body, a film of the following laminated configuration of the following layers, from the outermost to the innermost, was used as the label material in addition to the above.

(1) Stretch polypropylene film (printing base) (30 μm)/aluminum foil (harrier layer) (15 μm)/oriented polypropylene film having a heat seal layer (adhesive layer) (30 μm);
(2) Stretchpolypropylenefilm (printingbase) (30 μm)/ polyethylene terephthalate film on which silicon oxide is vapor-deposited (barrier layer) (12 μm)/oriented polypropylene film having a heat seal layer (adhesive layer) (30 μm);
(3) Unoriented polypropylene film (30 μm)/polyethylene terephthalate film (printing base) (12 μm)/polyvinylidene

K-FEE SYSTEM GMBH, EX2009, page 1505
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

chloride film (barrier layer) (30 μm)/unoriented polypropylene film (adhesive layer) (30 μm) :
(4) Stretch polypropylene film (30 μm)/polyethylene terephthalate film (printing base) (12 μm)/polyethylene terephthalate film on which silicon oxide is vapor-deposited (barrier layer) (12 μm)/oriented polypropylene film having a heat seal layer (adhesive layer) (30 μm); and
(5) Unoriented polypropylene film (30 μm)/polyethylene terephthalate film (printing base) (12 μm)/aluminum foil (barrier layer) (9 μm)/polyethylene terephthalate film (12 μm)/unoriented polypropylene film (adhesive layer) (30 μm).

Table 1

Barrier layer	Oxygen permeability (cc/pkg·day·atm)*	Water vapor permeability (g/pkg·day)*
PET with silicon oxide vapor-deposited thereon	0.07	0.0041
Polyvinylidene chloride film	0.08	0.0043
Aluminum foil	0.06	0.00088
None	6.70	0.01
* Measuring methods: For oxygen permeability 23 °C in temperature, 90%RH in humidity, purged for 3 days; MOCON's Oxtran used For water vapor permeability Calcium chloride weight method, measured for 6 days; 40 °C in temperature, 90%RH in humidity		

[0089] Generally, when a label material is to be arranged on the side face and the bottom face of the female mold 3 after it is punched into a prescribed shape, the extent of curling of the label material affects the yield of injection molding. Namely, the smaller the curling of the label material, the higher the yield.

[0090] To reduce the curling of the label material, it is desirable to configure the laminated structure of the label material in a symmetrical pattern centering on the central layer.

[0091] In the label material having the configuration of (1), (2) and (5) layers, it is possible to configure the laminated structure in a symmetrical pattern centering on the central layer, and the label material of (3) and (4) can also be considered to have a symmetrical laminated structure if the polyethylene terephthalate film and the polyethylene terephthalate film on which silicon oxide is vapor-deposited are considered a single polyethylene terephthalate film. For this reason, the curling of the label material was successfully reduced at the time of punching. Where the label material having the configuration of (1) through (5) layers was used, both the gas barriering characteristic and the tight adhesiveness to the injected resin were satisfactory.

(Example 3)

[0092] A face of a biaxially oriented polypropylene film of 30 □m in thickness was coated with a polyurethane adhesive to a thickness of 4 g/m^2 (in a dry state) to form an adhesive layer, and a biaxially oriented polyethylene terephthalate film of 12 μm in thickness, on one face of which a prescribed print pattern was printed to form a printed layer was dry-laminated over a face of the adhesive layer. Next, a face of this biaxially oriented polyethylene terephthalate film was coated with a polyurethane adhesive to a thickness of 4 g/m^2 (in a dry state) in the same way as above to form an adhesive layer, and further a biaxially oriented polyethylene terephthalate film on which silicon oxide of 12 μm in thickness was vapor-deposited was dry-laminated on a face of the adhesive layer. After that, the face of the biaxially oriented polyethylene terephthalate film on which silicon oxide was vapor-deposited was coated with a polyurethane adhesive to a thickness of 4 g/m^2 (in a dry state) in the same way as above to form an adhesive layer, and then a biaxially oriented film of 30 μm in thickness, mainly consisting of polypropylene and having a heat seal layer, was dry-laminated over a face of the adhesive layer to fabricate a laminated material for label formation. By using this laminated material for label formation, a label for the outer circumferential face to be tightly adhered to the whole outer wall face of the circumferential side wall part constituting an injection molded container of prescribed dimensions and similarly a label for the bottom face (perforated label) to be tightly adhered to the whole outer wall face of the bottom wall part constituting the injection molded container were fabricated by punching. Next, the label for the outer circumferential face and the label for the bottom face fabricated as described above were so fitted to the inner wall face of the metal mold that its biaxially oriented film face having the heat sealing function comes into contact with the molded resin while vacuum-sucking to fix it by

K-FEE SYSTEM GMBH, EX2009, page 1506
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

utilizing a vacuum suction device or the like. Then the male metal mold was fixed to the female metal mold; after that polypropylene resin melted by a heating cylinder was injected from a gate opening by way of a runner into a space formed by the female metal mold and the male metal mold to form a container matching the shape of the space between the metal molds; at the same time, the label was closely adhered to the outer wall face of the circumferential side wall part of the barrel constituting that container and the outer wall face of the bottom wall part by melting integration, followed by cooling and hardening, and the molded product was taken out to fabricate an inmold labeled injection molded container for retort food according to the invention (see FIG. 6). Incidentally, the capacity of the container was 320 cc, and the flange part constituting the injection molded container was disposed with a downward inclination of 3° to the horizontal line of the opening. The inmold labeled injection molded container for retort food fabricated as described above was filled through its opening with curry roux (290 g) as the content to fill it into a package; after that, over its opening, a biaxially oriented polyethylene terephthalate film whose internal face consisted of an unoriented polypropylene resin film having a heat sealing function and, over which silicon oxide was further vapor-deposited as a barriering base, was stacked; it was further sealed with a lid member formed by stacking a biaxially oriented polyethylene terephthalate film of 12 μm in thickness as the base film to fabricate a sealed packaged product. Next, the sealed packaged product was put into a retort boiler to undergo retort processing (sterilization with heat) under retorting conditions of 120°C in temperature, 2.1 Kgf/cm^2 in pressure and 30 minutes in duration to fabricate a packaged product having gone through retort processing. The packaged product having gone through retort processing manifested no deformation of the container body or any other detect, and was found excelling in packaging suitability, retorting suitability, distribution suitability, preservative suitability and other respects. The packaging container constituting this packaged product was not destroyed when it was dropped five times from a height of 50 cm, and found excelling in oxygen permeability and humidity permeability among other properties. The curry roux which was heated for two minutes in a 500W microwave oven after the lid material of the packaged product was peeled off became just hot enough to eat, suffering no deformation of the container or any other trouble. Incidentally, in the injection molded container, T1 (Ta) was 0.95 mm, T1, 1.0 mm, T2, 1.1 mm, T3, 1.2 mm, and r1, 0.5 mm.

(Example 4)

[0093] By using a similar container to what was used in Embodiment 3, the container was filled with 310 cc of tomato paste as its content, and sealed with the lid member over the opening. This container was subjected to boiling sterilization at 95°C for 60 minutes to provide a boil-treated package product. This boil-treated package product manifested no deformation of the container body or any other detect, and was found excelling in packaging suitability, retorting suitability, distribution suitability, preservative suitability and other respects. The packaging container constituting this packaged product was not destroyed when it was dropped five times from a height of 50 cm, and found excelling in oxygen permeability and humidity permeability among other properties. The tomato paste which was heated for one minute in a 500W microwave oven after the lid material of the packaged product was peeled off became just hot enough to eat, suffering no deformation of the container or any other trouble, and the container was thus found also excellent for use involving boiling.

