In the illustrated embodiment of the insert 400, the upper part 401 and lower part 402 are shown as separate items. In an alternative configuration, the upper part 401 and lower part 402 may be hinged together at one point but movable from an open position and a closed position to allow loading and unloading of the quantity of beverage ingredients. Preferably, this version of the insert 400 would be formed as a plastic moulding with a plastic hinge.

Flow through the insert 400 is generally in an inward direction from the inlet 405 to the outlet 404. Also, advantageously since the inlet 405 and outlet 404 are both provided in the lower part 402, the construction of the upper part 401 is simplified.

In the above description the insert has been described as defining a brew volume. It should be understood that the insert and beverage preparation machine may be used with beverage ingredients which do not require brewing but are, instead, dissolved, diluted or otherwise mixed with water without departing from the scope of the present invention.

An insert of a non-cartridge form has been described for use with the beverage preparation system comprising an upper and a lower part and defining a brewing volume inbetween. Open-topped inserts may also be used which are formed for sealing against the brew head 250 of the machine 210 and which are provided with a barcode or RFID on their lower surface located in accordance with the present invention.

Claims:

1. An insert for use in a beverage preparation machine of a type comprising a brew head comprising an upwardly directed inlet for supplying water to the brew head and a downwardly directed outlet for outflow of beverage produced by the machine, the insert comprising, or being adapted to contain in use, a quantity of beverage ingredients in a brewing volume, a lower surface of the insert comprising an inlet and an outlet arranged to communicate respectively with the inlet and outlet of the brew head of the beverage preparation machine when the insert is inserted into the machine such that, in use, water from the inlet of the brew head passes upwardly through the inlet of the insert into the brewing volume and such that beverage produced from the water and the quantity of beverage ingredients passes downwardly through the outlet of the insert to flow out of the outlet of the brew head, characterised in that the lower surface of the insert further comprises a RFID or barcode which, in use, is readable by a RFID or barcode reader of the beverage preparation machine for controlling operation of the beverage preparation machine, wherein the barcode or RFID is located on the lower surface of the insert such that a line joining the outlet of the insert to a centre of the barcode or RFID and a line joining the outlet of the insert to the inlet of the insert separated by a minimum angular separation of greater than 70 degrees.

2. An insert as claimed in claim 1 wherein the line joining the outlet of the insert to the centre of the barcode or RFID and the line joining the outlet of the

insert to the inlet of the insert subtend an angle of greater than or equal to 85 degrees.

3. An insert as claimed in any preceding claims wherein the outlet is located at a centre or near a centre of the lower surface of the insert.

4. An insert as claimed in any preceding claim wherein the barcode or RFID is located at or near a periphery of the lower surface.

5. An insert as claimed in any preceding claim wherein the insert is disc-shaped.

6. An insert as claimed in any preceding claim wherein the insert is a cartridge.

7. An insert as claimed in claim 6 wherein the cartridge is rigid or semi-rigid.

8. An insert as claimed in claim 6 or claim 7 wherein the lower surface is a laminate.

9. An insert as claimed in any of claims 6 to 8 wherein the inlet and outlet of the cartridge are portion of the lower surface which are opened for transportation, in use, by piercing the lower surface.

10. An insert as claimed in any of claims 1 to 5 wherein the insert defines a receptacle for receiving loose beverage ingredients.

11. An insert as claimed in any of claims 1 to 5 wherein the insert defines a receptacle for receiving a container of beverage ingredients, wherein the container comprises filtering means.

12. An insert as claimed in claim 11 wherein the container is formed at least in part from filter paper or filtering membrane.

13. An insert as claimed in claim 12 wherein the container is a filter bag.

14. An insert as claimed in any of claims 10 to 13 wherein the inlet and outlet of the insert are open.

15. An insert as claimed in any of claims 10 to 13 wherein the inlet and outlet of the insert are closed prior to use by means of a frangible membrane.

16. An insert as claimed in claim 15 wherein the frangible membrane comprises a tear-off portion.

17. An insert as claimed in any of claims 10 to 16 which is reusable.

18. An insert as claimed in any preceding claim wherein the inlet of the insert, outlet of the insert and barcode or RFID are coplanar.

19. An insert as claimed in any preceding claim wherein the inlet of the insert, outlet of the insert and barcode or RFID are not coplanar.

20. An insert as claimed in any preceding claim wherein the insert further comprises means for preventing rotation of the insert in the brew head after insertion of the insert and closing of the brew head.

21. An insert as claimed in claim 20 wherein the means for preventing rotation comprises an externally directed handle or tab portion.

22. An insert as claimed in claim 21 wherein the externally directed handle or tab portion is located substantially diametrically opposite the inlet of the insert.

23. A beverage preparation system comprising a beverage preparation machine and an insert for use in said machine, said insert being as claimed in any preceding claim.

24. A beverage preparation system as claimed in claim 23 wherein the beverage preparation machine comprises a brew head comprising an upwardly directed inlet for supplying water to the brew head, a downwardly directed outlet for outflow of beverage produced by the machine and a barcode or RFID reader having a window in the brew head through which signals may be transmitted, wherein a line joining the outlet of the machine to a centre of the window and a line joining the outlet of the machine to the inlet of the machine subtend an angle of greater than 70 degrees.

25. A beverage preparation system as claimed in claim 24 wherein the line joining the outlet of the machine to the centre of the window and the line joining the outlet of the

machine to the inlet of the machine subtends an angle of greater than or equal to 85 degrees.

26. A beverage preparation system as claimed in claim 24 or claim 25 wherein the outlet of the beverage preparation machine is located at or near a centre of the brew head.

27. A beverage preparation system as claimed in any of claims 24 to 26 wherein the barcode reader or RFID reader window is located at or near a periphery of the brew head.

28. A beverage preparation system as claimed in any of claims 24 to 27 wherein the brew head comprises a mount for receiving the insert so as to prevent relative rotation of the insert and the brew head once the brew head is closed.

29. A beverage preparation system as claimed in claim 28 wherein the mount comprises a recess or opening for receiving an externally directed handle or tab portion of the insert.

30. A beverage preparation system as claimed in claim 28 or claim 29 wherein the mount comprises an opening through which the inlet of the brew head, outlet of the brew head and barcode reader or RFID reader window are accessible.

31. A beverage preparation system as claimed in any of claims 24 to 27 wherein the brew head comprises a cavity for receiving the insert wherein one of the insert and cavity comprises a key and the other of the insert and cavity comprises a recess, wherein interengagement of the key and

recess prevents relative rotation of the insert and the brew head once the brew head is closed.

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IPR2023-00502, U.S. PATENT 10,994,923

FIG. 1a.

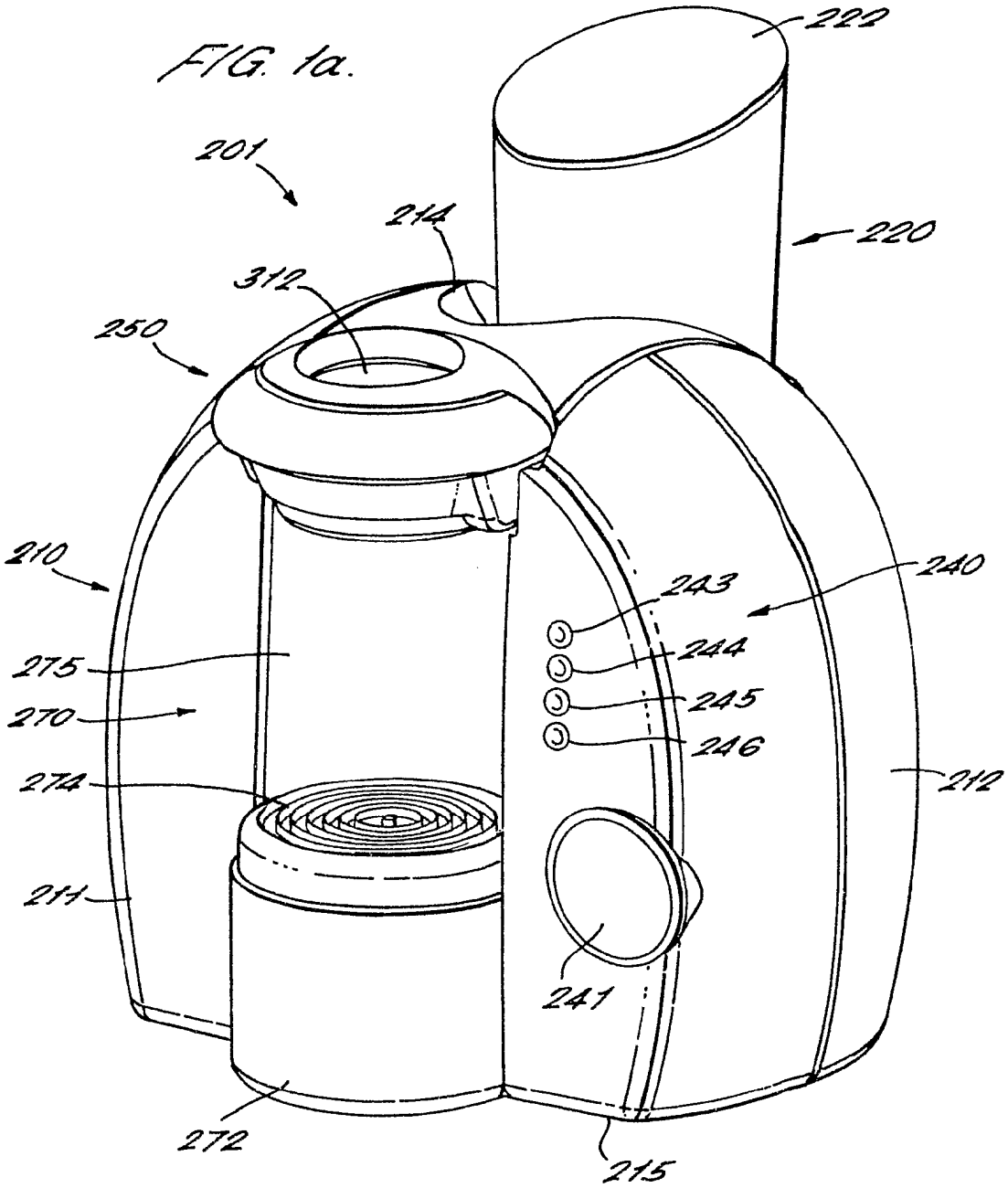

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FIG. 1b.

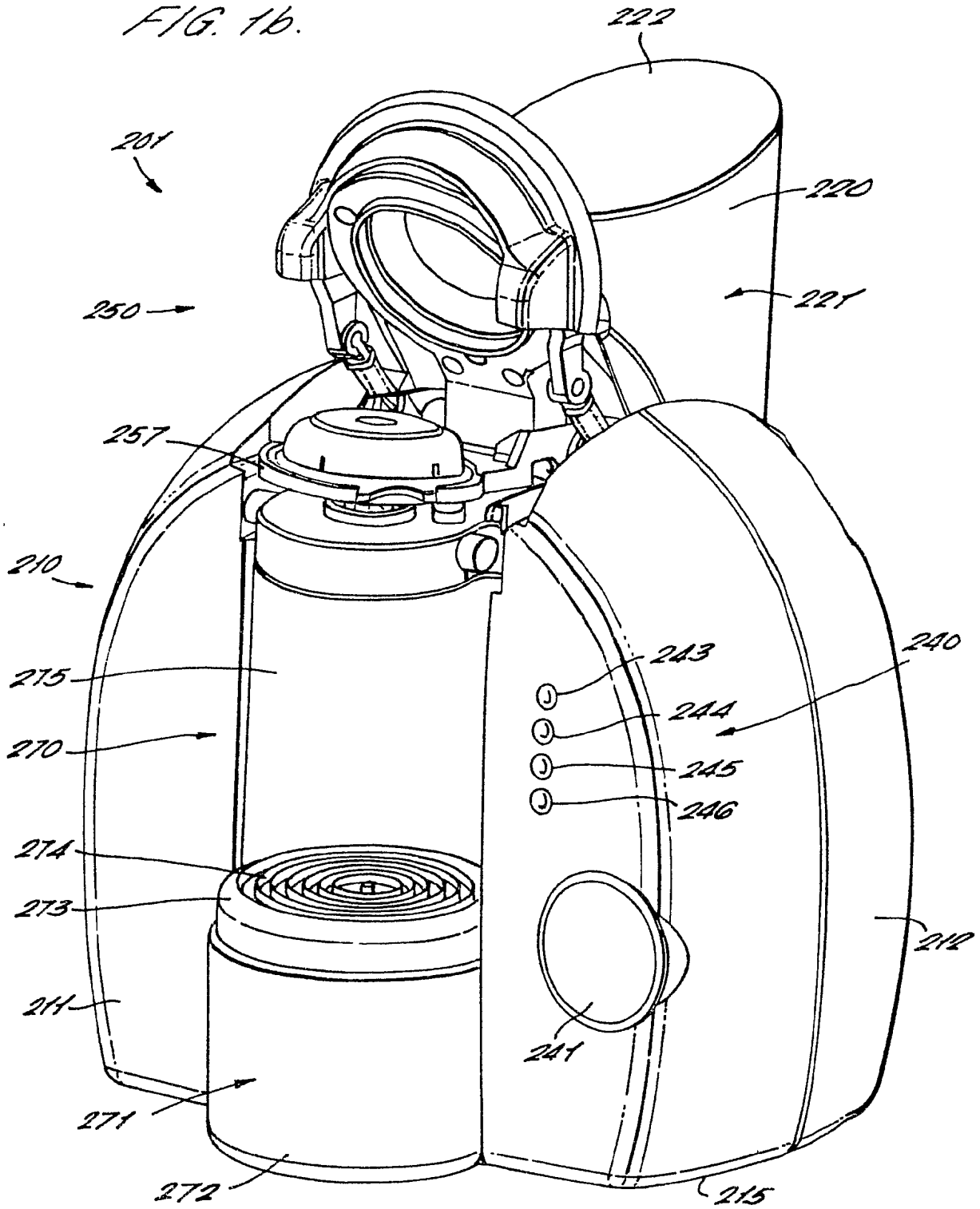

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FIG. 2.

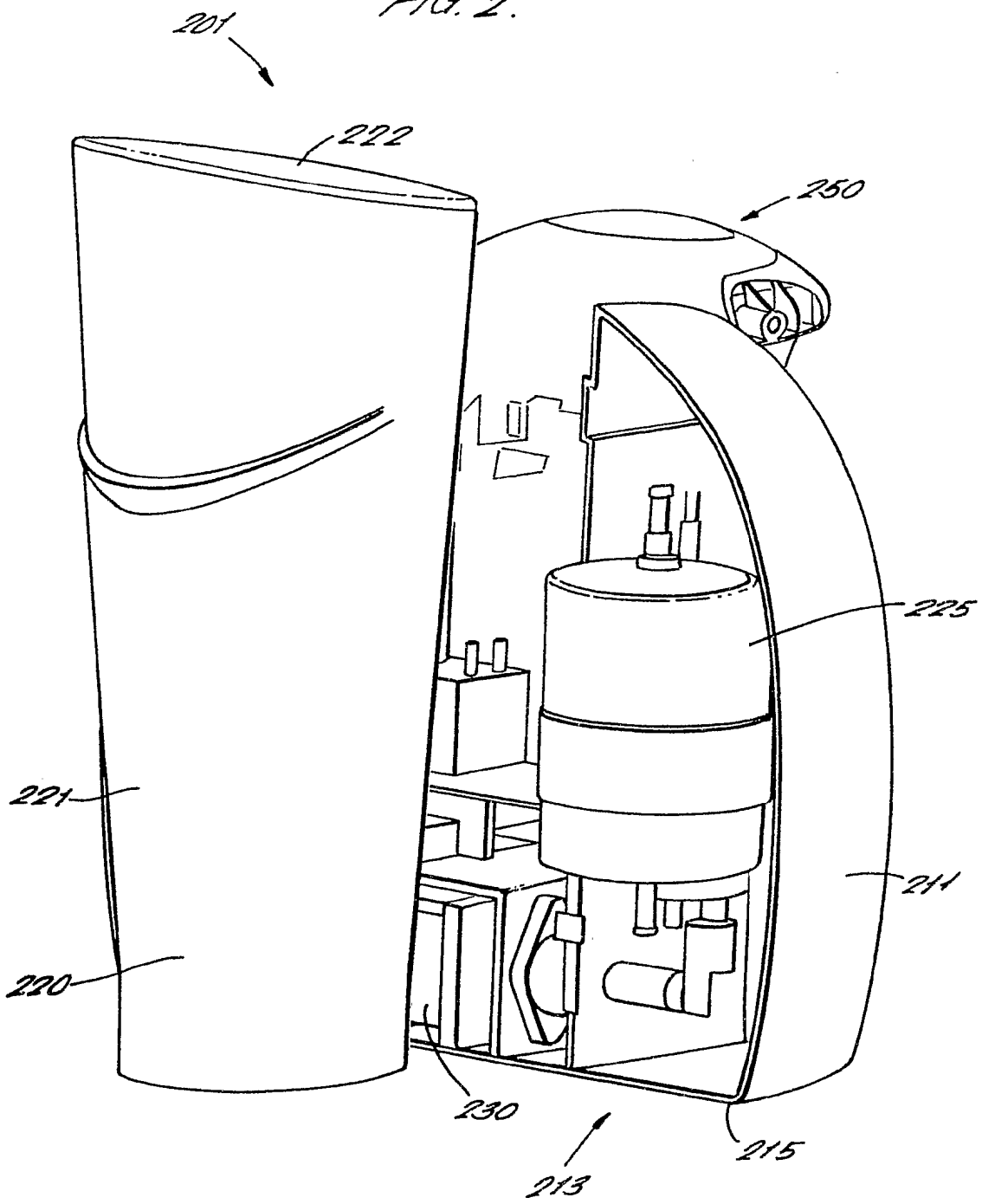
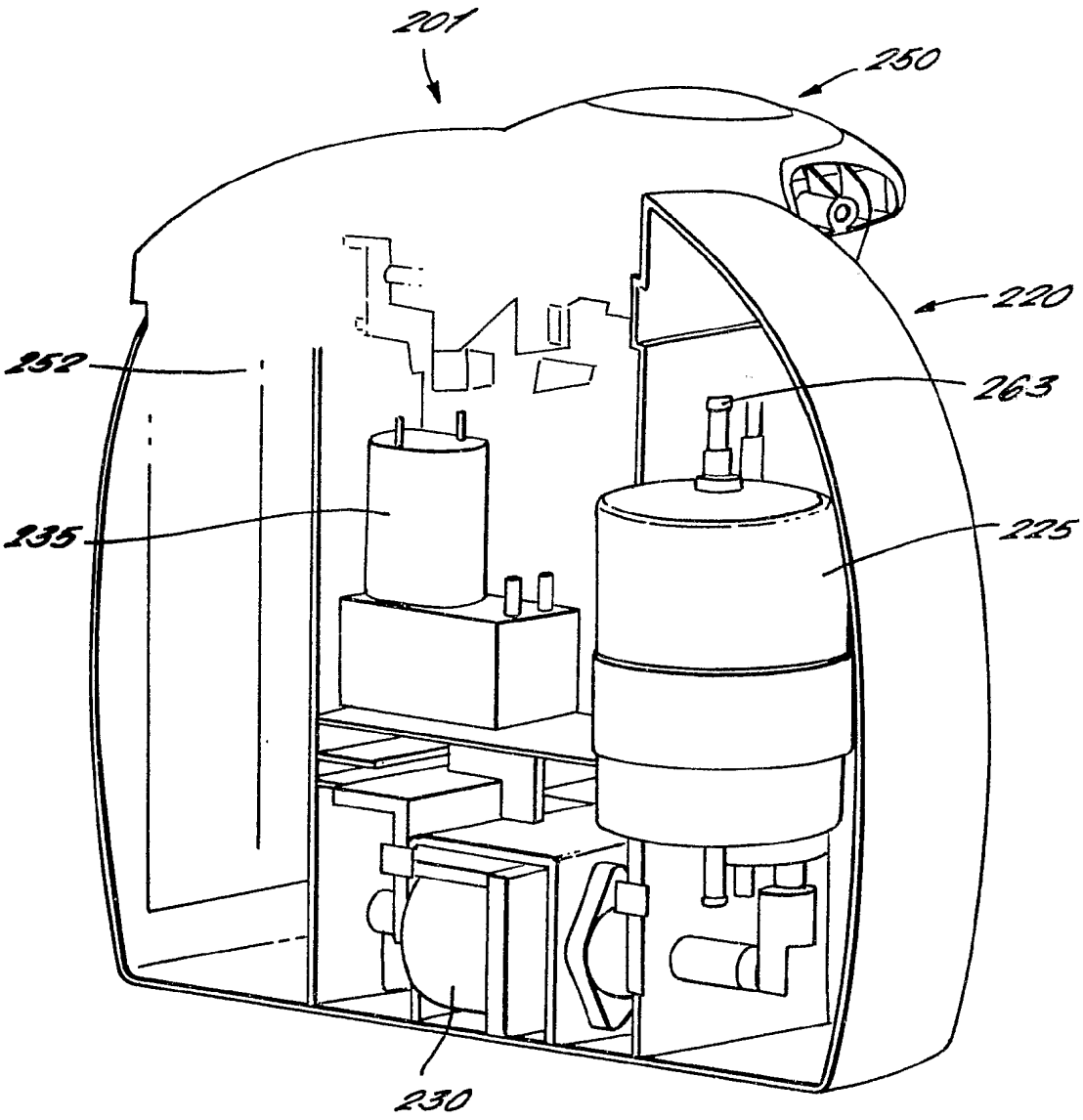


FIG. 3.



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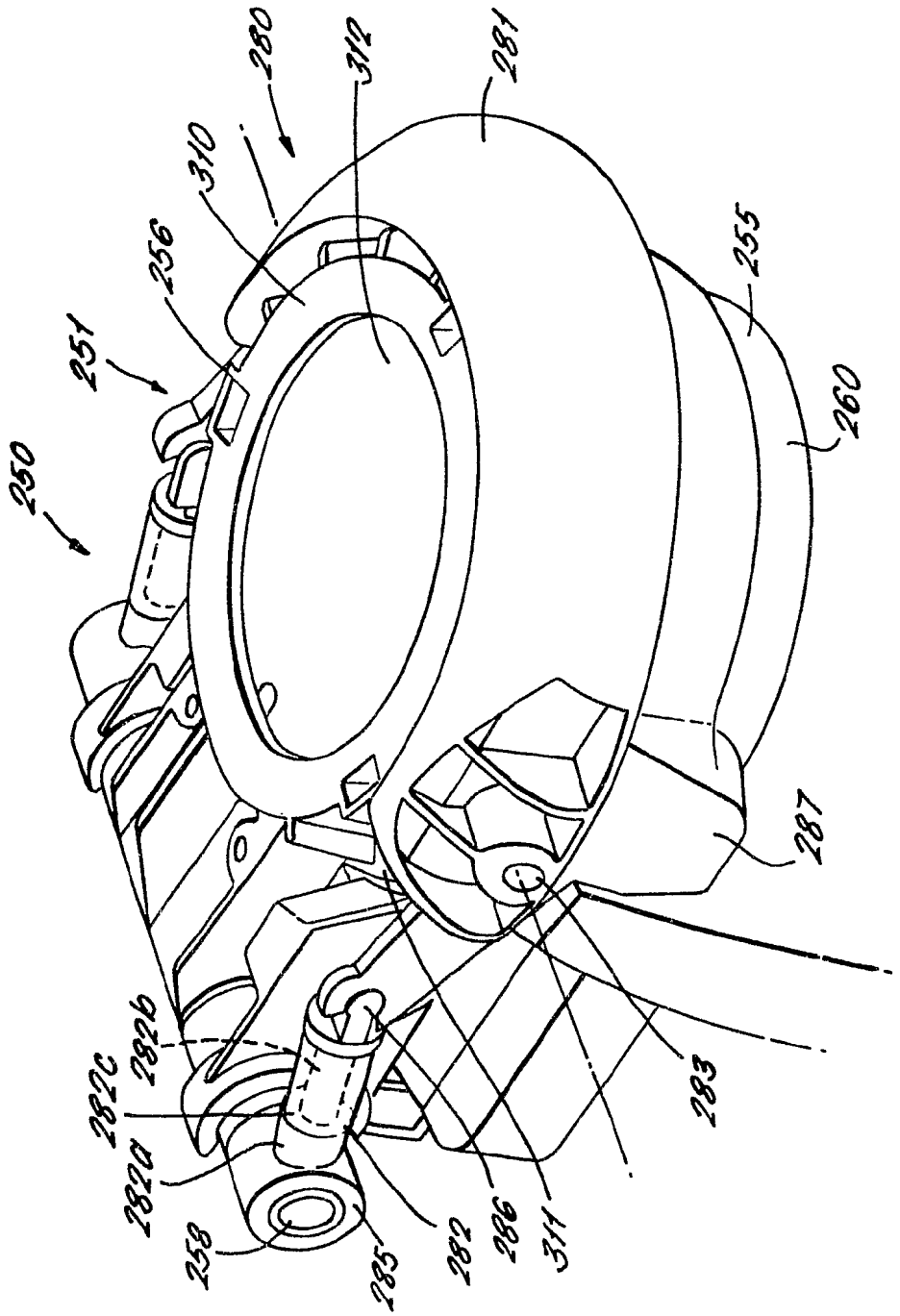
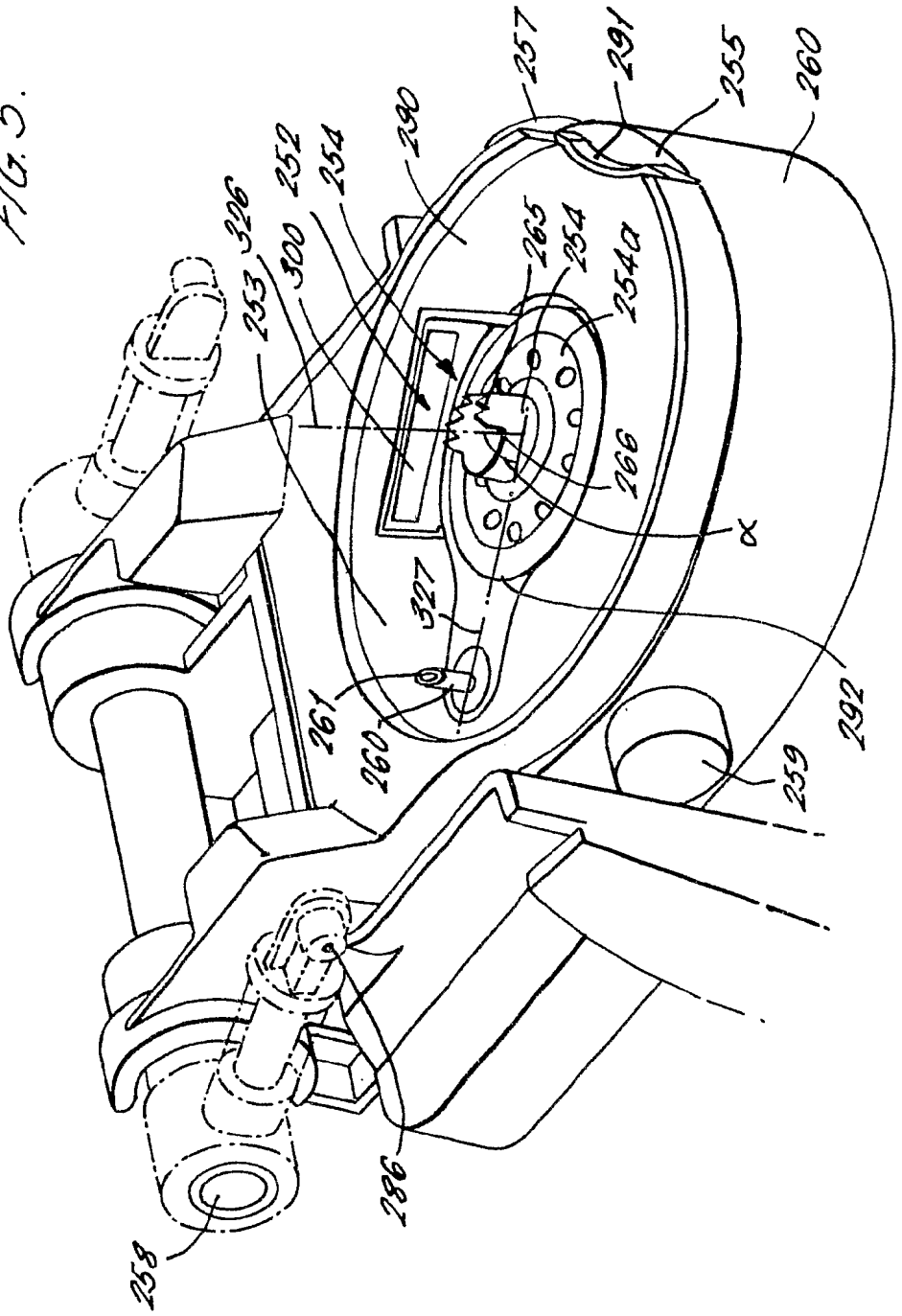

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FIG. 4.

FIG. 5.


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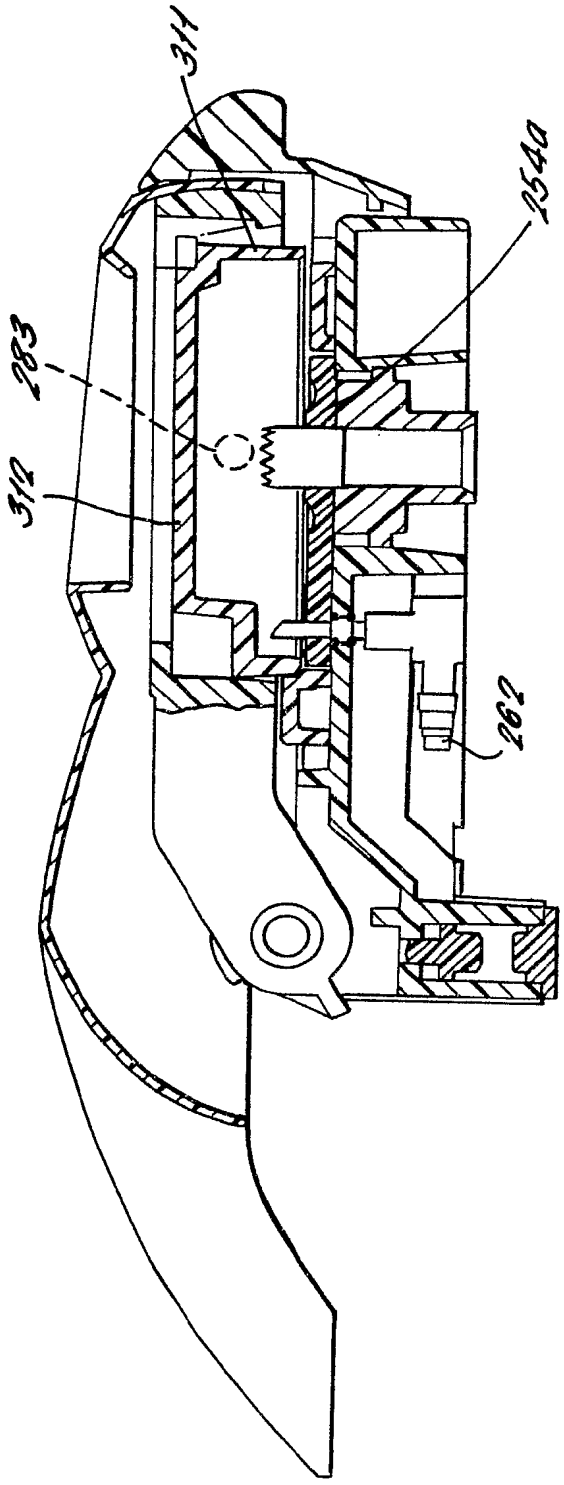
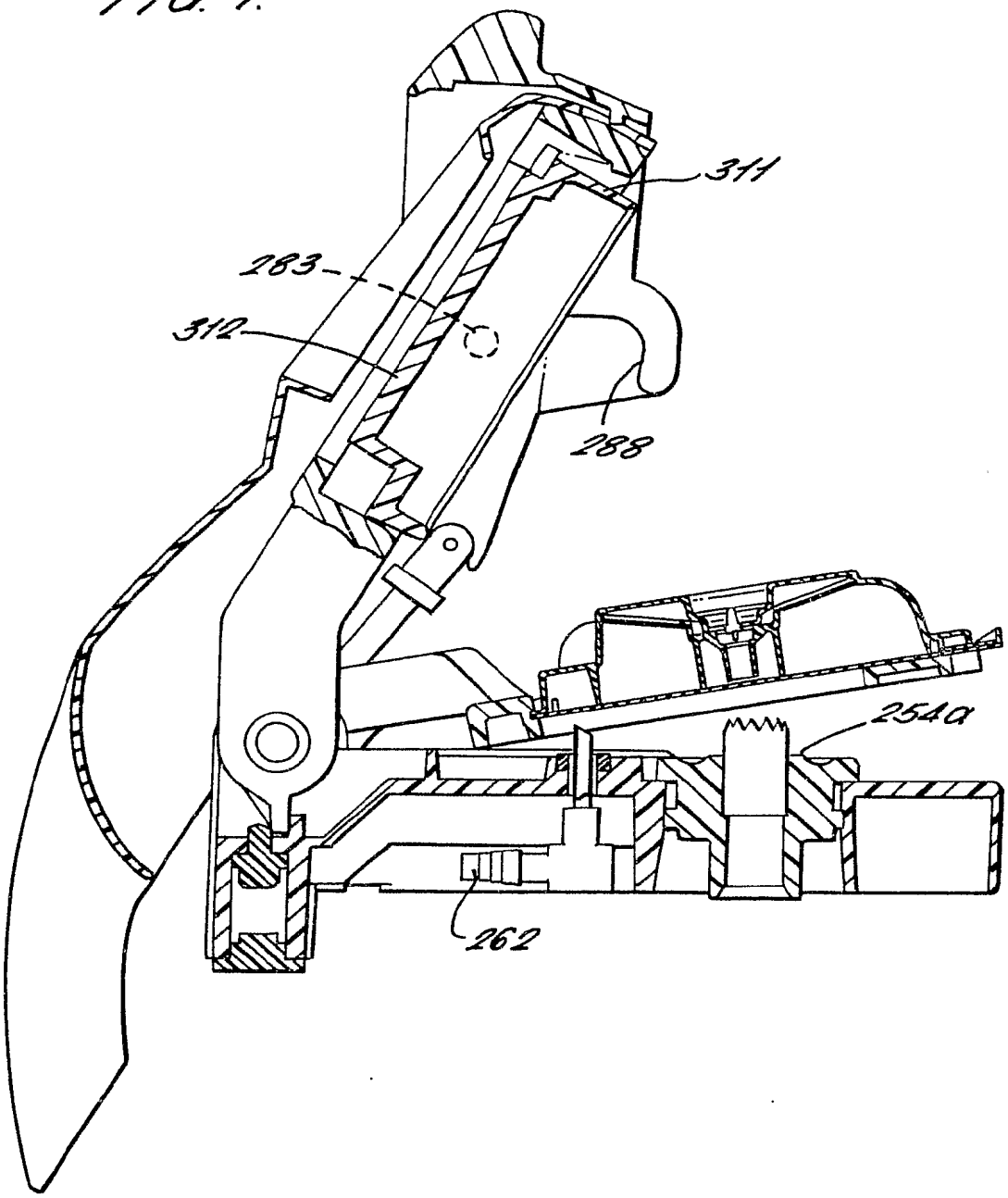


FIG. 6.

FIG. 7.



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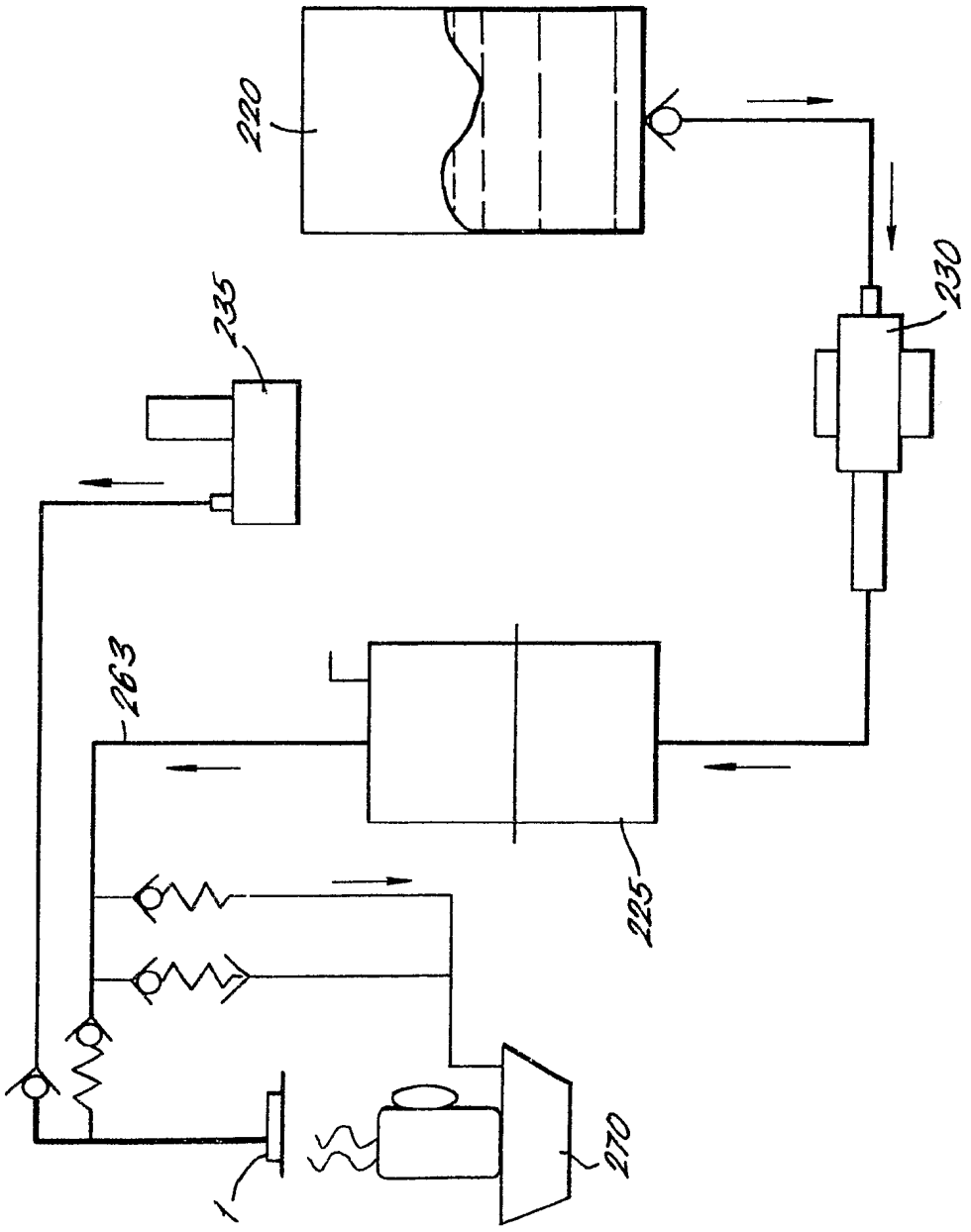


FIG. 8.

FIG. 9a.

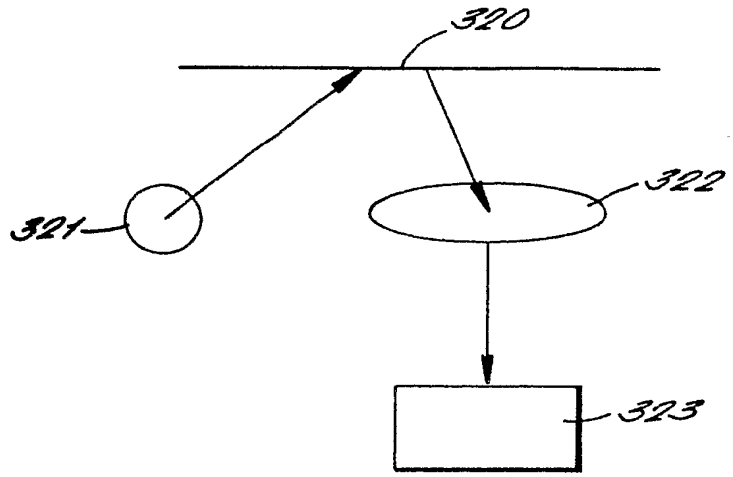


FIG. 9b.

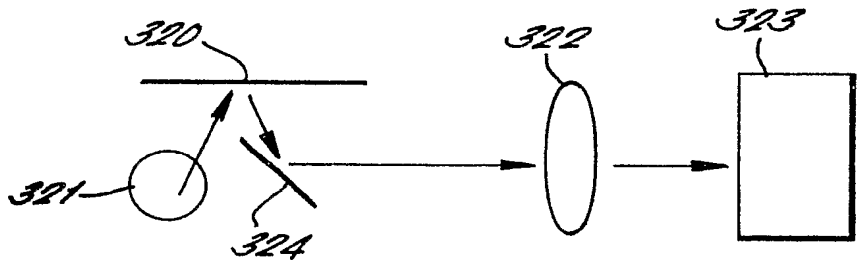


FIG. 10.

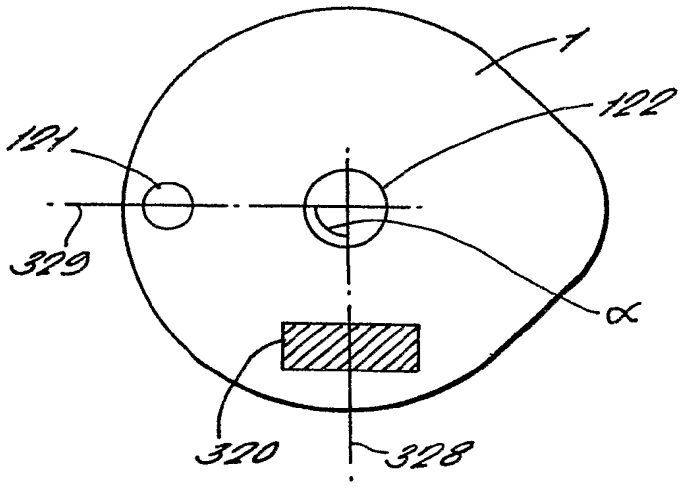


FIG. 11.

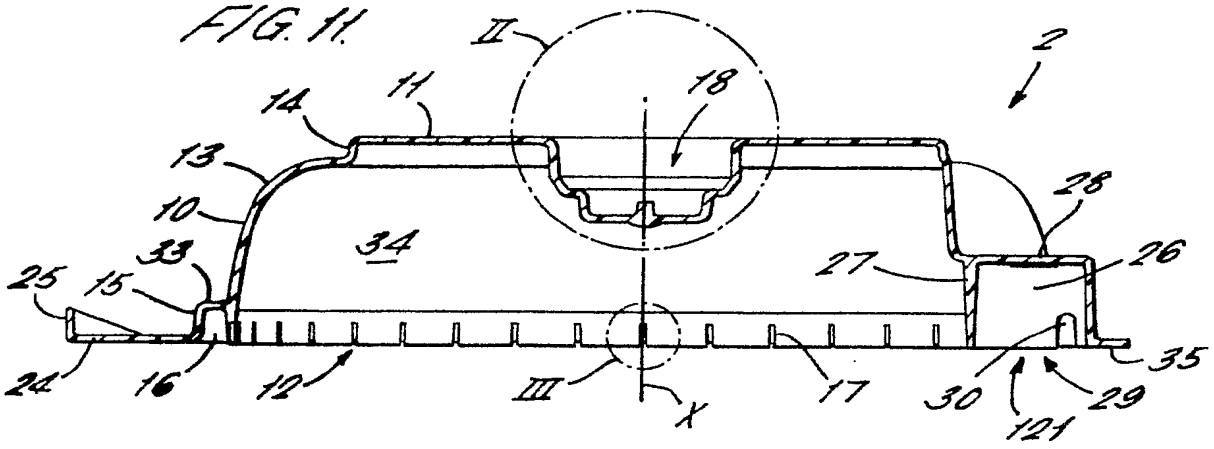


FIG. 12.

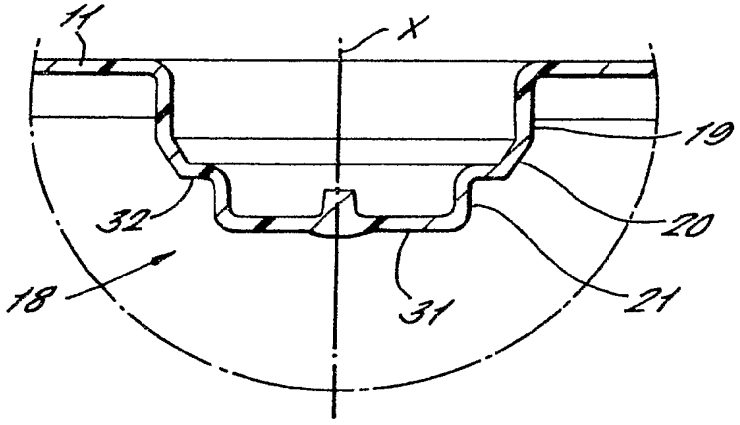


FIG. 13.

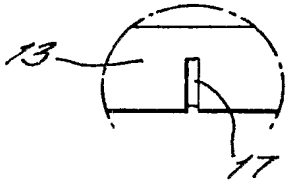
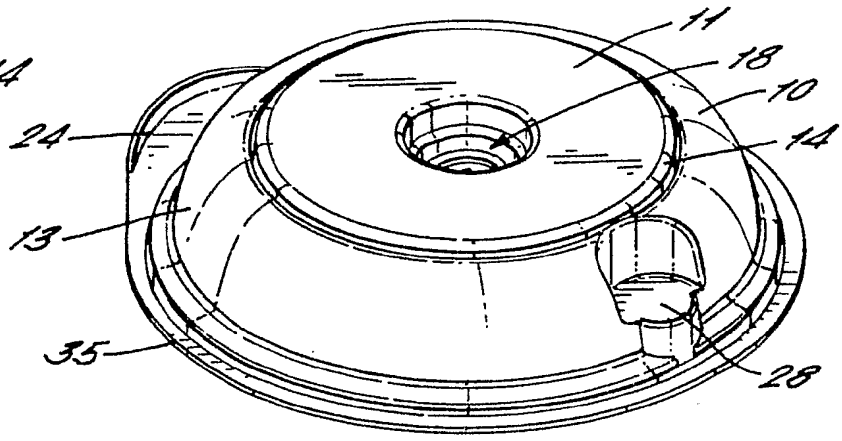


FIG. 14



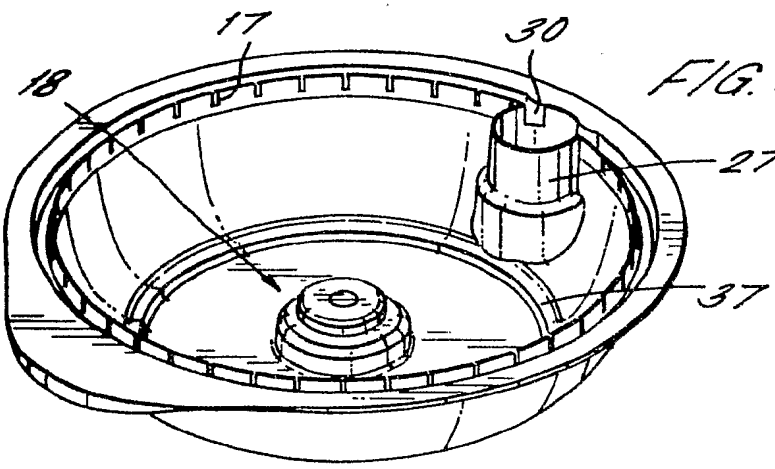


FIG. 15

FIG. 16.

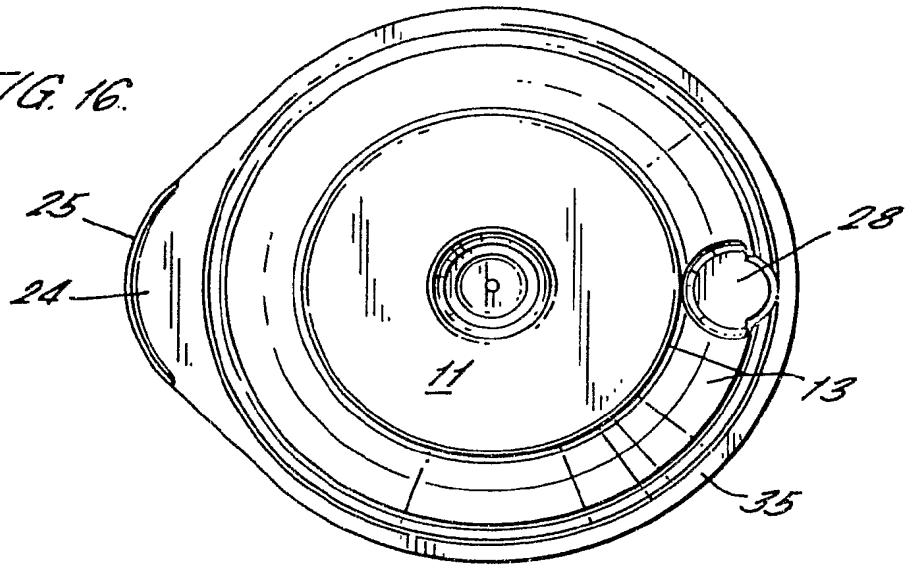


FIG. 17.