Claims

1. An inmold labeled plastic container (7) fabricated by an inmold labeling fabricating method by which molding of the container and labeling are accomplished at the same time by fitting an inmold label (R1) into a gap, and injecting molten resin (6) into said gap, said gap being formed by using a female metal mold (2) and a male metal mold (1) and by joining said female mold and male mold, said label (R1) being fitted onto an inner wall surface of the female mold (2) at a position corresponding to an outer wall surface of the side part of the container (7) to be molded;
   wherein the inmold labeled plastic container (7) has a flange part (30) formed at an upper end of the side part of the container (7), having a flange width (y) of 2 mm or more and a flange thickness (z) of 0.5 mm or more,
   wherein the container (7) is fabricated by joining said female metal mold (2) and male metal mold (1) at the flange part (30) in the formed container, and the flange width (y') of a flange part (32) formed by the female mold (2) is smaller than the flange width (y) of a flange part (33) formed by the male mold (1), and
   wherein the flange width (y') of the flange part (32) formed by the female mold (2) is a width between the inner end of the flange part which is located at the lower side of the flange part and the outer end of the flange part (32) formed by the female mold (2), and the flange width (y) is a width between the inner end of the flange part which is located at the lower side of the flange part and the outer end of the flange part (33) formed by the male mold.

2. An inmold labeled plastic container as claimed in Claim 1, wherein the thickness of said label (R1) is not more than 150 μm.

K-FEE SYSTEM GMBH, EX2009, page 1507
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

3. An inmold labeled type plastic container as claimed in Claim 1 or Claim 2, wherein the label (R1) has a configuration in which a plurality of thin films are stacked, the thin film positioned on the front face and the thin film positioned on the rear face consist of thin films of the same material, and wherein at least a resin film layer, and a barrier layer having a defined strength or barrier layers having a defined strength, are stacked between these thin films.

4. An inmold labeled plastic container as claimed in Claim 3, wherein the thin film positioned on the front face and the thin film positioned on the rear face of said label (R1) consist of biaxially oriented polypropylene resin film layers or polyethylene resin film layers,
wherein said resin film layers having a defined strength consist of biaxially oriented polyethylene terephthalate film layers, biaxially oriented polyamide film layers or biaxially oriented polypropylene film layers, and
wherein the barrier layers consist of metal foil layers, vapor-deposited metal film layers or inorganic vapor-deposited oxide film layers.

5. An inmold labeled plastic container as claimed in any preceding claim, wherein the relationship between the fluid length (L) of the injected molten resin (6) and the average wall thickness (t) of the container (7) is:

$$L/t \leq 250.$$

6. An inmold labeled type plastic container as claimed in any preceding claim, wherein a bottom rim (20) is formed in the bottom part of the container, with a dimension of not less than 0.3 mm but not more than 20 mm, and a side part of the bottom rim is labeled in a similar way to the side part of the container (7).

7. An inmold labeled plastic container as claimed in Claim 6, wherein the relationships between the wall thickness (A) of the intersection between the bottom rim (20) and the bottom part (9) of the container, the wall thickness (B) of the bottom part (9) of the container and the wall thickness (C) of the side part (8) of the container are:

$$A \leq 2 \times B$$

and

$$A \leq 2 \times C.$$

Patentansprüche

1. In der Spritzgussform etikettierter Kunststoffbehälter (7), welcher durch ein Herstellungsverfahren zum in der Spritzgussform Etikettieren hergestellt wird, durch welches das Spritzgussformen des Behälters und das Etikettieren gleichzeitig durch Einpassen eines Spritzgussformetiketts (R1) in einen Spalt und Einspritzen von geschmolzenem Harz (6) in den Spalt erzielt wird, wobei der Spalt durch Verwenden einer weiblichen Metallgussform (2) und einer männlichen Metallgussform (1) und durch Zusammenfügen der weiblichen und der männlichen Gussform ausgebildet wird, wobei das Etikett (R1) auf eine innere Wandfläche der weiblichen Gussform (2) an einer Position, welche einer äußeren Wandfläche des Seitenteils des Behälters (7), der spritzgegossen werden soll, entspricht, eingepasst wird;
wobei der in der Spritzgussform etikettierte Kunststoffbehälter (7) einen Flanschteil (30) aufweist, welcher an einem oberen Ende des Seitenteils des Behälters (7) ausgebildet ist, welcher eine Flanschbreite (y) von 2 mm oder mehr und eine Flanschdicke (z) von 0,5 mm oder mehr aufweist,
wobei der Behälter (7) durch Zusammenfügen der weiblichen Metallgussform (2) und der männlichen Metallgussform (1) am Flanschteil (30) in dem ausgebildeten Behälter hergestellt wird und wobei die Flanschbreite (y') eines Flanschteils (32), welcher durch die weibliche Gussform (2) ausgebildet ist, kleiner ist als die Flanschbreite (y) eines Flanschteils (33), welcher durch die männliche Gussform (1) ausgebildet ist, und
wobei die Flanschbreite (y') des Flanschteils (32), welcher durch die weibliche Gussform (2) ausgebildet ist, eine Breite zwischen dem inneren Ende des Flanschteils, welcher an der unteren Seite des Flanschteils angeordnet ist, und dem äußeren Ende des Flanschteils (32), welcher durch die weibliche Gussform (2) ausgebildet ist, darstellt und die Flanschbreite (y) eine Breite ist zwischen dem inneren Ende des Flanschteils, welcher an der unteren Seite des Flanschteils angeordnet ist, und dem äußeren Ende des Flanschteils (33), welcher durch die männliche Gussform

K-FEE SYSTEM GMBH, EX2009, page 1508
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

ausgebildet ist.

2. In der Spritzgussform etikettierter Kunststoffbehälter nach Anspruch 1, wobei die Dicke des Etiketts (R1) nicht mehr als 150 μm beträgt.

3. In der Spritzgussform etikettierter Kunststoffbehälter nach Anspruch 1 oder Anspruch 2, wobei das Etikett (R1) eine Konfiguration aufweist, in welcher eine Mehrzahl von dünnen Filmen gestapelt ist, wobei der Dünnfilm, welcher auf der Vorderseite positioniert ist, und der Dünnfilm, welcher auf der Hinterseite positioniert ist, aus Dünnfilmen desselben Materials bestehen und wobei wenigstens eine Harzfilmschicht und eine Sperrschicht mit einer definierten Festigkeit oder Sperrschichten mit einer definierten Festigkeit zwischen diesen Dünnfilmen gestapelt sind.

4. In der Spritzgussform etikettierter Kunststoffbehälter nach Anspruch 3, wobei der Dünnfilm, welcher auf der Vorderseite positioniert ist, und der Dünnfilm, welcher auf der Hinterseite des Etiketts (R1) positioniert ist, aus biaxial ausgerichteten Polypropylenharzfilmschichten oder Polyethylenharzfilmschichten bestehen,
wobei die Harzfilmschichten, welche eine definierte Festigkeit aufweisen, aus biaxial ausgerichteten Polyethylenterephtalatfilmschichten, aus biaxial ausgerichteten Polyamidfilmschichten oder aus biaxial ausgerichteten Polypropylenfilmschichten bestehen und
wobei die Sperrschichten aus Metallfolienlagen, Vapor-Deposition-Metallfilmlagen oder anorganischen, Oxidfilmlagen bestehen.