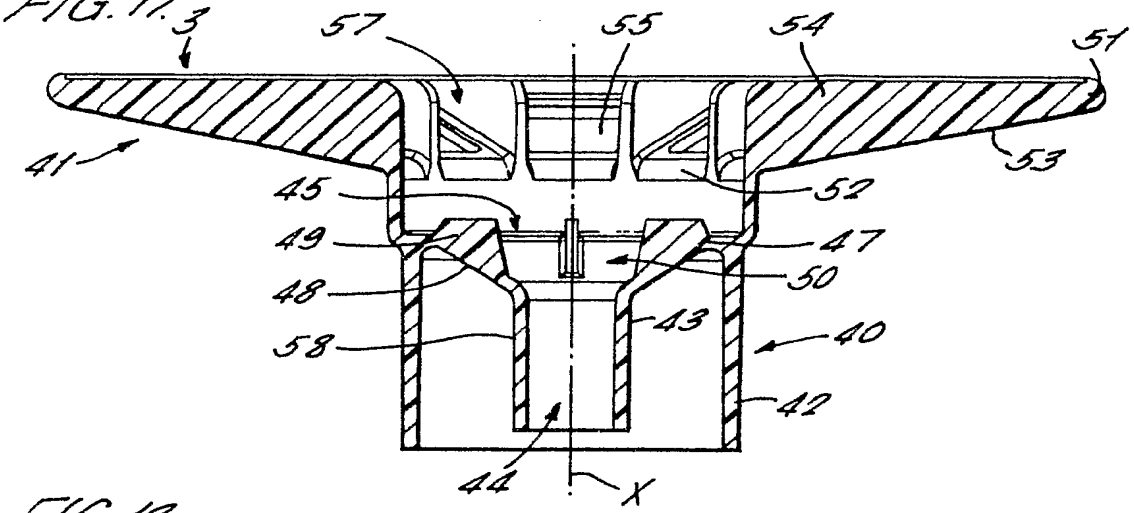


FIG. 18.

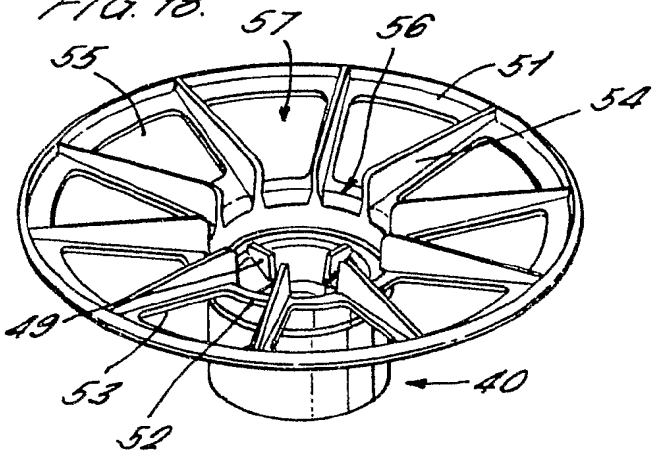


FIG. 19.

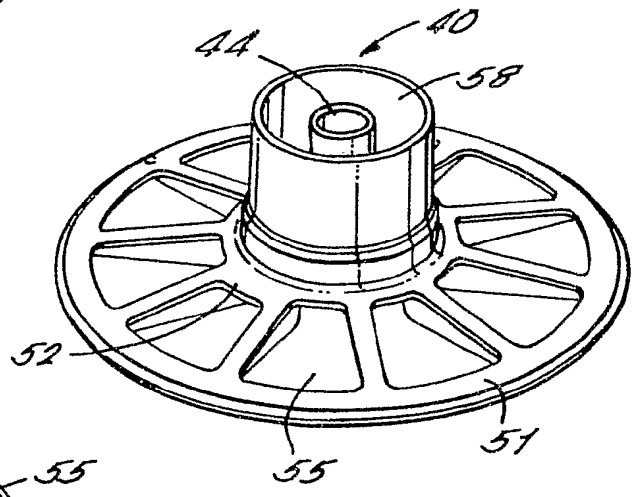
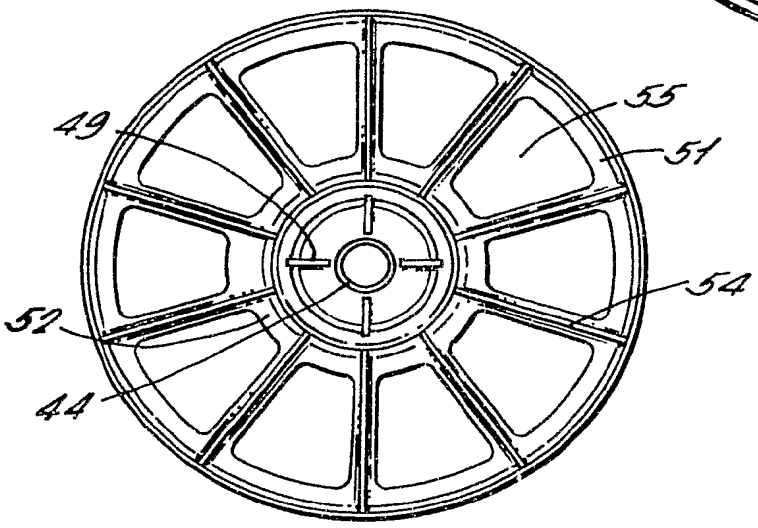


FIG. 20.



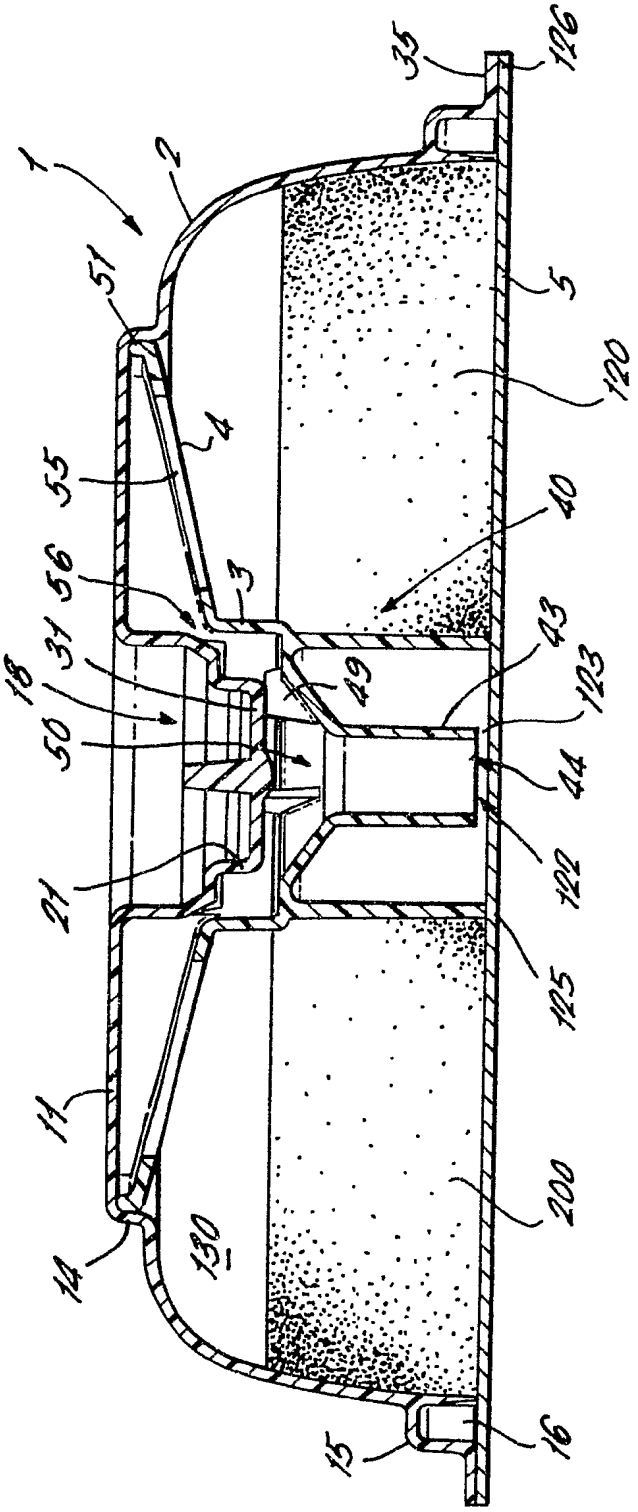

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FIG. 21.

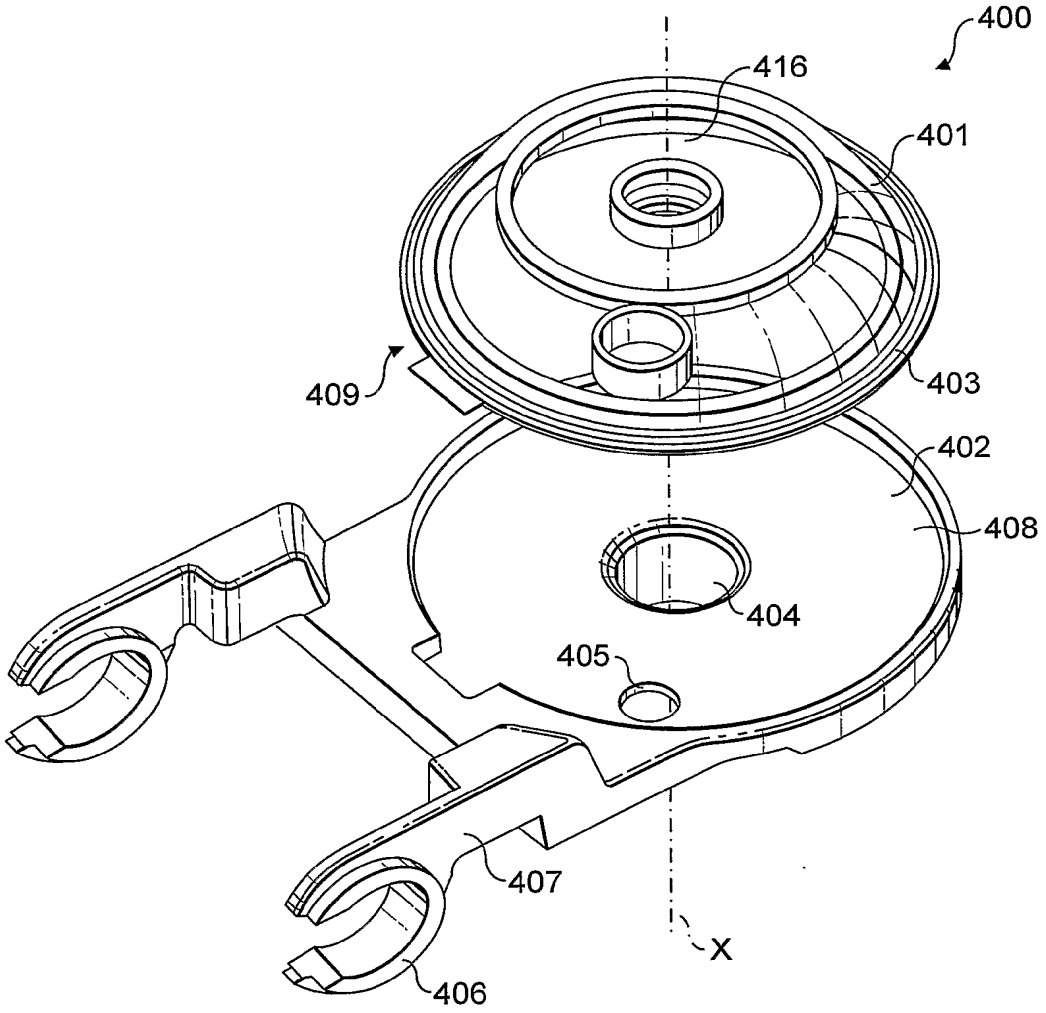


FIG. 22

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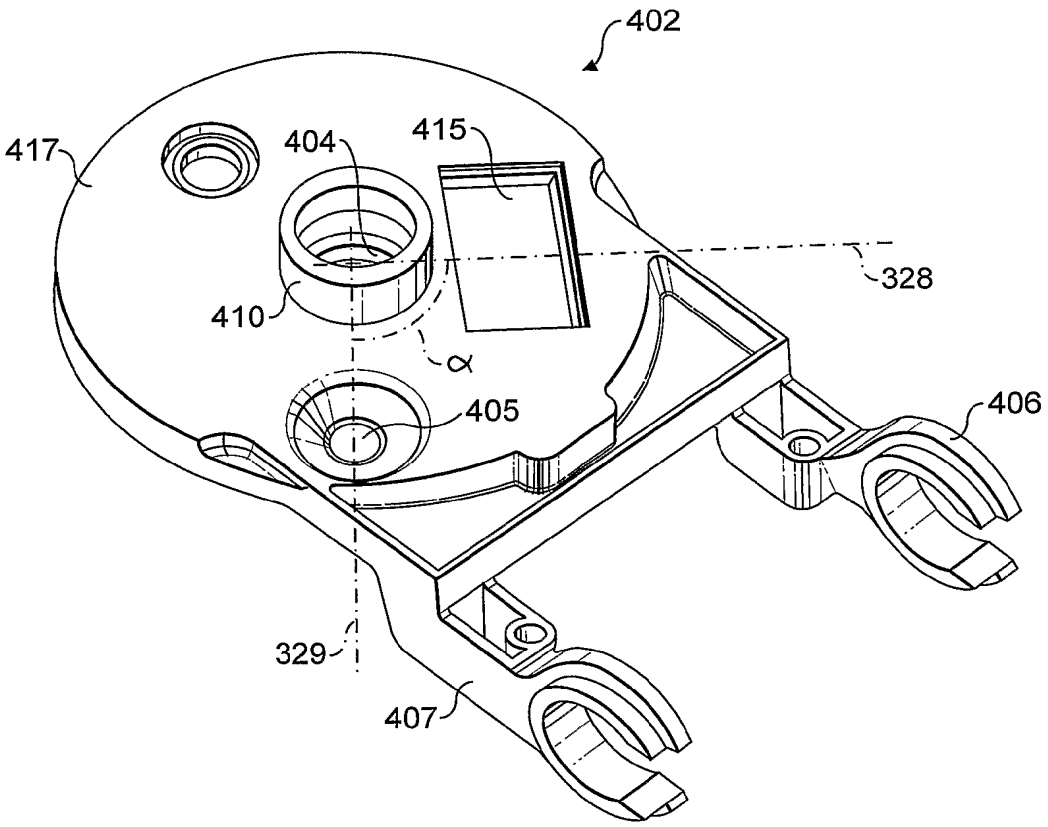


FIG. 23

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IPR2023-00502, U.S. PATENT 10,994,923

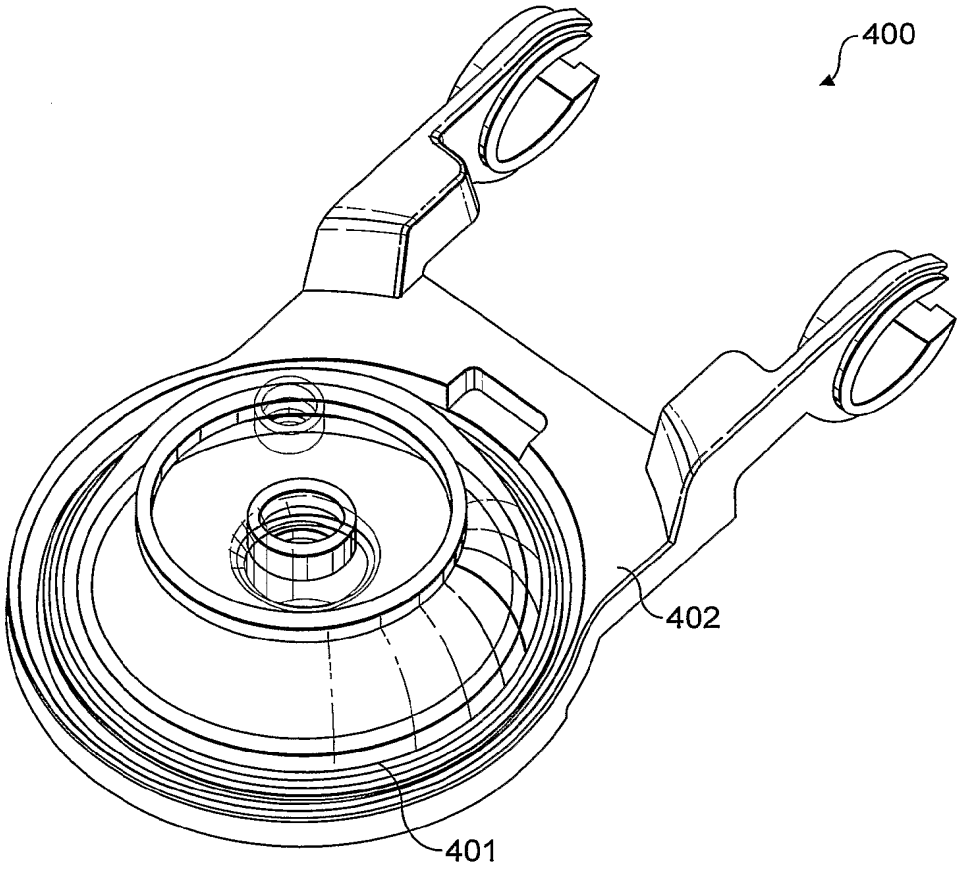
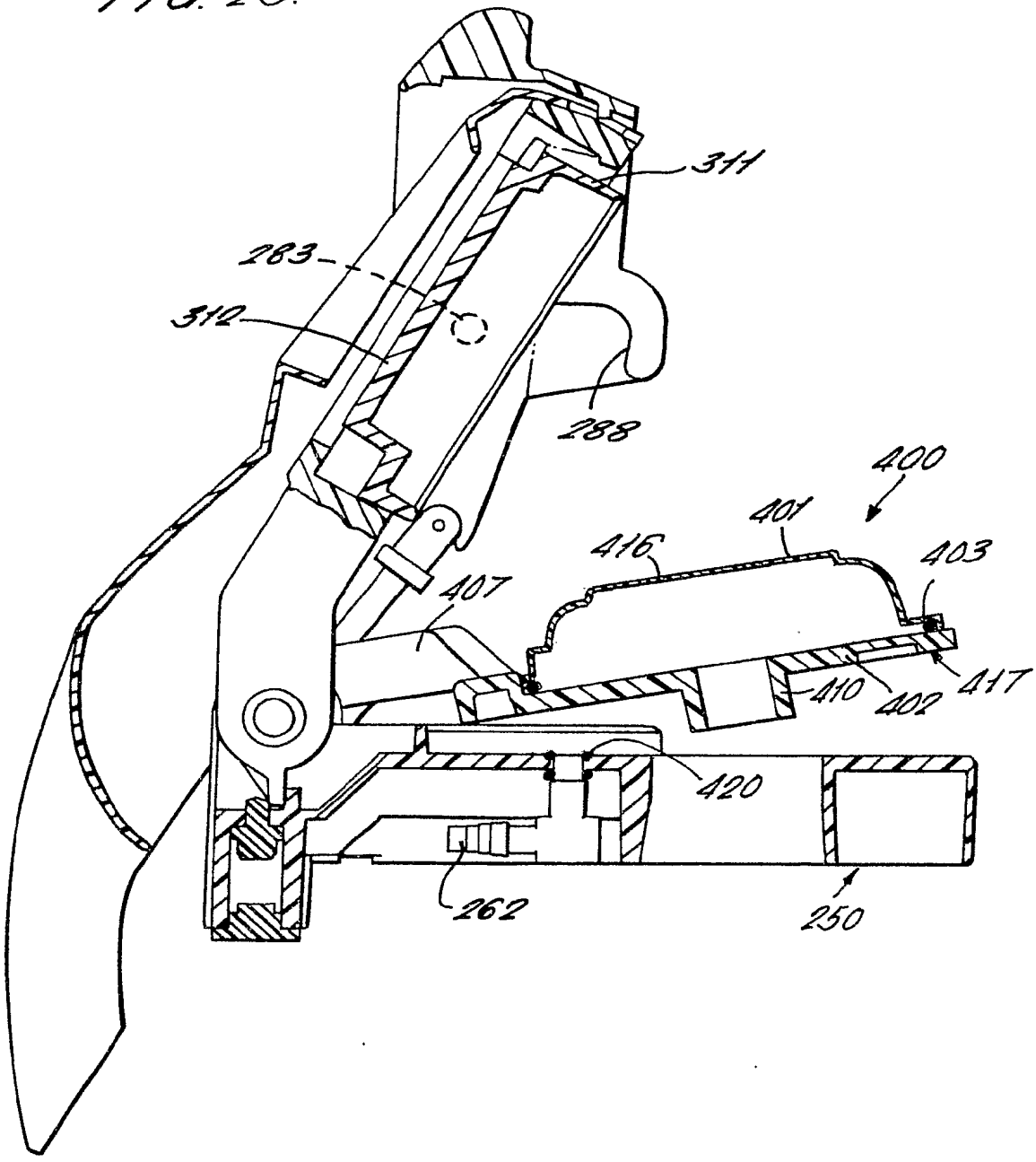


FIG. 24

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FIG. 25.



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INTERNATIONAL SEARCH REPORT

PCT/GB2005/000469

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A47J31/06 A47J31/40

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A47J

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 201 21 494 U (EUGSTER FRISMAG AG ROMANSHORN ;MAHLICH GOTTHARD (DE)) 17 October 2002 (2002-10-17) abstract figures 1-4 page 1, line 21 - line 31 page 6, line 7 - line 14	1,23
A	US 5 762 987 A (PLEISCH JEAN-PIERRE ET AL) 9 June 1998 (1998-06-09) figure 10 column 9, line 53 - line 57 column 12, line 18 - line 21	1,3, 23-31
A	US 2002/148358 A1 (BEAULIEU RODERICK H ET AL) 17 October 2002 (2002-10-17) abstract figure 3	11-14,17

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

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
28 April 2005	06/05/2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Sainz Martinez, M

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IPR2023-00502, U.S. PATENT 10,994,923

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
19 May 2011 (19.05.2011)

PCT

(10) International Publication Number
WO 2011/060292 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/US2010/056579

(22) International Filing Date:
12 November 2010 (12.11.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/260,742 12 November 2009 (12.11.2009) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, 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, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR PREPARING A LIQUID MIXTURE

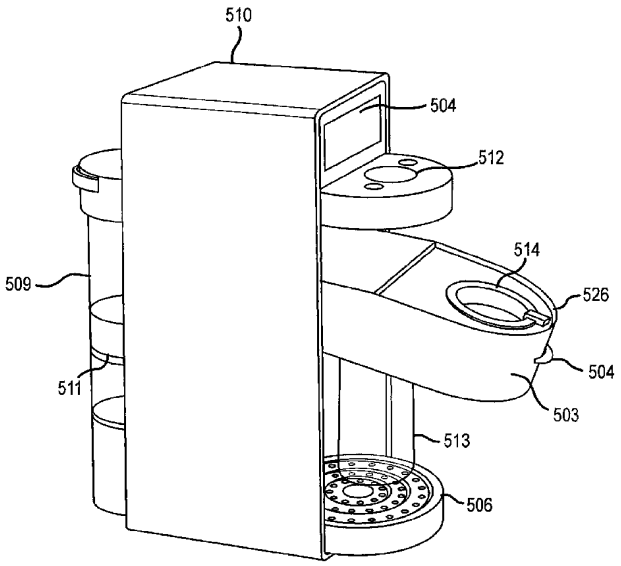


FIGURE 19

(57) Abstract: A mixing apparatus, puncturing mechanism, and cartridge are disclosed. The mixing apparatus has a housing and a drawer with a recess. Corresponding cartridges may be inserted into the drawer and slid into the housing to facilitate mixing a liquid with contents of the cartridge. The liquid may originate from a reservoir in the mixing apparatus or a direct line. Also inside the housing of the mixing apparatus is the puncturing mechanism. The puncturing mechanism has a nozzle configured to puncture a lid of a cartridge and inject liquid to mix with the contents of the cartridge. The puncturing mechanism is further configured to drive an internal puncturing unit inside of the cartridge through a lower portion of the cartridge to allow liquid from the nozzle and contents of the cartridge to be dispensed into a receptacle.

WO 2011/060292 A2

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

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APPARATUS AND METHOD FOR PREPARING A LIQUID MIXTURE

CROSS REFERENCE TO RELATED APPLICATION(S)

[001] This application claims priority to United States Provisional Application No. 61/260,742, filed November 12, 2009, which application is incorporated herein by reference, in its entirety, for any purpose.

TECHNICAL FIELD

[002] Embodiments of the invention relate generally to mixing apparatus and methods, and more specifically, to automated mixing apparatus and methods for mixing a liquid with a mixture ingredient in a sanitary manner.

BACKGROUND OF THE INVENTION

[003] Many mixtures that are made for human consumption require a minimal level of care in mixing together the mixture ingredients. However, in many instances, the quality or character of the mixture can be inadvertently compromised if the minimal level of care is not used in mixing the ingredients of the mixture. For example, the mixing ratios may be improper due to mixing an incorrect amount of liquid (e.g., water) with a mixture ingredient (e.g., concentrate). The temperature of the liquid mixed into the mixing ingredient may be incorrect making consumption of the mixture difficult or unpleasant, and in some cases, causing incomplete dissolution of the mixture ingredient in liquid. Moreover, when making the same mixture at several different times, the resulting mixtures may be inconsistent, for example, the mixtures made at different times may have different mixing ratios and may be made at different mixing temperatures.

[004] In many instances, variations in the quality and character of the mixture is not the result of carelessness, but of the circumstances at the time the mixture is made. For example, where the mixture is an infant nutritional supplement, such as formula, mixing may occur in the middle of the night or under urgent time constraints due to the demands of the infant. Fatigue or the rushed nature of the situation can detrimentally affect the level of care the parent uses when mixing the

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formula. As known, maintaining consistency of the quality of the formula consumed by the infant is desirable for the health and well being of the infant.

[005] Machines for automated mixing have been developed to address some of the problems presented by manually mixing. The machines automate the dispensing of the appropriate amount of water and at the correct temperature during mixing with the mixture ingredient. The resulting mixture is dispensed into an awaiting receptacle. Some of these machines are designed for mixing a single serving of a mixture, for example, single servings of coffee. In such machines, single serving cartridges are used that contain a mixture ingredient to be mixed with water, the quantity and temperature of which is controlled by the machine. Other machines have a larger container with multiple servings of a mixture ingredient (e.g., "bag-in-box"), which is dispensed under the control of the machine and mixed with an appropriate amount of water and at the correct temperature.

[006] Although these machines automate the mixing process, the machines are often designed in such a way that residue from the mixture remains on part of the machine after the mixture is mixed and dispensed. For example, some machines have a channel, tube, or guide that guides a mixture to an opening where the mixture is dispensed into a receptacle. In other machines, a device that punctures a container to allow the ingress and egress of water during the mixing operation comes into contact with the container contents. As a result, residue from a previous mixing operation may contaminate the mixture of a current mixing operation. This is an issue particularly relevant to machines that mix single-servings of mixtures. Where the mixture ingredient is perishable, the residue may create an environment for the growth of bacteria or other organisms, which will be introduced into subsequently made mixtures and may present health concerns. In these types of machines, regular cleaning and maintenance is necessary to maintain a sanitary condition.

BRIEF DESCRIPTION OF THE DRAWINGS

[007] Figures 1 and 2 are perspective drawings of a mixing apparatus according to an embodiment of the invention.

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[008] Figure 3 is a perspective drawing of a closure mechanism according to an embodiment of the invention for a mixing apparatus.

[009] Figure 4 is a perspective drawing of a bottle holder according to an embodiment of the invention for a mixing apparatus.

[010] Figure 5 is a perspective drawing of a cartridge holder according to an embodiment of the invention for a mixing apparatus.

[011] Figures 6 and 7 are perspective drawings of a cartridge according to an embodiment of the invention for use with a mixing apparatus.

[012] Figure 8 is a cross-sectional drawing of the cartridge of Figures 6 and 7 positioned in a cartridge holder.

[013] Figure 9 is a cross-sectional drawing of the cartridge of Figures 6 and 7 positioned in a cartridge holder and punctured by a puncture nozzle.

[014] Figures 10 and 11 are perspective drawings of a mixing apparatus according to another embodiment of the invention.

[015] Figure 12 is a cross-sectional drawing of a portion of the mixing apparatus of Figures 10 and 11 with a mixture ingredient container according to an embodiment of the invention.

[016] Figure 13 is a perspective drawing of the mixture ingredient container according to an embodiment of the invention for the mixing apparatus of Figures 10 and 11.

[017] Figures 14 and 15 are perspective drawings of a mixing apparatus according to another embodiment of the invention.

[018] Figures 16 and 17 are cross-sectional drawings of a puncture housing and cartridge drawer according to an embodiment of the invention for a mixing apparatus.

[019] Figures 18 and 19 are perspective drawings of a mixing apparatus according to another embodiment of the invention.

[020] Figures 20, 21, and 22 are cross-sectional drawings of a puncture mechanism and cartridge according to an embodiment of the invention.

[021] Figure 23 is a perspective drawing of a cartridge according to an embodiment of the invention for use with a mixing apparatus.

[022] Figure 24 is a block diagram of a controller-based system illustrating an example mixing apparatus according to an embodiment of the invention.

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DETAILED DESCRIPTION

[023] Certain details are set forth below to provide a sufficient understanding of embodiments of the invention. However, it will be clear to one skilled in the art that embodiments of the invention may be practiced without these particular details. Moreover, the particular embodiments of the present invention described herein are provided by way of example and should not be used to limit the scope of the invention to these particular embodiments. While the following description will be made in the context of mixing infant formula, it will be appreciated that the invention encompasses embodiments for mixing other mixtures such as juice, coffee, and hot chocolate, and may be used in other applications as well such as in pharmaceutical processes. In other instances, well-known circuits, control signals, timing protocols, and software operations have not been shown in detail in order to avoid unnecessarily obscuring the invention.

[024] Figures 1 and 2 illustrate a mixing apparatus 100 according to an embodiment of the invention. The mixing apparatus 100 has a clamshell-type closure mechanism 101. As will be explained in more detail below, the apparatus 100 accepts cartridges 1 of a mixture ingredient in the closure mechanism 101 to be mixed with a liquid, such as water, according to a mixing recipe. The mixture ingredient of a cartridge 1 may be in solid or liquid form. In the closed position (as shown in Figure 1) the mixing apparatus 100 punctures the cartridge 1 and provides heated or unheated liquid through the cartridge 1 to be mixed with the mixture ingredient. The resulting mixture is dispensed into a receptacle 305. A mixing recipe, which may be preset or manually selected in some embodiments, is used by the mixing apparatus 100 to provide the appropriate amount and appropriate temperature of liquid for the mixture.

[025] The closure mechanism 101 includes an upper closure piece 102 and a lower closure piece 103. The upper closure piece 102 includes a puncturing mechanism (not shown in Figures 1 or 2), user interface and controls 112 and a display screen 104. Setting, control and operation of the mixing apparatus 100 is enabled through the use of the user interface and controls 112, for example, setting time, date, language, and other operational configurations, selecting a mixing recipe, liquid temperature and/or quantity, and initiating a mixing operation. The display

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screen 104 provides a user with visual information. The lower closure piece 103 includes a cartridge holder 114 and cartridge base 115 for receiving and holding a cartridge 1 in place during operation. Housed in the upper closure piece 102 are electronic processing components that receive input from the user interface and controls 112 and various sensors. In response, the electronic processing components generate control and command signals for managing operation of the mixing apparatus 100 and to perform mixing operations. In another embodiment of the invention, a sensor (e.g., an optical scanner, such as a barcode scanner) for obtaining information from a cartridge positioned in the cartridge holder is included in the upper closure piece 102. The upper closure piece 102 is pivotally coupled at a rear closure hinge 108 to a housing 110 in which various components of the mixing apparatus 100 are contained. For example, heating components and pumping components are located in and protected by the housing 110. Conventional heating and pumping components may be used in the mixing apparatus 100.

[026] The mixing apparatus 100 further includes a receptacle niche 113 in which a receptacle 305 is received by receptacle holder 105 that is configured to hold the receptacle 305 in place during mixing operations and to receive the dispensed mixture. An overflow tray 106 fits into a bottom of the receptacle niche 113 to receive any spillage or overflow of liquid or mixture. In some embodiments, the overflow tray 106 is a liquid-tight receptacle having a cover with drain holes or grooves into which any spillage is received. The overflow tray 106 can be removable for cleaning.

[027] A reservoir 109 stores the liquid that is used for mixing. In some embodiments, the reservoir 109 may be removable from the apparatus 100 for easy filling. The reservoir 109 can have a lid and a handle for carrying as well. The reservoir 109 may also contain a water filter and a method for indicating when the filter should be replaced.

[028] The mixing apparatus 100 in some embodiments includes an interface module 111. The interface module 111 allows a user to interface with the mixing apparatus 100, such as to download information from or upload information to the apparatus 100. For instance, the interface module 111 can store a record of what

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the mixing apparatus 100 has dispensed. A user can take the interface module 111 (e.g., USB flash memory) insert it into a computer and download the information. In other embodiments, software for the electronic processing components can be updated by loading the new software onto the interface module 111 and inserting it back into the mixing apparatus 100. For example, when new products are on the market, the user could upload information to the interface module 111 which can then be used to upload the information to the mixing apparatus 100 for mixing and dispensing the new product. The interface module 111 may be used in some embodiments to update product information. For example, if there were a product recall on a batch of mixture ingredient, the user could download the recall information onto the interface module 111 via a website, upload the recall information into the mixing apparatus 100, and the mixing apparatus 100 would not process any mixture ingredient having the batch number. In alternative embodiments of the invention, the interface module 111 includes a wireless transceiver for communicating with another wireless transceiver. For example, a user could transfer information from a website directly to the mixing apparatus 100 via a wireless enabled hand held device connected to the Internet. Conversely, information could be wirelessly uploaded from the mixing apparatus 100 to a hand held device or nearby computer.

[029] Figure 2 illustrates the mixing apparatus 100 with the closure mechanism 101 in an open position. As previously discussed, the lower closure piece 103 includes a cartridge holder 114 and cartridge base 115 for receiving and holding a cartridge 1 in place during mixing. In the open position, a mixture ingredient cartridge 1 can be placed into the cartridge holder 114, as shown in Figure 2. In some embodiments of the invention the cartridge holder 114 includes cartridge holder datum tab 126 (Figure 5) and a cartridge holder input tab 127 (Figure 5) located along the circumference of the holder 114 for orientation and identification of the cartridge 1 (e.g., content, concentration, quantity, etc.). The cartridge holder datum tab 126 does not move and functions as a datum. An upper ring of the cartridge holder 114 rotates and snaps into pre-designed locations so that the cartridge holder input tab 127 can be rotated to different positions relative to the cartridge holder datum tab 126. As will be described in more detail below, the

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upper closure piece 102 is notched to fit around the cartridge holder datum tab 126 so that a second notch in the upper closure piece 102 is positioned in relation to the cartridge holder input tab 127.

[030] Figure 3 illustrates a closure mechanism according to an embodiment of the invention. The upper closure piece 102 is hingeably coupled to the lower closure piece 103 at center pivot hinges 116. The rear of the bottom closure piece 103 tilts around the center pivot hinges 116 as the upper closure piece 102 is opened so that the bottom closure piece is positioned for easier insertion of a cartridge 1 into the cartridge holder 114. A cartridge holder recess 121 located in the upper closure piece 102 fits over the cartridge 1 and cartridge holder 114 when the closure mechanism 101 is closed. Cartridge holder input recesses 117 and cartridge holder datum recess 118 are located in the cartridge holder recess 121 and positioned to correspond to the different positions of the cartridge holder input tab 127 and the cartridge holder datum tab 126, respectively.

[031] Operation of the cartridge holder datum tab 126 (Figure 5), cartridge holder input tab 127, cartridge holder data recess 118, and cartridge holder input recesses 117 according to an embodiment of the invention will be described with reference to Figures 3 and 5. Turning to Figure 5, the cartridge holder 114 includes the cartridge holder datum tab 126 at a fixed position and a cartridge holder input ring 128 that can be rotated and snapped into fixed positions to position the cartridge holder input tab 127 at different locations. A cartridge holder lower piece 129 is configured to snap into the cartridge holder base 115 (Figure 3) and be securely fixed. The cartridge holder 114 further includes a cartridge holder pressure lip 130 on which a cartridge 1 rests when it is in place and provides a point of compression for the cartridge when the closure mechanism 101 is closed.

[032] With reference to Figure 3, when the closure mechanism 101 is closed, the cartridge holder input tab 127 (Figure 5) extends into a corresponding cartridge holder input recess 117. When the tab 127 enters the input recess 117, it presses a corresponding switch, which conveys information to the electrical processing components as to which dispensing recipe (e.g., temperature, volume, etc.) to use for the mixture ingredient of the cartridge 1. As illustrated in Figure 3, and as will be discussed in more detail below, a cartridge 1 has two notches on its lip. A first

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notch corresponds to the datum tab 126 which does not move and a second notch corresponds to the input tab 127. The location of the input notch on the cartridge 1 varies depending on the contents of the cartridge. For example, when the second notch in the cartridge 1 is located at a first position, the cartridge 1 will only fit into the cartridge holder 114 if the input tab 127 is also rotated to the first position. With the cartridge 1 inserted into the cartridge holder 114 and the closure mechanism 101 closed, the input tab 127 will fit into an input recess 117 corresponding to the first position of the input tab 127. A switch in the input recess 117 will be pressed by the input tab 127 and the pre-programmed mixing recipe corresponding to the input recess 117 in which the switch is pressed will be used to mix the mixture ingredient in the cartridge 1. In some embodiments, the mixing apparatus 100 is put into a manual mode by having the input tab 127 in one of the positions, during which the mixing recipe can be manually selected and set by a user to tailor preparation of the mixture.

[033] The use of tabs 126, 127 and input recesses 117, 118 will help prevent an incorrect mixing recipe from being used for a particular mixture ingredient. For example, where cartridge 1 contains an infant formula concentrate, the tabs and input recesses prevent a user from inserting a cartridge having concentrate for 4 oz. of infant formula but selecting and using a mixture recipe for providing 6 oz. of infant formula. That is, the cartridge having infant formula concentrate in a ratio for a 4 oz. output would have the notch in its lid at position "X". The 4 oz. cartridge will only fit in the cartridge holder 114 when the cartridge holder input ring 128 is rotated so that the input tab 127 is at position "X." With the closure mechanism 101 closed the input tab 127 will fit into the input recess 117 at position "X," thereby indicating to the electrical processing components to use the mixture recipe for a 4 oz. output. In comparison, the cartridge for 6 oz. of infant formula will have an input notch in its lid at position "Y". Erroneous mixing will be prevented because the 6 oz. cartridge will not fit since the input tab 127 is in the "X" position and the input tab 127 will not trigger the "X" position switch in the "X" position input recess 117 since the cartridge lid for the 6 oz. cartridge will cover the input tab 127.

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[034] Returning to Figure 3, in some embodiments a sensor 119 is positioned in the cartridge closure recess 121 to obtain information about the cartridge 1 when the closure mechanism 101 is closed. The sensor 119 can be an optical sensor, an example of which is a barcode scanner. In such an embodiment, the barcode scanner 119 will read a barcode on the lid of the cartridge 1. The bar code may be used to identify the mixture ingredient contained in the cartridge 1. The barcode may additionally, or alternatively, contain information about the proper mixing recipe, for example, how to dispense the product, the liquid-to-concentrate ratio, and temperature of the liquid. A benefit of having this information in barcode form is that less memory may be used for storing instructions for the electrical processing components to properly mix and dispense the mixture. Moreover, as new products are released, or if the concentration level of the mixture ingredient changes, the mixing apparatus 100 can adapt to the new information. In embodiments where the mixture ingredient is concentrated infant formula, it is more important than with adult beverages that a user not be able to prepare the infant formula using non-recommended ratios of liquid (i.e., water) and concentrate. For example, with coffee, a user can make it stronger or weaker to their liking. However, with infant formula, the water-to-concentrate ratios are important to the health and well being of the infant. As a precaution, the user should not be able to insert a cartridge designed for a 4 oz. output, for example, and accidentally or intentionally select a 6 oz. output. A barcode encoding a mixing recipe would take this step out of the hands of the user and provide for greater safety in product output.

[035] In some embodiments the barcode is a three-dimensional (3D) barcode. Additional information beneficial for mixture preparation may be encoded through the use of 3D barcodes. For example, the barcode may contain a serial number, batch number and date of manufacture. With this type of information readable by the mixing apparatus 100, the mixing apparatus may be programmed to not dispense out-of-date product or a recalled product (if the user updates the machine with the recall information, e.g., via interface module 111). In another embodiment, new software updates could be encoded by the barcode. For

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example, a user could print out the barcode to be read by the mixing apparatus 100 to update the software.

[036] A puncture nozzle 120 is located in the cartridge closure recess 121. The nozzle 120 is configured to puncture the cartridge 1 and provide liquid into the cartridge 1. The nozzle 120 includes a surface that pushes an internal puncture unit of the cartridge 1 (shown in Figures 8 and 9). In some embodiments, the nozzle 120 includes a pressure switch (not shown) to enable the mixing apparatus 100 to shut off liquid flow into a punctured cartridge in the event the mixture is not being dispensed from the cartridge.

[037] Figure 4 illustrates a bottle holder 105 according to an embodiment of the invention. The bottle holder 105 includes gripper units 141 for holding a receptacle 305 (Figure 1) in place during mixing operations to receive the mixture. Compression springs 140 extend from the gripper units 141 to provide a spring bias as the gripper units 141 are forced apart when a receptacle 305 is pushed into position to receive a mixture, thus providing a compression force to hold the receptacle 305 in place. The gripper units 141 may have ridges 142 formed on the inside curved surface that receives a receptacle 305. The ridges are configured to provide friction against a downward force of the receptacle 305 (e.g., as the mixture is dispensed into the receptacle) while allowing for a horizontal force to spread the gripper units 141 when receptacle is inserted and removed.

[038] Figures 6 and 7 illustrate a cartridge 1 according to an embodiment of the invention. The cartridge 1 includes a cartridge lip 2 having a datum notch 5 and input notch 4. As previously discussed, the notches 4, 5 correspond to an input tab 127 and a datum tab 126 on the cartridge holder 114, and can be used ensure correct orientation of the cartridge 1 in the holder 114, as well as provide information to the mixing apparatus 100 about the cartridge and/or the mixing ingredient contained in the cartridge. The cartridge lip 2 may be configured to provide a clamping surface between an upper surface of the holder 114 and a surface of the cartridge closure recess 121 to hold the cartridge firmly in place when the closure mechanism 101 is in a closed position. A cartridge lid 3 seals in the content of the cartridge 1 (i.e., mixture ingredient). The cartridge lid may be formed from a material that can be punctured by a puncture nozzle as well as seals

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the cartridge 1 to maintain the quantity and quality of the mixture ingredient. The cartridge lid 3 may have a barcode 15 printed on it to provide information about the cartridge, the contents of the cartridge, or other information for embodiments of the mixing apparatus 100 having a barcode scanner.

[039] Below the cartridge lip 2 are cartridge lower and upper compression ridges 7, 8. The lower compression ring 7 rests on the cartridge holder pressure lip 130 (Figure 5) to keep the cartridge 1 in place. A cartridge dispensing nozzle 6 below the lower compression ring acts as a dispensing nozzle for the mixture during mixing. Because the cartridge 1 rests in the cartridge holder 114 on the lower compression lip 130, the cartridge dispensing nozzle 6 (i.e., lower portion) of the cartridge may be of various sizes, diameters and can taper at a variety of angles, which allows for holding varying amounts of mixture ingredients. The bottom of the dispensing nozzle has an opening with a drip lip 9 to guide the output mixture from the cartridge into a receptacle. Inside the opening is a membrane to keep the contents sealed in the cartridge 1 until it is punctured. As will be described in more detail below, when the closure mechanism 101 is in the closed position, the cartridge 1 deforms at a region between the compression ridges 7 and 8 so that the upper compression ring 8 is compressed against the lower compression ring 7. As a result, the length of the cartridge 1 is contracted, and as will be explained in more detail below, forces an internal puncture unit through the lower membrane at the bottom of a cartridge dispensing nozzle 6.

[040] Figures 8 and 9 illustrate cross-sectional views of a cartridge according to an embodiment of the invention positioned in a cartridge holder 114. Figure 8 illustrates the cartridge in an uncompressed condition and Figure 9 illustrates the cartridge in a compressed condition, such as when the upper closure piece 102 of the closure mechanism 101 is closed onto the lower closure piece 103. As previously discussed, a surface of the lower compression ring 7 rests on the cartridge holder pressure lip 130 when positioned in the cartridge holder 114.

[041] As shown in Figure 8, an internal puncture unit (IPU) 10 is positioned in the cartridge 1. The IPU 10 is generally hollow and has an opening at an end proximate the cartridge lid 3 and extends to a pointed end configured to puncture the membrane at the bottom of the dispensing nozzle 6. An IPU support 13 holds

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the IPU 10 in position in the cartridge and deflects when the IPU 10 is forced downward, such as when the cartridge is compressed. The IPU 10 includes an IPU output opening 11 that when the cartridge 1 is compressed, has a portion of the opening 11 outside the cartridge and another portion of the opening 11 inside the cartridge. In this manner, liquid in the cartridge is allowed to flow into the portion of the opening 11 inside the cartridge and be dispensed from the portion of the opening 11 on the outside the cartridge. In some embodiments, the IPU 10 is fluted to facilitate dispensing of the mixture through the puncture of the membrane at the bottom of the cartridge dispensing nozzle 6. The IPU 10 further includes an IPU diversion stop 12 that guides liquid provided into the open end of the IPU 10 from the puncture nozzle 120 through an opening above the stop and into the cartridge where it can mix with the mixture ingredients. The diversion stop 12 may also have an opening to allow the liquid to pass straight through and out the bottom in the event of a partial puncture, thus, preventing the cartridge from over filling.

[042] Figure 9 illustrates the cartridge 1 positioned in the cartridge holder 114 and compressed by the closure mechanism 101 in a closed position. The closing of the closure mechanism 101 causes the puncture nozzle 120 to puncture the cartridge lid 3 and mate with a top opening of the IPU 10. The cartridge 1 is also compressed so that the lower and upper compression ridges 7, 8 are brought together. The compression of the cartridge 1 and the force of the puncture nozzle against the IPU 10 causes the IPU 10 to puncture the membrane at the bottom of the cartridge 1. Liquid is provided through the puncture nozzle 120 from a liquid input tube 131 to the IPU 10. As previously discussed, the IPU 10 includes an IPU diversion stop 12 that guides water into the cartridge to mix with the contents of the cartridge 1. As also previously discussed, in the punctured position the IPU output opening 11 has a portion inside the cartridge into which the mixture enters and a portion outside of the cartridge from which the mixture is dispensed. As also shown in Figure 9, the cartridge lip 2 is clamped between a surface of the cartridge holder 114 and a surface of the cartridge closure recess 121 to hold the cartridge 1 in place during mixing.

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[043] As illustrated in Figure 9 and as previously described, the mixing of the contents of the cartridge 1 with a liquid provided by the puncture nozzle 120 takes place without any part of the mixing apparatus 100 coming in contact with the contents in the cartridge 1. By avoiding contact with the contents of cartridge 1, the cleanliness of the mixing apparatus 100 can be maintained without the need for disassembly and cleaning of parts. Additionally, by not having parts of the mixing apparatus 100 come in contact with the contents of a cartridge 1 during mixing, residue from a previous mixture will not contaminate a current mixture during its preparation.

[044] Figures 10 and 11 illustrate a mixing apparatus 200 according to an embodiment of the invention. Reference numbers previously introduced will be used in describing the mixing apparatus 200 where applicable. In contrast to the mixing apparatus 100, rather than using a container (e.g., cartridge) that is punctured and into which liquid is introduced during mixing, the mixing apparatus 200 uses mixture ingredients dispensed from a container (not shown) through a pump valve, as will be described in more detail below.

[045] The mixing apparatus 200 includes a door 201 for the storage area 202 into which the container of mixture ingredient is stored. A sensor 119 is positioned in the storage area 202 to obtain information about the container of mixture ingredients when positioned in the storage area 202. The sensor 119 can be an optical sensor, an example of which is a barcode scanner. In such an embodiment, the barcode scanner 119 will read a barcode on the container. In some embodiments, the door 201 is insulated and the storage area 202 insulated by insulation 203 so that the storage area 202 can be cooled by a refrigeration unit (not shown), for example, a peltier cooler, included in the housing 110. Vent openings 205 may be included to vent the interior of the housing 110. A dispensing unit housing 204 of the mixing apparatus 200 includes a liquid dispensing unit to control dispensing of the mixture ingredient through a pump valve and provide liquid to be mixed with the contents dispensed from the container. Integrated in the door 201 are user interface controls 112 to allow a user to control operation of the mixing apparatus 200 as previously discussed. A display 104 is also included on the door 201 to provide a user with visual

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feedback and operation information for the mixing apparatus 200. A bottle holder 105 is positioned under the dispensing unit housing 204 to receive and hold a receptacle 305 in the output receptacle niche 113 during mixing and dispensing of a mixture.