5. In der Spritzgussform etikettierter Kunststoffbehälter nach jedem beliebigen der vorangehenden Ansprüche, wobei das Verhältnis zwischen der Fluidlänge (L) des eingespritzten geschmolzenen Harzes (6) und der durchschnittlichen Wandstärke (t) des Behälters (7) beträgt:

$$L/t \leq 250.$$

6. In der Spritzgussform etikettierter Kunststoffbehälter nach jedem beliebigen der vorangehenden Ansprüche, wobei ein Bodenstandrand (20) im Bodenteil des Behälters ausgebildet ist, wobei die Abmessung nicht weniger als 0,3 mm ist, aber auch nicht mehr als 20 mm, und der Seitenteil des Bodenstandrings auf eine ähnliche Weise zum Seitenteil des Behälters (7) etikettiert ist.

7. In der Spritzgussform etikettierter Kunststoffbehälter nach Anspruch 6, wobei die Verhältnisse zwischen der Wandstärke (A) im Schnittbereich zwischen dem Bodenstandring (20) und dem Bodenteil (9) des Behälters, der Wandstärke (B) des Bodenteils (9) des Behälters und der Wandstärke (C) des Seitenteils (8) des Behälters sind:

$$A \leq 2 \times B$$

und

$$A \leq 2 \times C.$$

Revendications

1. Récipient en matière plastique étiqueté en moulage (7) fabriqué par un procédé de fabrication d'étiquetage en moulage par lequel le moulage du récipient et l'étiquetage sont accomplis en même temps par ajustement de l'étiquette de moulage (R1) dans un espace, et une injection d'une résine fondue (6) dans ledit espace, ledit espace étant formé à l'aide d'un moule en métal femelle (2) et d'un moule en métal mâle (1) et par jonction dudit moule femelle et dudit moule mâle, ladite étiquette (R1) étant ajustée sur une surface de paroi interne du moule femelle (2) à une position correspondant à une surface de paroi externe de la partie latérale du récipient (7) à mouler ;
dans lequel le récipient en matière plastique étiqueté au moulage (7) présente une partie de bride (30) formée au niveau d'une extrémité supérieure de la partie latérale du récipient (7), ayant une largeur de bride (y) de 2 mm ou

K-FEE SYSTEM GMBH, EX2009, page 1509
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

plus et une épaisseur de bride (z) de 0,5 mm ou plus,
dans lequel le récipient (7) est fabriqué par jonction desdits moule en métal femelle (2) et moule en métal mâle (1) au niveau de la partie de bride (30) dans le récipient formé, et la largeur de bride (y') d'une partie de bride (32) formée par le moule femelle (2) est plus petite que la largeur de bride (y) de la partie de bride (33) formée par le moule mâle (1), et
où la largeur de bride (y') de la partie de bride (32) formée par le moule femelle (2) est une largeur comprise entre l'extrémité interne de la partie de bride qui est située au niveau du côté inférieur de la partie de bride et l'extrémité externe de la partie de bride (32) formée par le moule femelle (2), et la largeur de bride (y) est une largeur comprise entre l'extrémité interne de la partie de bride qui est située au niveau du côté inférieur de la partie de bride et l'extrémité externe de la partie de bride (33) formée par le moule mâle.

2. Récipient en matière plastique étiqueté au moulage selon la revendication 1, dans lequel l'épaisseur de ladite étiquette (R1) n'est pas supérieure à 150 μm.

3. Récipient en matière plastique de type étiqueté au moulage selon la revendication 1 ou la revendication 2, dans lequel l'étiquette (R1) présente une configuration dans laquelle une pluralité de films minces est empilée, le film mince positionné sur la face avant et le film mince positionné sur la face arrière sont constitués de films minces du même matériau, et dans lequel au moins une couche de film en résine, et une couche barrière ayant une résistance mécanique définie ou des couches barrières ayant une résistance mécanique définie, sont empilées entre ces films minces.

4. Récipient en matière plastique étiqueté au moulage selon la revendication 3, dans lequel le film mince positionné sur la face avant et le film mince positionné sur la face arrière de ladite étiquette (R1) sont constitués de couches de film en résine de polypropylène ou de couches de film en résine de polyéthylène à orientation biaxiale,
dans lequel lesdites couches de film en résine ayant une résistance mécanique définie sont constituées de couches de film de téréphtalate de polyéthylène à orientation biaxiale, de couches de film de polyamide à orientation biaxiale ou de couches de film en polypropylène à orientation biaxiale, et
dans lequel les couches barrières sont constituées de couches en feuille métallique, de couches en film métallique déposées en phase vapeur ou de couches de film d'oxyde inorganique déposées en phase vapeur.

5. Récipient en matière plastique étiqueté au moulage selon l'une quelconque des revendications précédentes, dans lequel la relation entre la longueur de fluide (L) de la résine fondue injectée (6) et l'épaisseur moyenne de paroi (t) du récipient (7) est :

$$L/t \leq 250.$$

6. Récipient en matière plastique de type étiqueté au moulage selon l'une quelconque des revendications précédentes, dans lequel un rebord inférieur (20) est formé dans la partie inférieure du récipient, avec une dimension non inférieure à 0,3 mm, mais non supérieure à 20 mm, et une partie latérale du rebord inférieur est étiquetée de manière similaire à la partie latérale du récipient (7).

7. Récipient en matière plastique étiqueté au moulage selon la revendication 6, dans lequel les relations entre l'épaisseur de paroi (A) de l'intersection entre le rebord inférieur (20) et la partie inférieure (9) du récipient, l'épaisseur de paroi (B) de la partie inférieure (9) du récipient et l'épaisseur de paroi (C) de la partie latérale (8) du récipient sont :

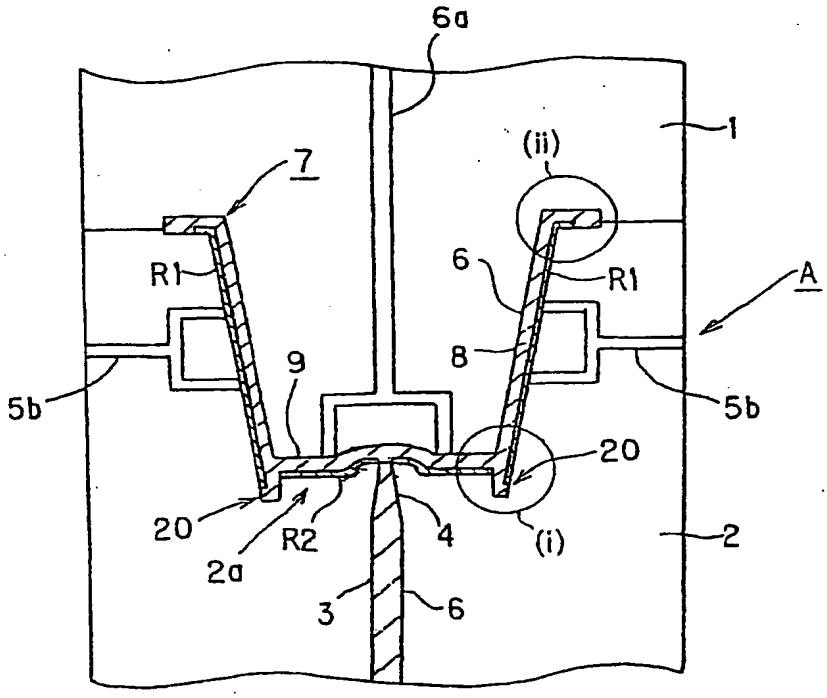
$$A \leq 2 \times B$$

et

$$A \leq 2 \times C.$$

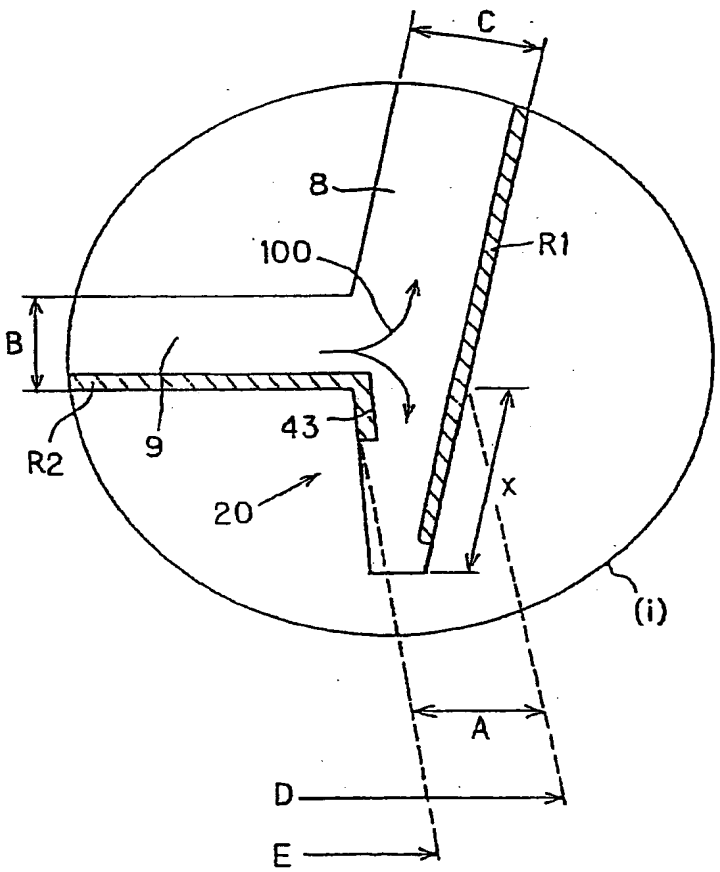
K-FEE SYSTEM GMBH, EX2009, page 1510
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

FIG. 1



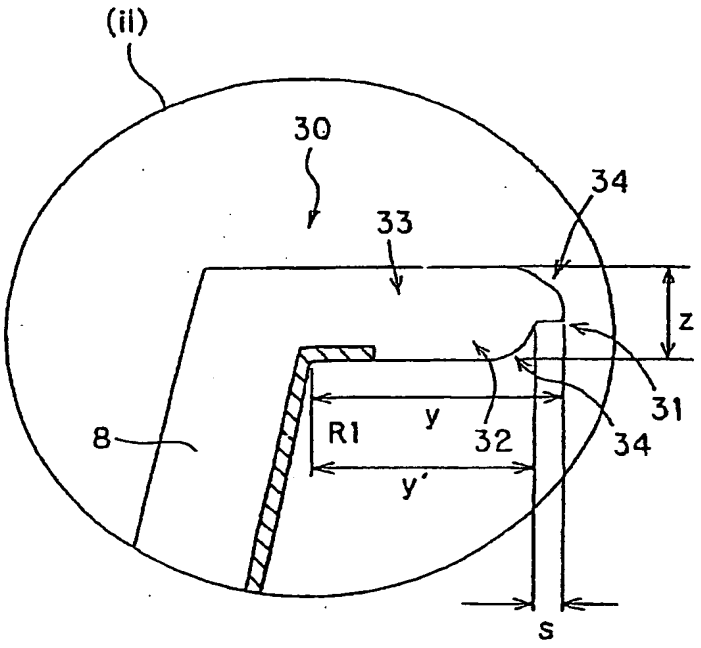
K-FEE SYSTEM GMBH, EX2009, page 1511
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

FIG. 2



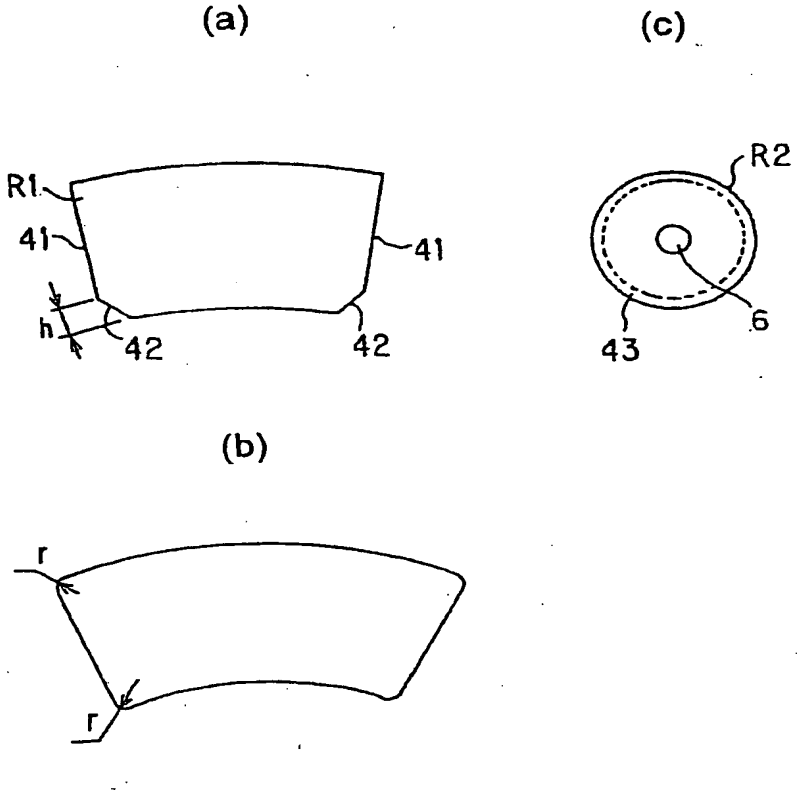
K-FEE SYSTEM GMBH, EX2009, page 1512
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

FIG. 3



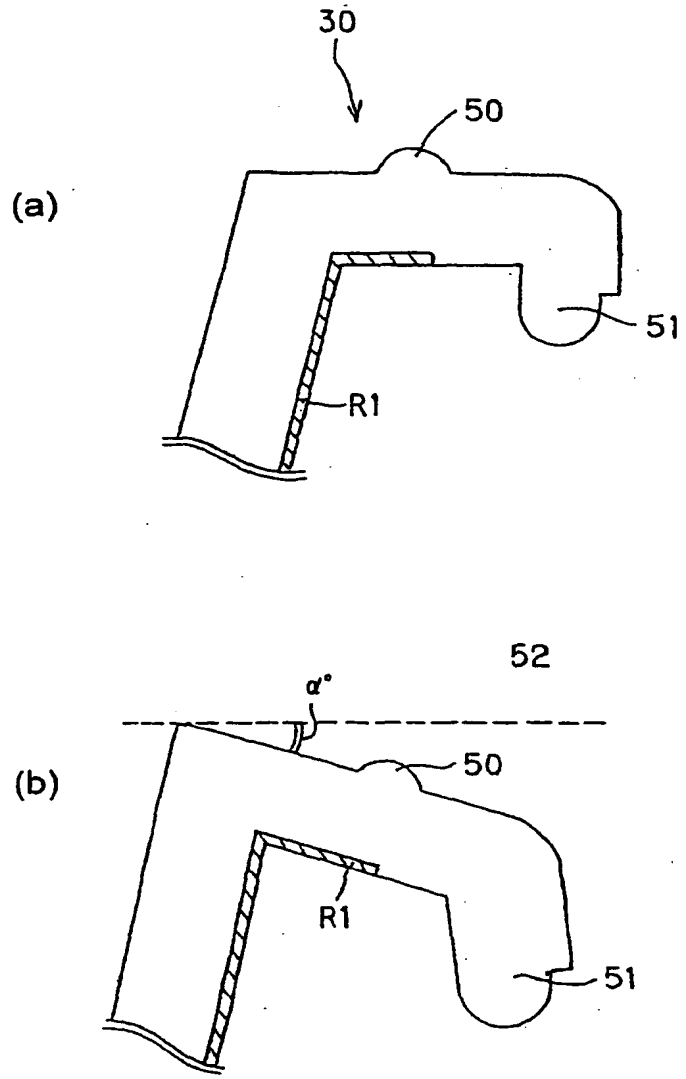
K-FEE SYSTEM GMBH, EX2009, page 1513
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