[046] Figure 12 illustrates a container 300 according to an embodiment of the invention positioned in the storage area 202. Also shown in Figure 12 are a peltier cooler 206 and a fan 207 for cooling the storage area 202 for embodiments having this feature. The dispensing unit housing 204 includes a solenoid actuator 208 that operates with a pump valve 303 to control flow of the mixture ingredient from the container for mixing. For example, in one embodiment, the solenoid actuator opens a one-way pump valve in the pump valve 303 through electromagnetic force. In some embodiments, the pump valve 303 is integrated with the container 300. The pump valve 303 may also be a reusable attachment coupled to the container 300. A liquid dispenser 209 provides liquid (e.g., water) for mixing with the contents of the container 300. Liquid dispensed by the liquid dispenser 209 is guided by dispensing nozzle 302 to be mixed with the mixture ingredient dispensed from the container at a tip of the dispensing nozzle 302. A dispensing nozzle drip lip 304 at the tip of the dispensing nozzle 302 further guides the mixture into a receptacle 305 held in place by gripper 141 of the bottle holder 105. For example, in some embodiments, the dispensing nozzle 302 is radially ribbed to have the liquid guided to the same point at which the mixture ingredient is dispensed from the dispensing nozzle 302.

[047] The container 300 includes a box portion 301 in which the mixture ingredient is contained and has a lower portion that is shaped to guide the mixture ingredient to the pump valve 303. For example, as shown in Figures 12 and 13, the lower portion of the container 300 is angled downward so that under the force of gravity the mixture ingredient flows through the pump valve 303 and to the dispensing nozzle 302. The container 300 may also include a barcode 13 to provide information about the container, the contents of the container, or other information for mixing, as previously discussed.

[048] In operation, liquid dispensed from liquid dispenser 209 is mixed with the mixture ingredient as it is dispensed from the container 300 from the bottom of

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nozzle 302. By having the liquid and mixture ingredient mixed in this manner, the mixture ingredient does not come in contact with any part of the mixing apparatus 200. As with the mixing apparatus 100, the cleanliness of the mixing apparatus 200 can be maintained without the need for disassembly and cleaning of parts. Moreover, contamination of a current mixture can be avoided because there is no residue on the mixing apparatus 200 from the mixing of a previous mixture.

[049] Figures 14 and 15 illustrate a mixing apparatus 400 according to another embodiment of the invention. Reference numbers previously introduced will be used in describing the mixing apparatus 400 where applicable. In contrast to the mixing apparatus 100, cartridges are positioned in a cartridge drawer 403 which slides out and pivots downward to facilitate insertion of cartridges in the cartridge holder 114. Figure 14 illustrates the cartridge drawer 403 in a closed position (for mixing) and Figure 15 illustrates the cartridge drawer in an open position (for cartridge insertion). The cartridge drawer 403 slides back into place under a puncture housing 401 that includes a puncture nozzle 120 and a cartridge closure recess 121. Grip ridges 404 may be included on the cartridge drawer 403 to help a user grip it when opening or closing. A handle 402 is used to puncture a cartridge 1 positioned in the cartridge holder 114 and when the cartridge drawer 403 is closed. The puncture nozzle 120 and the cartridge closure recess 121 are attached to the handle 402 so that when it is moved downward, it will move the puncture nozzle 120 and the cartridge closure recess 121 into position for holding the cartridge in place, puncturing the cartridge lid 3 and driving an internal puncture unit 10 of the cartridge 1 through the lower membrane of the cartridge 1.

[050] Figures 16 and 17 illustrate a cross-sectional view of the puncture housing 401 and the cartridge drawer 403 according to an embodiment of the invention. Figure 16 illustrates the cartridge drawer 403 in the closed position and the handle 402 in a downward position and Figure 17 illustrates the cartridge drawer 403 in open position and the handle 402 in an upward position.

[051] As shown in Figure 16, when the cartridge drawer 403 is closed and the handle 402 is rotated about a handle hinge 409 to the downward position, the puncture nozzle 120 and the cartridge closure recess 121 are also moved downward into position to clamp a cartridge lip 2 of a cartridge 1 (not shown in Figures 16 and

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17) between the cartridge closure recess 121 and the cartridge holder 114, and puncture the cartridge lid 3. Liquid to mix the contents of the cartridge 1 is provided through the nozzle 120 from liquid input tube 131. Mixing of the cartridge contents is performed as previously described. Magnets 405 and 406 are used to attract and align the drawer 402 when in a closed position. A locking spring 407 and locking bar 408 are used to hold the handle 402 in place in the downward position during mixing of the cartridge contents but allows the locking bar 408 to be released upward when enough force is applied to the handle 402.

[052] When opening the cartridge drawer 403, the handle 402 is positioned in its upward position to move the puncture nozzle 120 and the cartridge closure recess 121 upward and out of the way for the drawer 403 to be pulled open. The drawer 403 is pulled open by pulling with enough force to overcome the attraction of magnets 405, 406. The cartridge drawer 403 includes drawer sliding pin 410 and drawer pivot pin 411 which slide in drawer slide tracks 412 as the drawer 403 is opened and closed. The drawer sliding pin 410 adds stability when the drawer 403 is opened or closed and slides downward when the drawer 403 is fully opened and pivoted downward. The drawer pivot pin 411 also slides in the drawer slide track 412 and helps maintain alignment as the drawer 403 is opened and closed. As the drawer 403 is fully opened, the drawer pivot pin 411 functions as a pivot so that the drawer 403 can pivot downward as shown in Figure 17.

[053] Figures 18 and 19 illustrate a mixing apparatus 500 according to an embodiment of the invention. Reference numbers previously introduced will be used in describing the mixing apparatus 500 where applicable. Figure 18 illustrates mixing apparatus 500 with a drawer 503 which may slide in and/or out of housing 110 and may rotate downward to allow insertion of cartridges in the cartridge holder 514. Figure 18 illustrates cartridge drawer 503 in a closed position (for mixing) and Figure 19 illustrates the cartridge drawer 503 in an open position (for cartridge insertion). The cartridge drawer 503 may slide back into place under a puncture housing 501, aligning a cartridge in puncturing apparatus 555 as shown in Figures 20, 21, and 22. Magnets (not shown) may be used to align the drawer in a predetermined position. A drawer tab 504 may be included

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on the cartridge drawer 503 to help a user push or pull drawer 503 into an open or closed position.

[054] Mixing apparatus 500 may further include a receptacle niche 513 in which a receptacle 305 may be inserted to receive liquid or mixture. Overflow tray 506 may be inserted into the bottom of receptacle niche 513. In at least one embodiment, overflow tray 506 is a liquid-tight receptacle for containing overflow or spillage of fluid or mixture and may be removed for cleaning.

[055] In some embodiments, a reservoir 509 may be used for storing fluid that is used for mixing. Reservoir 509 may also be removed from mixing apparatus 500 for cleaning or filling with liquid to be mixed. A filter 511 may be included in reservoir 509 along with a filter indicator to designate when the filter 511 has expired or may be replaced. Reservoir 509 may contain fluid heating mechanisms (not shown) or be coupled to fluid heating mechanisms located within housing 510. In additional embodiments, a fluid source, such as a water line, may be connected to reservoir 509 or directly connected to mixing apparatus 500 to provide fluid to be mixed.

[056] Mixing apparatus 500 may further include a user interface and controls 512 and display screen 504. Settings, controls, and operation of mixing apparatus 500 may be facilitated through the user interface and controls 512, and display screen 504 may provide a user with system information. Settings of mixing apparatus 500 may include network connectivity configuration enabling remote communication with users over a wireless transceiver (not shown). In another embodiment, a wireless transceiver is capable of communicating over cellular, Wi-Fi , Bluetooth, wired, or other wireless networks, and may be compatible with any communication protocol. Remote communication may be used, for example, to remotely upload data tracking usage of mixture apparatus 500, or alternatively, to initiate a mixing procedure. In one scenario, a user could communicate with mixing apparatus 500 from a remote device to initiate a the mixing process and subsequently receive a notification from mixing apparatus 500 alerting the user that the mixing procedure has completed.

[057] Media Interfaces may also be included in mixing apparatus 500. In at least one embodiment, a user may interface with the mixing apparatus 500. This may

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include uploading data to or downloading data from mixing apparatus 500. A user, for example, may download a history of usage of the mixture apparatus 500 and/or upload more recent firmware.

[058] In contrast to the mixing apparatus 400, mixing apparatus 500 may use a solenoid 540 to move puncture nozzle 520 downward as shown in Figure 20. Solenoid 540 may be a solenoid having any number of stages. Figure 20 illustrates a cross-sectional view of puncturing system 555 according to an embodiment of the invention. In one embodiment, cartridge 50 does not have compression ridges and no cartridge compression occurs when the cartridge is inserted into puncturing system 555. In another embodiment, cartridge 50 may have compression ridges 7, 8 similar to cartridge 1 previously shown in Figures 8 and 9. Once fully inserted into puncturing system 555, cartridge 50 may be compressed so that compression ring 8 is pushed downward toward compression ring 7. The puncturing system 555 is configured to accept and position cartridges of various shapes, volumes, and dimensions, for example, the cartridges having longer or shorter cartridge dispensing nozzles may used with the puncturing system 555 to operate with cartridges of various volumes. As a result, the cartridge may be compressed and IPU 10 may be positioned closer to the membrane in the opening at the bottom of the dispensing nozzle.

[059] After cartridge 50 is fully inserted into puncturing system 555, a user may interface with mixing apparatus 500 and initiate a mixing procedure or the procedure may initiate automatically. Once the process begins, solenoid 540 may cause puncture nozzle 520 to move in a downward direction and puncture cartridge lid 3 as shown in Figure 21. In one embodiment, puncture nozzle 520 may include a temperature sensing element (not shown) and measure the temperature of contents of the cartridge. The temperature sensing element may be rinsed by the puncture nozzle 520 to prevent any future contamination resulting from contact with mixture ingredient in the cartridge. In another embodiment, the temperature of the contents of the cartridge may be read using an infrared thermometer (not shown), enabling the temperature to be measured without puncture nozzle 520 coming in contact with mixture ingredient. Temperature of

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liquid provided for mixing with the cartridge contents may be adjusted based on the temperature of mixture ingredient in the cartridge.

[060] Solenoid 540 may move puncture nozzle 520 further downward, causing puncture nozzle lip 515 of puncture nozzle 520 to push the IPU 10 downward. This may cause the IPU 10 to puncture the membrane in the opening at the bottom of the dispensing nozzle as shown in Figure 22. With the membrane of the opening of drip lip 9 punctured, mixture ingredient can be dispensed from the cartridge into a receptacle 305 (not shown) and mix with any fluid from reservoir 509 that may be injected by puncture nozzle 520. In some embodiments, after the puncture nozzle 520 punctures the cartridge lid 3, liquid is provided into the cartridge to "premix" with the contents of the cartridge. The puncture nozzle is then moved further downward to drive the IPU 10 downward and puncture the bottom of the cartridge. Additional liquid is further provided to fully mix the contents of the cartridge.

[061] Figure 23 illustrates a cartridge 50 according to an embodiment of the invention. In contrast to cartridge 1, cartridge 50 includes a datum notch 5 and a identification marker 52. As shown in Figure 19, cartridge 50 is inserted into cartridge holder 514 in drawer 503 and oriented such that datum notch 5 lines up with cartridge holder datum tab 526. In one embodiment, an identification marker may be a protrusion on lip 54 and product reader 545 (Figure 20) may be a plurality of push buttons. When drawer 503 is in a closed position, the identification marker may impress on one of the push buttons of product reader 545, as shown in Figure 21. This may indicate to the mixing apparatus 500 one or more characteristics about the contents of cartridge 50, such as volume, type, expiration date, or brand. In other embodiments, the identification marker and product reader 545 may be a barcode and barcode reader respectively, or may be a RFID tag, and RFID reader, respectively, to identify cartridge content characteristics.

[062] Figure 24 illustrates a block diagram of a controller-based system showing a representative implementation of mixing apparatus 500 in which various aspects of the present invention may be embodied. In one embodiment, a controller 601 may interface with network interface 602 and media interface 603 to facilitate

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remote communication and allow a user to locally upload and download data respectively. Controller 601 may also receive user inputs from user interface and controls 512 and display information to the user on display 504. Temperature sensor 611 and product reader 545 may be coupled to controller 601 to provide cartridge information. Typically, the system will also include connection to a solenoid 540 that allows the system to facilitate an automated mixing process.

[063] From the foregoing it will be appreciated that, although specific embodiments of the invention have been described herein for purposes of illustration, various modifications may be made without deviating from the spirit and scope of the invention. Accordingly, the invention is not limited except as by the appended claims.

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What is claimed:

1. A puncturing apparatus, comprising:

a nozzle configured to puncture a first membrane of a container and configured to be positioned adjacent an internal puncture unit of the container;

a lowering mechanism coupled to the nozzle and configured to move the nozzle to puncture the first membrane of the container and further configured to move the nozzle to interact with the internal puncture unit and drive the internal puncture unit through a second membrane to puncture the same.

2. The puncturing apparatus of claim 1, wherein the lowering mechanism comprises a solenoid.

3. The puncturing apparatus of claim 1, further comprising a temperature sensor disposed in the nozzle.

4. The puncturing apparatus of claim 1, further comprising:

a tube coupled to the nozzle and configured to provide a liquid to the nozzle, the nozzle further configured to provide the liquid into the container.

5. The puncturing apparatus of claim 1, wherein the nozzle is configured to move the internal puncture unit responsive to moving from a first position to a second position.

6. The puncturing apparatus of claim 1, wherein the nozzle does not come in contact with contents of the container during movement by the lowering mechanism.

7. A cartridge, comprising:

a container having a receiving end and a dispensing end;

a first membrane disposed at the receiving end;

a second membrane disposed at the dispensing end;

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an internal puncture unit disposed within the container and positioned between the first membrane and the second membrane, the internal puncture unit configured to puncture the second membrane; and

a datum notch configured to orient the cartridge in a first position.

8. The cartridge apparatus of claim 7, further comprising:

a plurality of compression ridges configured to allow the container of the cartridge to deform in a first region between the compression ridges.

9. The cartridge apparatus of claim 7, wherein the internal puncture mechanism comprises:

a diversion stop configured to guide a liquid provided to a first end of the internal puncture unit to at least one opening in the internal puncture unit and into the cartridge.

10. The cartridge apparatus of claim 7, wherein the internal puncture mechanism is fluted.

11. The cartridge apparatus of claim 7, further comprising:

at least one internal puncture unit support coupled to the internal puncture unit and configured to position the internal puncture unit at a second position, the at least one internal puncture unit support further configured to allow the internal puncture unit to move in a first direction responsive to the internal puncture unit being pushed in the first direction.

12. The cartridge apparatus of claim 7, further comprising:

an identification marker configured to indicate at least one characteristic of a content of the cartridge.

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13. The cartridge apparatus of claim 12, wherein the identification marker comprises at least one of a protrusion, barcode, RFID tag, and notch.

14. An apparatus for mixing a mixture, comprising:

a first recess configured to accept and position a cartridge in a predetermined orientation;

a puncture system, comprising:

a nozzle configured to puncture a lid of a cartridge positioned in the first recess and further configured to provide liquid through the puncture; and

a mechanism configured to position the nozzle in a plurality of positions and puncture the top membrane; and

a second recess configured to receive a receptacle to receive a mixture including the liquid from beneath the cartridge.

15. The apparatus of claim 14, further comprising a processor configured to determine a correct mixing ratio between contents of the cartridge and the liquid provided by the nozzle.

16. The apparatus of claim 14, further comprising:

a product reader configured to determine at least one characteristic about contents of the cartridge responsive to analyzing the cartridge.

17. The apparatus of claim 14, further comprising:

a reservoir configured to store the liquid;

a heating mechanism configured to heat the liquid to be provided by the nozzle.

18. The apparatus of claim 14, wherein the puncture system is configured to puncture the membrane without coming in contact with contents of the cartridge.

19. The apparatus of claim 14, wherein the nozzle is further configured to interact with

an internal puncture unit of the cartridge to puncture a second membrane responsive to being moved by the nozzle.

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20. The apparatus of claim 14, wherein the first recess is configured to accept and position cartridges of various shapes, volumes, dimensions, or combinations thereof.

21. A method for combining a mixture and a liquid, comprising:

moving a nozzle to a first position adjacent to a lid of a cartridge;

puncturing the lid of the cartridge using the nozzle; and

moving the nozzle to a second position to effect a puncturing of a lower portion of the cartridge.

22. The method of claim 21, further comprising:

after said puncturing the lid, measuring a temperature of contents of the cartridge.

23. The method of claim 22, further comprising:

heating a liquid to be provided into the cartridge to a temperature based at least in part on the temperature of the contents of the cartridge.

24. The method of claim 21, further comprising:

determining at least one characteristic of contents of the cartridge responsive to reading a feature of the cartridge.

25. The method of claim 21, wherein moving the nozzle to a first position and moving the nozzle to the second position comprise using a solenoid to move the nozzle.

26. The method of claim 21, further comprising:

after said puncturing the lid, providing a liquid into the cartridge.

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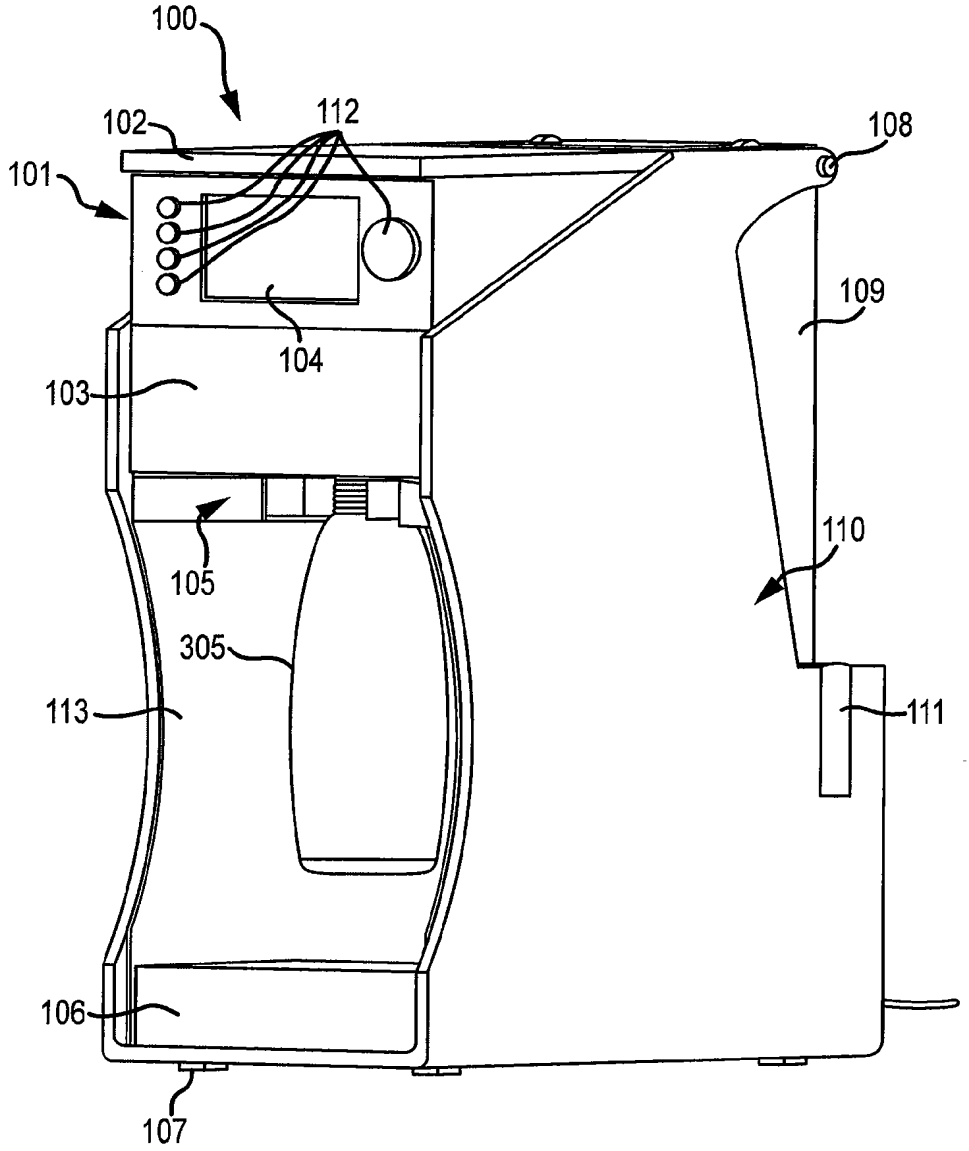


FIGURE 1

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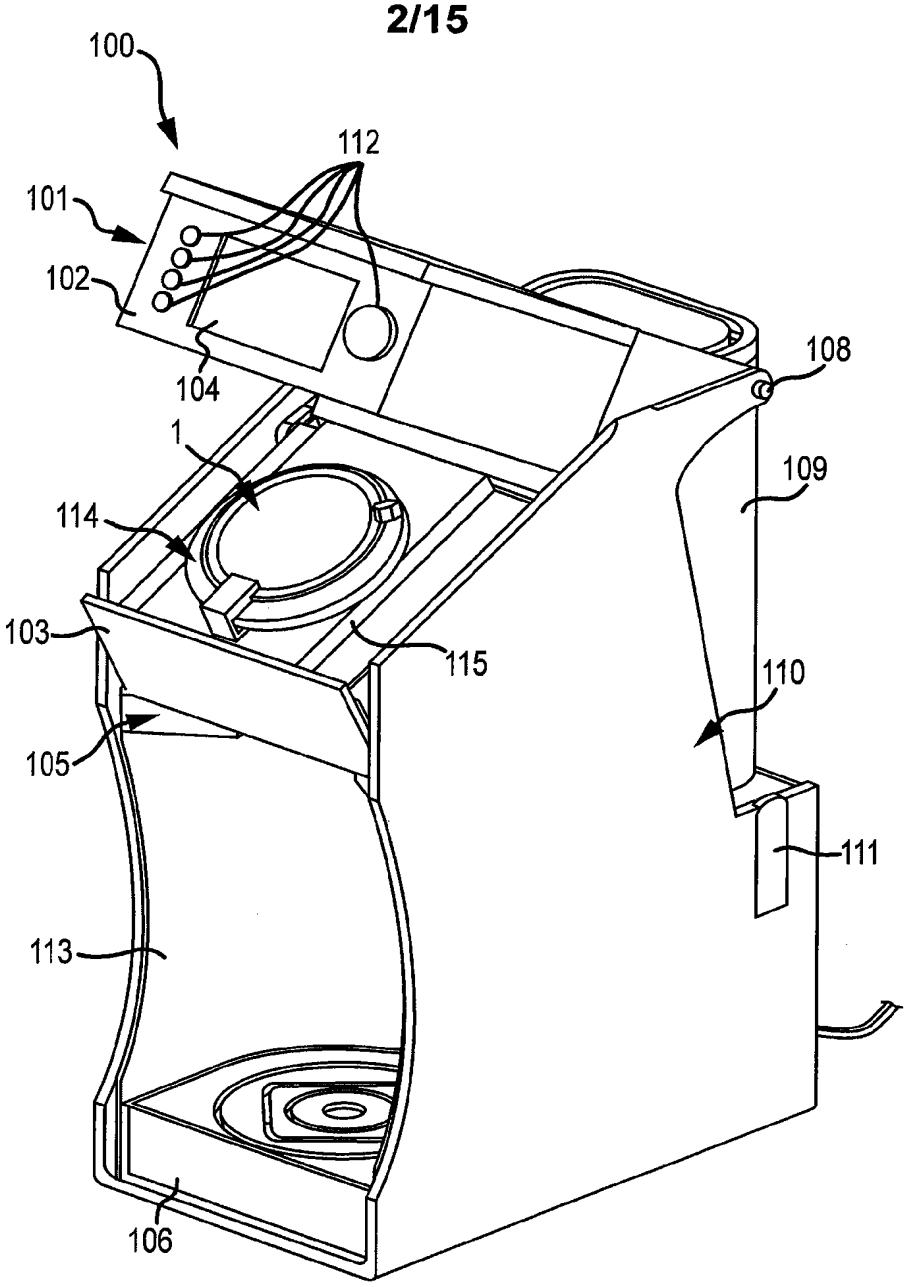


FIGURE 2

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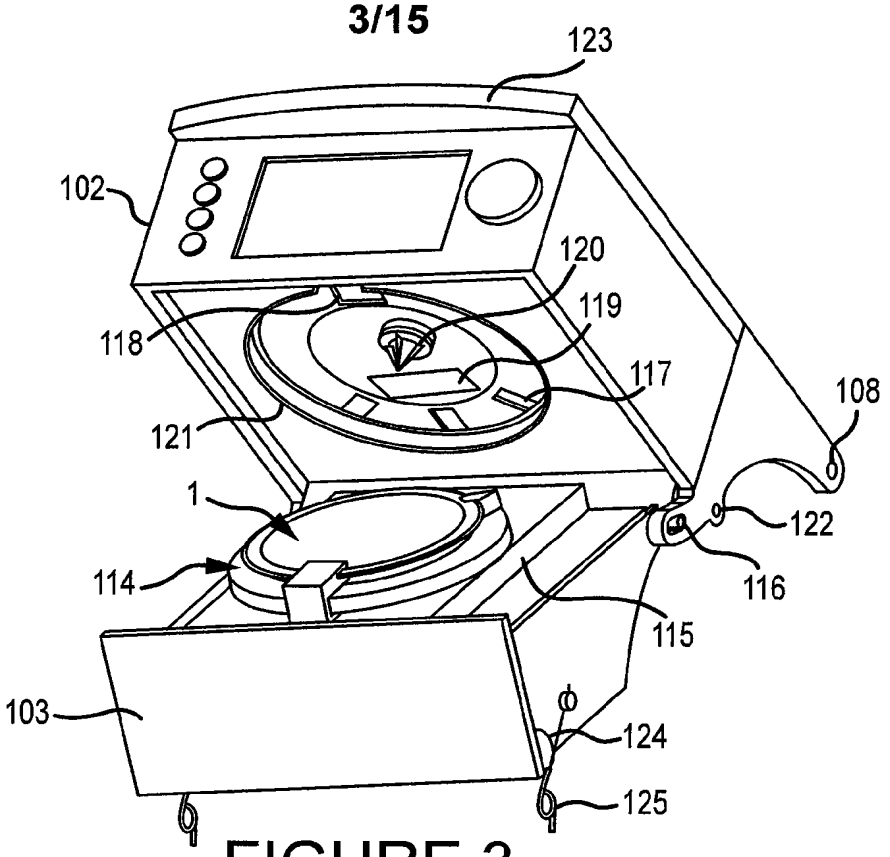


FIGURE 3

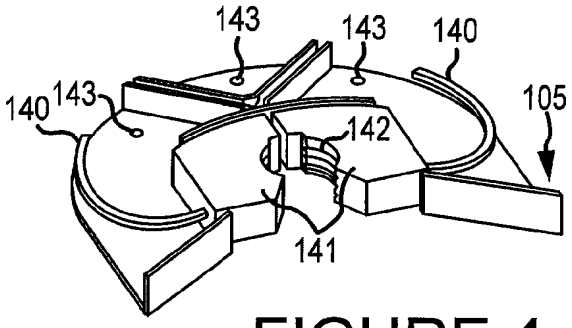


FIGURE 4

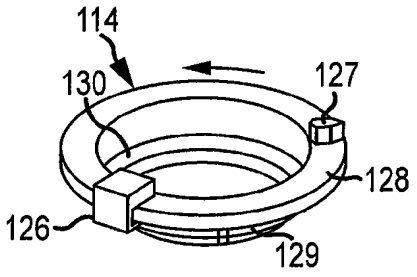


FIGURE 5

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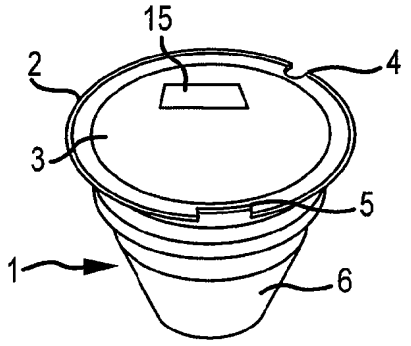


FIGURE 6

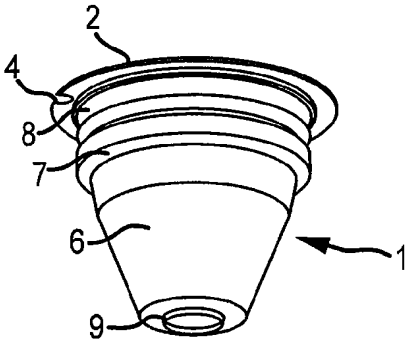


FIGURE 7

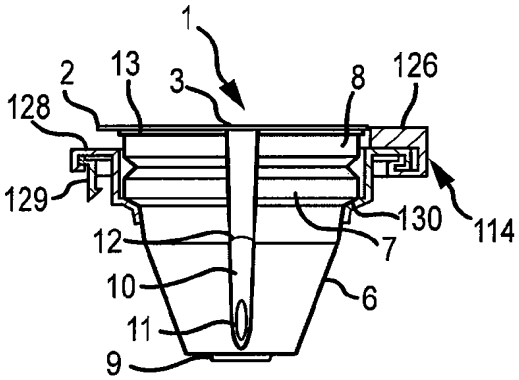


FIGURE 8

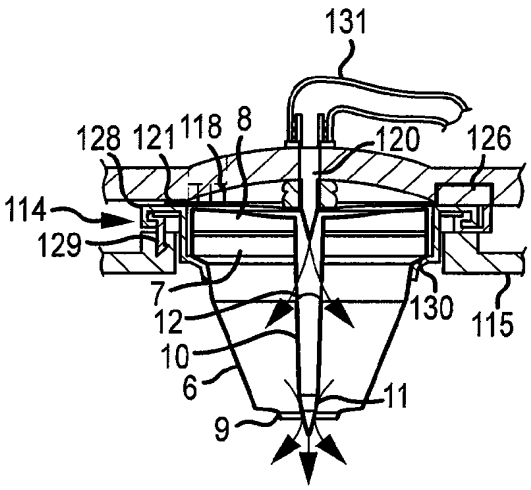


FIGURE 9

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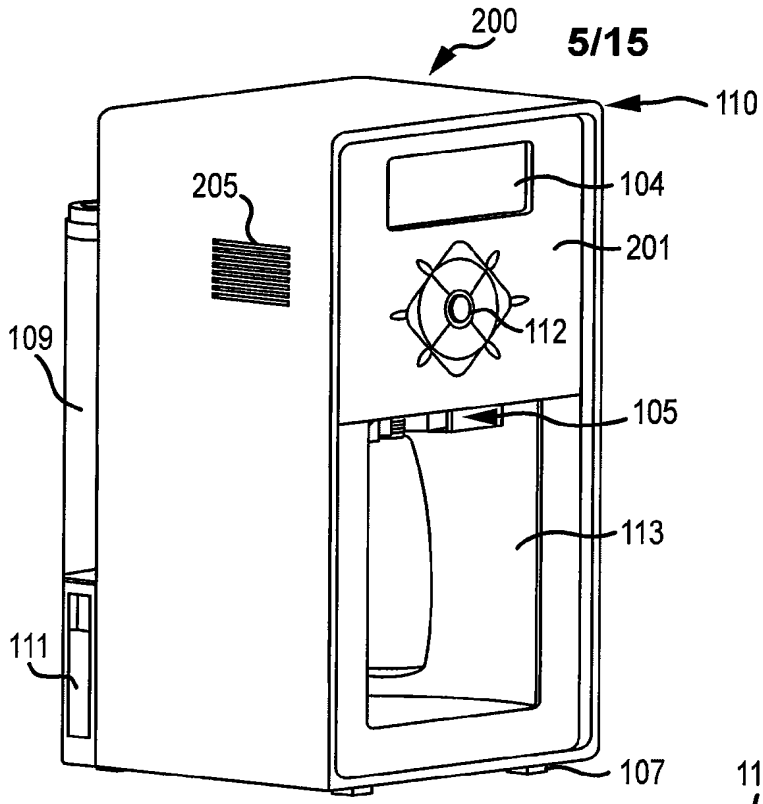


FIGURE 10

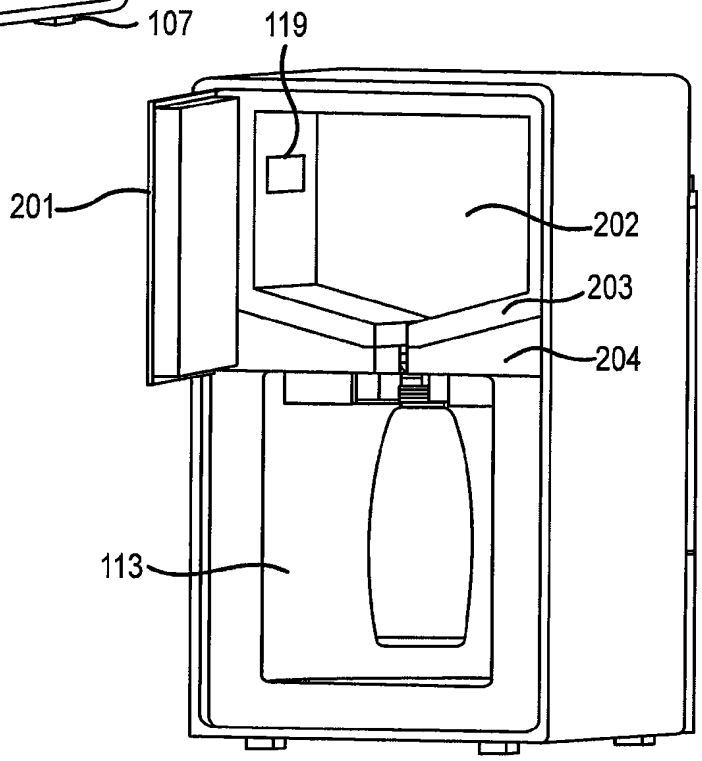


FIGURE 11

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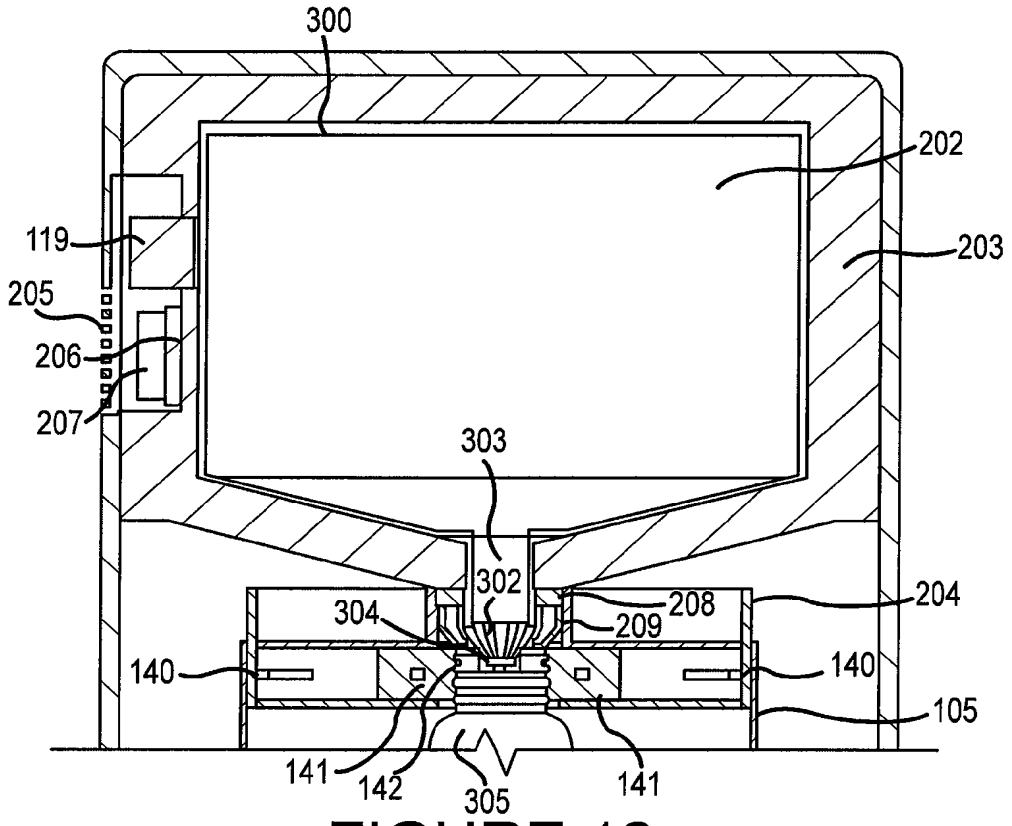


FIGURE 12

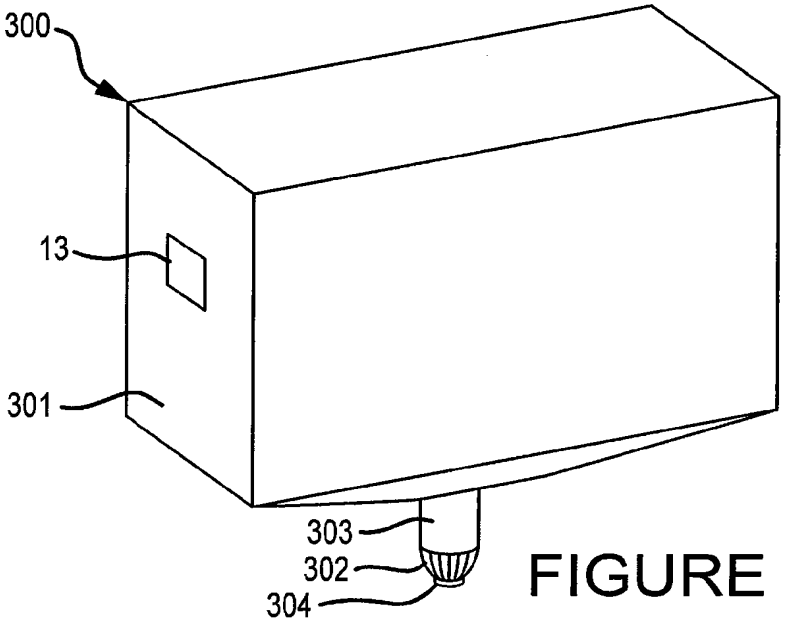


FIGURE 13

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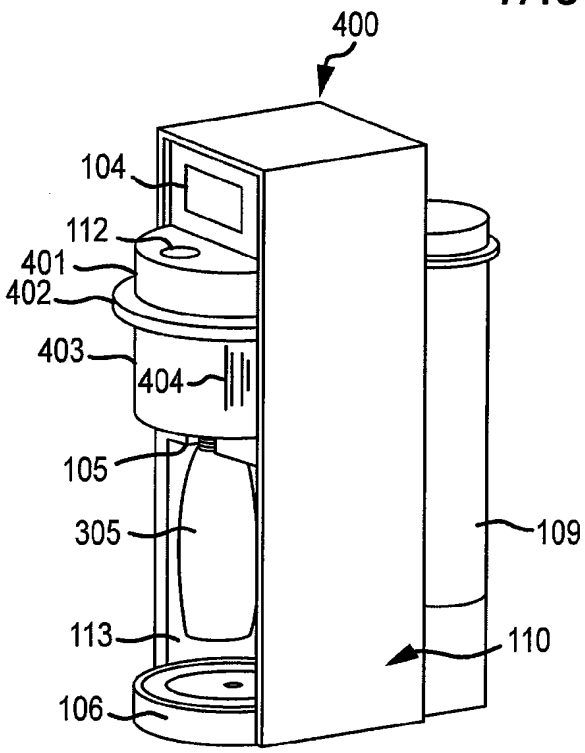


FIGURE 14

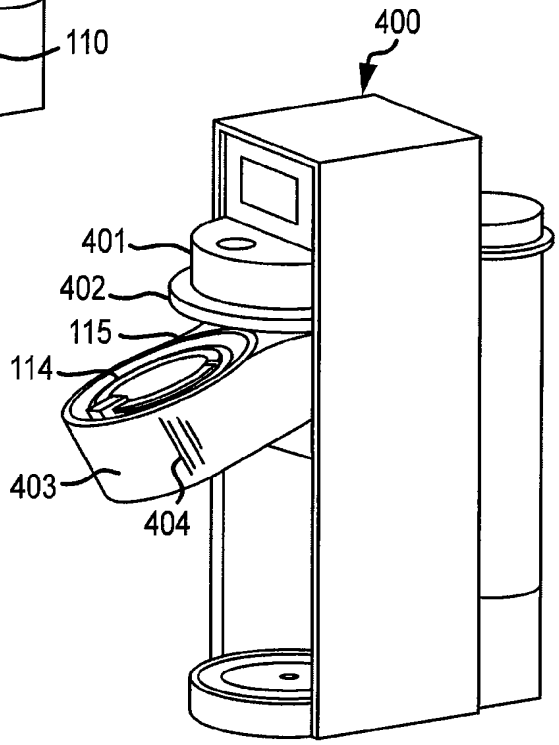


FIGURE 15

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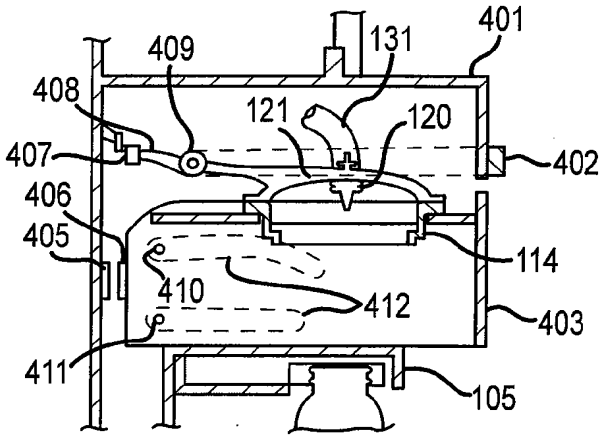


FIGURE 16

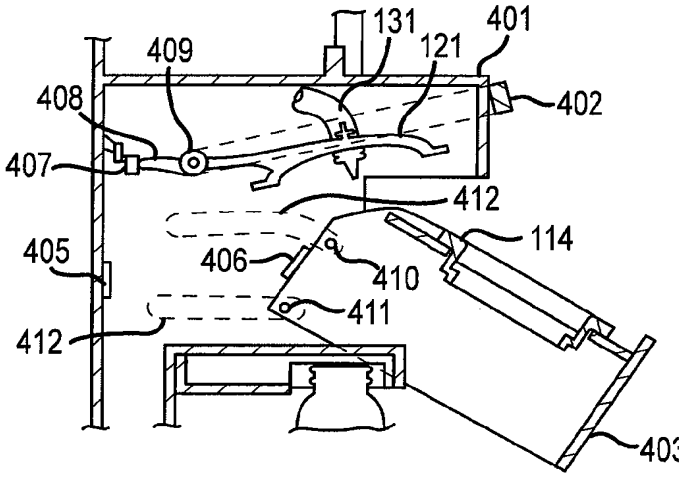


FIGURE 17

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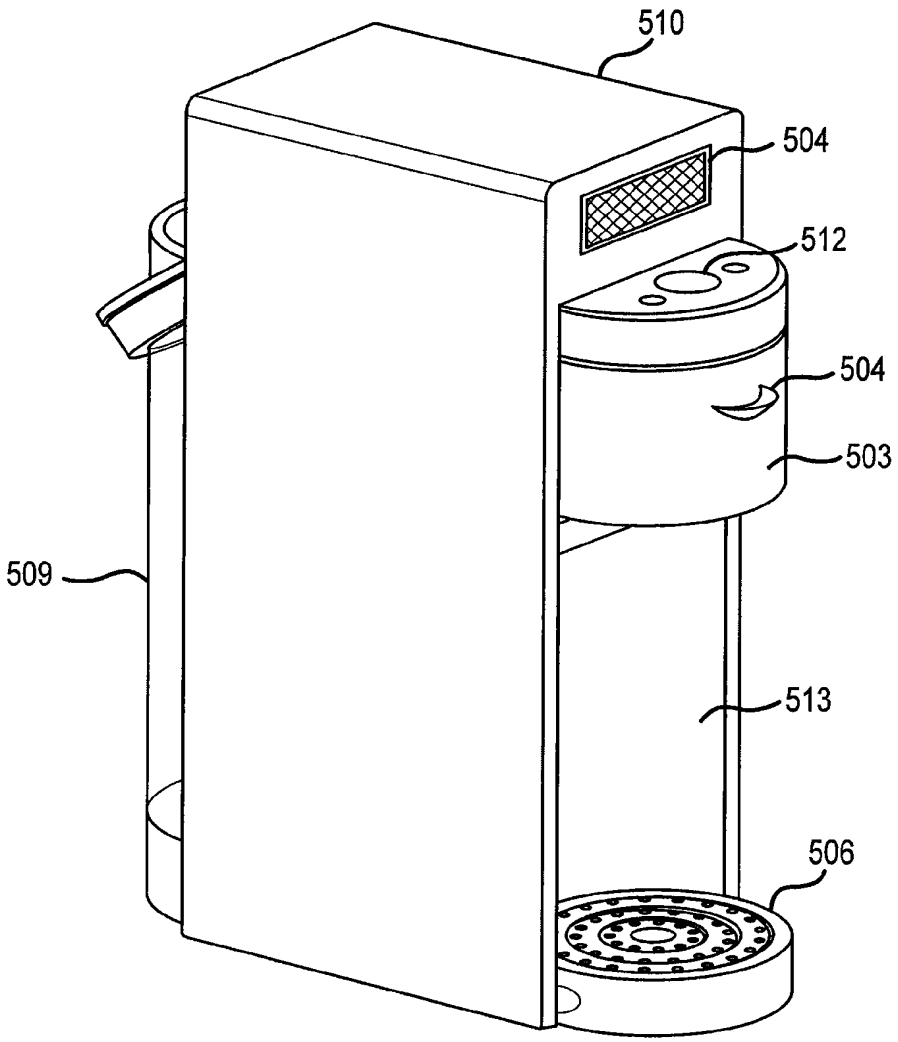


FIGURE 18

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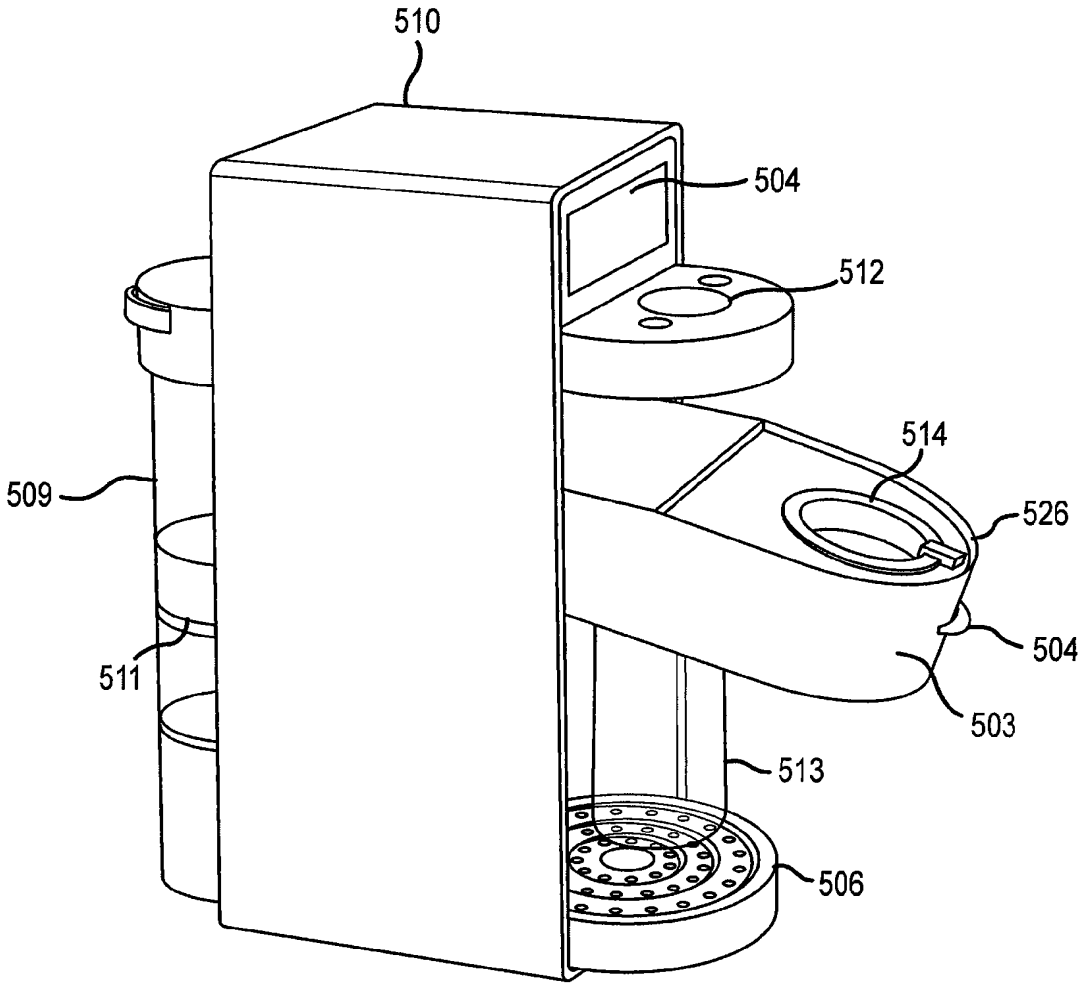


FIGURE 19

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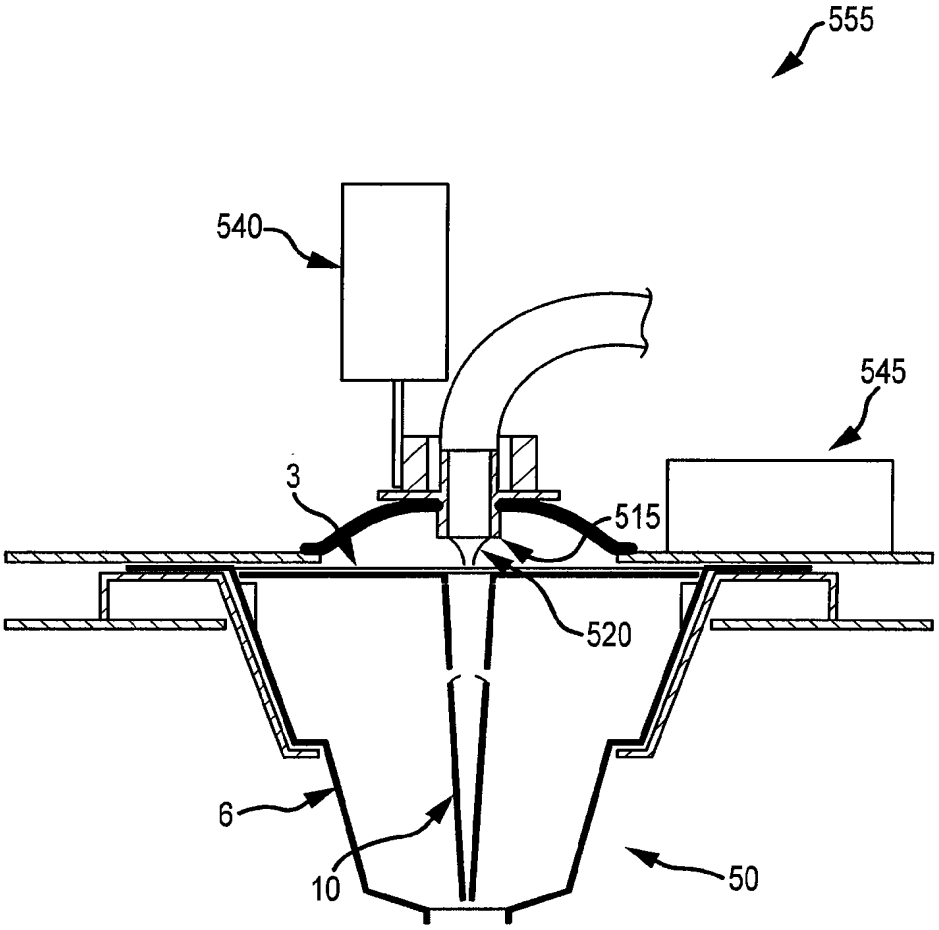


FIGURE 20

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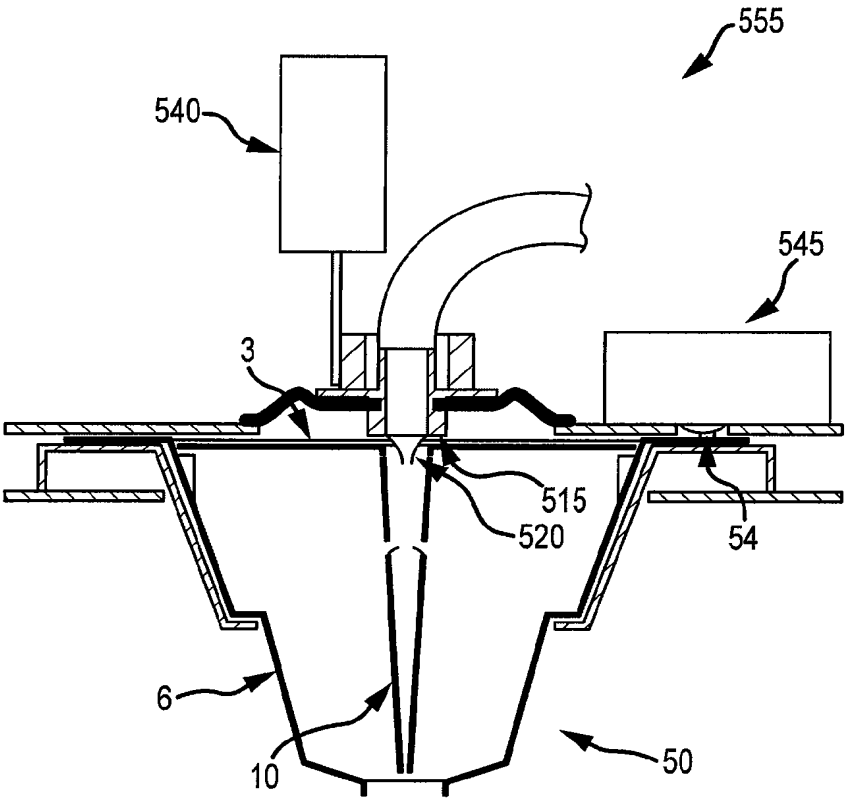


FIGURE 21

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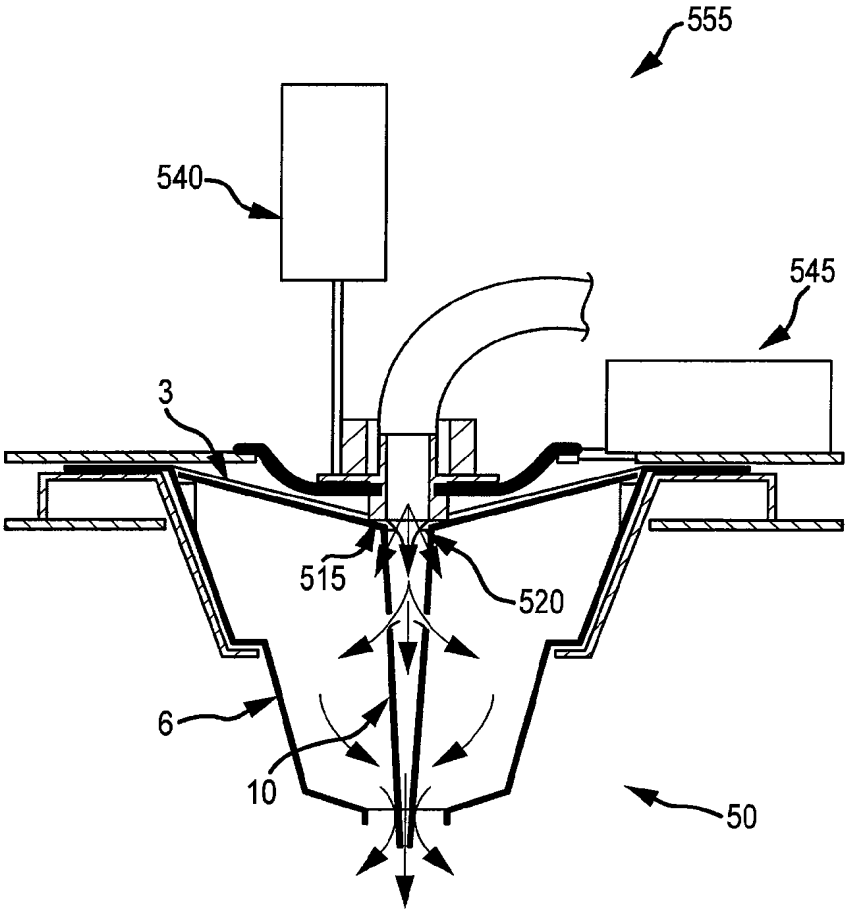


FIGURE 22

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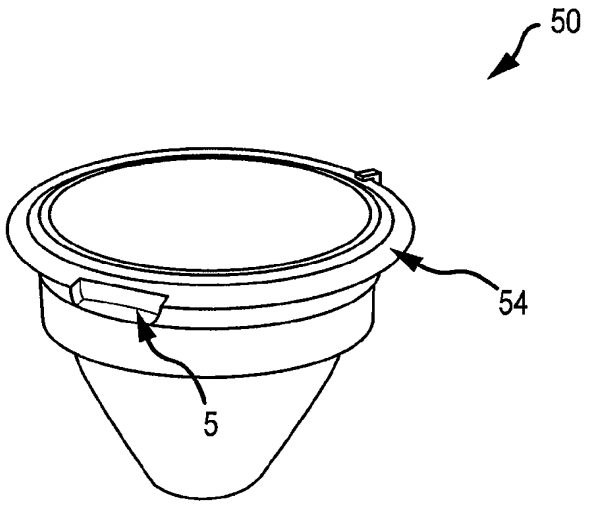


FIGURE 23

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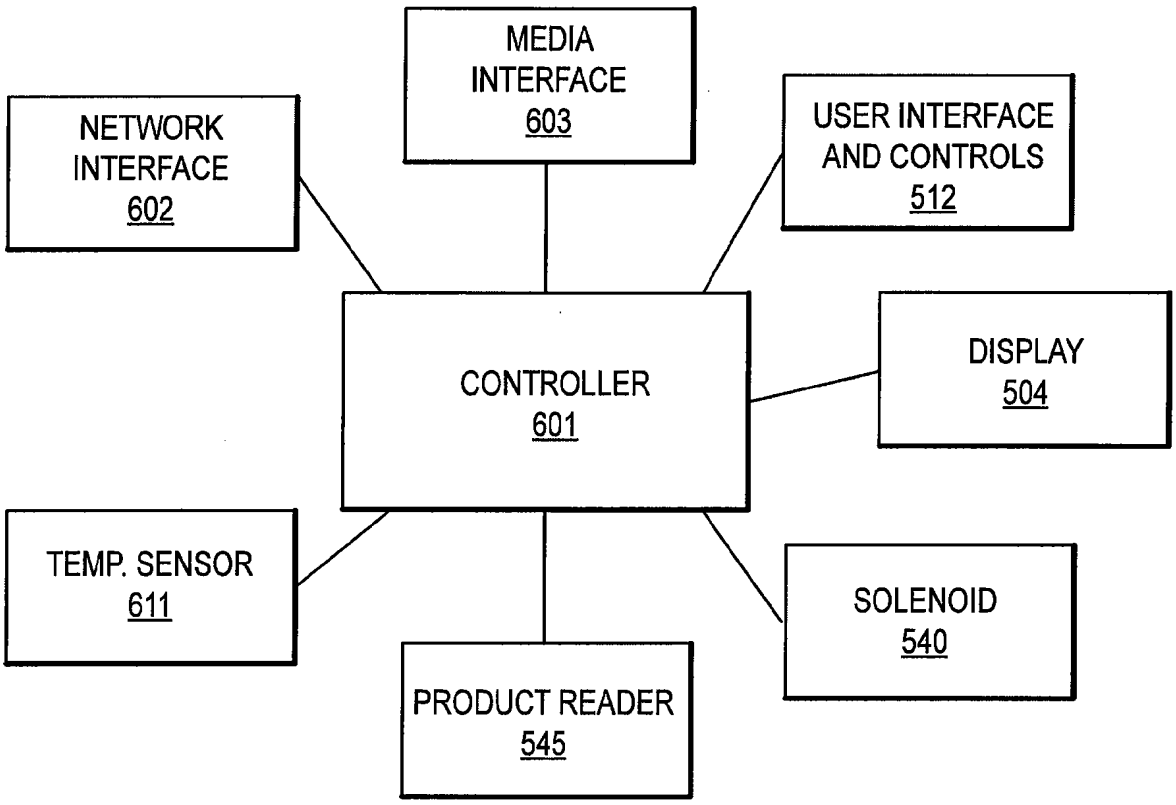


FIGURE 24

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

(11) Publication number : **0 455 337 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **91302538.3**

(51) Int. Cl.^{5} : **B65D 81/00**

(22) Date of filing : **22.03.91**

(30) Priority : **30.03.90 GB 9007149**

(43) Date of publication of application :
06.11.91 Bulletin 91/45

(84) Designated Contracting States :
AT BE CH DE DK ES FR GB GR IT LI LU NL SE

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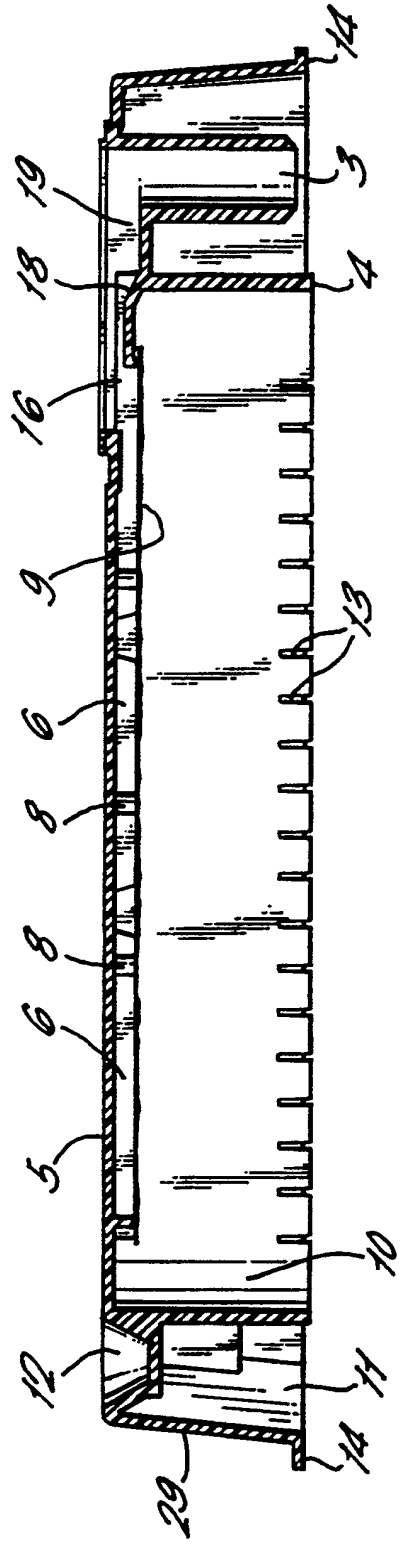
(54) Beverage preparation cartridge.

(57) A beverage package (1) containing one or more beverage preparation ingredients and being formed from substantially air- and water-impermeable materials, the said package comprising a compartment (2) containing the beverage preparation ingredient(s), an inlet (12) which communicates with the said compartment and an outlet (3), a filter (9) being disposed between the compartment and at least a part of the under surface (5) of the top of the package, one or more passages (15) being formed between the filter and the top of the package, which passage(s) communicate with the outlet whereby, in use, a liquid medium is passed into the compartment containing the beverage preparation ingredient(s), filtered upwardly through the filter and collected through the outlet.

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FIG. 5.



The present invention relates to packages containing ingredients for the preparation of beverages and, in particular, to sealed packages which are formed from a substantially air- and water-impermeable material and which contain one or more ingredients for the preparation of beverages.

It has previously been proposed to seal beverage preparation ingredients in individual air-impermeable packages. For example, cartridges or capsules containing compacted ground coffee are known for use in certain coffee making machines which are generally termed "espresso" machines. In the production of coffee using these coffee machines the coffee cartridge is placed in a brewing chamber and hot water is generally caused to pass under pressure through the cartridge, thereby extracting the aromatic coffee constituents from the ground coffee and producing a coffee beverage.

Cartridges containing roast and ground coffee in which hot water flows under gravimetric force through the cartridge are also known. A cartridge of this general type is described in British Patent No. 1397116.

In our European Patent Application No. 87311325.2 there is described a package which contains at least one beverage preparation ingredient, e.g. roast and ground coffee. In a preferred embodiment the package is formed from a substantially air- and water-impermeable material and comprises a sealed body portion having a compartment containing the beverage ingredient and an outlet channel, the compartment and the outlet channel co-operating in such a manner that, in use, the beverage is filtered, thereby avoiding the necessity for an external filter.

There is also described in European Patent Application No. 87311325.2, a method for preparing a beverage which comprises positioning a beverage containing package at a brewing station, introducing water through water introduction means into the package, allowing the water to commingle with the beverage ingredient, and collecting the beverage so-formed through an outlet formed in the package.

The beverage packages as described in European Patent Application No. 87311325.2 are primarily intended to be used with a beverage preparation machine which handles the packages automatically or semi-automatically. A machine of this type is described in our European Patent Application No. 89302708.6. The packages may contain roast and ground coffee, leaf tea or one or more powdered beverage preparation ingredients such as powdered chocolate, powdered coffee or powdered soup.

We have now developed a package containing one or more ingredients for the preparation of beverages in which a filter is disposed in such a manner that the beverage so produced is filtered upwardly through the filter.

Accordingly, the present invention provides a beverage package containing one or more beverage preparation ingredients and being formed from substantially air- and water-impermeable materials, the said package comprising a compartment containing the beverage preparation ingredient(s), an inlet which communicates with the said compartment and an outlet, a filter being disposed between the compartment and at least a part of the under surface of the top of the package, one or more passages being formed between the filter and the top of the package, which passage(s) communicate with the outlet whereby, in use, a liquid medium is passed into the compartment containing the beverage preparation ingredient(s), filtered upwardly through the filter and collected through the outlet.

The beverage package of the present invention preferably has a body portion which may be formed, for example, from a moulded plastics material. The inlet and/or outlet of the package may be closed by a plug of a plastics material moulded into the inlet and/or outlet nozzle during the moulding of the body portion. Alternatively, the inlet and/or outlet may be covered by a substantially air- and water-impermeable material, for example aluminium foil or a laminated material, such as a laminate of plastic material/metal foil/plastic material, prior to the opening of the inlet and/or outlet. Specific examples of materials which can be used are aluminium foil having a thickness in the range of from 30 to 60 micrometres coated with a layer of polypropylene or a laminate of polypropylene/aluminium foil/polyester.

The outlet in the package may be prepared during the beverage preparation cycle using a cutting and piercing tool for example of the type as described in our European Patent Application No. 89302708.6.

Alternatively, the inlet and/or outlet may be open and the beverage package provided with an outer wrapping or the like. For example, a plurality of packages may be provided with a shrink wrapped outer layer.

In the packages of the present invention, the communication between the inlet and the compartment containing the beverage preparation ingredient(s) is preferably via a channel which is separated from the compartment by a wall which has a plurality of openings formed therein for the entry of a liquid medium into the compartment. The channel preferably extends along at least one side of the compartment, more preferably along three sides of the compartment. The openings in the wall are preferably in the form of elongate slots which are generally arranged in a manner such that an even distribution of the liquid medium through the beverage preparation ingredients is acheived.

The filter is preferably made from a material with a high wet strength, for example a non-woven polyester fibre material or polypropylene. Other materials which may be used include a water-permeable cellulosic material, such as a cellulosic material compris-

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ing woven paper fibres. The woven paper fibres may be admixed with fibres of polypropylene, polyvinylchloride and/or polyethylene. The incorporation of these plastics materials into the cellulosic material renders the cellulosic material heat-sealable. The filter material may also be coated with a material which is activated by heat and/or pressure so that it can readily be sealed to ribs formed in the under surface of the top of the package, thereby forming one or more passages which communicate with the outlet.

The beverage preparation ingredients contained in the packages of the invention are preferably roast and ground coffee, or leaf tea, and according to individual taste, powdered milk or creamer, sugar or artificial sweetner.

It will be understood that it may be convenient for the compartment containing the beverage preparation ingredients to be separated into two or more sections, for example, one section containing roast and ground coffee and another section containing powdered milk or creamer. In such an arrangement the means for the entry of the liquid medium into the separate compartments would be varied to suit the requirements for filtration or dissolution of the particular ingredients.

The package of the present invention, when filled with roast and ground coffee, preferably contains from 2.5 to 10 grams of roast and ground coffee, preferably from 4.5 to 6 grams for the preparation of a single cup. However, packages which are intended to provide multiple servings of coffee will contain an appropriate amount of roast and ground coffee, for example, packages intended to provide say five cups of coffee will contain from 20 to 50 grams of roast and ground coffee, preferably from 25 to 30 grams. The roast and ground coffee is generally compacted when the beverage package is filled in order to aid the distribution and transport of water through the package.

In use of the beverage packages of the present invention a liquid medium is passed via the inlet of the package into the compartment containing the beverage preparation ingredient(s). The filter is disposed at the top of the compartment containing the beverage preparation ingredient(s) and the liquid medium is thereby caused to flow upwardly through the beverage preparation ingredients. The beverage so formed flows upwardly through the filter into the passage or passages which communicate with the outlet.

Filtering the beverage in an upwardly direction has been found to be advantageous in that the smaller and lighter particles of the beverage preparation ingredients settle to the bottom of the compartment and hence the clogging of the filter by these small particles is mitigated. The beverage thus filters more rapidly upwardly through the filter than it would if the filter were placed beneath the beverage ingredients and the liquid medium caused to flow in a downwardly direction. Furthermore, the flow of water in an upwardly direction through the package is advantageous in that the particles of the beverage preparation ingredient(s) float up towards the filter, thereby re-establishing the filter bed. This is of particular advantage if the particles of the beverage preparation ingredient(s) have settled during transport and/or storage and if holes or cracks have formed in the bed. The upward filtration causes the filter bed to re-establish in these situations, thereby providing a more effective filtration of the beverage preparation ingredient(s). With regard to the preparation of a beverage from tea leaves the upward filtration is particularly advantageous because the tea leaves float initially and then sink and the configuration of the beverage packages of the present invention prevents the wetted tea leaves from blinding the filter.

The quality of the filtration of beverage preparation ingredients, in particular roast and ground coffee, is known to affect the flavour of the beverage. The brewing and flavour characteristics for roast and ground coffee charge with the roasting and grinding conditions and are effected by the size and shape of the particles. The beverage packages of the present invention enable efficient filtration to be achieved and thereby give rise to beverages which have little or no turbidity and a good flavour.

Another advantage of the package of the present invention is that with the continuous flow of water in an upwardly direction through the package a more effective wetting of the beverage preparation ingredient(s) is achieved. This is of importance for roast and ground coffee since the wetting of the particles causes the particles to swell and thus assists in preventing fine particles from passing through the filter. It will be appreciated that for the preparation of coffee from roast and ground coffee, or the preparation of tea from leaf tea, the liquid medium is hot water.

The present invention also includes within its scope a method for the preparation of a beverage from a sealed package containing one or more beverage preparation ingredients located in a compartment in the package, which method comprises introducing a liquid medium suitable for the preparation of the beverage under pressure into the package through an inlet formed therein, causing the liquid medium to enter the compartment thereby forming the beverage, filtering the beverage in an upwardly direction through a filter, and collecting the beverage so formed from an outlet formed in the package.

The packages of the present invention are preferably provided with a recognition means whereby, in use, the package is identified by the machine into which it is placed for treatment and the identification of the package thereby causes it to be subjected to the correct treatment steps including the introduction of a liquid medium into the package. For the preparation of beverages from beverage preparation ingredients the liquid medium introduced into the package

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will generally be water or a water/air mixture.

The recognition means may comprise one or more surface features formed in the body of the beverage package. For example, the package body may be provided with one or more indents, cut outs, protrusions or holes which can be identified by a mechanical sensor in the beverage preparation machine, the mechanical sensor registering the presence or absence of the indents, cut outs, protrusions or holes.

The recognition means may, alternatively, comprise a system which can be sensed by a simple optical device, for example a bar code printed onto the body of the package, a pattern of through holes in the package, a pattern of contrasting tones or colours printed onto the package or packages containing different comestibles being of different colours.

The recognition means may also comprise one or more strips of a magnetic material applied to the body of the package which can be read by an appropriate magnetic sensor; one or more shaped or divided areas of metal foil applied to the package body which cause an inductive effect on movement of the package in the machine, which inductive effect can be sensed; or one or more electrically conductive areas formed on the body of the package which can be sensed electrically.

As mentioned above, the package of the present invention contains one or more beverage preparation ingredients, for example, roast and ground coffee or leaf tea and sugar and/or creamer, as desired. One machine which can readily be adapted for the preparation of a beverage from the preferred beverage package of the invention which includes a recognition means is described in our European Patent Application No. 89302708.6. The only modification required to be made to such a beverage preparation machine is to incorporate an appropriate sensor or sensors into it, the sensor or sensors being designed to read the particular coding on the capsule and to send a signal to the controller, which then selects the appropriate beverage preparation cycle.

The recognition system used on the beverage packages of the present invention enables a single beverage preparation machine to prepare from different beverage packages a great number of different beverages which require different beverage preparation conditions.

The packages of the present invention may be treated by a machine which includes therein one or more sensors which are adapted to sense and identify a recognition means provided on a package inserted into the machine.

The sensor may be, for example, a mechanical sensor, an optical sensor, a magnetic sensor, an electrical sensor or an inductive sensor. The machine is preferably adapted so that the package is handled automatically following its insertion into the machine. For example, a machine of the type as described in our European Patent Application No. 89302708.6 can be fitted with an appropriate sensor to sense and identify a recognition means provided on beverage packages intended for use therewith.

The present invention will be further described with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of part of a beverage package of the invention;

Figure 2 is a top plan view of the beverage package of Figure 1;

Figure 3 is a section through the beverage package of Figure 1 along line A-A of Figure 2;

Figure 4 is a section through the beverage package of Figure 1 along line B-B of Figure 2; and

Figure 5 is a section along the line C-C of Figure 2;

Referring to the drawings a beverage package body is shown at 1. The body may be formed, for example, from a moulded plastics material. The body 1 has a compartment 2 in which the beverage preparation ingredient or ingredients are contained. The package body has an outlet nozzle 3 and an inlet 12 formed therein. The compartment 2 is separated from the area of the body in which the nozzle 3 is formed by means of a wall 4. The top 5 of the package 1 has four longitudinal ribs 6 moulded to the underside thereof which are shown as a plurality of dotted lines in Figure 2. The four ribs 6 are joined at either end by transverse ribs 7 which are also shown in dotted outline in Figure 2. The ribs 6 and 7 are strengthened at intervals by posts 8 which are also moulded to the underside of the top 5 of package 1. These posts 8 are also shown in dotted outline in Figure 2. A filter material 9 is heat sealed to ribs 6, ribs 7 and posts 8, the filter material 9 extends across a substantial part of the top of compartment 2.

Compartment 2 is separated from the outlet nozzle by a wall 4 and surrounded on its other three sides by a U-shaped wall 10. The wall 10 has a U-shaped channel 11 surrounding it, the channel 11 communicating with inlet 12. The wall 10 has a plurality of small slots 13 formed in the two longitudinal arms thereof.

In use of the beverage package as shown in the drawings, the bottom of the package 1 is sealed by means of an aluminium foil or a laminated foil which is heat sealed to the lower edges of walls 4 and 10 and to the lower edge 14 of the package. Water enters the package at a pressure of about 10^5Pa via inlet 12 which is opened by piercing or cutting the material covering the said opening. The water enters the channel 11 surrounding three sides of the compartment 2 containing the beverage ingredients. The water, which is under pressure, is forced through the elongate slots 13 formed in the wall 10 which separates channel 11 from compartment 2. The water mixes with the beverage preparation ingredients contained in

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compartment 2 and is forced upwardly through the beverage preparation ingredients. The beverage formed by passage of the water through the beverage preparation ingredients passes through filter material 9 into passages 15 which are formed between the ribs 6. The sealing of the filter material 9 onto ribs 6 and 7 prevents any short circuit and all of the beverage has to pass through the filter. The passages 15 are closed at the end remote from the outlet by transverse rib 7. The beverage formed by the passage of water through the beverage preparation ingredients also passes directly through the filter material 9 into areas 16 which communicate with passages 15. The beverage passes along passages 15, commingles with the beverage collected in areas 16 and is then funnelled by means of angled extensions 17 of the middle two ribs 6 over a weir 18 to a beverage collection area 19 and thence into outlet nozzle 3. The beverage is then collected in a cup or other receptacle placed below the outlet nozzle 3. It may be desirable to support the filter material 9 by means of additional support ribs in the passages 15 in order to prevent the filter material from bowing and sealing the passages.

Additional strengthening of the package of the invention is provided in the area adjacent the outlet nozzle, as best shown in Figure 4, by a hollow post 20 which is attached by ribs 21 arranged in cruciform fashion to the end wall 22, side wall 27 and wall 4.

Using the beverage package as illustrated in Figures 1 to 5 it is possible to prepare 160 ml of coffee from roast and ground coffee contained in compartment 2 in 20 seconds by passing water at a pressure of 10^5Pa through the package.

The beverage package as illustrated in Figures 1 to 5 incorporates the recognition means which is a preferred feature of the invention. The package of the invention 1 containing one or more beverage preparation ingredients has a generally rectangular shape with flat top and bottom surfaces and is thereby suitable for insertion into a beverage preparation machine, for example of the type as described in our European Patent Application No. 89302708.6, longitudinally through a slot.

The package is also provided, as best shown in Figure 2, with teeth 25 moulded along one side wall of compartment 2. The teeth 25 have recesses 26 formed therebetween. These teeth 25 are intended to enable the beverage package to be driven through a beverage preparation machine by the engagement of the teeth 25 with the tooth of a cam (not shown). The side wall 27 of the beverage package has a flange 28 extending at right angles thereto. The flange 28 has an upstanding rib 30 at the end thereof near to the leading end 29 of the package.

As the package is driven into the beverage preparation machine the flange 28 is sensed as the side edge of the package passes beneath a sensing arm (not shown). The flange 28 has a plurality of upstanding pegs 31,32,33,34 located therein and as the package is driven into the machine by the engagement of the teeth 25 with the tooth of a cam, the sensor senses the presence or absence of upstanding pegs 31,32,33,34.

If one or more of pegs 31,32,33,34 is not present the sensing arm will thereby identify a different type of beverage package. The sensing arm operates a switch (not shown) 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 31,32,33,34 on the package thus identifies the type of package to the controller which then selects the appropriate beverage preparation conditions.

The presence or absence of three pegs provides scope for the sensing arm to sense up to 8 different types of beverage packages. Thus, if the presence of a peg at a particular location is coded as 1 and the absence of a peg coded as 0, the following code combinations can be achieved.

000
001
010
100
101
110
011
111

The presence of the additional fourth peg formed in flange 28 provides an even larger number of code combinations.

When the beverage preparation machine has selected the appropriate beverage preparation conditions, the water inlet 12 of the package is pierced or cut, the outlet 3 is uncovered in the package and water caused to flow under pressure through the compartment containing the beverage ingredient(s). The chosen beverage then being collected in a cup or receptacle placed below the outlet 3 of the package.

It will be appreciated that for different types of packages the beverage or other ingredient may require significantly different treatment. Thus, some beverages will be prepared with hot water and some with cold water, whilst others, such as espresso coffee, will require a smaller amount of water for their preparation. Preparation times may require to be varied. Similarly water and/or air may be required either for preparing/dispensing the beverage/content of the package or for the purpose of pre-cleaning an inlet pipe or flushing out a used package. Furthermore, a user may require a particular beverage to be dispensed in combination with one or more ingredients from independent sources, e.g. powdered milk and/or sugar.

The present invention will be further illustrated with reference to the following non-limiting Example.

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EXAMPLE

The following experiments were conducted in respect of the preparation of beverages from coffee capsules, adapted for upward or downward filtration, which had been subject to vibration during transport and distribution. The capsules were each tapped prior to the preparation of the beverages.

Downward Filtration

Sample 1

6.3g of roast and ground coffee contained in a capsule adapted for downward filtration gave 153cc of a coffee beverage at 0.8% solids with a yield of 19.4%.

Sample 2

6.3g of roast and ground coffee contained in a capsule adapted for downward fitration gave 153cc of a coffee beverage at 0.81% solids with a yield of 19.7%.

Upward Filtration

Sample 3

6.3g of roast and ground coffee contained in a capsule adapted for upward filtration, when brewed in the same manner as for samples 1 and 2, gave 156cc of a coffee beverage at 1.04% solids with a yield of 25.7%.

Sample 4

6.3g of roast and ground coffee contained in a capsule adpated for upward filtration, when brewed in the same manner as for samples 1 and 2, gave 158cc of a coffee beverage at 1.02% solids with a yield of 25.6%.

These results indicate an improvement of approximately 20% yield.

Claims

1. A beverage package containing one or more beverage preparation ingredients and being formed from substantially air- and water-impermeable materials, the said package comprising a compartment containing the beverage preparation ingredient(s), an inlet which communicates with the said compartment and an outlet, a filter being disposed between the compartment and at least a part of the under surface of the top of the package, one or more passages being formed between the filter and the top of the package, which passage(s) communicate with the outlet whereby, in use, a liquid medium is passed into the compartment containing the beverage preparation ingredient(s), filtered upwardly through the filter and collected through the outlet.

2. A package as claimed in claim 1 wherein the inlet and/or outlet is covered by a substantially air- and water-impermeable material prior to the formation, in use, of an outlet in the package.

3. A package as claimed in claim 1 wherein the inlet and/or outlet is closed by a plug prior to the formation, in use, of an outlet in the package.

4. A package as claimed in any one of the preceding claims wherein a channel communicates with the inlet for the entry of a liquid medium into the package, the channel being separated from the compartment by a wall which has a plurality of openings formed therein for the entry of the liquid medium into the compartment containing the beverage preparation ingredient(s).

5. A package as claimed in claim 4 wherein the channel extends along at least one side of the compartment containing the beverage preparation ingredient(s).

6. A package as claimed in claim 4 or claim 5 wherein the channel extends around three sides of the compartment containing the beverage preparation ingredient(s).

7. A package as claimed in any one of the claims 4 to 6 wherein the openings comprise a plurality of elongate slots.

8. A package as claimed in any one of the preceding claims wherein the filter is made from a water-permeable material.

9. A package as claimed in any one of the preceding claims wherein a plurality of passages are formed between the filter and the top of the package.

10. A package as claimed in any one of the preceding claims wherein the beverage preparation ingredient is leaf tea or roast and ground coffee.

11. A package as claimed in any one of the preceding claims which is provided with a recognition means whereby, in use, the package is identified by the machine into which it is placed for treatment therefrom and the identification of the package thereby causes it to be subjected to the correct treatment steps including the introduction of a fluid medium into the package.

12. A package as claimed in claim 11 wherein the recognition means comprises one or more surface features formed in the body of the package.

13. A package as claimed in claim 11 wherein the rec-

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ognition means comprises a bar code.

14. A package as claimed in claim 11 wherein the recognition means comprises a pattern of holes formed in the body of the package.

15. A package as claimed in claim 11 wherein the recognition means comprises a pattern of contrasting tones or colours.

16. A package as claimed in claim 11 wherein the recognition means comprises one or more strips of a magnetic material.

17. A package as claimed in claim 11 wherein the recognition means comprises an inductive device.

18. A package as claimed in claim 11 wherein the recognition means comprises a plurality of electrically conductive means.

19. A method for the preparation of a beverage from a sealed package containing one or more beverage preparation ingredients located in a compartment in the package, which method comprises introducing a liquid medium suitable for the preparation of the beverage under pressure into the package through an inlet formed therein, causing the liquid medium to enter the compartment thereby forming the beverage, filtering the beverage in an upwardly direction through a filter, and collecting the beverage so formed from an outlet formed in the package.

20. A method as claimed in claim 19 wherein the inlet and/or outlet in the package is/are formed by means of a piercing and cutting tool.

21. A method as claimed in claim 19 or claim 20 wherein the liquid medium is water.

22. A method as claimed in any one of claims 19 to 21 wherein the flow of the liquid medium into the compartment containing the beverage preparation ingredients is achieved by causing the liquid to flow through one or more restricted openings into the said compartment.

23. A method as claimed in claim 22 wherein the restricted openings are elongate slots.

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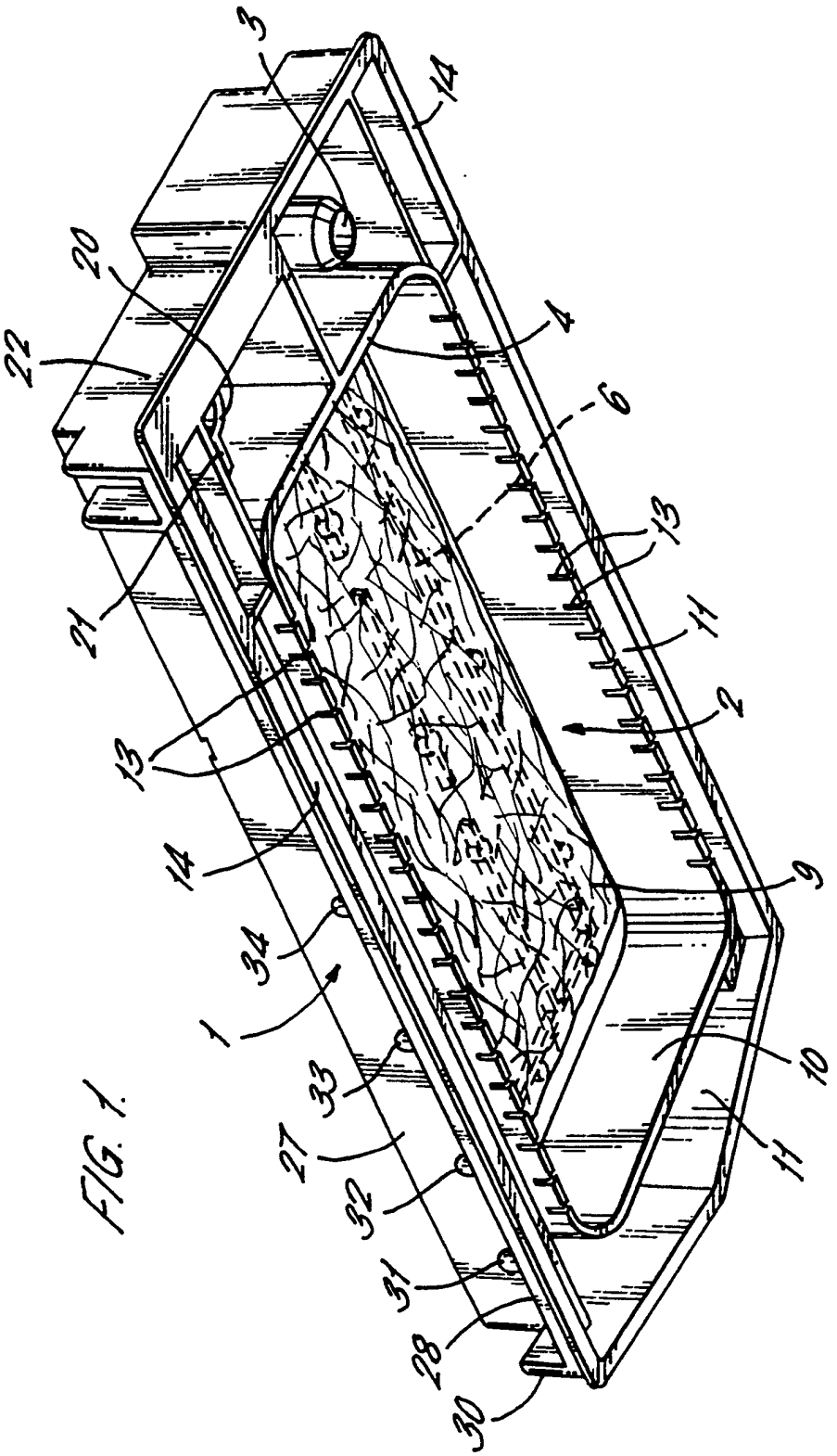


FIG. 1.

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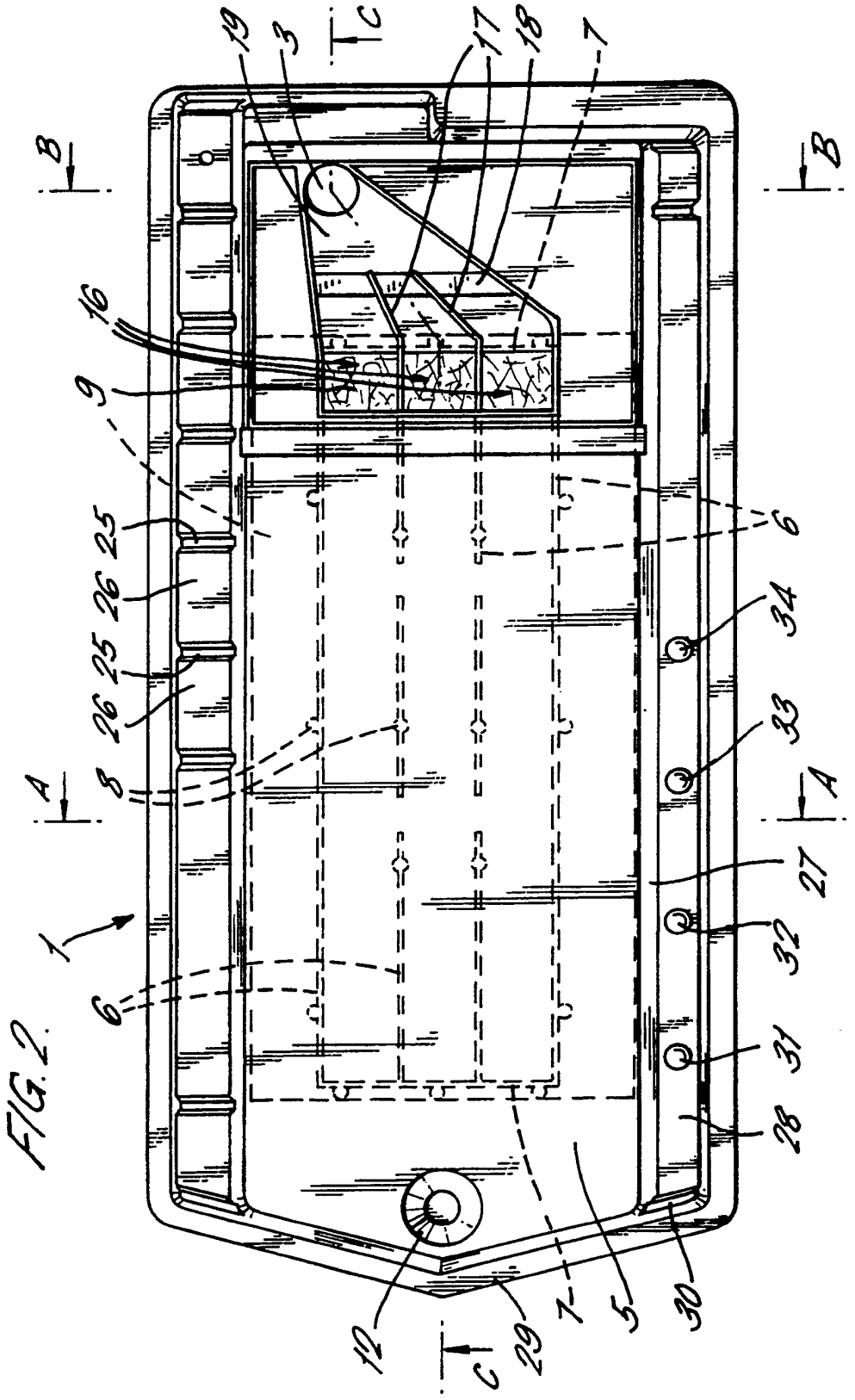


FIG. 2.

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FIG. 3.

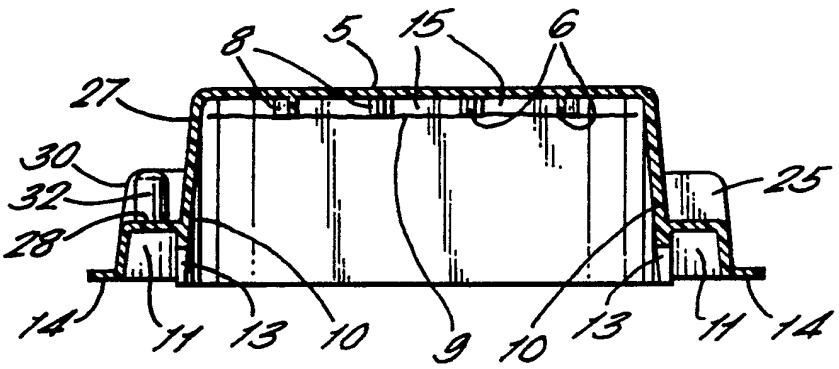
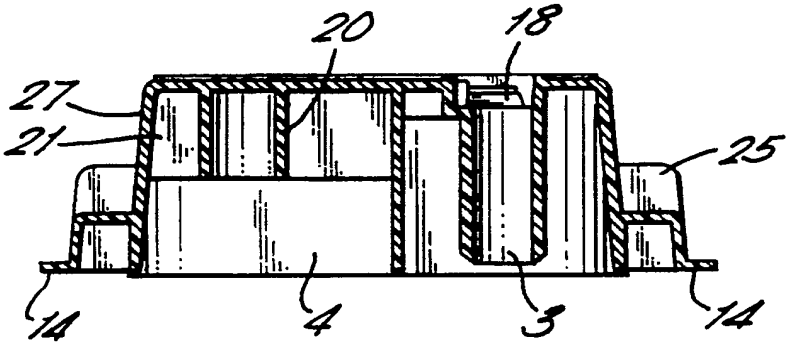


FIG. 4.



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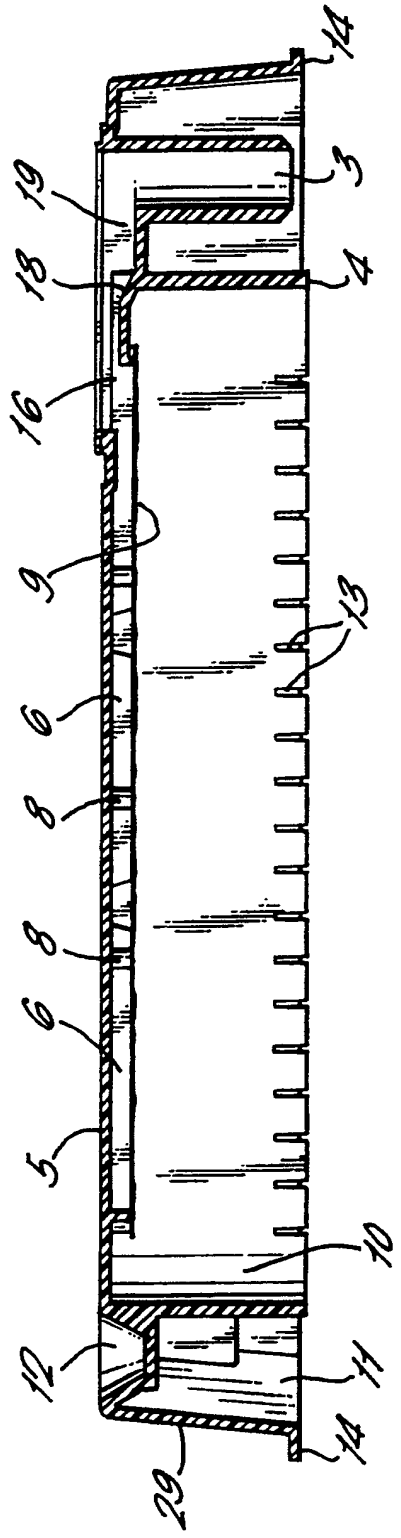


FIG. 5.

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European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 30 2538

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.5)
A	EP-A-334 573 (GENERAL FOOD LIMITED) * abstract; figure 4 *	1,4,11, 19	B65D81/00

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27 JUNE 1991	ZANGHI AMEDEO

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
O : non-written disclosure
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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

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(19) BUNDESREPUBLIK DEUTSCHLAND

DEUTSCHES PATENTAMT

(12) **Offenlegungsschrift**

(10) **DE 44 21 910 A 1**

(51) Int. Cl.[6]: G 06 K 9/20

(21) Aktenzeichen: P 44 21 910.5
(22) Anmeldetag: 24. 6. 94
(43) Offenlegungstag: 4. 1. 96

DE 44 21 910 A 1

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(54) Einrichtung und Verfahren zum Lesen von Codes

(57) Bei einer Einrichtung und einem Verfahren zum Lesen von Codes, die außen im unteren Bereich eines durchsichtigen Behälters, insbesondere einer Flasche oder eines Glases, in Form von erhabenen Code-Zeichen, insbesondere Balken oder Punkten, aufgebracht sind, wobei eine Videokamera durch die Öffnung des Behälters hindurch auf den unteren Bereich gerichtet ist, eine Beleuchtungseinrichtung den Behälter von unten beleuchtet und von einer an die Videokamera angeschlossenen Bildverarbeitungseinrichtung Bildelemente, die sich innerhalb einer ringförmigen Maske befinden, auf Code-Zeichen hin untersucht werden, gibt ein Sensor ein Signal ab, wenn die Öffnung des Behälters eine Aufnahmeposition erreicht hat. Eine Meßeinrichtung ist auf den unteren Bereich des Behälters gerichtet, welche die Position des unteren Bereichs des Behälters mißt, wenn sich der Behälter in der vom Sensor signalisierten Aufnahmeposition befindet. Die Position der Maske wird dann an die Position des unteren Bereichs des Behälters angepaßt.