FIG. 4



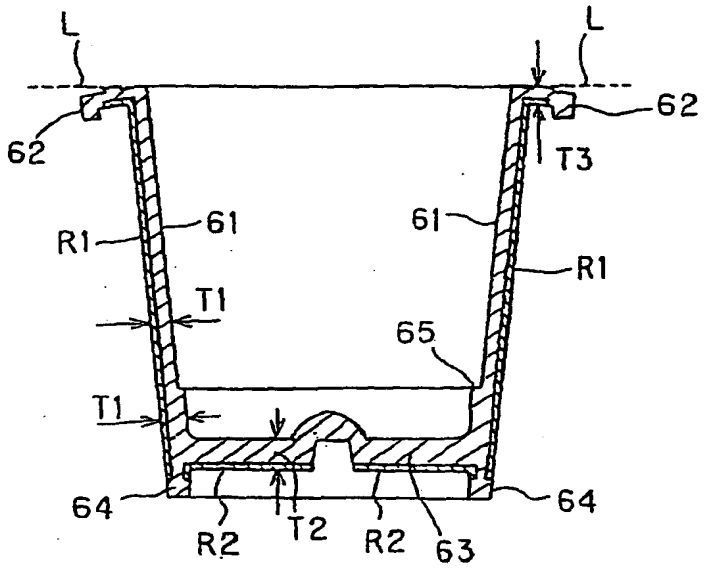
K-FEE SYSTEM GMBH, EX2009, page 1514
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

FIG. 5



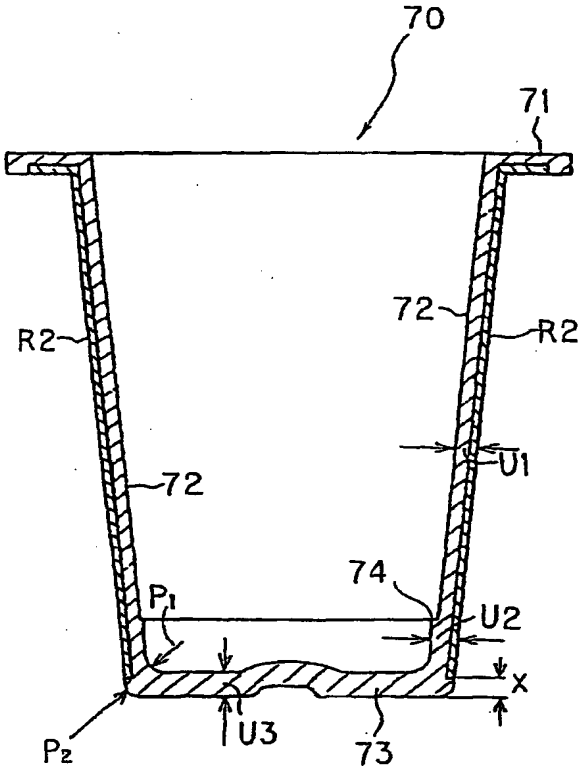
K-FEE SYSTEM GMBH, EX2009, page 1515
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

FIG. 6



K-FEE SYSTEM GMBH, EX2009, page 1516
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

FIG. 7



K-FEE SYSTEM GMBH, EX2009, page 1517
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

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

- JP 2000177784 A **[0009]**

K-FEE SYSTEM GMBH, EX2009, page 1518
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 299 851 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
22.08.2018 Bulletin 2018/34

(21) Application number: **09793926.8**

(22) Date of filing: **02.07.2009**

(51) Int Cl.:
A23L 33/00 *(2016.01)* ***A47J 31/40*** *(2006.01)*

(86) International application number:
PCT/EP2009/058338

(87) International publication number:
WO 2010/003878 (14.01.2010 Gazette 2010/02)

(54) PORTION-CONTROLLED NUTRITION SYSTEM AND METHOD USING CAPSULES

PORTIONSWEISES ERNÄHRUNGSSYSTEM UND -VERFAHREN UNTER VERWENDUNG VON KAPSELN

SYSTÈME DE NUTRITION À PORTIONS CONTRÔLÉES ET PROCÉDÉ UTILISANT DES CAPSULES

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **08.07.2008 EP 08159947**

(43) Date of publication of application:
30.03.2011 Bulletin 2011/13

(73) Proprietor: **Nestec S.A.**
1800 Vevey (CH)

(72) Inventors:
- **MANSER, Daniel, Roland**
  CH-3700 Spiez (CH)
- **ROULIN, Anne**
  CH-1400 Yverdon-les-Bains (CH)
- **STEVEN, Matthew, David**
  Cavite (PH)
- **WYSS, Heinz**
  CH-3672 Oberdiessbach (CH)
- **EPARS, Yann**
  CH-1305 Penthalaz (CH)
- **TRAN, Conchita**
  CH-1188 Gimel (CH)

(74) Representative: **Borne, Patrice Daniel et al**
Nestec S.A.
Centre de Recherche Nestlé
Vers-chez-les-Blanc
Case Postale 44
1000 Lausanne 26 (CH)

(56) References cited:
EP-A- 1 440 640
WO-A-03/073896
WO-A-2005/122851
WO-A-2006/077259
WO-A-2008/079462
US-A1- 2006 000 851
US-B2- 7 216 582

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 299 851 B1

Printed by Jouve, 75001 PARIS (FR)

K-FEE SYSTEM GMBH, EX2009, page 1519
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

Description

[0001] The present invention relates to a portion-controlled nutrition system and method adapted for persons requiring a differentiated nutritional feeding such as infants, the infirm, elderly people or athletes.

[0002] Considering infant feeding, in particular, mother's milk is recommended. However, in some cases breast feeding is inadequate or unsuccessful or inadvisable for medical reasons or the mother chooses not to breast feed. Infant formulae have been developed for these situations.

[0003] Generally infant formulae are available in powder form, concentrated liquid form, or ready to feed liquid form. Powdered infant formulae are the most popular form; primarily due to their cost and nutritional quality. The key disadvantage with powdered infant formulae is the inconvenience of preparation. The powdered formula must be spooned into a sterilized drinking vessel, water which has been boiled and allowed to cool is then poured into the drinking vessel to reconstitute the formula, the drinking vessel is then sealed and shaken to ensure the powder has been dissolved. To avoid any bacterial growth, the formula should then be consumed immediately after reconstitution.