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Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

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Beschreibung

Die Erfindung betrifft eine Einrichtung und ein Verfahren zum Lesen von Codes, die außen im unteren Bereich eines durchsichtigen Behälters, insbesondere einer Flasche oder eines Glases, in Form von erhabenen Code-Zeichen, insbesondere Balken oder Punkten, aufgebracht sind, wobei eine Videokamera durch die Öffnung des Behälters hindurch auf den unteren Bereich gerichtet ist, eine Beleuchtungseinrichtung den Behälter von unten beleuchtet und von einer an die Videokamera angeschlossenen Bildverarbeitungseinrichtung Bildelemente, die sich innerhalb einer ringförmigen Maske befinden, auf Code-Zeichen hin untersucht werden.

Zum Lesen von Codes, welche auf durchsichtigen Behältern aufgebracht sind, ist eine Vielzahl von Einrichtungen bekanntgeworden. Darunter befinden sich auch Einrichtungen, bei denen eine Videokamera durch einen Flaschenhals hindurch auf den unteren Teil der Flasche gerichtet ist. Dabei können Code-Zeichen auf dem Flaschenboden angeordnet sein (DE 29 43 811 A1) oder an der Flaschenwand oberhalb des Bodens (DE 36 37 210 A1). Ferner ist durch EP 0 465 775 A2 ein Code-Leseverfahren bekanntgeworden, bei welchem eine Videokamera ebenfalls durch den Flaschenhals auf den unteren Bereich der Flasche gerichtet ist und die Flasche von unten beleuchtet wird. Dabei hängen die Flaschen in einer Sternscheibe, welche die Flaschen im Halsbereich zentriert.

Bei dieser bekannten Art des Transports der Flaschen in das Gesichtsfeld der Videokamera und bei anderen Transportarten ist eine Abweichung des unteren Bereichs der Flasche von der Soll-Lage im Moment der Aufnahme nicht ausgeschlossen.

Aufgabe der Erfindung ist es, das Lesen von Codes, die außen im unteren Bereich eines durchsichtigen Behälters in Form von erhabenen Code-Zeichen aufgebracht sind, sicher zu ermöglichen, auch wenn sich die Behälter nicht in einer exakten zuvor festgelegten Lage befinden.

Die erfindungsgemäße Einrichtung ist dadurch gekennzeichnet, daß ein Sensor ein Signal abgibt, wenn die Öffnung des Behälters eine Aufnahmeposition erreicht hat, daß eine Meßeinrichtung auf den unteren Bereich des Behälters gerichtet ist, welche die Position des unteren Bereichs des Behälters mißt, wenn sich der Behälter in der vom Sensor signalisierten Aufnahmeposition befindet, und daß die Position der Maske an die Position des unteren Bereichs des Behälters angepaßt wird.

Einen besonders schnellen und zuverlässigen Transport der Flaschen ermöglicht eine Weiterbildung der erfindungsgemäßen Einrichtung dadurch, daß zwei den Behälter an entgegengesetzten Seiten berührende Endlosförderer zum Transport der Behälter vorgesehen sind.

Bei einer vorteilhaften Ausgestaltung der Erfindung ist vorgesehen, daß die Meßeinrichtung zwei zueinander senkrecht gerichtete Größen mißt. Dabei ist es vorteilhaft, wenn die Meßeinrichtung im wesentlichen von zwei zu einander senkrecht gerichteten Vielfachlichtschranken gebildet ist.

Eine andere Ausführungsform der Meßeinrichtung ist von zwei zueinander senkrecht gerichteten Zeilenkameras gebildet. Bei einer weiteren Ausführungsform ist vorgesehen, daß die Meßeinrichtung von einer quer zur Bewegungsrichtung ausgerichteten Zeilenkamera gebildet ist, wobei als Maß für die Lage des Behälters quer zur Bewegungsrichtung die Breite der Abbildung des Behälters und als Maß für die Lage des Behälters in Bewegungsrichtung die Lage der Abbildung des Behälters auf einem in der Zeilenkamera befindlichen Zeilensensor ausgewertet wird.

Die Erkennung des auf dem Behälter aufgebrachten Codes wird wesentlich gemäß einer anderen Weiterbildung der Erfindung dadurch erleichtert, daß zur Kennzeichnung des ersten und des letzten Code-Zeichens eines Codes zwischen diesen in Umfangsrichtung gemessen jeweils ein größerer Abstand als zwischen den übrigen Code-Zeichen vorgesehen ist. Für den Fall, daß sich in diesem Bereich des Behälters ein Klarschriftfeld befindet, kann eine Störung der Erkennung der Code-Zeichen dadurch vermieden werden, daß der Abstand zwischen dem ersten und dem letzten Code-Zeichen derart groß ist, daß zwischen einem gegebenenfalls vorhandenen Klarschriftzeichen und dem ersten Code-Zeichen einerseits und dem letzten Code-Zeichen andererseits jeweils ein größerer Abstand als zwischen den übrigen Code-Zeichen vorhanden ist.

Eine andere Weiterbildung der erfindungsgemäßen Einrichtung besteht darin, daß die Meßeinrichtung von der Videokamera und der Bildverarbeitungseinrichtung gebildet wird, daß die Videokamera außer den Code-Zeichen eine am Rand des Bodens des Behälters verlaufende Riffelung aufnimmt und daß die Position des Bildes der Riffelung innerhalb des Bildfeldes der Videokamera mit Hilfe der Bildverarbeitungseinrichtung gemessen und zur Anpassung der Position der Maske verwendet wird.

Diese Weiterbildung hat den Vorteil, daß für die Messung der Position des unteren Teils des Behälters keine zusätzlichen Einrichtungen erforderlich sind. Es genügen die ohnehin vorhandenen zur Erkennung der Code-Zeichen erforderlichen Einrichtungen, insbesondere die Videokamera und die Bildverarbeitungseinrichtung. Es ist allerdings das Vorhandensein einer Riffelung am Boden des Behälters erforderlich.

Bei dieser Weiterbildung ist vorzugsweise vorgesehen, daß die Position des Bildes der Riffelung innerhalb des Bildfeldes der Kamera dadurch gemessen wird, daß am Umfang des Bildes einer kreisförmigen Riffelung verteilt mehrere Meßlinien, vorzugsweise von innen, an das Bild der Riffelung herangeführt werden und daß die Position aus den Positionen derjenigen Meßlinien gemittelt wird, die eine bestimmte mittlere Helligkeitsänderung aufweisen und mit der Anwesenheit des Bildes der Riffelung korrelieren.

Ein erfindungsgemäßes Verfahren zum Lesen von Codes, die außen im unteren Bereich eines durchsichtigen Behälters, insbesondere einer Flasche oder eines Glases, in Form von erhabenen Code-Zeichen, insbesondere Balken oder Punkten, aufgebracht sind, wobei eine Videokamera durch die Öffnung des Behälters hindurch auf den unteren Bereich gerichtet ist, eine Beleuchtungseinrichtung den Behälter von unten beleuchtet und von einer an die Videokamera angeschlossenen Bildverarbeitungseinrichtung Bildelemente, die sich innerhalb einer ringförmigen Maske befinden, auf Code-Zeichen hin untersucht werden, ist dadurch gekennzeichnet, daß ein Sensor ein Signal abgibt, wenn die Öffnung des Behälters eine Aufnahmeposition erreicht hat, daß die Videokamera außer den Code-Zeichen eine am Rand des Bodens des Behälters verlaufende Riffelung aufnimmt, daß die Position des Bildes der Riffelung innerhalb des Bildfeldes der Videokamera mit Hilfe der Bildverarbeitungseinrichtung gemessen wird und daß die gemessene Position der Riffelung zur Anpassung

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der Position der Maske verwendet wird.

Ausführungsbeispiele der Erfindung sind in der Zeichnung anhand mehrerer Figuren dargestellt und in der nachfolgenden Beschreibung näher erläutert. Es zeigt:

Fig. 1 eine erfindungsgemäße Einrichtung in zwei Ansichten,

Fig. 2 eine schematische Darstellung eines aufgenommenen Bildes,

Fig. 3 eine Ansicht einer weiteren erfindungsgemäßen Einrichtung,

Fig. 4 eine schematische Darstellung eines aufgenommenen Bildes bei einem weiteren Ausführungsbeispiel und

Fig. 5 eine schematische Darstellung der Ermittlung der Position einer am Behälterboden befindlichen Riffelung mit Mitteln der Bildverarbeitung.

Gleiche Teile sind in den Figuren mit gleichen Bezugszeichen versehen.

Mit Hilfe von zwei Endlosförderern **1, 2** wird eine Flasche **3** in Richtung des Pfeils bewegt. Befindet sie sich in einer Aufnahmeposition, in welcher die Flaschenöffnung **4** mit dem Objektiv **5** einer Videokamera **6** fluchtet, wird von einem Sensor **7** ein Signal erzeugt, das einem Steuerrechner **8** zugeführt wird. Dieser veranlaßt eine Beleuchtungseinrichtung **9** einen Lichtblitz zu erzeugen und das dadurch in der Videokamera erzeugte Bildsignal in einer Bildverarbeitungseinrichtung **10** zwischenzuspeichern.

Neben möglicherweise vorhandenen anderen Bildbestandteilen zeigt das Bild Code-Zeichen **11**, die in an sich bekannter Weise mit Hilfe einer Bildverarbeitungseinrichtung **10** ausgewertet werden können. Mit Hilfe einer elektronisch erzeugten Maske **13** werden die Bilder **12** der Code-Zeichen **11** aus anderen möglicherweise vorhandenen Bildbestandteilen herausgelöst.

Beim Transport des Behälters **3** mit Hilfe der Endlosförderer **1, 2** ist eine Ablage bzw. Schrägstellung des Behälters **3** nicht ausgeschlossen. Dadurch geraten die Abbildungen der Code-Zeichen **12** möglicherweise außerhalb der Maske und werden nicht mehr erfaßt.

Zu einer Verschiebung der Maske **13** entsprechend der Abweichung von der Soll-Lage ist eine Meßeinrichtung vorgesehen, die aus zwei Vielfachlichtschranken besteht. Die eine Vielfachlichtschranke besteht aus zeilenförmig angeordneten Leuchtdioden, die jeweils in Pfeilrichtung gebündeltes Licht aussenden, das je nach Lage des Behälters **3** von einzelnen Fotodioden einer Zeile **15** empfangen wird. In entsprechender Weise ist senkrecht dazu eine weitere Vielfachlichtschranke vorgesehen, die aus einer Zeile Leuchtdioden **16** und einer Zeile Fotodioden **17** besteht. Die Signale der Zeilen **16, 17** werden im Steuerrechner **8** verarbeitet. Die vom Steuerrechner **8** abgeleiteten Meßsignale, welche die Position des unteren Bereichs des Behälters **3** darstellen, werden dann in der Bildverarbeitungseinrichtung **10** zur Lagekorrektur der Maske **13** zugeführt.

Die Code-Zeichen sind am Umfang des Behälters **3** derart angeordnet, daß zwischen einem ersten Code-Zeichen **12'** und einem letzten Code-Zeichen **12''** ein wesentlich größerer Abstand als zwischen den übrigen Code-Zeichen besteht. Daraus kann die Bildverarbeitungseinrichtung das erste Code-Zeichen bzw. den Beginn des Codes ermitteln. Diese Maßnahme verhindert auch, daß ein im Bereich der Maske **13** gegenüber dem Code aufgenommenes Klarschriftfeld eine Störung der Code-Erkennung bewirkt.

Dabei ist es zweckmäßig, wenn der Abstand zwischen dem ersten **12'** und dem letzten Code-Zeichen **12''** derart groß ist, daß zwischen einem gegebenenfalls vorhandenen Klarschriftzeichen und dem ersten Code-Zeichen **12'** einerseits und dem letzten Code-Zeichen **12''** andererseits jeweils ein größerer Abstand als zwischen den übrigen Code-Zeichen **12** vorhanden ist.

Bei dem Ausführungsbeispiel gemäß **Fig.** 3 ist eine seitlich quer zur Bewegungsrichtung auf den Behälter **3** gerichtete Zeilenkamera schematisch durch einen Zeilensensor **21** und eine Linse **22** dargestellt. Die Zeilenkamera nimmt den Behälter **3** unter einem gestrichelt dargestellten Winkel auf. Die Ausgangssignale des Zeilensensors **21** werden in nicht dargestellter Weise einer Auswerteschaltung zugeführt, die Teil der Bildverarbeitungseinrichtung sein kann. Die Größe der Abbildung ist ein Maß für die Lage des Behälters **3** quer zur Bewegungsrichtung, während die Lage der Abbildung der Lage des Behälters **3** in Bewegungsrichtung entspricht.

Bei dem anhand der **Fig.** 4 und 5 erläuterten Ausführungsbeispiel wird die Position des unteren Teils des Behälters mit Hilfe eines Bildes **23** der bei den meisten Behältern, insbesondere Flaschen, am Rand des Bodens vorhandenen Riffelung gemessen. Die Einrichtung als solche gleicht im wesentlichen derjenigen nach **Fig.** 1a, wobei jedoch keine Photodiodenzeilen **15** und Leuchtdiodenzeilen **16** erforderlich sind. Die Bildverarbeitungseinrichtung **10** ist zusätzlich mit einem Programm zur Ermittlung der Position des Bildes **23** der Riffelung ausgestattet.

Fig. 4 zeigt die bereits im Zusammenhang mit **Fig.** 2 erläuterten Code-Zeichen **12, 12', 12''** und die Maske **13**, wobei von einer mittleren Position des unteren Behälterteils ausgegangen ist. Weicht diese Position jedoch von der dargestellten ab, so fallen die Code-Zeichen **12, 12'** und **12''** nicht mehr oder nicht vollständig in die Maske **13**.

Um dieses zu korrigieren, wird vor der Auswertung der Code-Zeichen die Position des Bildes **23** der Riffelung bestimmt. Dieses kann beispielsweise mit dem in **Fig.** 5 veranschaulichten Verfahren erfolgen. Dazu werden an vorgegebenen Positionen Meßlinien **24** bis **27** erzeugt, die nacheinander in Pfeilrichtung von innen nach außen verschoben werden. Sobald eine der Meßlinien **24** bis **27** mit dem Rand des Bildes **23** der Riffelung korreliert, wird dort ein Signal festgestellt, das eine bestimmte mittlere Helligkeitsänderung aufweist. Die Positionen (Koordinaten) jeweils gegenüberliegender Meßlinien **25, 27** bzw. **24, 26** werden dann gemittelt und stellen die Position des Bildes **23** der Riffelung dar. Entsprechend dieser Position wird dann die Maske **13** (**Fig.** 4) ausgerichtet.

Die Bestimmung der Position des Bildes der Riffelung kann auch mit anderen Verfahren der Bildverarbeitung durchgeführt werden. So kann beispielsweise ein Abtastkreis über den das Bild der Riffelung enthaltenen Bildbereich bewegt werden und dessen Position als Position der Riffelung angenommen werden, an der eine bestimmte Anzahl von Grauwertsprüngen oder eine bestimmte Histogrammverteilung vorliegt.

Patentansprüche

1. Einrichtung zum Lesen von Codes, die außen im unteren Bereich eines durchsichtigen Behälters, insbesondere einer Flasche oder eines Glases, in Form von erhabenen Code-Zeichen, insbesondere Balken oder Punkten, aufgebracht sind, wobei eine Videokamera durch die Öffnung des Behälters hin-

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durch auf den unteren Bereich gerichtet ist, eine Beleuchtungseinrichtung den Behälter von unten beleuchtet und von einer an die Videokamera angeschlossenen Bildverarbeitungseinrichtung Bildelemente, die sich innerhalb einer ringförmigen Maske befinden, auf Code-Zeichen hin untersucht werden, **dadurch gekennzeichnet,** daß ein Sensor (7) ein Signal abgibt, wenn die Öffnung (4) des Behälters (3) eine Aufnahmeposition erreicht hat, und daß eine Meßeinrichtung (14 bis 17; 21, 22; 6, 10) auf den unteren Bereich des Behälters (3) gerichtet ist, welche die Position des unteren Bereichs des Behälters (3) mißt, wenn sich der Behälter (3) in der vom Sensor (7) signalisierten Aufnahmeposition befindet, und daß die Position der Maske (13) an die Position des unteren Bereichs des Behälters (3) angepaßt wird.

2. Einrichtung nach Anspruch 1, dadurch gekennzeichnet, daß zwei den Behälter (3) an entgegengesetzten Seiten berührende Endlosförderer (1, 2) zum Transport der Behälter (3) vorgesehen sind.

3. Einrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Meßeinrichtung (14 bis 17) zwei zueinander senkrecht gerichtete Größen mißt.

4. Einrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Meßeinrichtung im wesentlichen von zwei zu einander senkrecht gerichteten Vielfachlichtschranken (14, 15; 16, 17) gebildet ist.

5. Einrichtung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Meßeinrichtung von zwei zueinander senkrecht gerichteten Zeilenkameras gebildet ist.

6. Einrichtung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Meßeinrichtung von einer quer zur Bewegungsrichtung ausgerichteten Zeilenkamera (21, 22) gebildet ist, wobei als Maß für die Lage des Behälters (3) quer zur Bewegungsrichtung die Breite der Abbildung des Behälters (3) und als Maß für die Lage des Behälters (3) in Bewegungsrichtung die Lage der Abbildung des Behälters (3) auf einem in der Zeilenkamera befindlichen Zeilensensor (21) ausgewertet wird.

7. Einrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß zur Kennzeichnung des ersten (12') und des letzten (12'') Code-Zeichens eines Codes zwischen diesen in Umfangsrichtung gemessen jeweils ein größerer Abstand als zwischen den übrigen Code-Zeichen vorgesehen ist.

8. Einrichtung nach Anspruch 7, dadurch gekennzeichnet, daß der Abstand zwischen dem ersten (12') und dem letzten (12'') Code-Zeichen derart groß ist, daß zwischen einem gegebenenfalls vorhandenen Klarschriftzeichen und dem ersten Code-Zeichen (12') einerseits und dem letzten Code-Zeichen (12'') andererseits jeweils ein größerer Abstand als zwischen den übrigen Code-Zeichen (12) vorhanden ist.

9. Einrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Meßeinrichtung von der Videokamera (6) und der Bildverarbeitungseinrichtung (10) gebildet wird, daß die Videokamera (6) außer den Code-Zeichen (11) eine am Rand des Bodens des Behälters (3) verlaufende Riffelung aufnimmt und daß die Position des Bildes (23) der Riffelung innerhalb des Bildfeldes der Videokamera (6) mit Hilfe der Bildverarbeitungseinrichtung (10) gemessen und zur Anpassung der Position der Maske (13) verwendet wird.

10. Einrichtung nach Anspruch 9, dadurch gekennzeichnet, daß die Position des Bildes der Riffelung innerhalb des Bildfeldes der Kamera dadurch gemessen wird, daß am Umfang des Bildes einer kreisförmigen Riffelung verteilt mehrere Meßlinien, vorzugsweise von innen, an das Bild der Riffelung herangeführt werden und daß die Position aus den Positionen derjenigen Meßlinien gemittelt wird, die eine bestimmte mittlere Helligkeitsänderung aufweisen und mit der Anwesenheit des Bildes der Riffelung korrelieren.

11. Verfahren zum Lesen von Codes, die außen im unteren Bereich eines durchsichtigen Behälters, insbesondere einer Flasche oder eines Glases, in Form von erhabenen Code-Zeichen, insbesondere Balken oder Punkten, aufgebracht sind, wobei eine Videokamera durch die Öffnung des Behälters hindurch auf den unteren Bereich gerichtet ist, eine Beleuchtungseinrichtung den Behälter von unten beleuchtet und von einer an die Videokamera angeschlossenen Bildverarbeitungseinrichtung Bildelemente, die sich innerhalb einer ringförmigen Maske befinden, auf Code-Zeichen hin untersucht werden, dadurch gekennzeichnet, daß ein Sensor ein Signal abgibt, wenn die Öffnung des Behälters eine Aufnahmeposition erreicht hat, daß die Videokamera außer den Code-Zeichen eine am Rand des Bodens des Behälters verlaufende Riffelung aufnimmt, daß die Position des Bildes der Riffelung innerhalb des Bildfeldes der Videokamera mit Hilfe der Bildverarbeitungseinrichtung gemessen wird und daß die gemessene Position der Riffelung zur Anpassung der Position der Maske verwendet wird.

Hierzu 3 Seite(n) Zeichnungen

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Int. Cl.[6]: G 06 K 9/20
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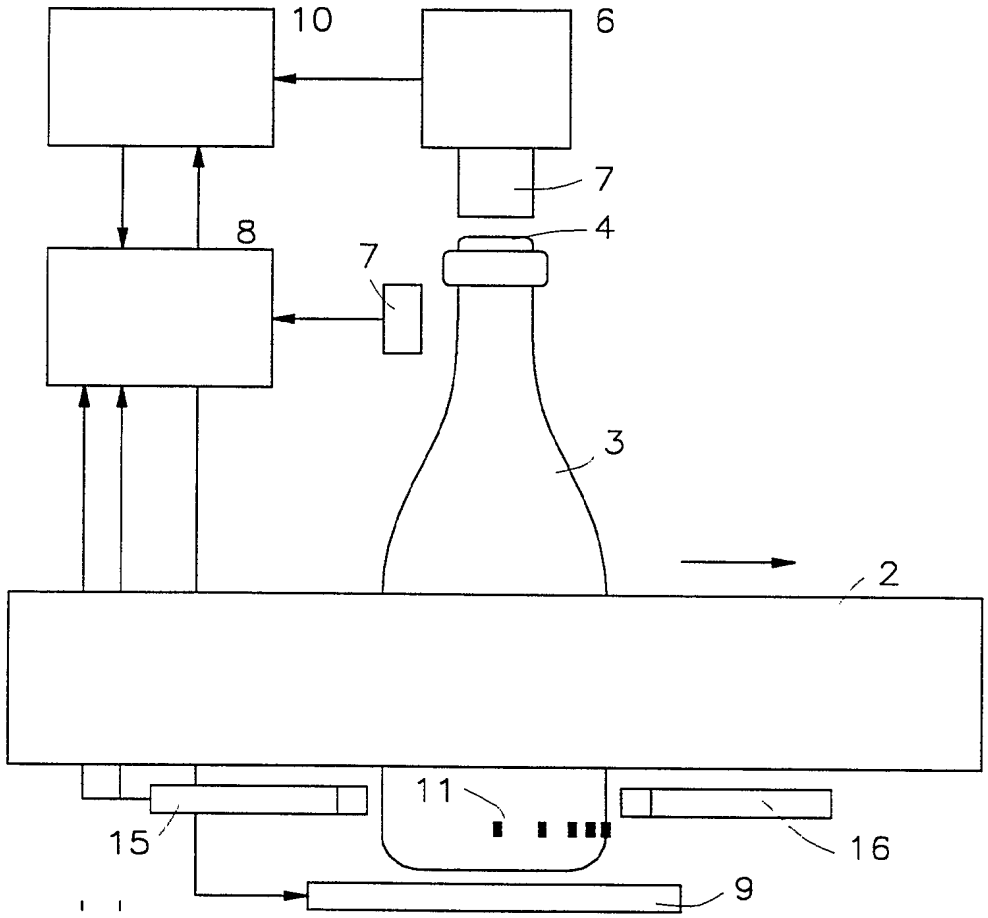


Fig.1a

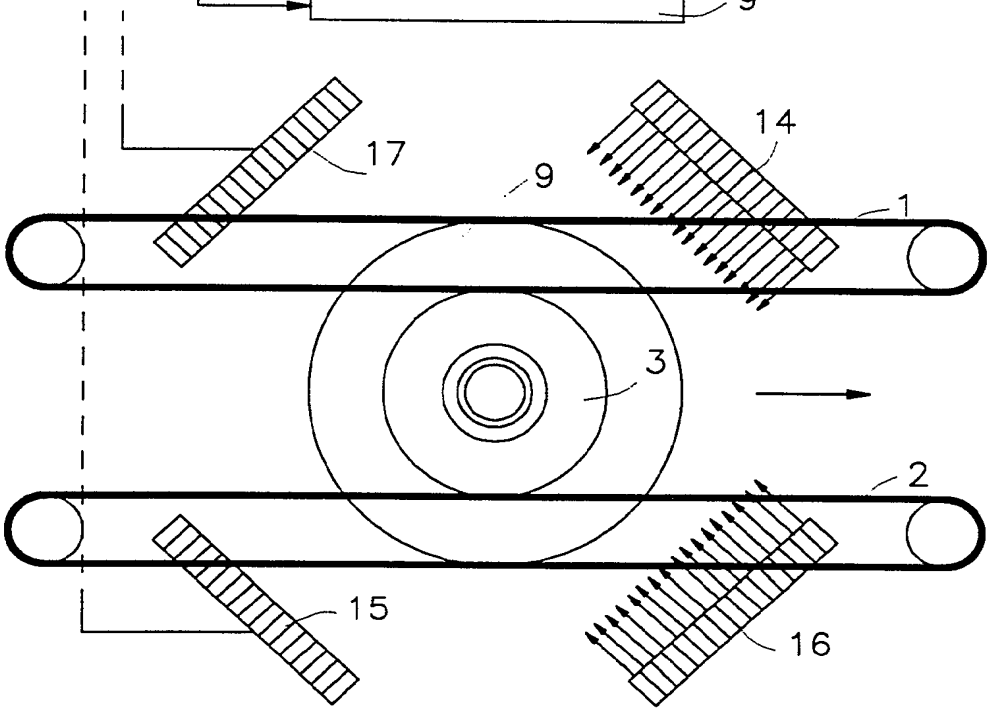


Fig.1b

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Nummer: DE 44 21 910 A1
Int. Cl.[6]: G 06 K 9/20
Offenlegungstag: 4. Januar 1996

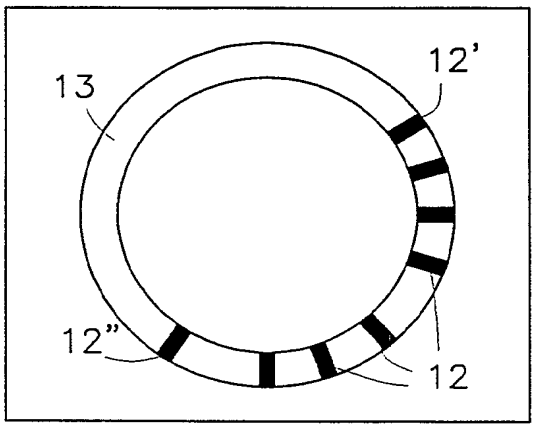


Fig.2

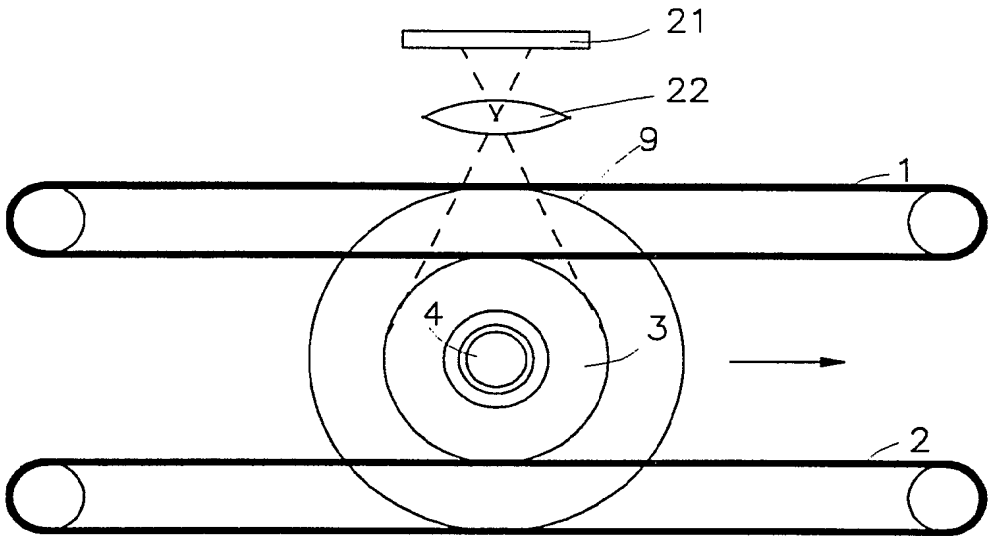


Fig.3

508 061/167

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Nummer: DE 44 21 910 A1
Int. Cl.[6]: G 06 K 9/20
Offenlegungstag: 4. Januar 1996

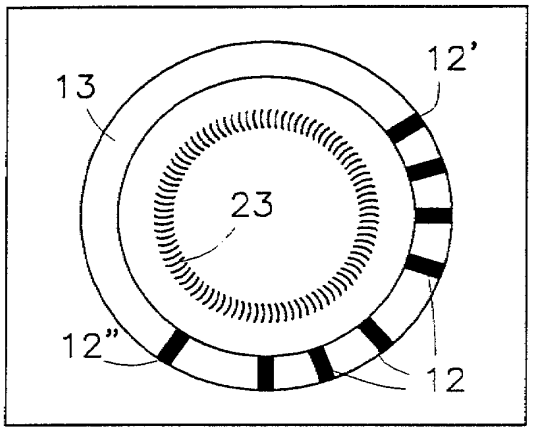


Fig.4

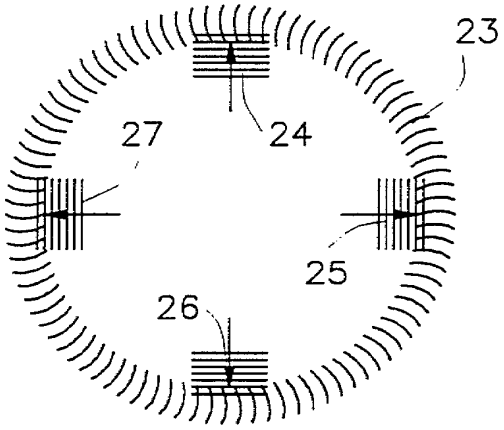


Fig.5

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

(11) EP 2 128 802 A1

(12) EUROPÄISCHE PATENTANMELDUNG

(43) Veröffentlichungstag:
02.12.2009 Patentblatt 2009/49

(51) Int Cl.:
G06K 19/06 *(2006.01)* ***F16J 15/00*** *(2006.01)*

(21) Anmeldenummer: **08009812.2**

(22) Anmeldetag: **29.05.2008**

(84) Benannte Vertragsstaaten:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Benannte Erstreckungsstaaten:
AL BA MK RS

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(54) Bauteil versehen mit einer maschinenlesbaren Kennzeichnung

(57) Bauteil (1) mit zumindest einem Element (2) mit einer gekrümmten Oberfläche (3) , wobei das Element (2) mit einer codierten elektronisch auslesbaren Kennzeichnung (4) versehen ist, die als topographische Kennzeichnung (4) in die Oberfläche eingebracht ist, wobei die Kennzeichnung (4) derart ausgebildet ist, dass sie mit einem Auslesegerät in zwei Dimensionen auslesbar ist.

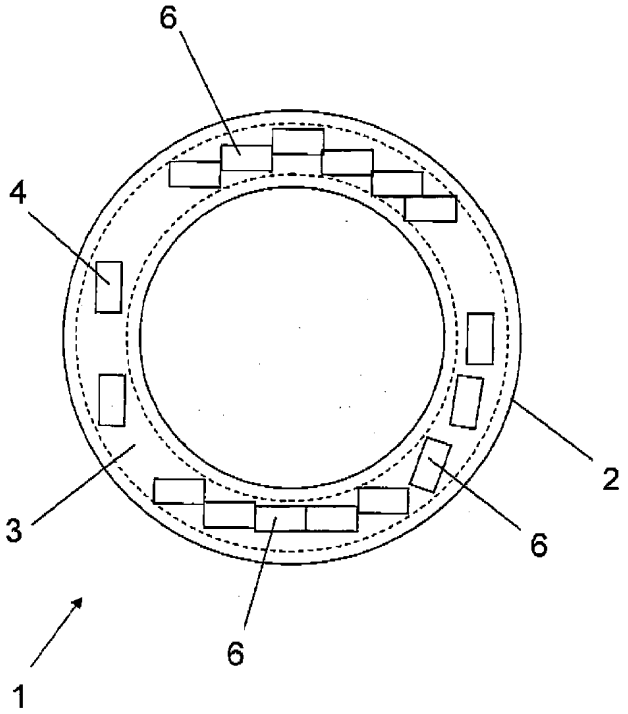


Fig. 3

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Beschreibung

Technisches Gebiet

[0001] Die Erfindung betrifft ein Bauteil mit zumindest einem Element mit einer gekrümmten Oberfläche, wobei das Element mit einer codierten elektronisch auslesbaren Kennzeichnung versehen ist, die als topographische Kennzeichnung in die Oberfläche eingebracht ist.

Stand der Technik

[0002] Derartige Bauteile sind aus der EP 1 354 304 B1 bekannt. Dort ist ein Verfahren beschrieben, Bauteile durch Aufbringen einer Markierung fälschungssicher zu kennzeichnen. Dazu wird ein Etikett mit detektierbaren Partikel versehen, die in einem Zufallsmuster auf dem Etikett verteilt sind. Diese Partikel werden mittels eines optischen Systems erfasst und gespeichert und können durch wiederholtes Auslesen erneut eindeutig zugeordnet werden. Beispielhaft wird das Markieren eines Reifens mittels eines Etiketts beschrieben. Auch bei Maschinenelementen werden die Fälschungssicherheit und die Nachvollziehbarkeit der Herstellung immer wichtiger, da beispielsweise gefälschte minderwertige Dichtungen vorzeitig verschleißen können oder die geforderte Dichtwirkung gar nicht erbringen und so immense Schäden verursachen können. Des Weiteren bietet eine Kennzeichnung Vorteile in der Produktionssteuerung, Logistik und Abrechnung. Dabei sollen die in der Kennzeichnung gespeicherten Informationen mehrfach redundante vorhanden sein. Redundant bedeutet, dass die Informationen mehrfach und in verschiedenen Formen in der Kennzeichnung erhalten sind, damit das Auslesen der Kennzeichnung auch dann noch möglich ist, wenn ein Großteil der Kennzeichnung beispielsweise durch Abnutzung des Bauteils zerstört ist. Die Schwierigkeit bei kleinen Bauteilen mit gekrümmter, beispielsweise torusförmiger Oberfläche besteht darin, in der Kennzeichnung eine Vielzahl von Informationen mehrfach redundant auf das Bauteil aufzubringen, so dass die Kennzeichnung mit üblichen Auslesegeräten auslesbar ist.

Darstellung der Erfindung

[0003] Der Erfindung liegt die Aufgabe zugrunde, die Kennzeichnung so weiter zu entwickeln, dass sie trotz einer Vielzahl mehrfach redundant gespeicherter Informationen einfach auslesbar ist und auf kleine Flächen aufgebracht werden kann.

[0004] Diese Aufgabe wird mit den Merkmalen von Anspruch 1 gelöst. Auf vorteilhafte Ausgestaltungen nehmen die Unteransprüche Bezug.

[0005] Zur Lösung der Aufgabe ist die Kennzeichnung derart ausgebildet, dass sie mit einem Auslesegerät in zwei Dimensionen auslesbar ist. Dazu wird die Kennzeichnung so gestaltet, dass sie auf eine gekrümmte Oberfläche aufgebracht und vorzugsweise in den Regionen angeordnet wird, bei denen eine bei einer zweidimensionalen Projektion keine oder nur eine geringe Verzerrung erfolgt. Dadurch kann die Kennzeichnung auch mit herkömmlichen, also für flächige Objekte ausgelegten Lesegeräten ausgelesen werden und es ist nicht erforderlich, die Kennzeichnung durch rechnerische Verfahren zu entzerren. Vorteilhafterweise folgt die Kennzeichnung der Oberfläche in einem Bereich mit geringer Verzerrung.

[0006] Die Kennzeichnung kann eine nicht-rechteckige Gestalt aufweisen. Dabei ergibt sich eine Formenvielfalt, die sich primär an der Gestalt des zu kennzeichnenden Bauteils ergibt. Die Kennzeichnung kann kreisförmig, kreisringförmig oder eine beliebige andere Gestalt annehmen. Die Kennzeichnung kann dabei einen ungeraden Begrenzungsrand aufweisen.
Eine derartige Kennzeichnung kann einen gezackten Begrenzungsrand oder einen Begrenzungsrand nach Art einer Freihandlinie aufweisen.

[0007] Die Kennzeichnung kann in Segmente eingeteilt sein. Dazu werden die in der Kennzeichnung enthaltenen codierten Zeichen aufgeteilt und in mehreren Segmenten angeordnet. Die vollständige Kennzeichnung ergibt sich nach Auslesen aller Segmente oder je nach Redundanz eines Teils der Segmente. Durch die Aufteilung in Segmente kann die Kennzeichnung in einer großen Formenvielfalt auf das Bauteil aufgebracht werden. Dadurch können auch stark gekrümmte Bauteile mit einer aussagekräftigen und redundanten Kennzeichnung versehen werden, da die Segmente verteilt angeordnet werden können. Die Segmente können eine rechteckige Gestalt aufweisen, wobei sich durch die Anordnung der Segmente zu einer Kennzeichnung eine nicht-rechteckige Gesamtform der Kennzeichnung ergibt. Die Segmente können auch voneinander abweichende Abmessungen aufweisen.

[0008] Die Segmente können unmittelbar aneinander angrenzen oder voneinander beabstandet sein. Dabei können die Segmente zueinander versetzt oder zueinander verdreht ausgerichtet sein. Sind die Segmente zueinander versetzt, ergeben sich treppenförmige Strukturen, wobei die Segmente direkt aneinander grenzen oder voneinander beabstandet sein können. Durch den treppenförmigen Versatz können runde oder andere nichtrechtwinklige Strukturen nachgebildet werden. Sind die Segmente zueinander verdreht, also verkippt, können die Segmente beispielsweise auf kreisringförmigen Bauteilen angeordnet werden, wobei nahezu die gesamte Oberfläche des Bauteils die mit nur geringen Verzerrungen zweidimensional projizierbar ist, für die Kennzeichnung nutzbar und auch einfach auslesbar ist.

[0009] Die Kennzeichnung kann einzelne auslesbare Zeichen enthalten, die zueinander versetzt angeordnet sein können. Dabei können die Zeichen alternativ oder zusätzlich um einen gemeinsamen Mittelpunkt angeordnet sein. Für die Zeichen gilt grundsätzlich das Gleiche wie für die zuvor beschriebenen Segmente. In diesem Fall ist es nicht erforderlich, die Kennzeichnung in ein-

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zelne Segmente aufzuteilen, die Zeichen können vielmehr innerhalb der Kennzeichnung versetzt und verdreht werden. Es ist jedoch auch denkbar, die Zeichen innerhalb der Segmente zu versetzen und zu verdrehen.

[0010] Die Kennzeichnung kann sich über mehrere Elemente des Bauteils erstrecken. Bei Verbundteilen, die aus mehreren Werkstoffen bestehen erhöht sich dadurch die Fälschungssicherheit, da mehrere Elemente gekennzeichnet sind. Dazu kann die Kennzeichnung in Segmente aufgeteilt sein, wobei die Segmente über die Elemente verteilt werden. Die komplette Kennzeichnung ergibt sich nach Auslesen der einzelnen über die Elemente verteilten Segmente.

[0011] Das Element kann ein O-Ring oder der elastomere Abschnitt eines Dichtelementes sein. Dabei kann die Kennzeichnung in eine Funkfionsfläche des Elementes eingebracht sein. Insbesondere bei Dichtungsbauteilen ist es erforderlich, deren nichtmetallische Bestandteil zu kennzeichnen. Häufig bestehen Dichtungen aus einem Dichtungswerkstoff-Metall-Verbund, wobei für gefälschte Produkte originale Metallteile wieder verwendet werden können. Daher ist es nicht zweckmäßig, nur das Metallteil zu kennzeichnen, sondern das für die Dichtfunktion verantwortliche und wesentlich kritischere und für den Verschleiß anfälligere Element aus Dichtungswerkstoff, unter Umständen auch die Funktionsfläche zu kennzeichnen. Überraschenderweise wurde dabei festgestellt, dass die Funktion einer Dichtung nicht beeinträchtigt ist, wenn eine Funktionsfläche mit einer Lasermarkierung versehen ist, die auf die Oberfläche aufgebracht ist und einen Materialabtrag bewirkt. Insbesondere hat sich gezeigt, dass erfindungsgemäß gekennzeichnete Bauteile auch erhöhten hygienischen Anforderungen genügen und in der Kennzeichnung kein unerlaubtes Keimwachstum stattfindet. Derartig gekennzeichnete Dichtungen können insbesondere als Dichtringe unterschiedlichen Querschnitts, Radialwellendichtringe, Flachdichtungen oder Ventilschaftdichtungen ausgebildet sein. Insbesondere bei O-Ringen und vergleichbaren Dichtelementen ist es vorteilhaft, die Kennzeichnung in eine Funktionsfläche einbringen zu können, da bei O-Ringen nicht von vornherein festgelegt ist, welcher Flächenabschnitt nach Montage für die Dichtfunktion wesentlich ist. Es ist aber auch denkbar, die Kennzeichnung in eine Fläche einzubringen die schräg, also nicht weder axial noch radial, ausgerichtet ist. Diese Fläche ist erfahrungsgemäß den geringsten Belastungen unterworfen.

[0012] Denkbare Werkstoffe für das Bauteil sind vorzugsweise gummiähnliche Werkstoffe, Elastomere, thermoplastische Elastomere, thermoplastische Polyurethane oder Polytetrafluorethylen. Das Bauteil kann aber auch als Metalldichtung, beispielsweise als Zylinderkopfdichtung ausgebildet sein. Die Kennzeichnung, die als topographische Kennzeichnung in die Tiefe des Materials des Elementes eingebracht ist, trägt in codierter Form Daten zu dem Produkt, dem Hersteller und weitere Informationen. Die Codierung erlaubt die Kennzeichnung sowie eine fälschungssichere Identifikation des Bauteils und eine eindeutige Zuordnung des Bauteils zu einem Hersteller sowie gegebenenfalls Informationen zu Produktions-Chargen, wobei jedes einzelne Bauteil mit einer durchlaufenden Seriennummer versehen werden kann. Die Kennzeichnung bildet also ein Echtheitsmerkmal. Bevorzugt wird die Kennzeichnung mittels einer Laserbearbeitung in das Element eingebracht, da die Lasermarkierung direkt auf das Bauteil aufgetragen ist und dadurch das Material an sich markiert ist. Durch die Laserbehandlung erfolgt ein Materialabtrag mit einer vorgewählten Tiefe. Daher ist es nicht möglich, die Markierung von dem Bauteil zu entfernen, ohne das Bauteil zu beschädigen. Weiter ist vorteilhaft, dass die Lasermarkierung berührungslos erfolgt und dadurch keine Verformung des Bauteils mit einer daraus folgenden Verfälschung der Kennzeichnung vorkommen kann. Des Weiteren wird die Kennzeichnung im Anschluss an die Herstellung auf das fertige Produkt aufgetragen. Es können daher Herstellungsdaten, wie Herstellungsdatum und Chargennummer sowie andere Qualitätsmerkcnale als weitere Information auf das Bauteil im Anschluss aufgebracht werden. Die Lasermarkierung wird oberflächlich aufgetragen und ist daher besonders einfach aufzubringen und zu detektieren. Des Weiteren wird kein Fremdmaterial in das Bauteil eingebracht, welche frei gesetzt werden könnten und unerwünschte Wirkungen verursachen könnten. Die Kennzeichnung ist mit vergleichsweise einfachen optischen Mitteln auslesbar. Insbesondere gegenüber elektronischen Kennzeichnungen, wie beispielsweise integrierte Speicherbausteine, ist die optische Kennzeichnung durch einen Laser kostengünstig und daher auch für preiswerte Massenbauteile geeignet. Die optische Kennzeichnung eignet sich insbesondere auch zur Kennzeichnung gekrümmter, dreidimensionaler Flächen. Denkbare Bauteile, die mit der erfindungsgemäßen Kennzeichnung versehen sein können, sind beispielsweise Radialwellendichtringe, O-Ringe, X-Ringe, Quadringe, Gummibälge, Membranen, Hydraulikdichtungen, Pneumatikdichtungen und ähnliche Bauteile.

Kurzbeschreibung der Zeichnung

[0013] Einige Ausführungsbeispiele des erfindungsgemäßen Bauteils werden nachfolgend anhand der Figuren näher erläutert. Diese zeigen, jeweils schematisch:

- Fig. 1 ein Bauteil als O-Ring ausgebildet;
- Fig. 2 ein Bauteil mit einer Kennzeichnung mit ungeradem Begrenzungsrand;
- Fig. 3 ein Bauteil mit einer segmentierten Kennzeichnung;
- Fig. 4a ein Bauteil mit einer Kennzeichnung enthaltend Zeichen die zueinander verdreht sind
- Fig. 4b ein Bauteil mit einer Kennzeichnung enthaltend Zeichen die zueinander verdreht sind;
- Fig. 4c ein Bauteil mit einer Kennzeichnung enthal-

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tend Zeichen die zueinander versetzt angeordnet sind;

Fig. 5 das Bauteil nach Figur 1 im Querschnitt.

Ausführung der Erfindung

[0014] Figur 1 zeigt ein Bauteil 1, hier einen O-Ring. Das Bauteil besteht aus einem Element 2 aus elastomerem Werkstoff mit einer gekrümmten Oberfläche 3, auf die eine codierte elektronisch auslesbaren Kennzeichnung 4 aufgebracht ist, die als topographische Kennzeichnung 4 in die Oberfläche eingebracht ist. Dabei ist die Kennzeichnung 4 derart ausgebildet ist, dass sie mit einem Auslesegerät in zwei Dimensionen auslesbar ist. Dazu weist die Kennzeichnung 4 eine nicht-rechteckige Gestaut und einen ungeraden Begrenzungsrand 5 auf. In dieser Ausführung ist die Kennzeichnung 4 kreisringförmig und erstreckt sich in einem Bereich der Oberfläche mit einer Erstreckung in Umfangsrichtung, so dass in den Randbereichen nur geringe Verzerrungen auftreten und die Kennzeichnung 4 mit einem einfachen Auslesegerät auslesbar ist. Die Breite der Kennzeichnung 4 ist dabei vorzugsweise so gewählt, dass sie maximal dem 0,8-fachen des Durchmessers des Elementes 2 entspricht. Eine derartige Kennzeichnung 4 ist grundsätzlich auf allen möglichen gekrümmten Elementen 2 denkbar. So kann das Element 2 beispielsweise Teil des Dichtelementes oder eines Elastomerformteils sein.

[0015] Figur 2 zeigt ein Bauteil 1 gemäß Figur 1, wobei der Begrenzungsrand 5 der Kennzeichnung 4 in dieser Ausgestaltung als "Freihandlinie" ausgebildet ist und einen besonders unebenen Verlauf aufweist. Die Kennzeichnung 4 kann dabei auch in Form von Zeichen oder graphischen Elementen angeordnet sein. Die Kennzeichnung 4 ist jeweils in einem Bereich des Elementes 2 angebracht, der nur eine geringe Verzerrung verursacht.

[0016] Figur 3 zeigt ein Bauteil 1, hier einen O-Ring. Das Bauteil besteht aus einem Element 2 aus elastomerem Werkstoff mit einer gekrümmten Oberfläche 3, auf die eine codierte elektronisch auslesbaren Kennzeichnung 4 aufgebracht ist, die als topographische Kennzeichnung 4 in die Oberfläche eingebracht ist. Dabei ist die Kennzeichnung 4 derart ausgebildet ist, dass sie mit einem Auslesegerät in zwei Dimensionen auslesbar ist. Dazu ist die Kennzeichnung 4 in Segmente 6 eingeteilt, wobei ein Teil der Segmente 6 unmittelbar aneinander angrenzen und ein Teil der Segmente 6 voneinander beabstandet sind. Des Weiteren sind die Segmente 6 zueinander versetzt und teilweise zueinander verdreht ausgerichtet.

[0017] Die Figuren 4a, 4b und 4c zeigen ein Bauteil 1, hier einen O-Ring. Das Bauteil 1 besteht aus einem Element 2 aus elastomerem Werkstoff mit einer gekrümmten Oberfläche 3, auf die eine codierte elektronisch auslesbaren Kennzeichnung 4 aufgebracht ist, die als topographische Kennzeichnung 4 in die Oberfläche eingebracht ist. Dabei ist die Kennzeichnung 4 derart ausgebildet ist, dass sie mit einem Auslesegerät in zwei Dimensionen auslesbar ist. Die Kennzeichnung 4 enthält einzelne auslesbare Zeichen 7. Bei dem Ausführungsbeispiel gemäß Figur 4a sind die Zeichen 7 strahlenförmig und bei dem Ausführungsbeispiel gemäß Figur 4b sind die Zeichen tangential zu einem gemeinsamen Mittelpunkt 8 ausgerichtet. Figur 4c zeigt ein Ausführungsbeispiel bei dem die Zeichen 7 zueinander versetzt angeordnet sind. Dabei sind die Zeichen 7 parallel innerhalb der Kennzeichnung 4 verschoben. Ein Referenzzeichen 9 verbessert die Auslesbarkeit.