[0004] If prepared and consumed in this manner, powdered infant formulae provide a safe and nutritionally good substitute for mother's milk in the situations described above. However, primarily due to the inconvenient preparation, many parents or caregivers do not prepare the formulae properly and hence expose the infant to risks of infection or other risks. For example, the water may not be boiled prior to use in which case, any pathogens in the water are fed to the infant. Alternatively, batches of the infant formula may be prepared and then stored until needed. Unfortunately, if any pathogen has contaminated the formula, it then has time to replicate.

[0005] In hospitals and other care facilities where infants cannot receive one to one attention, the practicalities associated with preparing infant formula for large numbers of infants coupled with concerns about the risk of growth of pathogens in reconstituted formula which is not consumed for several hours have led to drastic measures. For example, some hospitals will not use any powdered products insisting on the use of individual bottles of sterilized ready to drink formula. Other hospitals will prepare all the formula required for a given period which could be as much as 48 hours and then either autoclave the prepared formula to sterilize it or keep it under refrigeration. None of these solutions is ideal from a nutritional point of view. The severe heat treatment necessary to ensure sterilization can both promote undesirable reactions between the protein and carbohydrate components of the formula and degrade more sensitive components such as vitamins and probiotics. Further, the manufacture and distribution of individual bottles of sterilized liquid formula requires much more packaging as well as leading to higher transportation costs.

[0006] Infant formulae in concentrated liquid form suffer substantially the same disadvantages as powdered infant formulae. Hence they do not provide a better solution. Infant formulae in ready to feed form should in theory provide a solution to the inconvenience of preparation. However, they have their own disadvantages; in particular they are much more costly and bulky. Further, it is often necessary to provide them in a size enabling multiple feeds. However, once opened for the first feed, a contamination risk occurs if the opened package is stored and used for subsequent feeds.

[0007] Similar issues arise with other nutritional compositions for children such as growing up milks and infant cereals, and for nutritional compositions for adults such as nutritional products used in health care environments.

[0008] EP1843685 provides a convenient and safe method and system of preparing a single serving of nutritional composition comprising introducing water into a sealed disposable capsule containing a unit dose of the composition and operate opening contained within the capsule to permit draining of the resulting liquid directly from the capsule into a receiving vessel. WO2008/079462 discloses a beverage preparation system using different types of capsules of different liquid concentrations and operating the dispenser by varying the dilution ratio of the aqueous medium to a predetermined volume of liquid concentrate. WO03/073896 discloses sealed containers of various sizes and shapes for liquid food extraction. There is a further need for a system of this kind which can prepare in an automatic and safe manner a perfectly well balanced and dosed nutritional liquid from a nutritional composition according to the age and/or other specific requirements of the infant without requiring specific skills or attention from the operator of the system. Indeed, all mothers and caregivers have experienced the difficulties of preparing in baby bottles the right infant formula in relation to a proper dosage, a proper liquid volume and an adequate formula adapted to the age of the infant. For instance, the amount of the dry infant formula might be correct but it can be mixed to a too small amount or to a too high amount of water or be insufficiently dissolved or mixed. In the first case, the baby might not be sufficiently hydrated whereas in the other cases, the baby might not receive sufficient nutrition.

[0009] As another example, as the baby becomes older, there are several combined parameters that change and which require particular attention from the mothers and caregivers. In particular, the volume of the infant composition generally increases and the composition of the infant formula evolves from so-called starter formula to so-called follow-up formulae. The formula may differ according to the age of the infant in view of numerous changes regarding the nutritional and energetic properties. For example, WO2009068549 (published 4 June 2009) relates specifically to an age-tailored nutrition system and a method adapted for an infant in the first six months, wherein the formulae in their whey:casein ratio as well as the protein content of each formula may decrease according to the age.

[0010] Therefore, there is a need to propose a convenient, reliable and safe, portion controlled, nutrition system which

K-FEE SYSTEM GMBH, EX2009, page 1520
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

delivers the correct portion of infant formula according to the specific needs of the infant. In particular, the correct portion of infant formula requires that the total formula content is dissolved/dispersed in the volume of water and that substantially no residual amount is left in the capsule.

[0011] Accordingly the present invention provides a nutritional delivery system according to claim 1.

[0012] The present invention also relates to a method for delivering a nutritional liquid according to claim 6.

[0013] Each type of capsules corresponds to a feeding period which has been determined, e.g., by nutritional specialists, to match at best the needs of the specific categories of persons. Considering infants as the preferred example of the invention, different types of capsules can be designed in relation to the different key growth periods of the infant.

The feeding plan is primarily built to provide a correspondence between a predetermined age range and the differentiated capsule adapted for this predetermined age range.

Preferably, the nutritional feeding plan is an infant feeding plan.

According to the invention, the type of capsules can be differentiated by at least their size which differs for at least two different types of capsules. The different sizes of capsules enable to provide different amounts of the nutritional formula and different water volumes (i.e., reconstitution volume) for mixing with the formula in the capsule. For example, different capsules sizes can be provided for the preparation of infant formulae for infants of different ages. In particular, the size of capsule can progressively increase as a function of the age of the infant to be fed. In particular, the proportion of the volume of the capsule filled with the nutritional formula relative to the total available volume in the capsule varies for each type of capsules.

[0014] According to the invention, the types of capsules are differentiated by the amount of the nutritional formula which differs for at least two different types of capsules. In particular, for categories of persons such as infants, the content of infant formula increases as the infant becomes older. The increase may be a progressive increase or a step-by-step increase. For example, the amount of infant formula for an infant increases as a function of the age of the infant. Therefore, at least within a certain range of ages, the amount of nutritional formula also increases according to the increase of size of the capsules. For a step-by-step increase, the amount of nutritional formula can be substantially the same for two types of capsules covering two adjacent periods of age within the whole range of capsules and the amount of nutritional formula can increase for capsules designed below and above said periods of age. Furthermore, the amount of nutritional formula can increase for a same size of capsule so that within the whole range of capsules, two capsules covering two adjacent periods of age can contain different amounts of nutritional formula. One advantage is that a feeding plan, such as for infants of the age of between 0 and 36 months can be determined while using a limited number of sizes of capsules.

[0015] Furthermore, each type of capsules can also be differentiated by the recipe of the nutritional formula which differs for each type. For example, the recipe differs in the capsules as a function of the age of the infant.

[0016] Therefore, the recipe can differ according to the different sizes of capsules, e.g., to fit the age of the infant to be fed. Furthermore, the recipe can also differ for each size of capsules in order to reduce the number of sizes of capsules.

[0017] According to the invention, the types of capsules differ from each other regarding the nature and/or the amount of at the least the following nutrients: proteins, carbohydrates, lipids.

[0018] More particularly, for infants of age between 0 and 12 months, the whey:casein ratio of each formula is chosen in the range of from 100:0 to 40:60 and decreases according to the age of the infant. Also for infants of age between 0 and 12 months, the protein content of each formula decreases according to the age of the infant. Generally, the infant formula is chosen in the range of 4.6 to 6.0 lipid/100 kcal and decreases with the increasing age of the infant. In particular, the lipid source includes milk fat.

[0019] According to an aspect of the invention, the at least one differentiating operational parameter relevant to produce and deliver the differentiated nutritional formula liquid from the dispenser includes at least the volume of water that is mixed with the formula in the capsule for reconstitution of the nutritional liquid. Therefore, the volume of water is varied according to the predetermined nutritional feeding plan so that the person being fed receives the optimized volume of liquid. It is indeed important for infants that the volume of delivered liquid is absolutely controlled so that the infant is properly hydrated. Moreover, a too low volume of reconstituting water leads to dissolution problems or a reconstituted liquid of inappropriate texture that can be difficult to swallow for the baby. On the contrary, too much water can lead to difficulties for the infant to drink it all, which may cause behavior disorders on the short term and nutritional deficiencies on the long term. Therefore, according to the system of the invention, the volume of water is controlled by the controlling means according to the type of capsules which is inserted in the dispenser so that the correct volume of water is mixed with the nutritional formula for reconstitution of the nutritional liquid.