[0018] Figur 5 zeigt die Anordnung der Kennzeichnung 4 auf einem Element, hier einem O-Ring, in einem Zwischenbereich zwischen axialer und radialer Dichtfläche.

Patentansprüche

1. Bauteil (1) mit zumindest einem Element (2) mit einer gekrümmten Oberfläche (3), wobei das Element (2) mit einer codierten elektronisch auslesbaren Kennzeichnung (4) versehen ist, die als topographische Kennzeichnung (4) in die Oberfläche eingebracht ist, **dadurch gekennzeichnet, dass** die Kennzeichnung (4) derart ausgebildet ist, dass sie mit einem Auslesegerät in zwei Dimensionen auslesbar ist.

2. Bauteil nach Anspruch 1, **dadurch gekennzeichnet, dass** die Kennzeichnung (4) eine nicht-rechteckige Gestalt aufweist.

3. Bauteil nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Kennzeichnung (4) einen ungeraden Begrenzungsrand (5) aufweist.

4. Bauteil nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Kennzeichnung (4) in Segmente (6) eingeteilt ist.

5. Bauteil nach Anspruch 4, **dadurch gekennzeichnet, dass** die Segmente (6) unmittelbar aneinander angrenzen oder voneinander beabstandet sind.

6. Bauteil nach Anspruch 4 oder 5, **dadurch gekennzeichnet, dass** die Segmente (6) zueinander versetzt ausgerichtet sind.

7. Bauteil nach Anspruch einem der Ansprüche 4 bis 6, **dadurch gekennzeichnet, dass** die Segmente (6) zueinander verdreht ausgerichtet sind.

8. Bauteil nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** die Kennzeichnung (4) einzelne auslesbare Zeichen (7) enthält die zueinander versetzt angeordnet sind.

9. Bauteil nach Anspruch 6, **dadurch gekennzeichnet, dass** die Kennzeichnung (4) einzelne ausles-

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bare Zeichen (7) enthält, die um einen gemeinsamen Mittelpunkt (8) angeordnet sind.

10. Bauteil nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet**, **dass** sich die Kennzeichnung (4) über mehrere Elemente (2) des Bauteils (1) erstreckt.

11. Bauteil nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet**, **dass** das Element (2) ein O-Ring oder der elastomere Abschnitt eines Dichtelementes ist.

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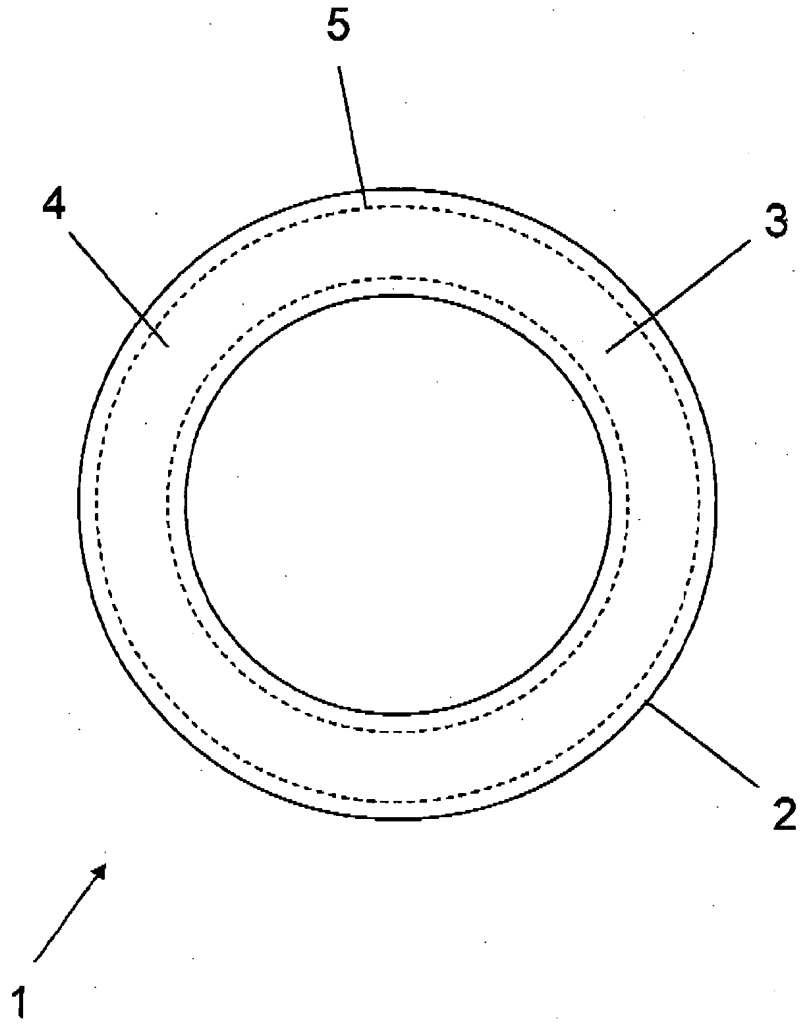


Fig. 1

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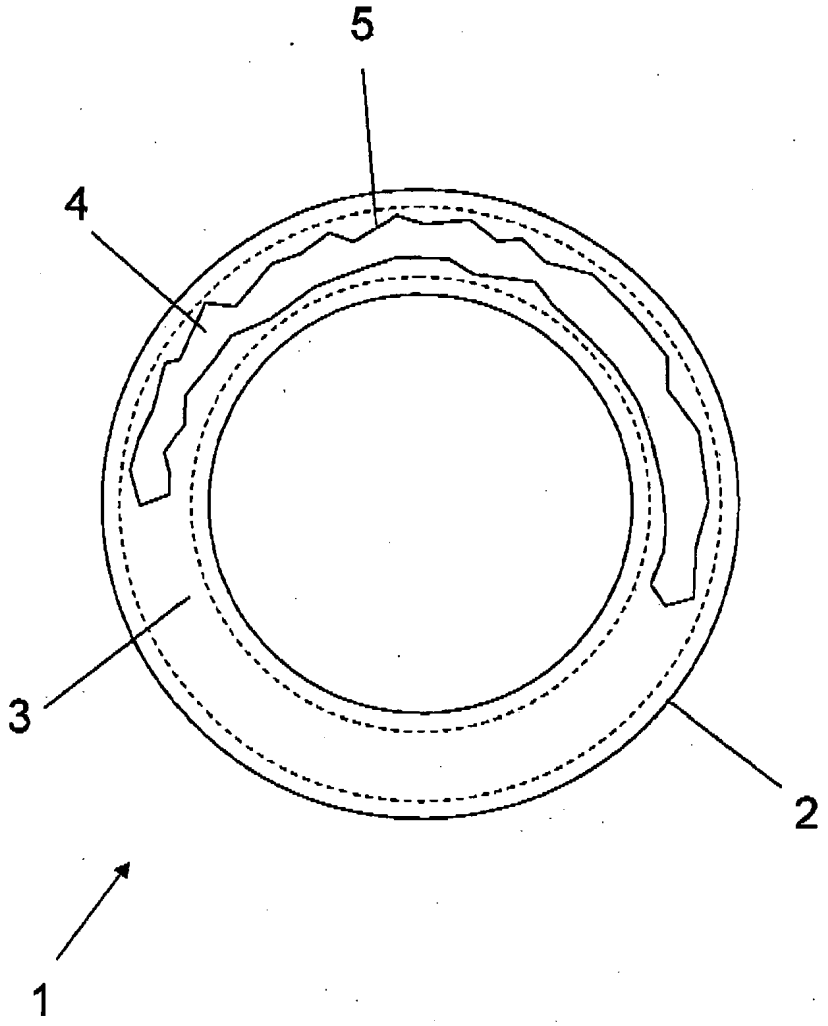


Fig. 2

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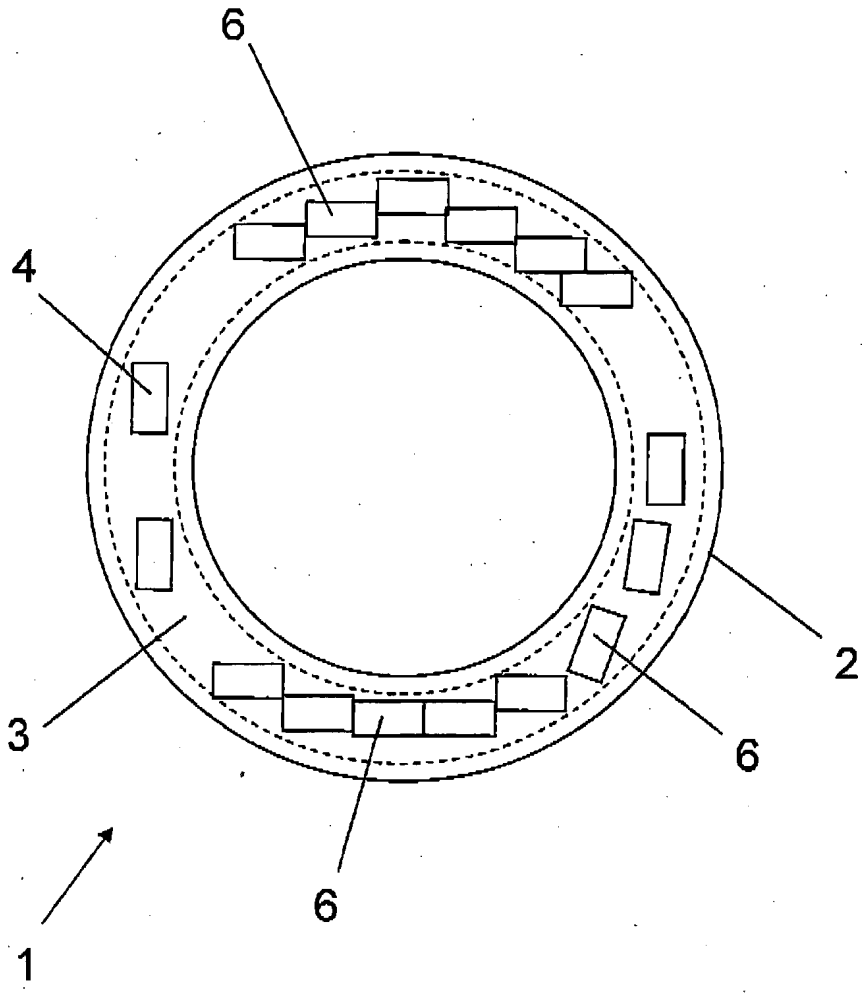


Fig. 3

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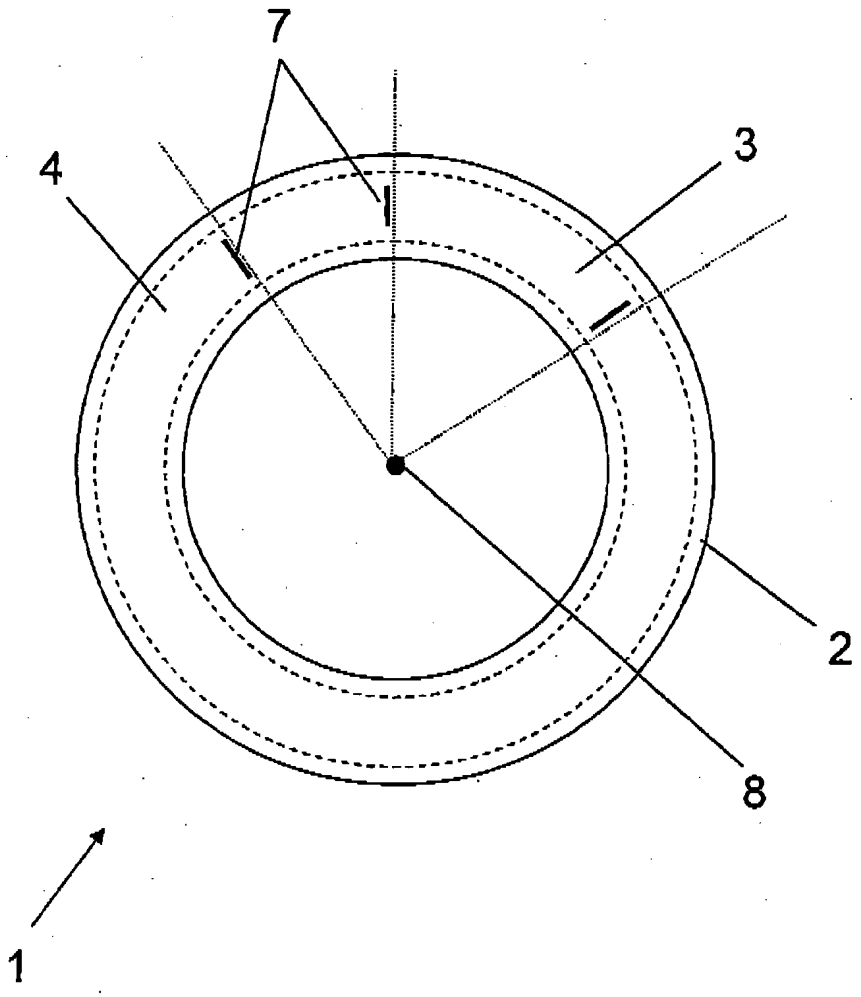


Fig. 4a

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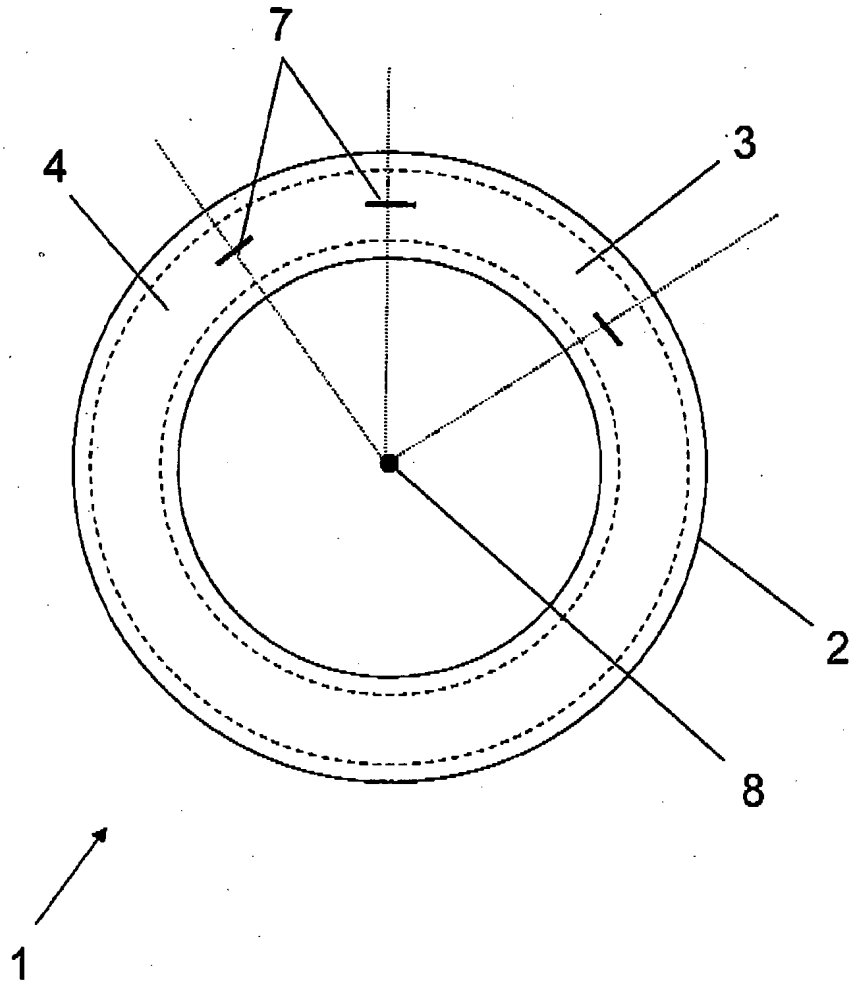


Fig. 4b

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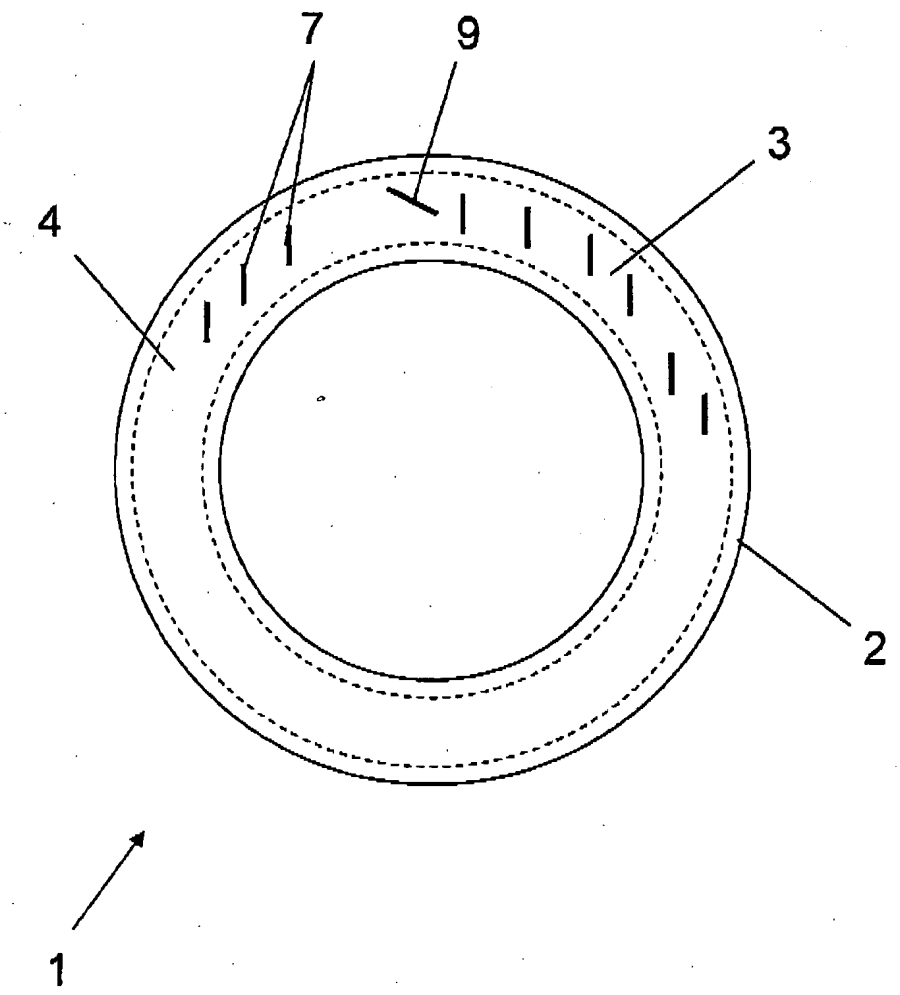


Fig. 4c

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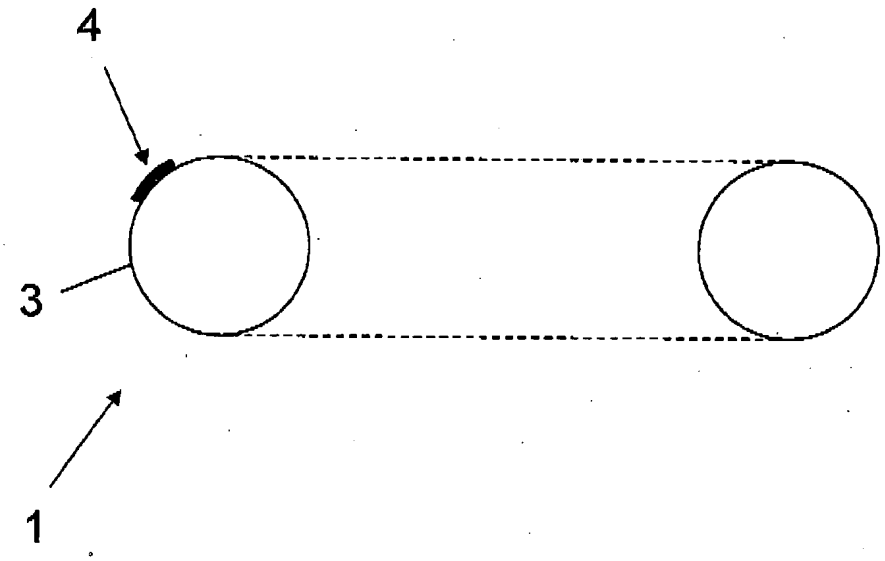


Fig. 5

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IPR2023-00502, U.S. PATENT 10,994,923

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EUROPÄISCHER RECHERCHENBERICHT

Nummer der Anmeldung
EP 08 00 9812

EINSCHLÄGIGE DOKUMENTE

Kategorie	Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile	Betrifft Anspruch	KLASSIFIKATION DER ANMELDUNG (IPC)
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A	US 6 089 455 A (YAGITA KIYOSHI [JP]) 18. Juli 2000 (2000-07-18) * das ganze Dokument * -----	1-11	

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G06K
F16J
F16F

Der vorliegende Recherchenbericht wurde für alle Patentansprüche erstellt

Recherchenort	Abschlußdatum der Recherche	Prüfer
München	27. Oktober 2008	Palukova, Mila

KATEGORIE DER GENANNTEN DOKUMENTE

X : von besonderer Bedeutung allein betrachtet
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ANHANG ZUM EUROPÄISCHEN RECHERCHENBERICHT ÜBER DIE EUROPÄISCHE PATENTANMELDUNG NR. EP 08 00 9812

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Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am
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27-10-2008

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Für nähere Einzelheiten zu diesem Anhang : siehe Amtsblatt des Europäischen Patentamts, Nr.12/82

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(12) UK Patent Application (19) GB (11) 2 022 050 A

(21) Application No **7841613**
(22) Date of filing **23 Oct 1978**
(23) Claims filed **23 Oct 1978**
(30) Priority data
(31) **870461**
(32) **18 Jan 1978**
(33) **United States of America (US)**
(43) Application published **12 Dec 1979**
(51) **INT CL²**
B65B 7/28
(52) Domestic classification
B8C 40A7 U34
(56) Documents cited
GB 1275333
GB 1233189
GB 923741
US 3712021A
(58) Field of search
B8C
(71) Applicant
Raymond Arthur Davis, 1150 Chula Vista Drive, Belmont, State of California 94002, United States of America
(72) Inventor
Raymond Arthur Davis
(74) Agent
Boult, Wade & Tennant

(54) Apparatus for Applying Foil Covers to Trays

(57) Apparatus feeds a web 23 of metal foil or other dead-fold material, cuts lengths of the web to size and positions the leading edge of a cut sheet 32 of foil in advance of the leading edge 14*a* of a tray 11 having a peripheral flange lip around its top. The tray 11 is advanced on a continuous conveyor 16 and its leading edge pinches the leading corners 38 of the sheet 32 between the underside of the lip and stationary blocks 36, one on each side of the conveyor 16. Next a plate 47 having an aperture 48 slightly larger than the tray is caused by cranks 44 to move with the tray and also down over the tray, bending the foil downward. In one embodiment, at each corner of the plate aperture 48 is an L-shaped bar 56 which is actuated to move diagonally inward, tucking the foil securely under the tray lip. Actuation of the L-shaped bars may be mechanical, pneumatic or electro-mechanical. In another embodiment, Figures 9 and 10 (not shown), said tucking under of the foil is effected by a blast of air from an aperture tube surrounding the aperture 48. After the foil has been tucked under, the plate 47 is lifted above the tray.
A smaller plate 51 may be spring mounted in plate aperture 48 to level the contents of the tray during wrapping of the foil.

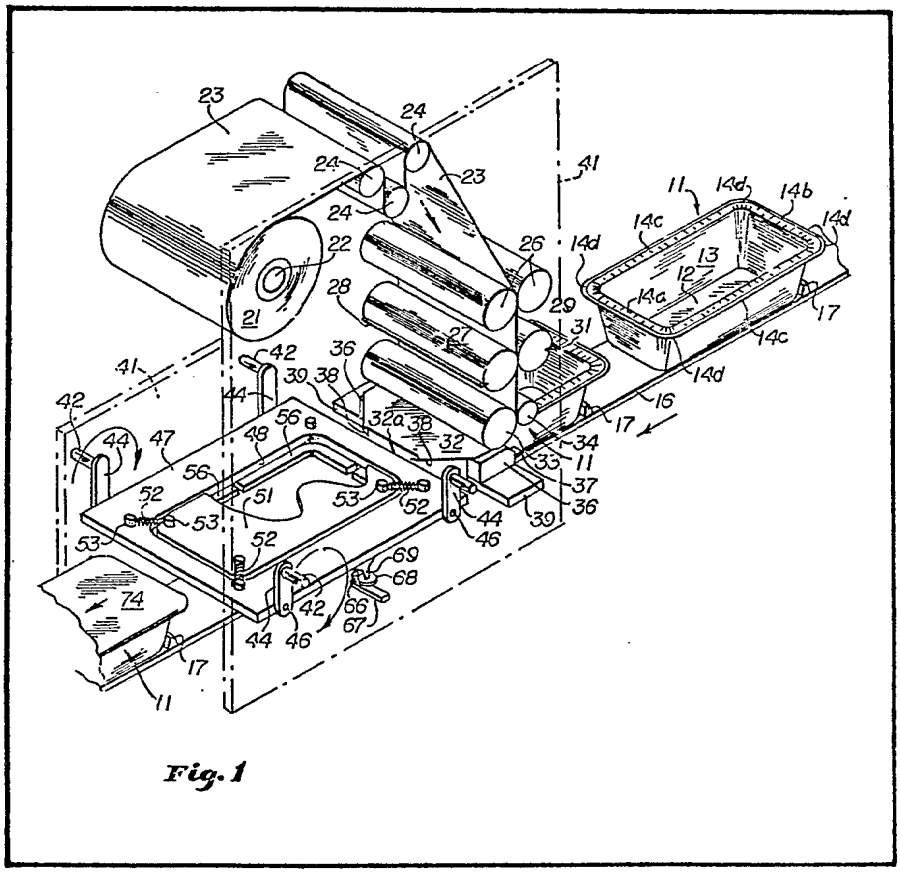


Fig. 1

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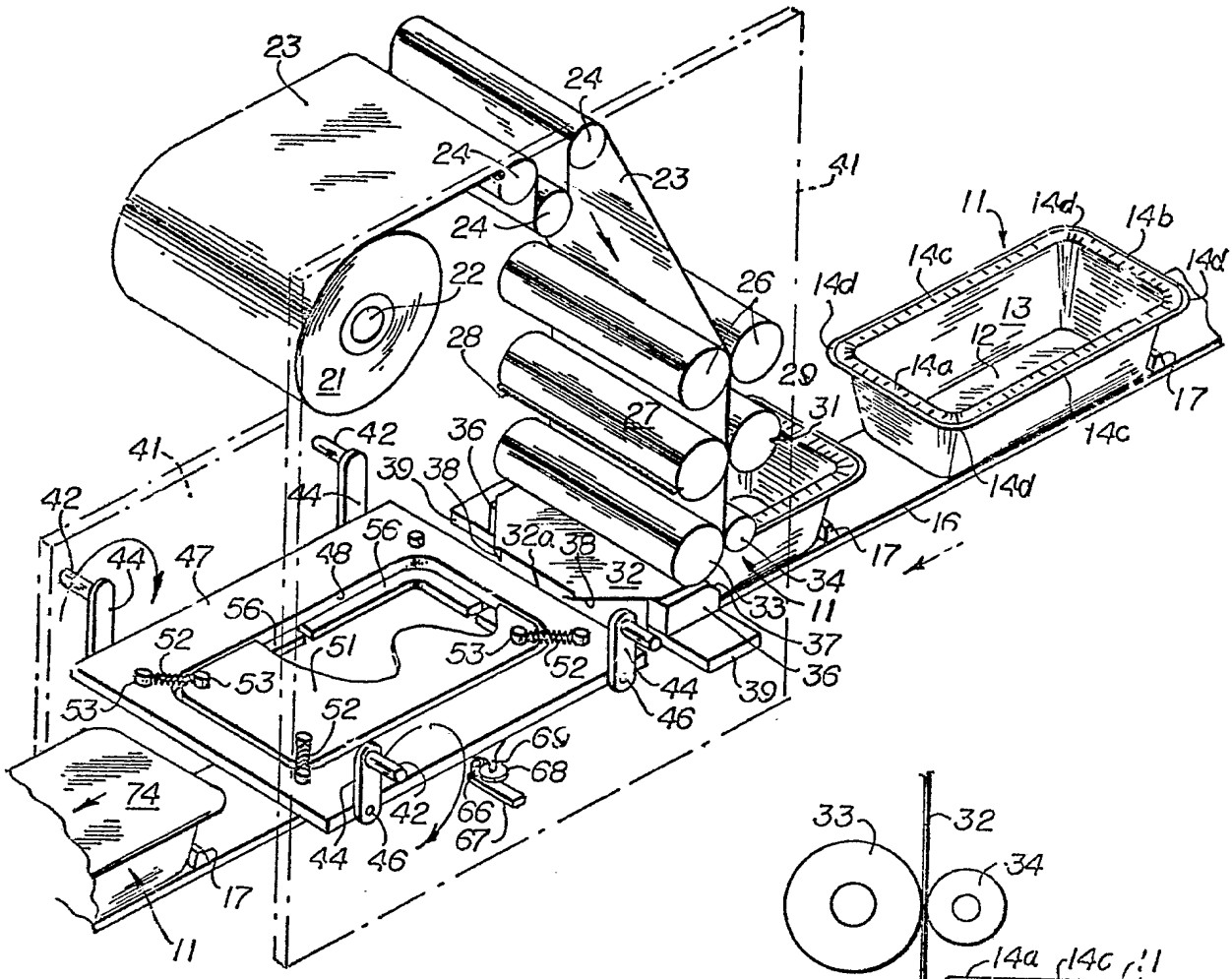


Fig. 1

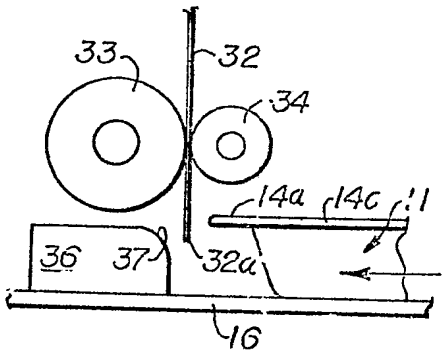


Fig. 2

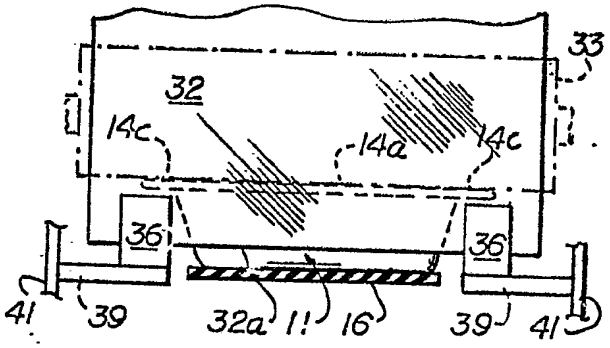


Fig. 3

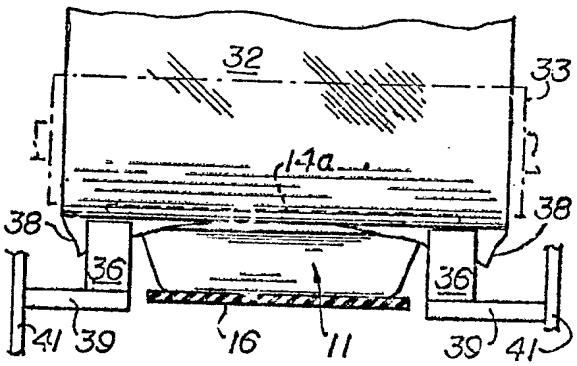


Fig. 4

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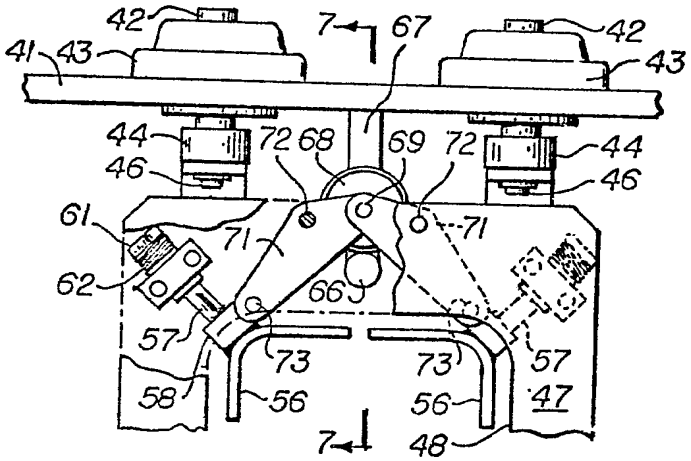


Fig. 5

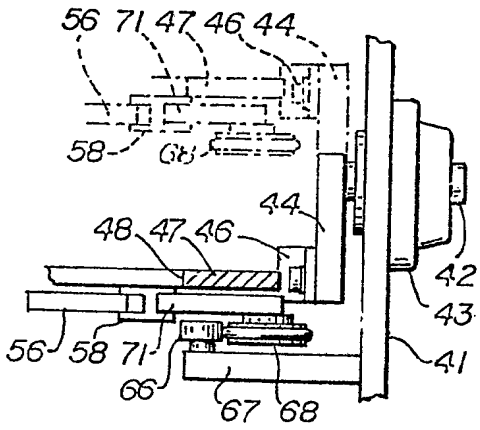


Fig. 7

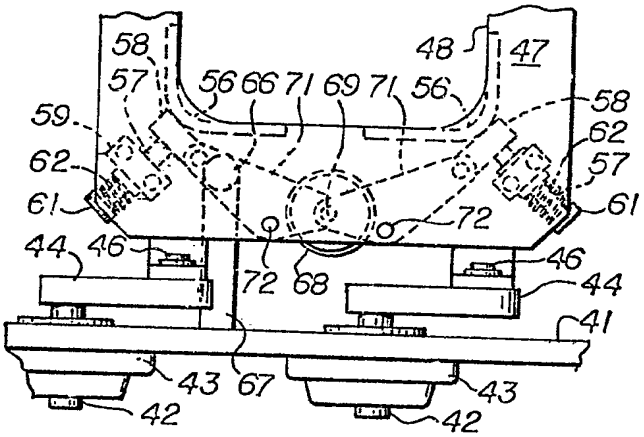


Fig. 6

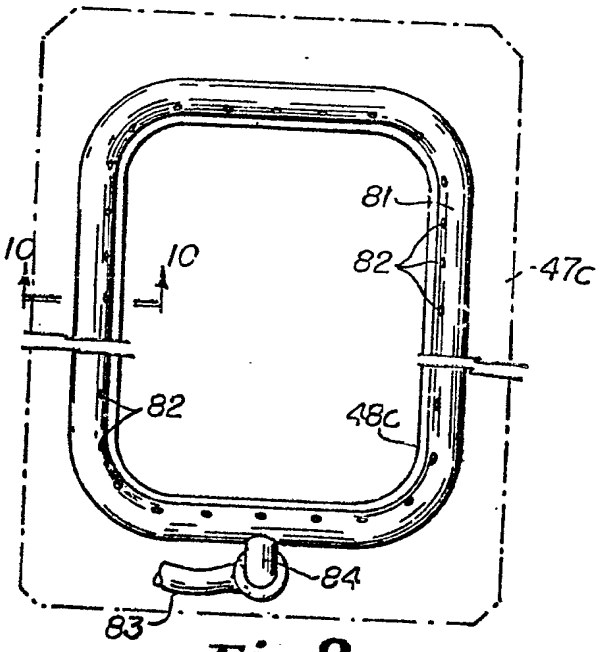


Fig. 9

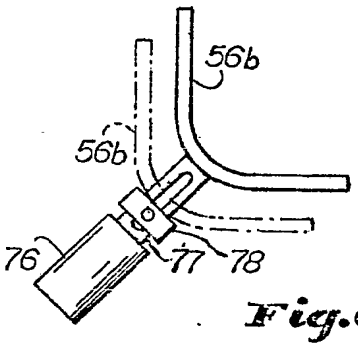


Fig. 8

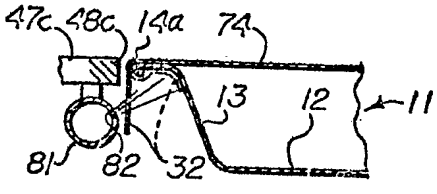


Fig. 10

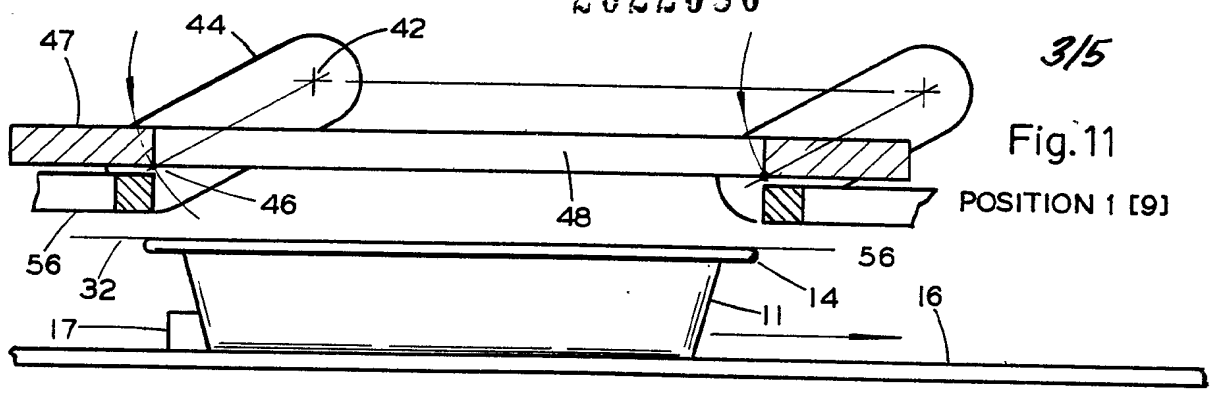


Fig. 11
POSITION 1 [9]

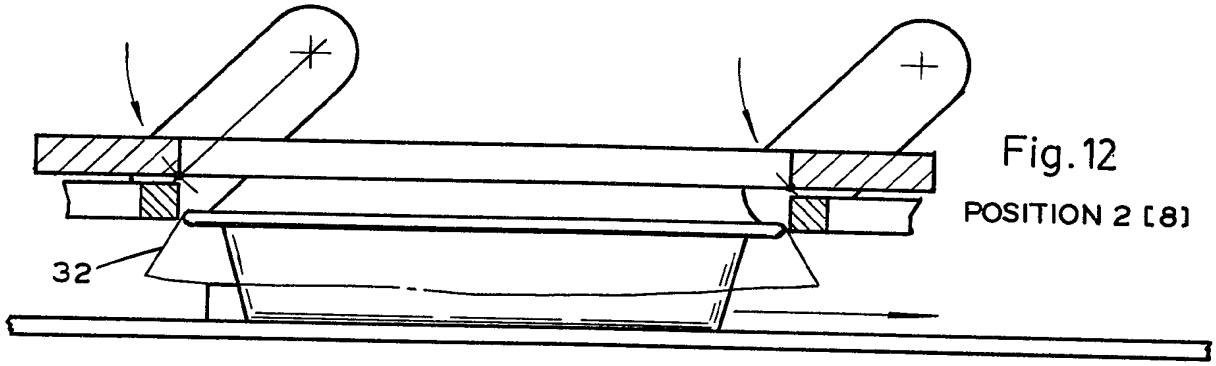


Fig. 12
POSITION 2 [8]

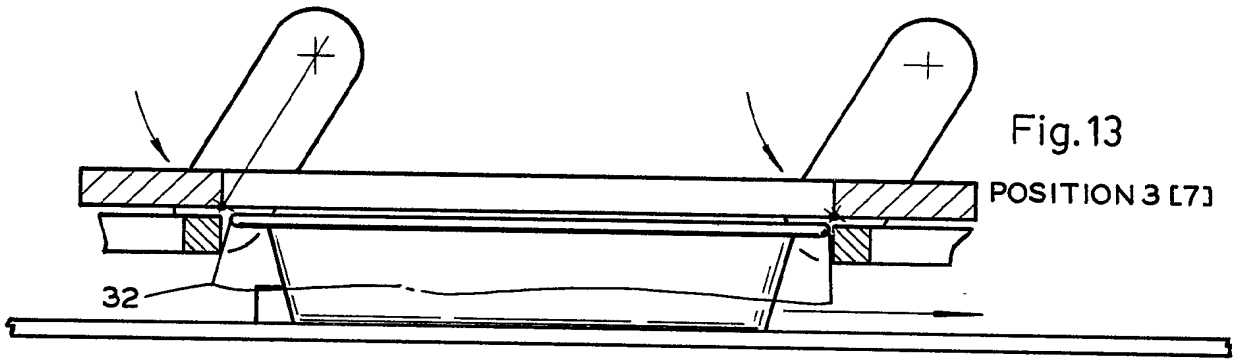


Fig. 13
POSITION 3 [7]

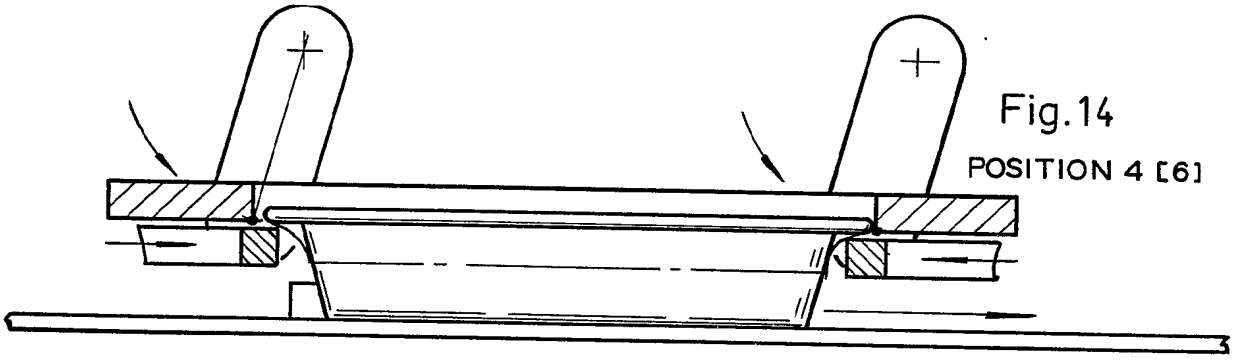


Fig. 14
POSITION 4 [6]

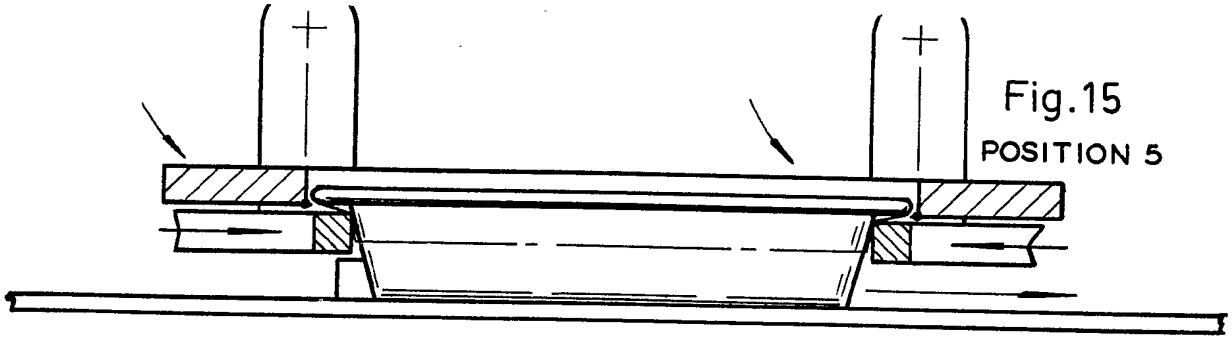


Fig.15
POSITION 5

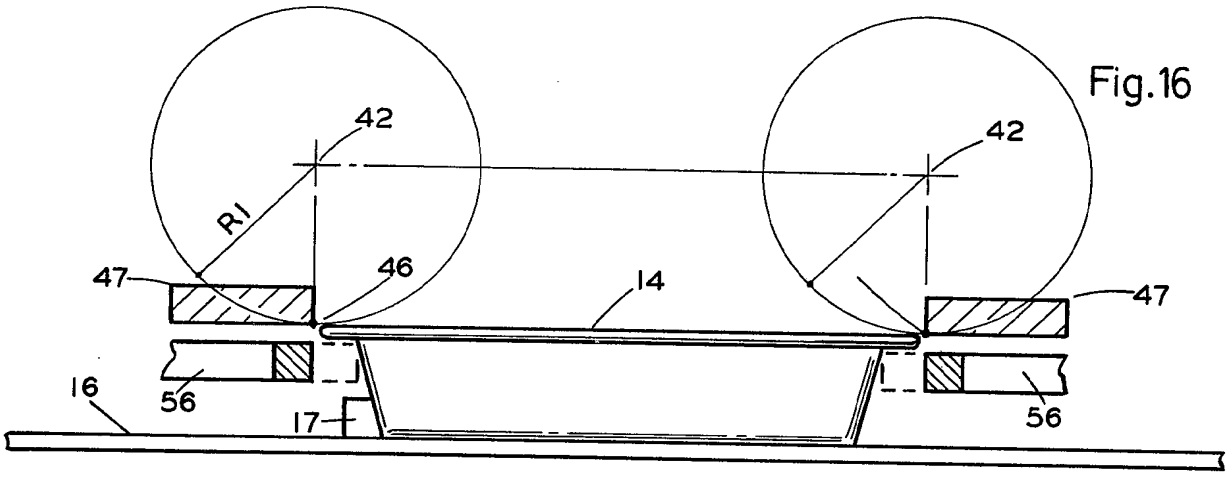


Fig.16

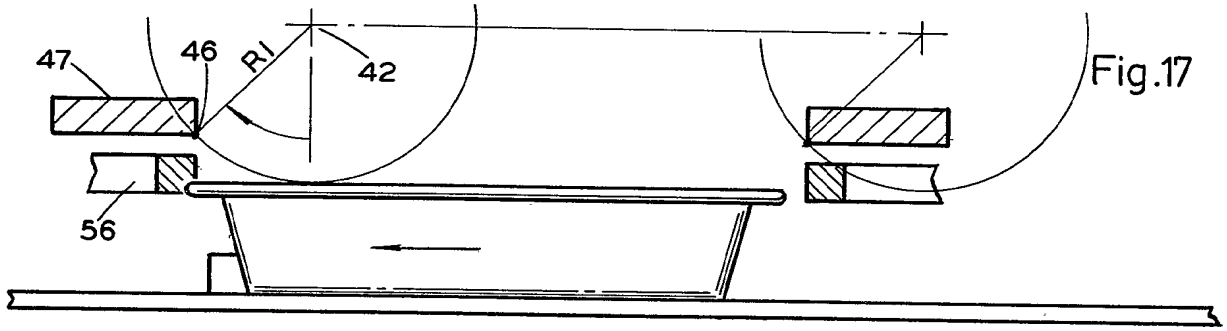


Fig.17

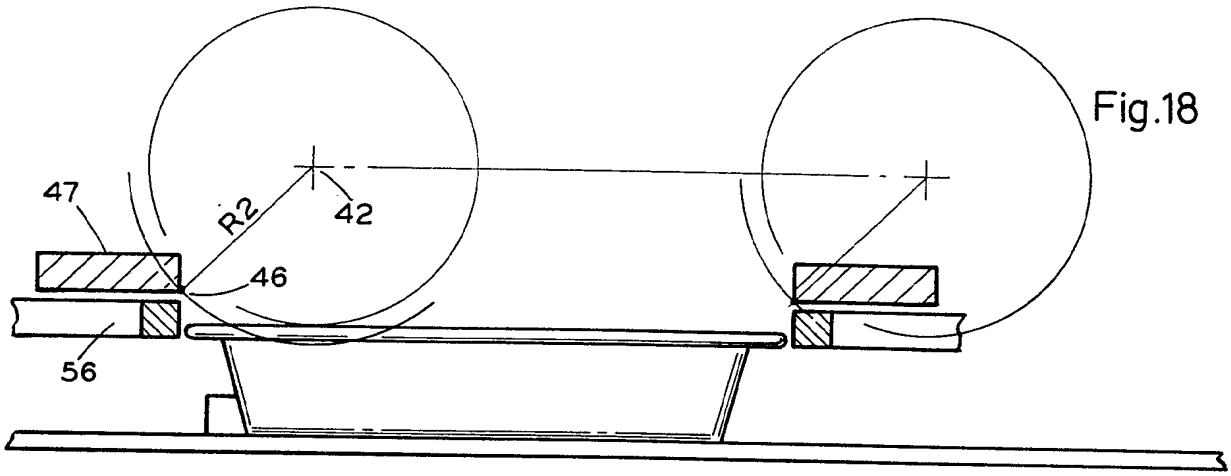
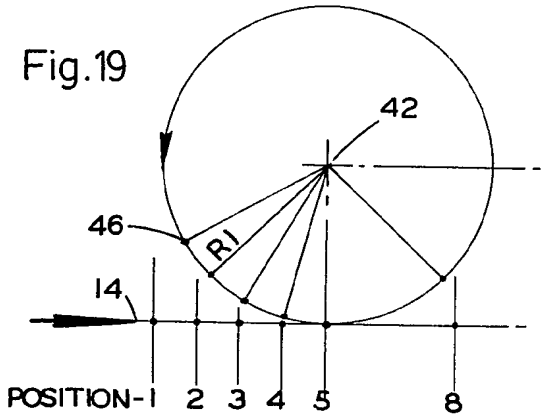


Fig.18

Fig.19



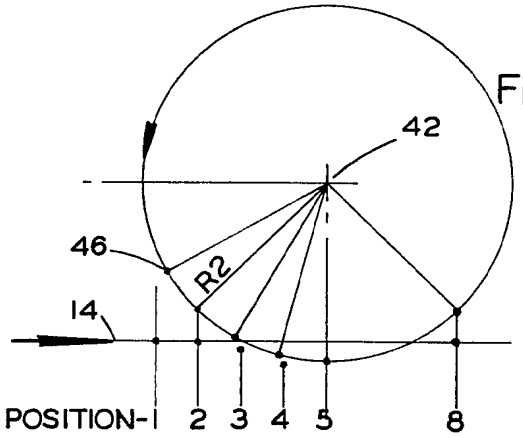


Fig.20

SPECIFICATION

Apparatus for Applying Foil Covers for Trays

This invention relates to apparatus for applying foil covers for trays and provides apparatus for wrapping a sheet of foil positioned on top of a tray under the peripheral lip of said tray comprising

a conveyor,

first means for advancing said tray horizontally at a continuous rate,

second means,

third means for mounting and supporting said second means, said third means comprising a first and second crank, said cranks being of equal length,

fourth means for continuously rotating said cranks in unison about first and second axes, respectively, said axes being equal distances above and transverse to said conveyor and spaced apart longitudinally relative to said conveyor,

said second means being moved by said third means in a rotary path,

said path including a first position above said tray and conveyor, said second means being disposed above and spaced outward relative to the edges of said lip,

then below to a second position and spaced from said first position in the direction of movement of said conveyor,

continuing to a third position,

then to a fourth position wherein said second means passes around the lip,

then a fifth position with said cranks being vertically downward, said second means being around the lip of the tray and spaced outward relative to said lip at said fifth position,

then to sixth, seventh, eighth and ninth positions at the same levels above the conveyor as said fourth, third, second and first positions respectively,

fifth means on said second means positioned at a fixed distance from said axes to engage said sheet and fold said sheet somewhat vertically downward below said lip all around the periphery of said lip as said second means moves from first to third positions,

sixth means for actuating said fifth means to move said downward-folded foil inward under said lip all around the periphery of said lip as said second means moves between third and fifth positions and then to retract said fifth means as said second means moves from fifth to seventh position.

The apparatus feeds a continuous web of metal foil or other material which will remain folded and cuts it continuously into lengths slightly greater than preformed trays of the type used for packaging frozen food and the like. As the trays move along a conveyor the forward lip of the tray strikes the downward moving leading edge of the foil pushing the foil forward. The forward corners of the foil strike stationary blocks which cause the foil to tuck under the tray corners and be pinched firmly to enable the tray and foil to advance together.

A carrier plate rotates above the trays, once per tray. Attached under the plate, and at each corner of it, are four bars which together are the shape of the body of the tray under the lip. These folder bars are arranged slightly outward from the tray lip. As the plate with folders is rotated downwards towards the foil-covered tray and the folders contact the foil, they push it downwards somewhat vertically all around the tray lip. After the folders have passed below the tray lip they are caused to move diagonally inward under the entire lip. This movement is completed at bottom dead center, the foil is now firmly crimped against the tray's body under the lip, all around. Because of this continuous movement the foil is now taut and well crimped, completely following the contours of the tray. As the carrier plate and folders continue their rotation the folders retract exactly as they came in, so that they are fully retracted as they clear the tray. The only independent movement of the folders is a horizontal in and out under the tray lip.

Of the faster continuous machines heretofore sold, many require several mechanisms along the conveyor to fold various portions of the tray. All are large and expensive with many change parts, requiring a long changeover time from one tray to another. None is operable without its own conveyor. Many have the tray changing direction, causing food spillage.

A major advantage of the design of the present invention over others which attempt rotary folding is that the trays are placed as close together as the unfolded foil can abut. By changing the cranks this condition can be achieved with any length of tray, one revolution of the cranks applying one foil to one tray. In, for instance, Logemann 3,712,021 where horizontal and vertical motions are combined to produce elongated rotary motion, the trays are always widely spaced because the folder must follow the tray down the conveyor and then return to the next tray.

In the present invention the size or shape of the tray handled requires merely removing a few simple fasteners to change parts. Because of the products handled and the number of personnel on a line, rapid changeover of tray sizes is always required.

Other features and advantages of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

Fig. 1 is a somewhat schematic perspective view of the invention installed on a conveyor line.

Fig. 2 is a somewhat schematic side elevational view showing the first stage in the wrapping of a sheet of foil to the leading edge of a tray.

Fig. 3 is an end elevational view of the structure of Fig. 2 with certain parts removed.

Fig. 4 is a view similar to Fig. 3 showing a

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further stage in the cycle of movement of the tray.

Fig. 5 is a plan view of a portion of the structure of Fig. 1.

Fig. 6 is a plan view of another portion of the structure of Fig. 1 showing the apparatus at a different stage in the cycle of operation than shown in Fig. 5.

Fig. 7 is a fragmentary sectional view taken substantially along line 7—7 of Fig. 5 showing in solid lines the parts in the position of Fig. 5 and is dot-and-dash lines the parts in the position of Fig. 6.

Fig. 8 is a fragmentary plan view of a modification.

Fig. 9 is a plan view similar to Fig. 5 of a further modification.

Fig. 10 is a sectional view taken substantially along the line 10—10 of Fig. 9.

Figs. 11, 12, 13, 14 and 15 are schematic views showing positions at a tray moving on a conveyor and the foil folding means at various positions in the cycle of operation of the machine.

Figs. 16, 17, 18, 19 and 20 explain how the folders can follow a rotary path while remaining in vertical relationship with the tray lip.

Tray 11 shown in the accompanying drawings is subject to considerable variation in size and shape. It is usually formed of a fabricated heavy metal foil and is generally of the type used to pack frozen food. The example shown is provided with a flat bottom 12, upwardly-outwardly slanting sides 13 and a peripheral lip 14 which is separate designated in the accompanying drawings as having a leading edge 14a, a rear edge 14b, side edges 14c and rounded corners 14d. Although shown empty, it will be understood that the tray 11 is filled with foodstuffs or other material, generally frozen after wrapping by the present apparatus. A conveyor 16 here shown as being a continuous belt is provided at intervals with lugs 17 extending transversely and engaging the rearward end of tray 11 so that the movement of the tray is in accurately timed and spaced relation. Lugs 17, may also be placed at the forward end if required.

The wrapping of the present invention is provided from a roll 21 of metal foil or other material which will remain in folded condition after passing through the apparatus. Roll 21 is supported on a mandrel 22. The mandrel 22 as well as the rolls which are hereinafter described are rotatably mounted relative to plates 41 (shown in Fig. 5 and schematically in Fig. 1) on opposite sides of the apparatus and certain of the rolls are driven in timed relation to the movement of the conveyor 16 and the spacing between lugs 17. Further, the length of tray 11 is accommodated by replacing plate 47 and its folding mechanism and occasionally cranks 44. Adjusting to width will readily occur to one skilled in the art to which this invention pertains but is not here shown in detail.

A web 23 of foil material of proper width for the tray being wrapped is threaded around dancer rolls 24 of well-known construction which maintain a tension on web 23. A pair of web feed rolls 26 rolls the foil in timed relation to the speed of conveyor 16. As a proper distance above the level of conveyor 16 are first and second shear rolls 27, 29 provided with a radial knife 28 and a slot 31, respectively, to shear off a sheet 32 of foil. Each sheet 32 passes between sheet feed roll 33 and backup roll 34. As each tray 11 approaches the rolls 33, 34, the leading edge 32a of sheet 32 is vertically positioned immediately above the conveyor 16 so that it is engaged by the leading edge 14a of the next approaching tray 11. On either side of conveyor 16 is a block 36 having a curve rearward edge 37 and stationarily mounted by means of support 39 to the side frames 41 of the machine (see Fig. 3). Directing attention to Fig. 2, as the leading edge 14a contacts the sheet 32, it moves it to the left in the position as show in Fig. 2; or, as shown in Fig. 3, towards the observer. Since the edges 14c project out over the blocks 36, the corners 38 of sheet 36 are folded backward and the center of the lower edge 32a of sheet 32 is left parallel with tray lip 14, all as shown in Fig. 4. This assures that the sheet 3 will move with the tray 11; and as it moves, the sheet 32 overlies the top of tray 11.

Immediately beyond the rolls 33, 34 in the direction of movement of conveyor 16 is the foil crimping station, a change part of the machine, which is partially shown in Fig. 1 and is shown in detail in Figs. 5—7. On each side of the conveyor 16 is a vertical side frame plate 41. Rotatable in plates 41 are four shafts 42 mounted in bearings 43 attached to plates 41 and driven in unison by means not shown but well understood by one skilled in the machinery arts. On the inside of plates 41 for each shaft 42 is a crank 44 having a length appropriate for the distance between the leading edges of trays 11. These cranks 44 are also change parts of the machines. The ends of cranks 44 are connected by pins 46 to the corners of a plate 47 formed with a central aperture 48 slightly larger than the tray 11. The rotation of shafts 42 causes plate 47 to pass through a cycle of movement in timed relation to the advance of the conveyor 16. This cycle is hereinafter described. The length of cranks 44 and the speed of rotation of the shafts 42 are a function of the distance between trays, the length of tray 11 and the speed of the conveyor 16.

A small plate 51 slightly smaller than the aperture 48 is spring mounted at the level of plate 47 by means of spring 52 at each corner. The opposite ends of springs 52 are attached to plate 46 and plate 51 by means of anchors 53. The function of the small plate 51 is to flatten any material filling the tray 11 and also to prevent the tray remaining within aperture 48 after the crimping of cover 74.

Mounted slightly below the level of plate 47 at each of the four corners of the aperture 48 are bars 56 which move diagonally inwardly and outwardly. For the rectangular trays 11 shown, the bars 56 are L-shaped and four in number and there is one bar 56 at each corner of aperture 48.

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For trays of other shapes (e.g. round or elliptical) the bars are shaped accordingly. Diagonal reciprocable horizontal rods 57 are attached to each bar 56 by a connector 58 and are mounted for reciprocation in bearings 59 attached to the underside of plate 47. Each rod 57 has an enlarged head 61 at its outer end and between head 61 and bearing 59 is a coiled spring 62 which biases the rods 57 and the bars 56 outwardly toward the position shown in dot-and-dash lines in Fig. 6 and away from the projected position shown in Fig. 5. Reciprocation of bars 56 may be accomplished in various manners as hereinafter described. No matter how they are removed, when they project inwardly they meet approximately at the center of each end and each side of tray 11, tucking the foil sheet 32 under the lip 14 to provide the wrapping 74, as best shown in Figs. 11—15. After the foil has been tucked under the lip, the spring 62 causes the bars 56 to retract to outer position. It will be noted that the movement of the bars 56 is diagonally inwardly from each corner 14b of the tray 11.

In the form of the invention shown in Figs. 5—7, the bars 56 are mechanically moved. Thus there is a stationary roller 66 mounted above the level of conveyor 16 near the outer edge of plate 47. Support 67 fixes the roller 66 to frame members 41. A larger roller 68 is carried by each outer side of plate 47 and is preferably rubber covered so that its contact with roller 66 is cushioned. Roller 68 is mounted on a vertical shaft 69 which moves inward and outward relative to plate 47. Outward movement of shaft 69 is caused by roller 68 contacting the stationary roller 66 as the plate 47 moves past the roller 66. Pinned for oscillatory movement on the underside of plate 47 are a pair of bell cranks 71. Pins 72 pin the cranks 71 to the plate 47. The crossed outer ends of the cranks 71 are mounted on shaft 69. The inner ends of the cranks 71 are pivoted by means of pivots 73 to the connectors 58. When the roller 68 is out of contact with the roller 66, as is shown in Fig. 6, the springs 62 cause the bars 56 to retract. When the roller 68 contacts roller 66, the shaft 69 moves outward to permit passage of roller 68 past roller 66 and this causes the ball cranks 71 to move from the position of Fig. 6 to the position of Fig. 5, which, in turn, moves the bars 56 from the retracted position of Fig. 6 to the projected position of Fig. 5, causing the bars 56 to tuck the foil under the lip 14.

As viewed in Fig. 7, the position of the plate 47 is shown in elevated position in dot-and-dash lines. The plate 47 moves from the elevated position downward to the solid line position of Fig. 7 and the roller 68 moves from a position immediately under the dotted line position of Fig. 7 to the outer solid line position at the bottom of Fig. 7 because of contact of roller 68 with stationary roller 66.

An alternate means of causing the bars 56b to be moved diagonally inward to tuck the foil under the lip of the tray is shown schematically in Fig. 8. Thus a pneumatic or hydraulic cylinder 76 or an electric solenoid has its ram 77 passing through guide 78 and attached to the corner of the bar 56b. As the tray moves into position and the plate 47 moves past a stationary roller 66 (not shown in Fig. 8), a valve or switch carried by plate 47b is contacted causing actuation of the cylinder or solenoid 76 and causing the movement of the bar 56b diagonally inward from the dot-and-dash position of Fig. 8 to the solid line position.

Directing attention now to Figs. 11—15 which show the path of the folders in nine equally-spaced positions. The cranks 44 continuously rotate around axes 42. The cranks being connected to plate 47 by hinge pins 46 cause the plate to rotate horizontally over the tray. The folders 56 attached to the plate follow the same circular path. In Fig. 11 this mechanism is rotating towards the tray. The tray has the foil folded around its forward corners but this is not shown. In Fig. 12 the tray has advanced and the folder bars 56 have pushed the foil down slightly all around the tray lip. The tray lip is centred between the folders. In Fig. 13 the foil is pushed further down, the tray is slightly off center but this is unimportant as the folders have now almost passed the tray lip. In Fig. 14 the folders are lower than the lip and the action shown in Figs. 5 and 7 has begun. As roller 68 rotates about stationary roller 66 the folders 56 have begun to move inwards, again with slight misalignment of the tray with the folders. In Fig. 15 the folders are fully extended as a Fig. 5 and the tray is perfectly aligned with the folders enabling an even crimp around the complete tray. The motion continues in an exact reversal of Figs. 15—11, or positions 5—9, leaving the foil fully crimped and clearing the tray at Fig. 12, position 8, with the tray aligned in the folders. In Fig. 16 it will be obvious that when a circle of radius R1 is to remain in timed contact with a horizontally moving line 14 they will only be aligned at one point on the lower semicircle, in this case, bottom dead center. This is the point at which the folders must be in line with the tray in order to provide a perfect crimp beneath the tray's lip. When the machine is backed up as in Fig. 17, it will be seen that the folders 56 and the tray lip 14, collide. Conversely, on leaving the tray, the folders would remain beneath the lip. For good, even folding the folder bars must be aligned with the tray on passing over the tray Fig. 12, again at bottom dead center Fig. 15 when crimping, and again at Fig. 12 position 8.

This is accomplished by designing in the following way: The hinge point instead of being placed in its natural place as in Figs. 16 and 17 is extended. A tray position is chosen at which the initial fold is desired and the folders placed around it to clear exactly. The radius of crank arm 44 is extended from R1 to R2 (see Figs. 19 and 20) and the folders raised slightly to provide a tighter crimp. It will be seen that at entrance (position 2), final folding at position 5, and on leaving the tray, position 8, the folders 56 are perfectly aligned

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with the tray, with absolutely minimum clearances required on entering and leaving, insuring a perfect fold all around conforming to the tray shape. The slight misalignment between folding down and folding inwards is unimportant as full contact is only made at bottom dead center. There is no rolling contact with the top of the tray, so that even if lugs 17 are placed at each end of the tray there will be no disturbance of the foil.

Fig. 19 shows the natural vertical relationships between a point on the line of the tray and one on a circle (radius R1) which are travelling together. If folding was attempted during the small segment which is almost in line, the maximum time available would be about 20° each side of position 5.

Fig. 20 shows the same tray relationships with the extended radius R2 used in the example, in this case the fold range is extended to 45° each side of position 5, and with exact alignment.

Figs. 9 and 10 show still another means for tucking the foil under the tray which is useful particularly in high speed installations. Thus surrounding the aperture 48c of plate 47c and immediately below and outside said aperture is a tube 81. This tube replaces folder bars 56 and pushes the foil down around the tray lip as in Figs. 11—13, and is hinged as in Fig. 18. However, once past the lip, inward folding is accomplished by having a plurality of spaced openings 82 through which compressed air in tube 81 escapes causing the air to blow the foil from the solid line position of Fig. 10 to the dotted line position. A flexible tube 83 connected to a source of air under pressure extends from the top of the machine downwardly to a connector 84 which communicates with tube 81.

The flexible tube 83 permits the plate 47c to move with the conveyor. In timed relation to the movement of the plate 47c, a valve (not shown) permits compressed air to flow through tube 83, connector 84 and tube 81. As is shown in Fig. 10, air escaping through the openings 82 blows the edges of the foil from the solid line position of Fig. 10 to the dotted line position where it is tucked under the lip 14a. The modification of Figs. 9 and 10 is particularly useful where rapid movement of conveyor 16 is required.

Many of the elements of the modification of Fig. 8 and of Figs. 9—10 are not shown since they will be well understood by those skilled in the art. Corresponding parts of the two modifications are shown with the same reference numerals as in the preceding modification followed by the subscripts *b* and *c* respectively.

Claims

1. Apparatus for wrapping a sheet of foil positioned on top of a tray under the peripheral lip of said tray comprising

a conveyor,

first means for advancing said tray horizontally at a continuous rate,

second means,

third means for mounting and supporting said second means, said third means comprising a first and second crank, said cranks being of equal length,

fourth means for continuously rotating said cranks in unison about first and second axes, respectively, said axes being equal distances above and transverse to said conveyor and spaced apart longitudinally relative to said conveyor,

said second means being moved by said third means in a rotary path,

said path including a first position above said tray and conveyor, said second means being disposed above and spaced outward relative to the edges of said lip,

then below to a second position and spaced from said first position in the direction of movement of said conveyor,

continuing to a third position,

then to a fourth position wherein said second means passes around the tray lip,

then to a fifth position with said cranks being vertically downward, said second means being around the lip of the tray and spaced outward relative to said lip at said fifth position,

then to sixth, seventh, eighth and ninth positions at the same levels above the conveyor as said fourth, third, second and first positions respectively.

fifth means on said second means positioned at a fixed distance from said axes to engage said sheet and fold said sheet somewhat vertically downward below said lip all around the periphery of said lip as said second means moves from first to third positions.

sixth means for actuating said fifth means to move said downward-folded foil inward under said lip all around the periphery of said lip as said second means moves between third and fifth positions and then to retract said fifth means as said second means moves from fifth to seventh position.

2. Apparatus according to claim 1 in which said second means comprises a plate formed with an aperture and which further comprises a second plate smaller than said aperture located at the level of said first-mentioned plate and resilient means connecting said plates together so that said second plate may float relative to said first-mentioned plate and bias said second plate toward said tray to compress said foil against the contents of said tray and to bias said tray out of said aperture as said plate moves from fifth to seventh positions.

3. Apparatus according to claim 1 in which said second means comprises a plate formed with an aperture and in which said aperture is generally rectangular and said fifth means are movable diagonally inward from each corner of said aperture.

4. Apparatus according to claim 3 in which said fifth means comprises horizontally disposed folder bars, shaped to a quarter of the tray body

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beneath the lip positioned slightly below said plate.

5. Apparatus according to claim 4 in which said sixth means comprises an electric solenoid.

6. Apparatus according to claim 4 in which said sixth means comprises a fluid-actuated cylinder.

7. Apparatus according to claim 1 in which said fifth means comprises a tube supported by and spaced below said second means, folding foil somewhat vertically downward at said second and third positions, having a plurality of holes directed inward relative to said tray and said sixth means comprises means for blowing air under pressure into said tube and out through said holes at position 5.

8. Apparatus according to claim 1 which further comprises sheet feed means for feeding a sheet of foil from a location above said conveyor hanging vertically toward said conveyor with the leading edge of said sheet positioned below the leading edge of the lip of one said tray as said tray advances along said conveyor, a pair of stationary blocks on opposite edges of said conveyor positioned to engage said leading edge of said sheet to turn said sheet to horizontal position and crimp the corners of said sheet partially inward under the corners of the leading edge of said lip, whereby said sheet advances with said tray and is held against sliding off said tray and overlies said tray as it advances on said conveyor to a position underlying said second means.

9. Apparatus according to claim 8 which further comprises web feed means for feeding a web of foil from a mandrel toward said sheet feed means, and shear means between said web feed means and said sheet feed means to shear off a sheet of foil of a length greater than the length of said tray.

10. Apparatus according to claim 8 in which said sheet feed means comprises a pair of rollers turned in timed relation to movement of said conveyor.

11. Apparatus for feeding foil for subsequent use in wrapping a tray movable along a continuous conveyor, said tray being of the type having a circumferential peripheral lip comprising sheet feed means for feeding a sheet of foil from a location above said conveyor hanging vertically toward said conveyor with the leading edge of said sheet positioned below the leading edge of the lip of one said tray as said tray advances along said conveyor, a pair of stationary blocks on opposite edges of said conveyor positioned to engage said leading edge of said sheet to turn said sheet to horizontal position and bend the lowermost two corners of said sheet partially inward under the corners of the leading edge of said lip, whereby said sheet advances with said tray and is held against sliding off said tray as it advances on said conveyor.

12. Apparatus according to claim 11 which further comprises web feed means for feeding a web of foil from a mandrel toward said sheet feed means, and shear means between said web feed means and said sheet feed means to shear off a sheet of foil of a length greater than the length of the said tray.

13. Apparatus for applying foil covers for trays substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1979. Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

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

(11) EP 1 440 638 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
28.07.2004 Bulletin 2004/31

(51) Int Cl.[7]: **A47J 31/40**, A47J 31/06

(21) Application number: **04250366.4**

(22) Date of filing: **23.01.2004**

(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 PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

(30) Priority: **24.01.2003 GB 0301709**

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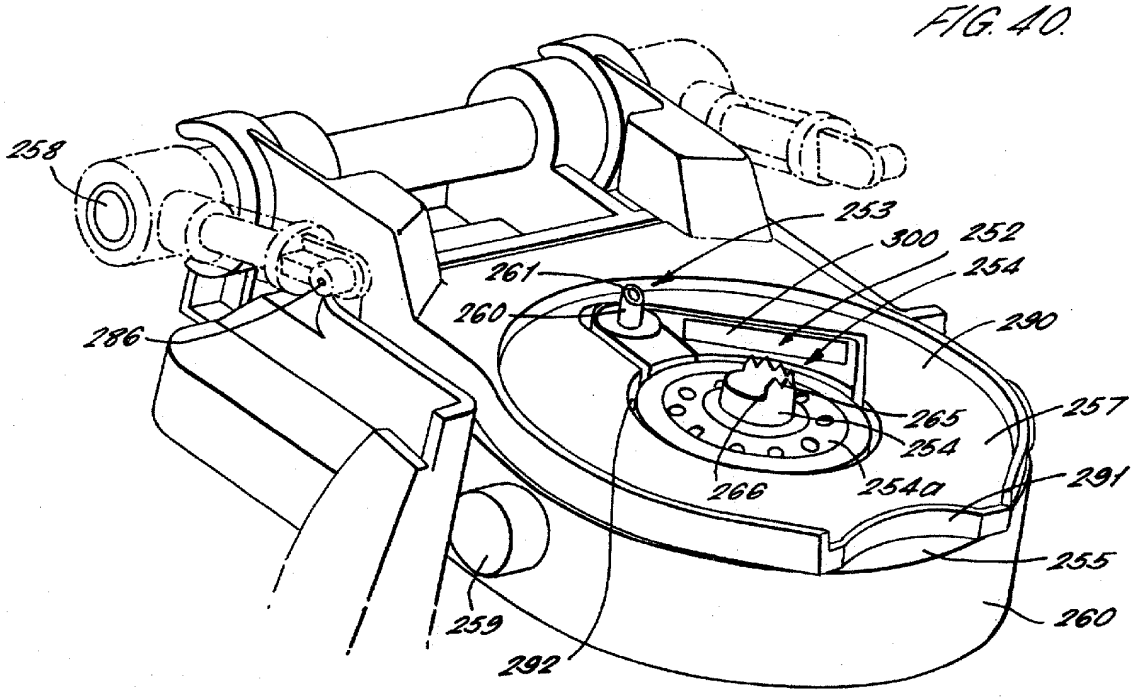
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(54) Machine for the preparation of beverages

(57) A beverage preparation machine (201) for preparing a beverage from a cartridge (1) containing one or more beverage ingredients comprising a first piercing element (253) for forming an inlet, in use, in a cartridge (1) received in the beverage preparation machine (201) and a second piercing element (254) for forming an outlet, in use, in said cartridge, characterised in that the first and second piercing elements (253, 254) are formed as a single removable unit.

FIG. 40.



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Printed by Jouve, 75001 PARIS (FR)

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Description

[0001] The present invention relates to a machine for the preparation of beverages and, in particular, for use with sealed cartridges which are formed from substantially air- and water-impermeable materials and which contain one or more ingredients for the preparation of beverages.

[0002] It has previously been proposed to seal beverage preparation ingredients in individual air-impermeable packages for use in beverage machines. For example, cartridges or capsules containing compacted ground coffee are known for use in certain coffee preparation machines which are generally termed "espresso" machines. In the production of coffee using these preparation machines the coffee cartridge is placed in a brewing chamber and hot water is passed though the cartridge at relatively high pressures, thereby extracting the aromatic coffee constituents from the ground coffee to produce the coffee beverage. Typically, such machines operate at a pressure of greater than 6×10^5 Pa. The preparation machines of the type described have to date been relatively expensive since components of the machine, such as the water pumps and seals, must be able to withstand the high pressures.

[0003] In WO01/58786 there is described a cartridge for the preparation of beverages which operates at a pressure generally in the range 0.7 to 2.0×10^5 Pa. However, the cartridge is designed for use in a beverage preparation machine for the commercial or industrial market and is relatively expensive. Hence, there remains a requirement for a beverage preparation machine which is suitable, in particular, for the domestic market in terms of cost, performance and reliability. There is also a need for a beverage preparation machine for such cartridges which is simple to operate and reliable in operation. In particular it is desirable that the machine be straightforward to maintain.

[0004] WO02/082962 describes a beverage filter cartridge holder comprising inlet and outlet probes which pierce, in use, a beverage cartridge. The inlet and outlet probes are carried by a platen which is permanently mounted by means of a ball joint to a pneumatic cylinder. The inlet and outlet probes are difficult to access and hence difficult to maintain and, in particular, clean.

[0005] Accordingly, the present invention provides a beverage preparation machine for preparing a beverage from a cartridge containing one or more beverage ingredients comprising a first piercing element for forming an inlet, in use, in a cartridge received in the beverage preparation machine and a second piercing element for forming an outlet, in use, in said cartridge, characterised in that the first and second piercing elements are formed as a single removable unit.

[0006] It will be understood that by the term "cartridge" as used herein is meant any package, container, sachet or receptacle which contains one or more beverage ingredients in the manner described. The cartridge may be rigid, semi-rigid or flexible.

[0007] The cartridge for use with the present invention may contain one or more beverage ingredients suitable for the formation of a beverage product. The beverage product may be, for example, one of coffee, tea, chocolate or a dairy-based beverage including milk. The beverage ingredients may be powdered, ground, leaf-based or liquid. The beverage ingredients may be insoluble or soluble. Examples include roast and ground coffee, leaf tea, powdered chocolate and soup, liquid milk-based beverages, carbonated drinks and concentrated fruit juices.

[0008] The removable unit containing the inlet piercer and outlet piercer allows for easy cleaning of the components of the machine. In particular the piercers may be placed in a dishwasher or similar.

[0009] Preferably, the beverage preparation machine further comprises a fixed lower part and an upper part rotatable relative to the lower part, the upper part being moveable from an open position, in which the upper part is disengaged from the lower part for receiving a cartridge, and a closed position, in which the upper part is engaged with the lower part, wherein the removable unit is mounted, in use, in the fixed lower part.

[0010] Preferably, the inlet piercer and outlet piercer are orientated vertically and parallel to one another.

[0011] Preferably, the inlet piercer and outlet piercer are made of plastics materials.

[0012] In the following description the terms "upper" and "lower" and equivalents will be used to describe the relational positioning of features of the invention. The terms "upper" and "lower" and equivalents should be understood to refer to the cartridge (or other components) in its normal orientation for insertion into a beverage preparation machine and subsequent dispensing as shown, for example, in Figure 4. In particular, "upper" and "lower" refer, respectively, to relative positions nearer or further from a top surface 11 of the cartridge. In addition, the terms "inner" and "outer" and equivalents will be used to describe the relational positioning of features of the invention. The terms "inner" and "outer" and equivalents should be understood to refer to relative positions in the cartridge (or other components) being, respectively, nearer or further from a centre or major axis X of the cartridge 1 (or other component).

[0013] Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is cross-sectional drawing of an outer member of first and second embodiments of cartridge for use with the present invention;

Figure 2 is a cross-sectional drawing of a detail of the outer member of Figure 1 showing an inwardly directed cylindrical extension;

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Figure 3 is a cross-sectional drawing of a detail of the outer member of Figure 1 showing a slot;
Figure 4 is a perspective view from above of the outer member of Figure 1;
Figure 5 is a perspective view from above of the outer member of Figure 1 in an inverted orientation;
Figure 6 is a plan view from above of the outer member of Figure 1;
Figure 7 is a cross-sectional drawing of an inner member of the first embodiment of cartridge;
Figure 8 is a perspective view from above of the inner member of Figure 7;
Figure 9 is a perspective view from above of the inner member of Figure 7 in an inverted orientation;
Figure 10 is a plan view from above of the inner member of Figure 7;
Figure 11 is a cross-sectional drawing of the first embodiment of cartridge in an assembled condition;
Figure 12 is a cross-sectional drawing of an inner member of the second embodiment of cartridge;
Figure 13 is a cross-sectional drawing of a detail of the inner member of Figure 12 showing an aperture;
Figure 14 is a perspective view from above of the inner member of Figure 12;
Figure 15 is a perspective view from above of the inner member of Figure 12 in an inverted orientation;
Figure 16 is another cross-sectional drawing of the inner member of Figure 12;
Figure 17 is a cross-sectional drawing of another detail of the inner member of Figure 12 showing an air inlet;
Figure 18 is a cross-sectional drawing of the second embodiment of cartridge in an assembled condition;
Figure 19 is cross-sectional drawing of an outer member of third and fourth embodiments of cartridge for use with the present invention;
Figure 20 is a cross-sectional drawing of a detail of the outer member of Figure 19 showing an inwardly directed cylindrical extension;
Figure 21 is a plan view from above of the outer member of Figure 19;
Figure 22 is a perspective view from above of the outer member of Figure 19;
Figure 23 is a perspective view from above of the outer member of Figure 19 in an inverted orientation;
Figure 24 is a cross-sectional drawing of an inner member of the third embodiment of cartridge;
Figure 25 is a plan view from above of the inner member of Figure 24;
Figure 26 is a cross-sectional drawing of a detail of the inner member of Figure 24 showing an in-turned upper rim;
Figure 27 is a perspective view from above of the inner member of Figure 24;
Figure 28 is a perspective view from above of the inner member of Figure 24 in an inverted orientation;
Figure 29 is a cross-sectional drawing of the third embodiment of cartridge in an assembled condition;
Figure 30 is a cross-sectional drawing of an inner member of the fourth embodiment of cartridge;
Figure 31 is a plan view from above of the inner member of Figure 30;
Figure 32 is a perspective view from above of the inner member of Figure 30;
Figure 33 is a perspective view from above of the inner member of Figure 30 in an inverted orientation;
Figure 34 is a cross-sectional drawing of the fourth embodiment of cartridge in an assembled condition;
Figure 35 is a front perspective view of a beverage preparation machine according to the present invention;
Figure 36 is a front perspective view of the machine of Figure 35 with a cartridge head in an open position;
Figure 37 is a rear perspective view of the machine of Figure 35 with some parts omitted for clarity;
Figure 38 is another rear perspective view of the machine of Figure 35 with some parts omitted for clarity;
Figure 39 is a perspective view of the cartridge head of the machine of Figure 35 with some parts omitted for clarity;
Figure 40 is another perspective view of the cartridge head of the machine of Figure 35 with some parts omitted for clarity;
Figure 41 is a cross-sectional view of the cartridge head in a closed position;
Figure 42 is a cross-sectional view of the cartridge head in an open position;
Figure 43 is a schematic layout of the machine of Figure 35;
Figure 44a and 44b are schematic layouts of first and second code recognition means for the machine of Figure 35; and
Figure 45 is a plan view of a beverage of the present invention comprising a barcode.

[0014] As shown in Figure 11, the cartridge 1 for use with the present invention generally comprises an outer member 2, an inner member 3 and a laminate 5. The outer member 2, inner member 3 and laminate 5 are assembled to form the cartridge 1 which has an interior 120 for containing one or more beverage ingredients, an inlet 121, an outlet 122 and a beverage flow path linking the inlet 121 to the outlet 122 and which passes through the interior 120. The inlet 121 and outlet 122 are initially sealed by the laminate 5 and are opened in use by piercing or cutting of the laminate 5. The beverage flow path is defined by spatial interrelationships between the outer member 2, inner member 3 and laminate 5 as discussed below. Other components may optionally be included in the cartridge 1, such as a filter 4, as will be described further below.

[0015] A first version of cartridge 1 which will be described for background purposes is shown in Figures 1 to 11. The first version of the cartridge 1 is particularly designed for use in dispensing filtered products such as roast and

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ground coffee or leaf tea. However, this version of the cartridge 1 and the other versions described below may be used with other products such as chocolate, coffee, tea, sweeteners, cordials, flavourings, alcoholic beverages, flavoured milk, fruit juices, squashes, sauces and desserts.

[0016] As can be seen from Figure 5, the overall shape of the cartridge 1 is generally circular or disc-shaped with the diameter of the cartridge 1 being significantly greater than its height. A major axis X passes through the centre of the outer member as shown in Figure 1. Typically the overall diameter of the outer member 2 is 74.5 mm ±6mm and the overall height is 16 mm ±3mm. Typically the volume of the cartridge 1 when assembled is 30.2 ml ±20%.

[0017] The outer member 2 generally comprises a bowl-shaped shell 10 having a curved annular wall 13, a closed top 11 and an open bottom 12. The diameter of the outer member 2 is smaller at the top 11 compared to the diameter at the bottom 12, resulting from a flaring of the annular wall 13 as one traverses from the closed top 11 to the open bottom 12. The annular wall 13 and closed bottom 11 together define a receptacle having an interior 34.

[0018] A hollow inwardly directed cylindrical extension 18 is provided in the closed top 11 centred on the major axis X. As more clearly shown in Figure 2, the cylindrical extension 18 comprises a stepped profile having first, second and third portions 19, 20 and 21. The first portion 19 is right circular cylindrical. The second portion 20 is frusto-conical in shape and is inwardly tapered. The third portion 21 is another right circular cylinder and is closed off by a lower face 31. The diameter of the first, second and third portion 19, 20 and 21 incrementally decreases such that the diameter of the cylindrical extension 18 decreases as one traverses from the top 11 to the closed lower face 31 of the cylindrical extension 18. A generally horizontal shoulder 32 is formed on the cylindrical extension 18 at the junction between the second and third portions 20 and 21.

[0019] An outwardly extending shoulder 33 is formed in the outer member 2 towards the bottom 12. The outwardly extending shoulder 33 forms a secondary wall 15 co-axial with the annular wall 13 so as to define an annular track forming a manifold 16 between the secondary wall 15 and the annular wall 13. The manifold 16 passes around the circumference of the outer member 2. A series of slots 17 are provided in the annular wall 13 level with the manifold 16 to provide gas and liquid communication between the manifold 16 and the interior 34 of the outer member 2. As shown in Figure 3, the slots 17 comprise vertical slits in the annular wall 13. Between 20 and 40 slots are provided. In the embodiment shown thirty-seven slots 17 are provided generally equi-spaced around the circumference of the manifold 16. The slots 17 are preferably between 1.4 and 1.8 mm in length. Typically the length of each slot is 1.6 mm representing 10% of the overall height of the outer member 2. The width of each slot is between 0.25 and 0.35 mm. Typically, the width of each slot is 0.3 mm. The width of the slots 17 is sufficiently narrow to prevent the beverage ingredients passing therethrough into the manifold 16 either during storage or in use.

[0020] An inlet chamber 26 is formed in the outer member 2 at the periphery of the outer member 2. A cylindrical wall 27 is provided, as most clearly shown in Figure 5, which defines the inlet chamber 26 within, and partitions the inlet chamber 26 from, the interior 34 of the outer member 2. The cylindrical wall 27 has a closed upper face 28 which is formed on a plane perpendicular to the major axis X and an open lower end 29 co-planar with the bottom 12 of the outer member 2. The inlet chamber 26 communicates with the manifold 16 via two slots 30 as shown in Figure 1. Alternatively, between one and four slots may be used to communicate between the manifold 16 and the inlet chamber 26.

[0021] A lower end of the outwardly extending shoulder 33 is provided with an outwardly extending flange 35 which extends perpendicularly to the major axis X. Typically the flange 35 has a width of between 2 and 4 mm. A portion of the flange 35 is enlarged to form a handle 24 by which the outer member 2 may be held. The handle 24 is provided with an upturned rim 25 to improve grip.

[0022] The outer member 2 is formed as a single integral piece from high density polyethylene, polypropylene, polystyrene, polyester, or a laminate of two or more of these materials. A suitable polypropylene is the range of polymers available from DSM UK Limited (Redditch, United Kingdom). The outer member may be opaque, transparent or translucent. The manufacturing process may be injection moulding.

[0023] The inner member 3 as shown in Figures 7 to 10, comprises an annular frame 41 and a downwardly extending cylindrical funnel 40. A major axis X passes through the centre of the inner member 3 as shown in Figure 7.

[0024] As best shown in Figure 8, the annular frame 41 comprises an outer rim 51 and an inner hub 52 joined by ten equi-spaced radial spokes 53. The inner hub 52 is integral with and extends from the cylindrical funnel 40. Filtration apertures 55 are formed in the annular frame 41 between the radial spokes 53. A filter 4 is disposed on the annular frame 41 so as to cover the filtration apertures 55. The filter is preferably made from a material with a high wet strength, for example a non-woven fibre material of polyester. Other materials which may be used include a water-impermeable cellulosic material, such as a cellulosic material comprising woven paper fibres. The woven paper fibres may be admixed with fibres of polypropylene, polyvinyl chloride and/or polyethylene. The incorporation of these plastic materials into the cellulosic material renders the cellulosic material heat-sealable. The filter 4 may also be treated or coated with a material which is activated by heat and/or pressure so that it can be sealed to the annular frame 41 in this way.

[0025] As shown in the cross-sectional profile of Figure 7, the inner hub 52 is located at a lower position than the outer rim 51, resulting in the annular frame 41 having a sloping lower profile.

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[0026] The upper surface of each spoke 53 is provided with an upstanding web 54 which divides a void space above the annular frame 41 into a plurality of passages 57. Each passage 57 is bounded on either side by a web 54 and on a lower face by the filter 4. The passages 57 extend from the outer rim 51 downwardly towards, and open into, the cylindrical funnel 40 at openings 56 defined by the inner extremities of the webs 54.

[0027] The cylindrical funnel 40 comprises an outer tube 42 surrounding an inner, discharge spout 43. The outer tube 42 forms the exterior of the cylindrical funnel 40. The discharge spout 43 is joined to the outer tube 42 at an upper end of the discharge spout 43 by means of an annular flange 47. The discharge spout 43 comprises an inlet 45 at an upper end which communicates with the openings 56 of the passages 57 and an outlet 44 at a lower end through which the prepared beverage is discharged into a cup or other receptacle. The discharge spout 43 comprises a frusto-conical portion 48 at an upper end and a cylindrical portion 58 at a lower end. The cylindrical portion 58 may have a slight taper such that it narrows towards the outlet 44. The frusto-conical portion 48 helps to channel beverage from the passages 57 down towards the outlet 44 without inducing turbulence to the beverage. An upper surface of the frusto-conical portion 48 is provided with four support webs 49 equi-spaced around the circumference of the cylindrical funnel 40. The support webs 49 define channels 50 therebetween. The upper edges of the support webs 49 are level with one another and perpendicular to the major axis X.

[0028] The inner member 3 may be formed as a single integral piece from polypropylene or a similar material as described above and by injection moulding in the same manner as the outer member 2.

[0029] Alternatively, the inner member 3 and/or the outer member 2 may be made from a biodegradable polymer. Examples of suitable materials include degradable polyethylene (for example, SPITEK supplied by Symphony Environmental, Borehamwood, United Kingdom), biodegradable polyester amide (for example, BAK 1095 supplied by Symphony Environmental), poly lactic acids (PLA supplied by Cargil, Minnesota, USA), starch-based polymers, cellulose derivatives and polypeptides.

[0030] The laminate 5 is formed from two layers, a first layer of aluminium and a second layer of cast polypropylene. The aluminium layer is between 0.02 and 0.07 mm in thickness. The cast polypropylene layer is between 0.025 and 0.065 mm in thickness. In one embodiment the aluminium layer is 0.06 mm and the polypropylene layer is 0.025 mm thick. This laminate is particularly advantageous as it has a high resistance to curling during assembly. As a result the laminate 5 may be pre-cut to the correct size and shape and subsequently transferred to the assembly station on the production line without undergoing distortion. Consequently, the laminate 5 is particularly well suited to welding. Other laminate materials may be used including PET/Aluminium/PP, PE/EVOH/PP, PET/metallised/PP and Aluminium/PP laminates. Roll laminate stock may be used instead of die cut stock.

[0031] The cartridge 1 may be closed by a rigid or semi-rigid lid instead of a flexible laminate.

[0032] Assembly of the cartridge 1 involves the following steps:

a) the inner member 3 is inserted into the outer member 2;
b) the filter 4 is cut to shape and placed onto the inner member 3 so to be received over the cylindrical funnel 40 and come to rest against the annular frame 41;
c) the inner member 3, outer member 2 and filter 4 are joined by ultrasonic welding;
d) the cartridge 1 is filled with one or more beverage ingredients;
e) the laminate 5 is affixed to the outer member 2.

[0033] These steps will be discussed in greater detail below.

[0034] The outer member 2 is orientated with the open bottom 12 directed upwards. The inner member 3 is then inserted into the outer member 2 with the outer rim 51 being received as a loose fit in an axial extension 14 at top 11 of the cartridge 1. The cylindrical extension 18 of the outer member 2 is at the same time received in the upper portion of the cylindrical funnel 40 of the inner member 3. The third portion 21 of the cylindrical extension 18 is seated inside the cylindrical funnel 40 with the closed lower face 31 of the cylindrical extension 18 bearing against the support webs 49 of the inner member 3. The filter 4 is then placed over the inner member 3 such that the filter material contacts the annular rim 51. An ultrasonic welding process is then used to join the filter 4 to the inner member 3 and at the same time, and in the same process step, the inner member 3 to the outer member 2. The inner member 3 and filter 4 are welded around the outer rim 51. The inner member 3 and outer member 2 are joined by means of weld lines around the outer rim 51 and also the upper edges of the webs 54.

[0035] As shown most clearly in Figure 11, the outer member 2 and inner member 3 when joined together define a void space 130 in the interior 120 below the annular flange 41 and exterior the cylindrical funnel 40 which forms a filtration chamber. The filtration chamber 130 and passages 57 above the annular frame 41 are separated by the filter paper 4.

[0036] The filtration chamber 130 contains the one or more beverage ingredients 200. The one or more beverage ingredients are packed into the filtration chamber 130. For a filtered style beverage the ingredient is typically roast and ground coffee or leaf tea. The density of packing of the beverage ingredients in the filtration chamber 130 can be varied

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as desired. Typically, for a filtered coffee product the filtration chamber contains between 5.0 and 10.2 grams of roast and ground coffee in a filtration bed of thickness of typically 5 to 14 mm. Optionally, the interior 120 may contain one or more bodies, such as spheres, which are freely movable within the interior 120 to aid mixing by inducing turbulence and breaking down deposits of beverage ingredients during discharge of the beverage.

[0037] The laminate 5 is then affixed to the outer member 2 by forming a weld 126 around the periphery of the laminate 5 to join the laminate 5 to the lower surface of the outwardly extending flange 35. The weld 126 is extended to seal the laminate 5 against the lower edge of the cylindrical wall 27 of the inlet chamber 26. Further, a weld 125 is formed between the laminate 5 and the lower edge of the outer tube 42 of the cylindrical funnel 40. The laminate 5 forms the lower wall of the filtration chamber 130 and also seals the inlet chamber 26 and cylindrical funnel 40. However, a small gap 123 exists prior to dispensation between the laminate 5 and the lower edge of the discharge spout 43. A variety of welding methods may be used, such as heat and ultrasonic welding, depending on the material characteristics of the laminate 5.

[0038] Advantageously, the inner member 3 spans between the outer member 2 and the laminate 5. The inner member 3 is formed from a material of relative rigidity, such as polypropylene. As such, the inner member 3 forms a load-bearing member that acts to keep the laminate 5 and outer member 2 spaced apart when the cartridge 1 is compressed. It is preferred that the cartridge 1 is subjected to a compressive load of between 130 and 280N in use. The compressive force acts to prevent the cartridge failing under internal pressurisation and also serves to squeeze the inner member 3 and outer member 2 together. This ensures that the internal dimensions of passageways and apertures in the cartridge 1 are fixed and unable to change during pressurisation of the cartridge 1.

[0039] To use the cartridge 1 it is first inserted into a beverage preparation machine (which will be described in further detail below) and the inlet 121 and outlet 122 are opened by piercing members of the beverage preparation machine which perforate and fold back the laminate 5. An aqueous medium, typically water, under pressure enters the cartridge 1 through the inlet 121 into the inlet chamber 26 at a pressure of between 0.1-2.0 bar (10-200 KPa). From there the water is directed to flow through the slots 30 and round the manifold 16 and into the filtration chamber 130 of the cartridge 1 through the plurality of slots 17. The water is forced radially inwardly through the filtration chamber 130 and mixes with the beverage ingredients 200 contained therein. The water is at the same time forced upwardly through the beverage ingredients. The beverage formed by passage of the water through the beverage ingredients passes through the filter 4 and filtration apertures 55 into the passages 57 lying above the annular frame 41. The sealing of the filter 4 onto the spokes 53 and the welding of the rim 51 with the outer member 2 ensures that there are no short-circuits and all the beverage has to pass through the filter 4.

[0040] The beverage then flows downwardly along the radial passages 57 formed between the webs 54 and through the openings 56 and into the cylindrical funnel 40. The beverage passes along the channels 50 between the support webs 47 and down the discharge spout 43 to the outlet 44 where the beverage is discharged into a receptacle such as a cup.

[0041] Preferably, the beverage preparation machine comprises an air purge facility, wherein compressed air is forced through the cartridge 1 at the end of the dispense cycle to flush out the remaining beverage into the receptacle.

[0042] A second version of cartridge 1 is shown in Figures 12 to 18. The second version of the cartridge 1 is particularly designed for use in dispensing espresso-style products such as roast and ground coffee where it is desirable to produce a beverage having a froth of tiny bubbles known as a crema. Many of the features of the second version of the cartridge 1 are the same as in the first version and like numerals have been used to reference like features. In the following description the differences between the first and second versions will be discussed. Common features which function in the same manner will not be discussed in detail.

[0043] The outer member 2 is of the same construction as in the first version of cartridge 1 and as shown in Figures 1 to 6.

[0044] The annular frame 41 of the inner member 3 is the same as in the first version. Also, a filter 4 is disposed on the annular frame 41 so as to cover the filtration apertures 55. The outer tube 42 of the cylindrical funnel 40 is also as before. However, there are a number of differences in the construction of the inner member 2 of the second version compared to the first version. As shown in Figure 16, the discharge spout 43 is provided with a partition 65 which extends part way up the discharge spout 43 from the outlet 44. The partition 65 helps to prevent the beverage spraying and/or splashing as it exits the discharge spout 43. The profile of the discharge spout 43 is also different and comprises a stepped profile with a distinct dog-leg 66 near an upper end of the tube 43.

[0045] A rim 67 is provided upstanding from the annular flange 47 joining the outer tube 42 to the discharge spout 43. The rim 67 surrounds the inlet 45 to the discharge spout 43 and defines an annular channel 69 between the rim 67 and the upper portion of the outer tube 42. The rim 67 is provided with an inwardly directed shoulder 68. At one point around the circumference of the rim 67 an aperture 70 is provided in the form of a slot which extends from an upper edge of rim 67 to a point marginally below the level of the shoulder 68 as most clearly shown in Figures 12 and 13. The slot has a width of 0.64 mm.