[0020] Other differentiating parameters can be controlled by the control means according to the types of capsules in the dispenser such as the temperature of water and/or the water injection pressure in the capsule. Typically, for infants the water temperature which is fed into the capsule is preferably controlled between 30 and 40 degrees. Typically, water is supplied from a water reservoir and is heated to the controlled temperature before being mixed in the capsule. In order to ensure a microbiological safety of the liquid dispensed in the capsule, a microbial filter is provided in the system. The microbial filter can be placed anywhere between the water heater and the point of delivery of the nutritional liquid of the

K-FEE SYSTEM GMBH, EX2009, page 1521
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

capsule. Preferably, the filter is inserted in the capsule itself such as upstream of the compartment containing the nutritional formula. The use of a filter may be omitted or replaced by another water treatment or sanitation method operated in the dispenser. Also, the use of bottled water can be recommended for mixing with the nutritional formula in the dispenser.

[0021] The capsule of the invention can be a rigid or semi-rigid container containing the nutritional formula. Preferably, the capsule has an outlet duct for guiding the flow of nutritional liquid directly to the receiving receptacle, e.g., baby bottle, without contaminating the surroundings nor the dispenser itself. The capsule may further comprise a delivery system which opens the flow of the nutritional liquid toward or in the duct. Such delivery system can be a combination of a membrane and perforating elements that opens under a mechanical and/or liquid pressure or, alternatively, a valve means such as a silicone or rubber valve that opens under pressure of liquid. The outlet duct can also be a disposable part of the dispenser that is inserted in the capsule with its outlet part protruding outside the capsule.

[0022] In a general sense, the differentiating parameter for each type of capsules and/or the differentiating operational parameter for processing the capsule according to its type, differ according to the age of the person, e.g., infant, to be fed. Taking the preferred example of an infant nutritional plan, the delivered nutritional liquid is tailored, firstly, according to the different types of capsules which differs according to a combination of size, amount of nutritional formula, recipe of the nutritional formula and, secondly, according to the volume of water which is mixed into the capsules and which differs thus for each type.

[0023] More particularly, as the infant becomes older, the size of the capsule increases, the content of the nutritional formula increases, the recipe is adapted to the age and the controlled volume of water delivered is also increased. In general, the volume of water for reconstituting the nutritional liquid increases as a function of the size of the capsule, i.e., the larger the capsule, the larger the water volume fed in the capsule.

[0024] According to an important aspect of the invention, the dispensing system comprises control means enabling to control certain operational parameters of the dispenser as a function of the type of capsules which is inserted in the dispenser.

[0025] In a first mode, the control operation means comprises a code associated to each type of capsules and reader means associated to the dispenser for reading the code and a control unit configured to control the preparation of the nutritional formula liquid according to at least one differentiating parameter relating to the code. Therefore, the type of capsules is automatically recognized in the dispenser and the correct operational parameters are automatically set for enabling the delivery of the proper nutritional liquid. This control means guarantees that the nutritional plan can be followed by the user since the capsule can always be processed in compliance with specifications of the nutritional feeding plan.

[0026] The coding system can be any suitable coding technology available in the art including optical, shape or mechanical coding means or radio-frequency coding means. Optical recognition means includes barcodes, colour or symbols recognition. The radio frequency means includes chip RFID tags or chipless RFID tags such as wave SAW, thin film inductor capacitor, printed electromagnetic inductive ink, thin film transistors (TFTC), material-based recognition systems such as wires, stripes and layers of inductive material sensed by a magnetic coil reader. Other coding system can be numbers, characters, sounds, impulses, etc.

[0027] Therefore, according to this preferred mode, an identification code is associated to each type of capsules in order for the control unit to recognize the type of capsule and process the capsule accordingly. The code can contain an identification information which is identical for all capsules of a same type under the form of a binary code for instance, or a magnetic or electro-magnetic signal. The identification code may also contain information which varies from capsule to capsule of the same type such as serial numbers, in order to provide the opportunity to carry out the authentication of the capsule before processing it.

[0028] In particular, for infant formulae, each type of capsules comprises a specific code corresponding to the volume of water to be supplied by the dispenser in the capsules. The dispenser comprises a code reader for detecting the code on the capsule and a control unit for controlling the preparation of the nutritional formula liquid according to the information, e.g., a binary code, read by the reader.

[0029] According to an alternative, the control operation means comprise a plurality of visual marks on the capsules; each mark corresponding to one type of capsules, and a multi-choice activation means on the dispenser matching the plurality of visual marks and operating a control unit configured to control the preparation of the nutritional formula liquid according to the differentiating parameter relating to the choice made by the user on the multi-choice activation means. Therefore, instead of having codes for differentiating the types of capsules, this embodiment proposes differentiatable marks, e.g., a selection of colours, alphanumerical indicia, trademarks, signs, symbols, etc., provided for each type of capsules and the corresponding marks on the dispenser associated to activation means, e.g., a keyboard or touch screen, for enabling the user to start the operation steps of the capsule in the dispenser.

[0030] The term "differentiating characteristic" refers to a technical feature of the capsule, including the container itself and the nutritional formula contained in the container, which can effect a differentiation in the dispensed nutritional liquid.

[0031] The term "differentiating operational parameter" refers to a parameter which can be controlled or varied in the

K-FEE SYSTEM GMBH, EX2009, page 1522
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

processed operation of the capsule in dispenser which can effect a differentiation in the dispensed nutritional liquid.

[0032] The term "nutritional liquid" refers to the composition as dispensed from the dispenser and is not limited to a composition of pure liquid texture but may encompass a suspension in a liquid, a puree, a mixture of foam and liquid and/or a gel.

[0033] The term "size of the capsule" refers to the volume of the capsule available for containing the nutritional formula.

[0034] The invention will now be described in relation to the figures.

Figure 1 is a representation of a range of capsules according to a feeding nutritional plan for infants;

Figure 2 is a schematic representation of a dispenser, according to the invention, when a capsule is recognized before being processed;

Figure 3 is a schematic representation of a dispenser of the invention during processing;

Figure 4 is a representation of the capsule recognition means of the dispenser and capsules for controlling the operations of the dispenser.

[0035] In this specification, the following terms have the following meanings:
It exists international, US and European codes for defining the range of ages of an "infant" which are not fully harmonized. However, in the context of the invention, "infant" means an infant or a young child up to the age of 36 months (unless specified otherwise in the present description).

[0036] "Infant formula" means a foodstuff intended for participating to the complete or partial nutrition of an infant or young child during the first 36 months of life (unless specified otherwise in the present description).

[0037] All percentages are by weight unless otherwise stated.

[0038] The invention provides a nutritional delivery system using single-serve capsules as illustrated as a matter of example in figure 1. The capsules contain nutritional formulae intended to be processed, under specific control, in a nutritional dispenser for providing a metered amount of warm water in the capsule and for delivering after mixing of the nutritional formula in the capsule with said amount of water, a nutritional liquid tailored to the needs of a certain category of persons, e.g., infants.

[0039] The capsules are organized in a range of capsules' types 10, 11, 12, 13, 14, 15, 16, all types being designed according to a recommended nutritional feeding plan, each one being designed to provide a nutritional portion for a recommended age period of the infant. Thus, each type of capsules corresponds more particularly to an infant of a certain age.
For example:

- capsule 10 provides a recommended nutritional portion for an infant of one or two weeks,
- capsule 11 provides a recommended nutritional portion for an infant of between 3 to 4 weeks,
- capsule 12 provides a recommended nutritional portion for an infant of between 5 to 8 weeks,
- capsule 13 provides a recommended nutritional portion for an infant of between 9 weeks to 4 months,
- capsule 14 provides a recommended nutritional portion for an infant of between 5 and 6 months,
- capsule 15 provides a recommended nutritional portion for an infant of between 7 to 8 months,
- capsule 16 provides a recommended nutritional portion for an infant of between 9 and 12 months.

For instance, the types of capsules in the range can cover at least two different sizes of capsules. More preferably, it covers three different sizes; i.e., "Small", "Medium" and "Large". More specifically, the first two types of capsules 10, 11 can be designed with the smallest size. The last two types of the capsules 15, 16 can be designed with the largest size and the three intermediate types of capsules 12, 13, 14 can be designed at a medium size.

[0040] Furthermore, within each size, the capsules can be filled up with a specific weight of nutritional formula as a function of the age of the infant to be fed. For example, the smallest size of capsule can be filled up with an amount of nutritional formula which varies between about 5 and 17 grams solids. The medium size of capsule can be filled up with an amount of nutritional formula which varies between 13 and 27 grams solids. The largest size of capsules can be filled up with an amount of nutritional formula which varies between 20 grams and 38 grams solids. The amount of nutritional formula can increase on a step-by-step basis within the range according to the period of age of the infant as determined by the nutritional feeding plan with possibly capsule types adjacent in the range having a substantially equal amount of ingredients but different sizes enabling reconstitution with different volumes of water. In general, the free volume in the capsule (e.g., the volume not filled by the formula) increases as a function of the age increase of the infant thus enabling a higher reconstitution volume of water to be mixed in the capsule with the formula.

[0041] As the size of the capsule increases as a function of the water volume fed in the capsule, the nutritional formula

K-FEE SYSTEM GMBH, EX2009, page 1523
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

is properly mixed in the capsule and the risk of residual solids in the capsule is reduced. In particular, the size of the capsule is adapted to receive the dedicated volume of water so that the optimal mixing is obtained and then emptying can be carried out so that substantially no residue is left in the capsule. Preferably, for obtaining good dissolution in water of the powdered nutritional formula, the ratio of the capsule size to the water volume is selected to be comprised between 0.25 and 0.5, most preferably between 0.3 and 0.45. No head space is necessary in the capsule so that the nutritional formula in a powder form can occupy the whole ingredient's compartment of the capsule. The powder can be slightly compacted in the capsule so that its volume before filling exceeds somewhat the size of the capsule. A headspace lower than 10 ml is preferred, e.g., between 0 and 5 ml. Preferably, water is fed in the capsule in the form of at least one high-velocity jet. Emptying of the capsule after water injection can generally be obtained by injecting subsequently a compressed gas, e.g., compressed air, in the capsule.

[0042] The nutritional formula contained in the capsule can take various forms such as powder, concentrated liquids or gels and combinations thereof. The capsules of each type can be packed in containers (e.g. boxes) and can be sold separately from the capsules of the other types. In an alternative, more than one type of capsules can be presented to the consumer in multipacks containing a sufficient number of capsules to meet the requirements for an infant of at least two periods of age, e.g., from one to four weeks or from 2 to 6 months, for instance.

[0043] In order for each type of capsules to be recognized and treated properly in the dispenser, each type of capsule preferably comprises a code such as a barcode 40 and the like.

According to one aspect of the invention, each type of capsules in the range comprises a tailored nutritional formula which is a function of the nutritional need of the infant in function of his/her age.

[0044] In particular, the capsules for infant formulae, in particular, starter formulae and follow-up formulae, comprise a protein source comprising whey and casein proteins for providing an age-tailored nutrition system to an infant. The capsules comprise at least two different infant formulae, each formula having a whey casein ratio chosen in the range from 100:0 to 40:60, preferably from 70:30 to 50:50 according to the age of the infant and a protein content chosen in the range from 1.5 to 3.0g protein/100 kcal, preferably from 1.8 to 2.5g protein/100 kcal according to the age of the infant. Both the whey: casein ratio and the protein content decrease with increasing age of the infant. Thus, an age tailored nutrition system according to the invention may comprise for example a first infant formula with a whey:casein ratio of 70:30 and a protein content of 2.5g protein/100 kcal for an infant in the first two weeks of life, a second infant formula with a whey:casein ratio of 60:40 and a protein content of 2.0g protein/100 kcal for an infant in the next six weeks of life and a third infant formula with whey:casein ratio of 60:40 and a protein content of 1.8g protein/100 kcal for an infant in the third to sixth months of life.

[0045] Such an age-tailored nutrition system may additionally comprise a fourth infant formula having a whey:casein ratio of 50:50 and a protein content of 1.8g protein/100 kcal. Such a formula would be suitable for an infant in the second six months of life.

[0046] The infant formulae for use in the age-tailored nutrition system of the invention further comprises a carbohydrate source and a lipid source. Either of the carbohydrate content and the lipid content of the formulae may also vary as a function of the age of the infant and preferably both the carbohydrate content and the lipid content will so vary. Generally speaking, the carbohydrate content may increase with increasing age of the infant for example from 9.0 to 12.0 g carbohydrate/100 kcal, preferably from 10.1 to 11.6g carbohydrate/100 kcal and the lipid content may decrease with increasing age of the infant, for example from 6.0 to 4.5g lipid/100 kcal, preferably from 5.6 to 5.1g lipid/100 kcal.

[0047] The type of protein is not believed to be critical to the present invention provided that the minimum requirements for essential amino acid content are met and the requirements as to whey:casein ratio and protein content are satisfied. Thus, protein sources based on whey, casein and mixtures thereof may be used. As far as whey proteins are concerned, acid whey or sweet whey or mixtures thereof may be used as well as alpha-lactalbumin and beta-lactoglobulin in whatever proportions are desired.

[0048] The whey protein may be modified sweet whey. Sweet whey is a readily available by-product of cheese making and is frequently used in the manufacture of infant formulae based on cows' milk. However, sweet whey includes a component which is undesirably rich in threonine and poor in tryptophan called caseino-glyco-macropeptide (CGMP).

[0049] The proteins may be intact or hydrolysed or a mixture of intact and hydrolysed proteins. It may be desirable to supply partially hydrolysed proteins (degree of hydrolysis between 2 and 20%), for example for infants believed to be at risk of developing cows' milk allergy. If hydrolysed proteins are required, the hydrolysis process may be carried out as desired and as is known in the art.

[0050] The infant formulae for use in the capsules of the present invention contains a carbohydrate source. Any carbohydrate source conventionally found in infant formulae such as lactose, saccharose, maltodextrin, starch and mixtures thereof may be used although the preferred source of carbohydrate is lactose.

[0051] The infant formulae for use in the capsules of the present invention contains a lipid source. The lipid source may be any lipid or fat which is suitable for use in infant formulae. Preferred fat sources include milk fat, palm olein, high oleic sunflower oil and high oleic safflower oil. The essential fatty acids linoleic and α-linolenic acid may also be added as may small amounts of oils containing high quantities of preformed arachidonic acid and docosahexaenoic acid such

K-FEE SYSTEM GMBH, EX2009, page 1524
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923