[0046] An air inlet 71 is provided in annular flange 47 circumferentially aligned with the aperture 70 as shown in

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Figures 16 and 17. The air inlet 71 comprises an aperture passing through the flange 47 so as to provide communication between a point above the flange 47 and the void space below the flange 47 between the outer tube 42 and discharge spout 43. Preferably, and as shown, the air inlet 71 comprises an upper frusto-conical portion 73 and a lower cylindrical portion 72. The air inlet 71 is typically formed by a mould tool such as a pin. The tapered profile of the air inlet 71 allows the mould tool to be more easily removed from the moulded component. The wall of the outer tube 42 in the vicinity of the air inlet 71 is shaped to form a chute 75 leading from the air inlet 71 to the inlet 45 of the discharge spout 43. As shown in Figure 17, a canted shoulder 74 is formed between the air inlet 71 and the chute 75 to ensure that the jet of beverage issuing from the slot 70 does not immediately foul on the upper surface of the flange 47 in the immediate vicinity of the air inlet 71.

[0047] The assembly procedure for the second version of cartridge 1 is similar to the assembly of the first version. However, there are certain differences. As shown in Figure 18, the third portion 21 of the cylindrical extension 18 is seated inside the support rim 67 rather than against support webs. The shoulder 32 of the cylindrical extension 18 between the second portion 20 and third portion 21 bears against the upper edge of the support rim 67 of the inner member 3. An interface zone 124 is thus formed between the inner member 3 and the outer member 2 comprising a face seal between the cylindrical extension 18 and the support rim 67 which extends around nearly the whole circumference of the cartridge 1. The seal between the cylindrical extension 18 and the support rim 67 is not fluid-tight though since the slot 70 in the support rim 67 extends through the support rim 67 and downwardly to a point marginally below the shoulder 68. Consequently the interface fit between the cylindrical extension 18 and the support rim 67 transforms the slot 70 into an aperture 128, as most clearly shown in Figure 18, providing gas and liquid communication between the annular channel 69 and the discharge spout 43. The aperture is typically 0.64 mm wide by 0.69 mm long.

[0048] Operation of the second version of cartridge 1 to dispense a beverage is similar to the operation of the first version but with certain differences. Beverage in the radial passages 57 flows downwardly along the passages 57 formed between the webs 54 and through the openings 56 and into the annular channel 69 of the cylindrical funnel 40. From the annular channel 69 the beverage is forced under pressure through the aperture 128 by the back pressure of beverage collecting in the filtration chamber 130 and passages 57. The beverage is thus forced through aperture 128 as a jet and into an expansion chamber formed by the upper end of the discharge spout 43. As shown in Figure 18, the jet of beverage passes directly over the air inlet 71. As the beverage enters the discharge spout 43 the pressure of the beverage jet drops. As a result air is entrained into the beverage stream in the form of a multitude of small air bubbles as the air is drawn up through the air inlet 71. The jet of beverage issuing from the aperture 128 is funnelled downwards to the outlet 44 where the beverage is discharged into a receptacle such as a cup where the air bubbles form the desired crema. Thus, the aperture 128 and the air inlet 71 together form an eductor which acts to entrain air into the beverage. Flow of beverage into the eductor should be kept as smooth as possible to reduce pressure losses. Advantageously, the walls of the eductor should be made concave to reduce losses due to 'wall effect' friction. The dimensional tolerance of the aperture 128 is small. Preferably the aperture size is fixed plus or minus 0.02 mm^2. Hairs, fibrils or other surface irregularities can be provided within or at the exit of the eductor to increase the effective cross-sectional area which has been found to increase the degree of air entrainment.

[0049] A third version of cartridge 1 is shown in Figures 19 to 29. The third version of the cartridge 1 is particularly designed for use in dispensing soluble products which may be in powdered, liquid, syrup, gel or similar form. The soluble product is dissolved by or forms a suspension in, an aqueous medium such as water when the aqueous medium is passed, in use, through the cartridge 1. Examples of beverages include chocolate, coffee, milk, tea, soup or other rehydratable or aqueous-soluble products. Many of the features of the third version of the cartridge 1 are the same as in the previous versions and like numerals have been used to reference like features. In the following description the differences between the third and previous versions will be discussed. Common features which function in the same manner will not be discussed in detail.

[0050] Compared to the outer member 2 of the previous versions, the hollow inwardly directed cylindrical extension 18 of the outer member 2 of the third version has a larger overall diameter as shown in Figure 20. In particular the diameter of the first portion 19 is typically between 16 and 18 mm compared to 13.2 mm for the outer member 2 of the previous versions. In addition, the first portion 19 is provided with a convex outer surface 19a, or bulge, as most clearly shown in Figure 20, the function of which will be described below. The diameter of the third portions 21 of the cartridges 1 are however the same resulting in the area of the shoulder 32 being greater in this, the third version of the cartridge 1. Typically the volume of the cartridge 1 when assembled is 32.5 ml ±20%.

[0051] The number and positioning of the slots in the lower end of the annular wall 13 is also different. Between 3 and 5 slots are provided. In the embodiment as shown in Figure 23, four slots 36 are provided equi-spaced around the circumference of the manifold 16. The slots 36 are slightly wider than in the previous versions of the cartridge 1 being between 0.35 and 0.45 mm, preferably 0.4 mm wide.

[0052] In other respects the outer members 2 of the cartridges 1 are the same.

[0053] The construction of the cylindrical funnel 40 of the inner member 3 is the same as in the first version of cartridge 1 with an outer tube 42, discharge spout 45, annular flange 47 and support webs 49 being provided. The only difference

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is that the discharge spout 45 is shaped with an upper frusto-conical section 92 and a lower cylindrical section 93.

[0054] In contrast to the previous versions and as shown in Figures 24 to 28, the annular frame 41 is replaced by a skirt portion 80 which surrounds the cylindrical funnel 40 and is joined thereto by means of eight radial struts 87 which adjoin the cylindrical funnel 40 at or near the annular flange 47. A cylindrical extension 81 of the skirt portion 80 extends upwardly from the struts 87 to define a chamber 90 with an open upper face. An upper rim 91 of the cylindrical extension 81 has an in-turned profile as shown in Figure 26. An annular wall 82 of the skirt portion 80 extends downwardly from the struts 87 to define an annular channel 86 between the skirt portion 80 and the outer tube 42.

[0055] The annular wall 82 comprises at a lower end an exterior flange 83 which lies perpendicular to the major axis X. A rim 84 depends downwardly from a lower surface of the flange 83 and contains five apertures 85 which are circumferentially equi-spaced around the rim 84. Thus, the rim 84 is provided with a castellated lower profile.

[0056] Apertures 89 are provided between the struts 87 allowing communication between the chamber 90 and the annular channel 86.

[0057] The assembly procedure for the third version of cartridge 1 is similar to the assembly of the first version but with certain differences. The outer member 2 and inner member 3 are push-fitted together as shown in Figure 29 and retained by means of a snap-fit arrangement rather than welded together. On joining the two members the inwardly directed cylindrical extension 18 is received inside the upper cylindrical extension 81 of the skirt portion 80. The inner member 3 is retained in the outer member 2 by frictional interengagement of the convex outer surface 19a of the first portion 19 of the cylindrical extension 18 with the in-turned rim 91 of the upper cylindrical extension 81. With the inner member 3 located in the outer member 2 a mixing chamber 134 is defined located exterior to the skirt portion 80. The mixing chamber 134 contains the beverage ingredients 200 prior to dispensation. It should be noted that the four inlets 36 and the five apertures 85 are staggered circumferentially with respect to one another. The radial location of the two parts relative to each other need not be determined or fixed during assembly since the use of four inlets 36 and five apertures 85 ensures that misalignment occurs between the inlets and apertures whatever the relative rotational positioning of the components.

[0058] The one or more beverage ingredients are packed into the mixing chamber 134 of the cartridge. The density of packing of the beverage ingredients in the mixing chamber 134 can be varied as desired.

[0059] The laminate 5 is then affixed to the outer member 2 and inner member 3 in the same manner as described above in the previous versions.

[0060] In use, water enters the mixing chamber 134 through the four slots 36 in the same manner as previous versions of the cartridge. The water is forced radially inwardly through the mixing chamber and mixes with the beverage ingredients contained therein. The product is dissolved or mixed in the water and forms the beverage in the mixing chamber 134 and is then driven though the apertures 85 into the annular channel 86 by back pressure of beverage and water in the mixing chamber 134. The circumferential staggering of the four inlet slots 36 and the five apertures 85 ensures that jets of water are not able to pass radially directly from the inlet slots 36 to the apertures 85 without first circulating within the mixing chamber 134. In this way the degree and consistency of dissolution or mixing of the product is significantly increased. The beverage is forced upwardly in the annular channel 86, through the apertures 89 between the struts 87 and into the chamber 90. The beverage passes from chamber 90 through the inlets 45 between the support webs 49 into the discharge spout 43 and towards the outlet 44 where the beverage is discharged into a receptacle such as a cup. The cartridge finds particular application with beverage ingredients in the form of viscous liquids or gels. In one application a liquid chocolate ingredient is contained in the cartridge 1 with a viscosity of between 1700 and 3900mPa at ambient temperature and between 5000 and 10000mPa at 0°C and a refractive solids of 67 Brix ±3. In another application liquid coffee is contained in the cartridge 1 with a viscosity of between 70 and 2000mPa at ambient and between 80 and 5000mPa at 0°C where the coffee has a total solids level of between 40 and 70%.

[0061] A fourth version of cartridge 1 is shown in Figures 30 to 34. The fourth version of the cartridge 1 is particularly designed for use in dispensing liquid products such as concentrated liquid milk. Many of the features of the fourth version of the cartridge 1 are the same as in the previous versions and like numerals have been used to reference like features. In the following description the differences between the fourth and previous versions will be discussed. Common features which function in the same manner will not be discussed in detail.

[0062] The outer member 2 is the same as in the third version of cartridge 1 and as shown in Figures 19 to 23.

[0063] The cylindrical funnel 40 of the inner member 3 is similar to that shown in the second version of cartridge 1 but with certain differences. As shown in Figure 30 the discharge spout 43 is shaped with an upper frusto-conical section 106 and a lower cylindrical section 107. Three axial ribs 105 are provided on the inner surface of the discharge spout 43 to direct the dispensed beverage downwards towards the outlet 44 and prevent the discharged beverage from spinning within the spout. Consequently, the ribs 105 act as baffles. As in the second version of cartridge 1, an air inlet 71 is provided through the annular flange 47. However, the chute 75 beneath the air inlet 71 is more elongated than in the second version.

[0064] A skirt portion 80 is provided similar to that shown in the third version of the cartridge 1 described above. Between 5 and 12 apertures 85 are provided in the rim 84. Typically ten apertures are provided rather than the five

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provided in the third version of cartridge 1.

[0065] An annular bowl 100 is provided extending from and integral with the flange 83 of the skirt portion 80. The annular bowl 100 comprises a flared body 101 with an open upper mouth 104 which is directed upwards. Four feed apertures 103 shown in Figures 30 and 31 are located in the body 101 at or near the lower end of the bowl 100 where it joins the skirt portion 80. Preferably, the feed apertures are equi-spaced around the circumference of the bowl 100.

[0066] The laminate 5 is of the type described above in the previous embodiments.

[0067] The assembly procedure for the fourth version of cartridge 1 is the same as that for the third version.

[0068] Operation of the fourth version of cartridge is similar to that of the third version. The water enters the cartridge 1 and the mixing chamber 134 in the same manner as before. There the water mixes with and dilutes the liquid product which is then forced out through the apertures 85 towards the outlet 44 as described above. A proportion of the liquid product is initially contained within the annular bowl 100 as shown in Figure 34 and is not subject to immediate dilution by the water entering the mixing chamber 134. The diluted liquid product in the lower part of the mixing chamber 134 will tend to exit through apertures 85 rather than be forced up and into the annular bowl 100 through upper mouth 104. Consequently, the liquid product in the annular bowl 100 will remain relatively concentrated compared to the product in the lower part of the mixing chamber 134. The liquid product in the annular bowl 100 drips through the feed apertures 103 into the stream of product exiting the mixing chamber 134 through the apertures 85. The annular bowl 100 acts to even out the concentration of the diluted liquid product entering the cylindrical funnel 40 by holding back a proportion of the concentrated liquid product and releasing it into the exiting liquid stream more steadily throughout the dispensation cycle.

[0069] From the annular channel 86 the beverage is forced under pressure through the aperture 128 by the back pressure of beverage collecting in the filtration chamber 134 and chamber 90. The beverage is thus forced through aperture 128 as a jet and into an expansion chamber formed by the upper end of the discharge spout 43. As shown in Figure 34, the jet of beverage passes directly over the air inlet 71. As the beverage enters the discharge spout 43 the pressure of the beverage jet drops. As a result air is entrained into the beverage stream in the form of a multitude of small air bubbles as the air is drawn up through the air inlet 71. The jet of beverage issuing from the aperture 128 is funnelled downwards to the outlet 44 where the beverage is discharged into a receptacle such as a cup where the air bubbles form the desired frothy appearance.

[0070] Advantageously, the inner member 3, outer member 2, laminate 5 and filter 4 can all be readily sterilised due to the components being separable and not individually comprising tortuous passageways or narrow crevices. Rather, it is only after conjoining the components, after sterilisation, that the necessary passageways are formed. This is particularly important where the beverage ingredient is a dairy-based product such as liquid milk concentrate.

[0071] The fourth embodiment of beverage cartridge is particularly advantageous for dispensing a concentrated dairy-based liquid product such as liquid milk. Previously, powdered milk products have been provided in the form of sachets for adding to a pre-prepared beverage. However, for a cappuccino-style beverage it is necessary to foam the milk. This has been achieved previously by passing steam through a liquid milk product. However this necessitates the provision of a steam supply which increases the cost and complexity of the machine used to dispense the beverage. The use of steam also increases the risk of injury during operation of the cartridge. Accordingly the present invention provides for a beverage cartridge having a concentrated dairy-based liquid product therein. It has been found that by concentrating the milk product a greater amount of foam can be produced for a particular volume of milk when compared to fresh or UHT milk. This reduces the size required for the milk cartridge. Fresh semi-skimmed milk contains approximately 1.6% fat and 10% total solids. The concentrated liquid milk preparations of the present invention contain between 3 and 10% fat and 25 to 40% total solids. In a typical example, the preparation contains 4% fat and 30% total solids. The concentrated milk preparations are suitable for foaming using a low pressure preparation machine as will be described below. In particular, foaming of the milk is achieved at pressures below 2 bar, preferably approximately 1.5 bar (150 KPa) using the cartridge of the fourth embodiment described above.

[0072] The cartridge of the fourth embodiment is also advantageous in dispensing liquid coffee products.

[0073] It has been found that the embodiments of beverage cartridge of the present invention advantageously provide an improved consistency of the brewed beverage when compared to prior art cartridges. Reference is made to Table 1 below which shows the results of brew yields for twenty samples each of cartridges A and B containing roast and ground coffee. Cartridge A is a beverage cartridge according to the first embodiment of the present invention. Cartridge B is a prior art beverage cartridge as described in the applicant's document WO01/58786. The refractive index of the brewed beverage is measured in Brix units and converted to a percentage of soluble solids (%SS) using standard tables and formulae. In the examples below:

$$\%SS = 0.7774 * (\text{Brix value}) + 0.0569.$$

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% Yield = (%SS * Brew Volume (g))/

(100 * Coffee Weight (g))

Table 1

CARTRIDGE A

Sample	Brew Volume (g)	Coffee Weight (g)	Brix	% SS (*)	% Yield
1	105.6	6.5	1.58	1.29	20.88
2	104.24	6.5	1.64	1.33	21.36
3	100.95	6.5	1.67	1.36	21.05
4	102.23	6.5	1.71	1.39	21.80
5	100.49	6.5	1.73	1.40	21.67
6	107.54	6.5	1.59	1.29	21.39
7	102.70	6.5	1.67	1.36	21.41

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8	97.77	6.5	1.86	1.50	22.61
9	97.82	6.5	1.7	1.38	20.75
10	97.83	6.5	1.67	1.36	20.40
11	97.6	6.5	1.78	1.44	21.63
12	106.64	6.5	1.61	1.31	21.47
13	99.26	6.5	1.54	1.25	19.15
14	97.29	6.5	1.59	1.29	19.35
15	101.54	6.5	1.51	1.23	19.23
16	104.23	6.5	1.61	1.31	20.98
17	97.5	6.5	1.73	1.40	21.03
18	100.83	6.5	1.68	1.36	21.14
19	101.67	6.5	1.67	1.36	21.20
20	101.32	6.5	1.68	1.36	21.24
				AVERAGE	20.99

CARTRIDGE B

Sample	Brew Volume (g)	Coffee Weight (g)	Brix	% SS (*)	% Yield
1	100.65	6.5	1.87	1.511	23.39
2	95.85	6.5	1.86	1.503	22.16
3	98.4	6.5	1.8	1.456	22.04
4	92.43	6.5	2.3	1.845	26.23
5	100.26	6.5	1.72	1.394	21.50
6	98.05	6.5	2.05	1.651	24.90
7	99.49	6.5	1.96	1.581	24.19
8	95.62	6.5	2.3	1.845	27.14
9	94.28	6.5	2.17	1.744	25.29
10	96.13	6.5	1.72	1.394	20.62
11	96.86	6.5	1.81	1.464	21.82
12	94.03	6.5	2.2	1.767	25.56
13	96.28	6.5	1.78	1.441	21.34
14	95.85	6.5	1.95	1.573	23.19
15	95.36	6.5	1.88	1.518	22.28
16	92.73	6.5	1.89	1.526	21.77
17	88	6.5	1.59	1.293	17.50
18	93.5	6.5	2.08	1.674	24.08
19	100.88	6.5	1.75	1.417	22.00
20	84.77	6.5	2.37	1.899	24.77
				AVERAGE	23.09

[0074] Performing a t-test statistical analysis on the above data gives the following results:

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Table 2

t-Test: Two-Sample Assuming Equal Variances		
	% Yield (Cartridge A)	*% Yield (Cartridge B)*
Mean	20.99	23.09
Variance	0.77	5.04
Observations	20	20
Pooled Variance	2.90	
Hypothesized Mean Difference	0	
df	38	
t Stat	-3.90	
P(T<=t) one-tail	0.000188	
t Critical one-tail	1.686	
P(T<=t) two-tail	0.000376	
t Critical two-tail	2.0244	
Standard Deviation	0.876	2.245

[0075] The analysis shows that the consistency of % yield, which equates to brew strength, for the cartridges of the present invention is significantly better (at a 95% confidence level) than the prior art cartridges, with a standard deviation of 0.88% compared to 2.24%. This means that beverages brewed with the cartridges of the present invention have a more repeatable and uniform strength. This is preferred by consumers who like their drinks to taste the same time after time and do not want arbitrary changes in brew strength.

[0076] The materials of the cartridges described above may be provided with a barrier coating to improve their resistance to oxygen and/or moisture and/or other contaminant ingress. The barrier coating may also improve the resistance to leakage of the beverage ingredients from within the cartridges and/or reduce the degree of leaching of extractibles from the cartridge materials which might adversely affect the beverage ingredients. The barrier coating may be of a material selected from the group of PET, Polyamide, EVOH, PVDC or a metallised material. The barrier coating may be applied by a number of mechanisms including but not limited to vapour deposition, vacuum deposition, plasma coating, co-extrusion, in-mould labelling and two/multi-stage moulding.

[0077] A beverage preparation machine 201 according to the present invention for use with the above described beverage cartridges is shown in Figures 35 to 45. The beverage preparation machine 201 generally comprises a housing 210 containing a water tank 220, a water heater 225, a water pump 230, an air compressor 235, a control processor, a user interface 240 and a cartridge head 250. The cartridge head 250 in turn generally comprises a cartridge holder 251 for holding, in use, the beverage cartridge 1, cartridge recognition means 252 and inlet and outlet piercers 253, 254 for forming, in use, the inlet 121 and the outlet 122 in the beverage cartridge 1.

[0078] The housing 210 contains and holds in position the other components of the machine 201. The housing 210 preferably made in whole or in part from a robust plastics material such as ABS. Alternatively, the housing 210 can be made in whole or in part from a metallic material such as stainless steel or aluminium. The housing 210 is preferably comprises a clam-shell design having a front half 211 and a rear half 212 which allow access during assembly for fitting of the machine 201 components and can afterwards be joined together to define an interior 213 of the housing 210. The rear half 212 provides a recess 214 for the attachment of the water tank 220. The housing 210 is formed with means, such as detents, abutments, bosses and threaded portions, for retaining the components of the machine 201 in position without the need for a separate chassis. This reduces the overall cost and weight of the machine 201. A base 215 of the housing 210 is preferably provided with feet for standing the machine thereon in a stable manner. Alternatively, the base 215 itself may have a shape forming a stable support.

[0079] The front half 211 of the housing 210 comprises a dispense station 270 where dispensation of the beverage takes place. The dispense station 270 comprises a receptacle stand 271 having a hollow interior forming a drip tray 272. An upper surface 273 of the receptacle stand is provided with a grill 274 on which the receptacle is positioned. The drip tray 272 is removable from the housing 210 to ease emptying of the collected water. A recess 275 is formed in the front half of the housing 210 above the receptacle stand 271 to accommodate the dimensions of the receptacle.

[0080] The cartridge head 250 is located towards the top of the housing 210 above the receptacle stand as shown in Figures 35 and 36. Preferably, the height of the grill 274 relative to the cartridge head 250 can be adjusted to accommodate different sizes of receptacle. It is preferred that the receptacle is as close to the cartridge head 250 as possible, whilst still allowing the receptacle to be inserted and withdrawn from the dispense station 270, so as to

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minimise the height that the dispensed beverage has to descend before contacting the receptacle. This acts to minimise spraying and splashing of the beverage and minimise loss of entrained air bubbles where these are present. Preferably receptacles of between 70mm and 110 mm in height can be inserted between the grill 274 and cartridge head 250.

[0081] The machine user interface 240 is located on the front of the housing 210 and comprises a start/stop button 241, and a plurality of status indicators 243-246.

[0082] The status indicators 243-246 preferably include a light emitting diode (LED) 243 to indicate readiness of the machine 201, a LED 244 to indicate if an error has occurred in the machine 201 operation, and one or more LEDs 245-256 to indicate whether the machine 201 is operating in manual or automatic modes. The LEDs 243-246 may be controlled to illuminate at a constant intensity, to flash intermittently, or both depending on the status of the machine 201. The LEDs 243-246 may have a variety of colours including green, red and yellow.

[0083] The start/stop button 241 controls commencement of the dispense cycle and is a manually operated push-button, switch or similar.

[0084] A volume adjustment control may be provided to allow a user of the machine 201 to manually adjust the volume of the delivered beverage without altering the other operating characteristics. Preferably the volume adjustment control allows an adjustment in volume of plus or minus 20%. The volume adjustment control may be a rotary knob, a linear slider, a digital readout with increment and decrement buttons, or similar. More typically, volume is controlled by a user operating the start/stop button 241.

[0085] A manual power switch (not shown) may be provided on the machine 201. Alternatively, power supply can be controlled simply by insertion or removal or the power supply plug from the mains power supply.

[0086] The water tank 220 is located to the rear of the housing 210 and is connected to the rear half 212 of the housing 210. The water tank 220 comprises a generally cylindrical body 221 which may be right circular or a frustum as desired for aesthetic reasons. The tank comprises an inlet for filling the tank with water which is closed off in use by a manually removable lid 222. An outlet is provided towards a lower end of the tank which communicates with the water pump 230. The water tank 220 may be made from a transparent or translucent material to allow a consumer to view the quantity of water remaining in the tank. Alternatively, the water tank 220 may be made from an opaque material but have provided a viewing window therein. In addition, or in place of the above, the water tank 220 may be provided with a low level sensor which prevents operation of the water pump 230 and optionally triggers a warning indicator, such as an LED, when the water level in the tank descends to a preselected level. The water tank 220 preferably has an internal capacity of approximately 1.5 litres.

[0087] The water pump 230 is operatively connected between the water tank 220 and the water heater 225 as shown schematically in Figure 43 and is controlled by the control processor. The pump provides a maximum flow rate of 900 ml/min of water at a maximum pressure of 2.5 bar (250 KPa). Preferably, in normal use, the pressure will be limited to 2 bar. The flow rate of water through the machine 201 can be controlled by the control processor to be a percentage of the maximum flow rate of the pump by cycle chopping the electrical supply to the pump. Preferably the pump can be driven at any of 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90% or 100% of the maximum rated flow rate. The accuracy of the volume of water pumped is preferably + or - 5% leading to a + or - 5% accuracy in the final volume of the dispensed beverage. A suitable pump is the Evolution EP8 pump produced by Ulka S.r.l. (Pavia, Italy). A volumetric flow sensor (not shown) is preferably provided in the flow line either upstream or downstream of the water pump 230. Preferably, the volumetric flow sensor is a rotary sensor.

[0088] The water heater 225 is located in the interior of the housing 210. The heater 225 has a power rating of 1550 W and is able to heat water received from the water pump 230 from a starting temperature of approximately 20 °C to an operating temperature of around 85 °C in under 1 minute. Preferably the dwell time between the end of one dispense cycle and the heater 225 being able to commence a subsequent dispense cycle is less than 10 seconds. The heater maintains the selected temperature to within + or - 2 °C during the dispense cycle. As discussed below, the water for the dispense cycle may be delivered to the cartridge head 250 at 83 °C or 93 °C. The heater 225 is able to quickly adjust the delivery temperature to either 83 °C or 93 °C from a nominal water temperature of 85 °C. The heater 225 comprises an over-temperature cut-off which shuts off the heater if the temperature exceeds 98 °C. Water output from the heater 225 is fed to the cartridge head 250 and cartridge 1 by means of a three-way valve. If the pressure of the water flow is acceptable the water is passed to the cartridge 1. If the pressure is below or above predetermined limits then the water is diverted by means of the three-way valve into the drip tray recovery receptacle 270.

[0089] The air compressor 235 is operatively connected to the cartridge head 250 by means of a one-way valve and controlled by the control processor. The air compressor 235 provides a maximum flow rate of air of 500 ml/min at 1.0 bar (100 KPa). In use a working volume of 35 ml is pressurised to 2.0 bar (200 KPa). Preferably, the air compressor 235 can produce two flow rates: a fast (or maximum) flow rate and a slow flow rate.

[0090] The control processor of the beverage preparation machine 201 comprises a processing module and a memory. The control processor is operatively connected to, and controls operation of, the water heater 225, water pump 230, air compressor 235 and user interface 240.

[0091] The memory of the control processor includes one or more variables for one or more operational parameters

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for the beverage preparation machine 201. In the illustrated embodiment the operational parameters are the temperature of the water passed through the beverage cartridge 1 during the operating stage, the speed of charging the beverage cartridge 1, the presence or otherwise of a soak step, the total dispensed volume of the beverage, the flow rate of the water during the discharge stage, and the flow rate and period of the purge stage.

[0092] The variables for the operational parameters are stored in the memory. The cartridge 1 comprises a code provided on or in the cartridge 1 representing the operational parameters required for optimal dispensation of the beverage in that cartridge 1. The code is in binary format and comprises a plurality of data bits corresponding to the variables stored in the control processor memory. Table 3 illustrates how 13 bits of data can be used to represent the necessary variables for the operational parameters described above.

Table 3

Bit	Parameter	Description
0 & 1	Water temperature	00 = cold 01 = warm 10 = 83 °C 11 = 93 °C
2 & 3	Cartridge charge	00 = fast charge with soak 01 = fast charge without soak 10 = slow charge with soak 11 = slow charge without soak
4, 5, 6 & 7	Beverage volume	0000 = 50 ml 0001 = 60 ml 0010 = 70 ml 0011 = 80 ml 0100 = 90 ml 0101 = 100 ml 0110 = 110 ml 0111 = 130 ml 1000 = 150 ml 1001 = 170 ml 1010 = 190 ml 1011 = 210 ml 1100 = 230 ml 1101 = 250 ml 1110 = 275 ml 1111 = 300 ml
8, 9 & 10	Flow rate	000 = 30% 001 = 40% 010 = 50% 011 = 60% 100 = 70% 101 = 80% 110 = 90% 111 = 100%
11 &12	Purge	00 = slow flow/short period 01 = slow flow/long period 10 = fast flow/short period 11 = fast flow/long period

[0093] The code on or in the cartridge 1 will normally comprises one or more extra data bits for error checking. In one example a 16 bit code is provided. For example, using the variables listed in Table 3, a cartridge 1 bearing the code "1000100011110" would have the following operational parameters:

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10	Water temperature of 83 °C
00	Fast charge with soak
1000	Dispensed drink volume of 150ml
111	Flow rate equals 100%
10	Fast air flow purge/short period.

[0094] Thus, unlike in previous beverage preparation machines, the memory of the control processor does not store operational instructions for beverage cartridges based on the cartridge type, i.e. instructions for a coffee cartridge, instructions for a chocolate cartridge, instructions for a tea cartridge etc. Instead the memory of the control processor stores variables for adjusting the individual operational parameters of the dispense cycle. This has a number of advantages. Firstly, a greater degree of control of the dispensation cycle can be exercised. For example, slightly different operational parameters can be used for different grades or blends of coffee rather than using the same parameters for all types of coffee. Prior coding solutions relying on storing instructions by cartridge type rather than by individual parameters are unsuited to such subtle differences in dispense cycles for similar beverage types because they quickly consume the available storage space in the coding medium and control processor. Secondly, the coding method of the present invention allows for new beverage cartridge types to be used in pre-existing beverage preparation machines even where the operational parameters for the dispense cycle for the new beverage cartridge 1 are only decided upon after sale of the beverage preparation machine 201. This is because the control processor of the beverage preparation machine 201 does not need to recognise that the beverage is of a new type. Rather the operational parameters of the dispense cycle are set without direct reference to the beverage type. Hence the coding method of the present invention provides excellent backward compatibility of the beverage preparation machines for new beverage types. In contrast, with prior machines, the manufacturer is restricted to dispensing a new beverage type using one of the pre-existing dispensation cycles as determined by the in-market machines.

[0095] The cartridge head 250 is shown in Figures 39 to 42. The cartridge holder 251 of the cartridge head 250 comprises a fixed lower part 255, a rotatable upper part 256 and a pivotable cartridge mount 257 positioned inbetween the fixed lower part 255 and the rotatable upper part 256. The upper part 256, lower part 255 and cartridge mount 257 are rotated about a common hinge axis 258. Figures 39 to 42 show the cartridge holder 251 with some components of the machine 201 omitted for clarity.

[0096] The rotatable upper part 256 and pivotable cartridge mount 257 are moved relative to the fixed lower part 255 by means of a clamping mechanism 280. The clamping mechanism 280 comprises a clamping lever having first and second members or parts 281 and 282. The first part 281 of the clamping lever comprises a U-shaped arm which is pivotably mounted to the upper part 256 at two first pivot points 283, one on each side of the cartridge holder 251.

[0097] The second part of the clamping lever comprises two over-centre arms 282, one on each side of the cartridge holder 251 which are each pivotably mounted to the upper part 256 at a second pivot point 285 located on the hinge axis 258 coupling the upper part 256 to the fixed lower part 255. Each over-centre arm 282 is a reciprocal member comprising a cylinder 282a, a stem 282b and a resilient sleeve 282c. The cylinder 282a has an internal bore and is rotatably mounted at one end at the hinge axis 258. A first end of the stem 282b is slidingly received in the bore of the cylinder 282a. The opposite end of the stem 282b is rotatably mounted to the U-shaped arm 281 at a third pivot point 286. The third pivot points 286 are unconnected to, and freely moveable relative to, the upper part 256 and lower part 255. The resilient sleeve 282c is mounted externally on the stem 282b and extends, in use, between abutment surfaces on the cylinder 282a and stem 282b. The resilient sleeve 282c accommodates shortening of the over-centre arm 282 but biases the over-centre arm 282 into an extended configuration. Movement of the third pivot points 286 towards and away from the hinge axis 258 is thus possible by relative movement of the stems 282b in the cylinders 282a. The resilient sleeves 282c are preferably formed from silicone.

[0098] The U-shaped arm 281 extends around the front of the cartridge holder 251 and comprises two downwardly dependant hook members 287, one on each side of the cartridge holder 251, each comprising a cam surface 288 facing the hinge axis 258. The fixed lower part 255 of the cartridge holder 251 is provided with two bosses 259, or detents, located one on each side of the lower part 255 at or near a front edge 260 thereof aligned generally with the hook members 287.

[0099] As shown in Figure 39, the U-shaped arm 281 may be formed from a one piece plastics moulding comprising an ergonomic hand grip and the hook members 287 integral to the arm.

[0100] The cartridge mount 257 is rotatably mounted between the upper and lower parts 255, 256 of the cartridge holder 251. The mount 257 is provided with a substantially circular recess 290 which receives in use the beverage cartridge 1. The recess 290 includes an irregularity 291 for accommodating the handle portion 24 of the beverage cartridge 1 which also acts to prevent rotation of the beverage cartridge 1 in the cartridge holder 251. The cartridge mount 257 is sprung relative to the fixed lower part 255 such that in the open position, as shown in Figure 41, the

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cartridge mount 257 is biased out of contact with the fixed lower part 255 so that the cartridge mount 257 is moved out of contact with the outlet and inlet piercer members 254, 253. The cartridge mount 257 is provided with an aperture 292 for receiving therethrough the inlet and outlet piercers 253, 254 and a head 300 of the cartridge recognition means 252 when the cartridge mount 257 is moved into the closed position.

[0101] The upper part 256 comprises a generally circular body 310 housing a circular viewing window 312 through which a consumer can view the beverage cartridge 1 during a dispense cycle and also visually confirm whether a cartridge 1 is loaded in the machine 201. The viewing window 312 is cup-shaped having a downwardly directed rim 311 which engages and grips the flange 35 of the beverage cartridge 1 against the lower part 256 when the cartridge holder 251 is closed. At the same time the window 312 contacts the closed top 11 of the cartridge 1. A wave spring (not shown) is positioned between the viewing window 312 and the circular body 310 to enable the viewing window 312 to move axially relative to the circular body 310 by a small degree. The pressure exerted by the rim 311 on the flange 35 and by the window 312 on the closed top 11 ensures a fluid tight seal between the cartridge 1 and the cartridge holder 251.

[0102] The lower part 255 comprises the inlet and outlet piercers 253, 254 and the head 300 of the cartridge recognition means 252. The inlet piercer 253 comprises a hollow needle-like tube 260 having a sharpened end 261 for perforating the laminate 5 of the beverage cartridge 1 in use. The inlet piercer 253 is in fluid communication with a water conduit 262 as shown in Figure 42 which passes through the lower part 255 and is connected to an outlet conduit 263 of the water heater 225. The outlet piercer 254 is similar in type to the outlet piercer described in the applicant's European patents EP 0 389 141 and EP 0 334 572 and comprises an open ended cylinder 264 of circular or D-shaped cross-section having dimensions larger than the discharge spout 43. An arcuate portion 265 of the upper end of the outlet piercer 254 is serrated to pierce and eventually cut the laminate of the beverage cartridge 1. The remainder of the upper end is cut back longitudinally of the cylinder at least to the base of the teeth 266 of the serrated portion to fold or pull the cut laminate 5 away from the outlet aperture before the beverage is dispensed therethrough. The outlet piercer 254 pierces the laminate 5 externally of the discharge spout 43 and when the cartridge mount 257 is in the closed position, rests in the annulus between the discharge spout 43 and the outer wall 42 of the discharge funnel 40. The outlet piercer 254 folds back the cut laminate 105 into the annulus. Thereby both the outlet piercer 254 and the cut laminate 105 are held out of the way of the discharged beverage.

[0103] The outlet piercer 254 is surrounded by a ledge 254a which is raised relative to its surroundings by 0.5mm.

[0104] Advantageously, the outlet piercer 254 is removable from the lower part 255 to enable it to be thoroughly cleaned, for example, in a dishwasher. The removable outlet piercer 254 is received in a recess 267 in the lower part 255 where it is seated. The inlet piercer 253 and/or the outlet piercer 254 may be made of a metal, such as stainless steel, or from a plastics material. Advantageously, the use of plastic cutting elements is enabled by use of a laminate 5 which is able to be punctured and cut by a non-metallic material. Consequently, the piercers 253, 254 can be made less sharp which lowers the risk of injury to the consumer. In addition, plastic piercing elements are not prone to rust. The inlet piercer 253 and the outlet piercer 254 are formed as a single, integral unit which is removable from the lower part 255.

[0105] In use, the upper part 256 of the cartridge holder 251 is movable from an open position in which it is orientated vertically or towards the vertical as shown in Figure 36, to a closed position in which it is orientated substantially horizontally and in interengagement with the fixed lower part 255 and cartridge mount 257. The upper part 256 is moved from the open to the closed positions by operation of the clamping lever. To close the upper part 256 a user takes hold of the clamping lever by the U-shaped arm 281 and pulls downwards. Consequently, the upper part 256 rotates which first brings the rim 311 of the viewing window 312 into contact with the flange 35 of the beverage cartridge 1 in the cartridge mount 257 and the window 312 itself into contact with the closed top 11 of the cartridge 1. Continued rotation of the upper part 256 rotates the upper part 256 and cartridge mount 257 down into contact with the lower part 255. Further rotation of the U-shaped arm 281 causes the U-shaped arm 281 to rotate relative to the upper part 256 and the lower part 255 resulting in the hook members 287 of the upper part 256 engaging the bosses 259 of the lower part 255 with the cam surface 288 riding over the bosses 259. During this last stage of rotation the cartridge 1 is compressed between the cartridge mount 257 and the viewing window 312. As a result, the viewing window 312 is moved axially relative to the circular body 310 of the upper part 256 against the bias of the wave spring. This movement allows for a take up of tolerances in the beverage cartridge 1 and beverage preparation machine and ensures that the amount of compressive force applied to the cartridge is kept within an acceptable range. The clamping force of the mechanism as moderated by the action of the wave spring ensures a clamping pressure on the cartridge of between 130 and 280N. Preferably the force is approximately 200N. A force less than about 130N does not provide an adequate seal, whilst a force greater than about 280N leads to plastic failure of the components of the cartridge 1. During closure of the cartridge head the laminate 5 of the cartridge 1 is tensioned as it is brought into contact with the ledge 254a surrounding the outlet piercer 254 which causes the laminate 5 to flex out of plane as the distal end of the outer tube 42 of the cylindrical funnel is moved upwardly by 0.5mm relative to the flange 35. This movement also ensures that the great majority of the compressive force applied to the cartridge acts through the central region of the cartridge 1 through the

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load-bearing inner member 3. In the closed position the cartridge 1 is thus clamped around the flange 35 by means of the rim 311 of the viewing window 312 and firmly clamped between the closed top 11 of the cartridge and the outer tube 42 of the inner member 3 by contact with the viewing window 312 and the ledge 254a. These clamping forces help prevent failure of the cartridge 1 during pressurisation and also ensure that the inner member 3 and outer member 2 are fully seated relative to one another and thus that all internal passageways and apertures remain at their intended dimensions even during internal pressurisation.

[0106] An imaginary datum line can be drawn between the first and second pivot points 283, 285 of the cartridge holder 251. As can be seen in Figure 41, in the open position the third pivot points 286 are located on the side of the datum line nearest the fixed lower part 255. As the upper part 256 reaches the closed position, the third pivot points 286 of the clamping lever pass through the datum line joining the first and second pivot points 283, 285 to the opposite side of the line, furthest from the fixed lower part 255. Consequently, the U-shaped arm 281 'snaps through' from a first stable position to a second stable position. The snap through action is accommodated by shortening of the over-centre arms 282 and consequential compression of the resilient sleeves 282c. Once the third pivot points 286 are past the imaginary datum line then recovery of the resilient sleeves 282c acts to continue the motion of the third pivot points 286 away from the imaginary datum line. The clamping lever thus has a bi-stable operation in that the lever is stable in the open or closed positions but unstable at the point when the third pivot points 286 lie on the imaginary datum line joining the first and second pivot points 283, 285. Thus, the snap-through action of the clamping lever provides a positive closure mechanism which leads to a definite closure action wherein in the final stages of the clamping lever's rotation, the snap-through action of the U-shaped arm 281 and second arms 284 forces the hook members 287 firmly into engagement with the bosses 259. In addition, the resilient sleeves 282c provide a resistance to re-opening of the upper part 256 since a minimum force is required to compress the sleeves 282c sufficiently to move the third pivot points 286 back into line with the datum line joining the first and second pivot points 283, 285. Advantageously, the interengagement of the hook members 287 and the bosses 259 prevents separation of the upper and lower parts other than by rotation of the clamping lever. This is useful in preventing opening of the cartridge head 250 during operation when the cartridge head 250 is subject to internal pressurisation.

[0107] The purpose of the cartridge recognition means 252 is to allow the machine 201 to recognise the type of beverage cartridge 1 that has been inserted and to adjust one or more operational parameters accordingly. In a typical embodiment, the cartridge recognition means 252 comprises an optical barcode reader which reads a printed barcode 320 provided on the laminate 5 of the beverage cartridge 1 as shown in Figure 45. The barcode 320 is formed from a plurality of bars of contrasting colour. Preferably the bars are black on a white background to maximise the contrast. The barcode 320 is not required to conform to a published standard but a standard format for barcodes, such as EAN-13, UPC-A, or Interleaf 2 of 5 may be used. The optical barcode reader comprises one or more LEDs 321 to illuminate the barcode 320, a focusing lens 322 to acquire an image of the barcode, a charge coupled device (CCD) 323 for producing an electrical signal representative of the acquired image and support circuitry for the LEDs and CCD. The space in the lower part for accommodating the barcode reader is limited. A mirror or mirrors 324 may be used to reflect the light from the LEDs 321 to a focussing lens which is not located in the lower part 255. Schematic arrangements are shown in Figures 44a and 44b. The lower part 255 comprises an aperture 326 which is the same size as the barcode 320 on the beverage cartridge 1. In use the electrical signals produced are decoded by signal processing software and the results forwarded to the control processor. The software can recognise whether the read of the barcode contained errors. The barcode 320 may be rescanned a number of times before an error message is presented to the consumer. If the machine 201 is unable to read the barcode the consumer is able to use the beverage cartridge 1 to dispense a beverage using a manual mode of operation.

[0108] The cartridge head 250 also includes a cartridge sensor for detecting whether a cartridge is present in the cartridge holder 251.

[0109] The cartridge head 250 also includes a lock sensor which detects whether the cartridge holder 251 is properly closed. Preferably the lock sensor comprises a micro-switch which is triggered when the cartridge holder 251 is closed and locked. Preferably the cartridge sensor and lock sensor are connected in series such that the output of both sensors must be satisfactory, i.e. cartridge present and mechanism locked, before the dispense cycle can be commenced.

[0110] Operation of the machine 201 comprises insertion of a beverage cartridge 1 into the cartridge head 250, carrying out a dispense cycle in which the beverage is dispensed and removal of the cartridge 1 from the machine.

[0111] The operational behaviour of the machine 201 is determined by software embedded in the control processor. Operation of the machine can be described in terms of 'States', wherein the machine 201 will normally exist in a particular State until an event occurs to change the State, a step called a State transition.

[0112] Table 4 shows a State Transition Table which illustrates the States and State transitions for one embodiment of the beverage preparation machine 201.

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Table 4

State	State Description	Temperature	Lock Sensor	Cartridge Sensor variable (OK, NOK, CLR)	Water level indicator	Water flow rate	StartStop
1	WATER HEATING	> or = 85 goto 2	Closed: [Cartridge Sensor= readpod()] Open: [Cartridge Sensor =CLR]	N/A	Low goto 10	N/A	No Action
2	WATER READY If timeout 10mins goto 9	< 85 goto 2	Closed: [Cartridge Sensor = readpod()] Open: [Cartridge Sensor =CLR]	Cartridge Sensor =OK goto 4 Cartridge Sensor =NOK goto 3	Low goto 10	N/A	No Action
3	READY TO BREW AUTO	N/A [temperature controlled in background]	Open: [Cartridge Sensor =CLR] goto 2	N/A	Low goto 10	N/A	Goto 5
4	BREW IN PROGRESS AUTO [Run Brew State] goto 7	N/A [temperature controlled in background]	Open: [Cartridge Sensor =CLR] goto 10	N/A	Low goto 10	No flow goto 10	Water off goto 6
5	BREW SUSPENDED	N/A [temperature controlled in background]	Open: [Cartridge Sensor =CLR] goto 10	N/A	Low goto 10	N/A	Goto 5
6	READY TO BREW MANUAL	N/A [temperature controlled in background]	Open: [Cartridge Sensor =CLR] goto 2	N/A	Low goto 10	N/A	[Water On] Goto 8

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7	BREW IN PROGRESS MANUAL	N/A [temperature controlled in background]	Open: [Cartridge Sensor =CLR] goto 10	N/A	Low goto 10	No flow goto 10	Release d goto 7
8	PURGE [Water off; air on, timeout n sec then goto 9]	N/A [temperature controlled in background]	Open: [Cartridge Sensor =CLR] goto 10	N/A	No action	N/A	No Action
9	BREW DONE [air purge] [Cartridge Sensor =CLR] if timeout 10s goto 2	N/A [temperature controlled in background]	Open goto 2	N/A	Low goto 10	N/A	Goto 9
10	STANDBY	N/A [heater off]	Open: [Cartridge Sensor =CLR] goto 1 Closed: [Cartridge Sensor = readpod()]	N/A	Low goto 10	N/A	Goto 1
11	ERROR Power off/on required to clear	N/A	N/A	N/A	N/A	N/A	N/A
12	WATER LOW				Low goto 10		

[0113] The following example illustrates a dispense cycle to exemplify the use of the State Transitions by the control processor.

[0114] It is assumed that the machine 201 is initially switched off and with no cartridge 1 inserted in the cartridge head 250. When the machine 201 is switched on the control processor is in State 1. The water heater 225 is switched on. Once the temperature reaches 85 °C the control processor transits to State 2. If at any time during State 1 or 2 the cartridge holder 251 is closed the lock sensor will be triggered to send a signal to the control processor indicating that the cartridge holder 251 is properly closed. The control processor then interrogates the cartridge sensor by sending a 'readpod' instruction. The cartridge sensor returns a signal to the control processor indicating whether a cartridge is in place in the cartridge holder 251. If no cartridge is present the control processor transits to State 3 where it remains in a readiness state until the cartridge holder 251 is reopened at which point the control processor transits back to State 2. If a cartridge is present in State 2 then the control processor transits to State 4 and operation is commenced automatically. During States 4 to 9 the water temperature is controlled in the background to remain within the required tolerance range of the desired temperature as set by the operational parameters set by the barcode on the beverage cartridge 1. Once the discharge stage of dispense is completed an air purge is commenced in State 8. Once the air purge is completed the operating cycle is completed and the machine enters to standby mode in State 10. If, during operation, an error occurs then the processor transits to State 11. If a low water level is detected then the processor transits to State 12.

[0115] To insert the cartridge 1 the cartridge holder 251 is opened as described above to expose the cartridge mount 257. The cartridge 1 is then placed on the cartridge mount 257 received within the recess 290 such that the handle 24

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of the cartridge is located in the irregularity 291. The optical or magnetic barcode 320 of the cartridge 1 is orientated directly above the aperture 326 in the cartridge mount 257. The cartridge holder 251 is then closed by operation of the clamping lever as described above. During closure the inlet and outlet piercers 253, 254 pierce the laminate 5 of the cartridge 1 to form the cartridge inlet 121 and outlet 122. As described above the laminate 5 cut by the outlet piercer 254 is folded up into the annulus surrounding the discharge spout 43. When closed the cartridge holder 251 grips the cartridge 1 around the rim 35 between the cartridge mount 257 and the upper part 256 and between the window 311 and the top 11 of the cartridge 1 to form a fluid tight seal of sufficient integrity to withstand the pressures developed during the dispense cycle.

[0116] To commence the operating cycle the consumer operates the start/stop button 241.

[0117] The operating cycle comprises the steps of cartridge recognition and the discharge cycle.

[0118] Cartridge recognition is performed by the optical cartridge recognition means 252 as described above assuming that the outputs from the cartridge sensor and lock sensor are satisfactory. Once the barcode 320 has been decoded the operational parameters of the machine 201 are adjusted by the control processor. The discharge cycle is then automatically commenced.

[0119] The discharge cycle has four main stages, not all of which are used for all beverage types:

(i) Pre-wet
(ii) Pause
(iii) Brew/Mixing
(iv) Purge

[0120] In the pre-wet stage the cartridge 1 is charged with water from the water storage tank 220 by means of the water pump 230. The charging with water causes the beverage ingredients 200 in the filtration chamber 130 to be wetted. The charging may take place at a "fast" flow rate of 600 ml/min or a "slow" flow rate of 325 ml/min. The slow charging rate is particularly useful for cartridges containing viscous liquid beverage ingredients where the ingredients require some dilution before they are able to be pumped at a higher volume flow rate. The volume of water injected into the cartridge 1 is selected to ensure that water or beverage does not drip out of the cartridge outlet 122 during this stage.

[0121] The pause stage allows the beverage ingredients 200 to soak in the water injected during the pre-wet stage for a predetermined period of time. Both the pre-wetting and soaking stages are known to increase the yield of the extractibles from the beverage ingredients 200 and to improve the end flavour of the beverage. Pre-wetting and soaking are particularly used where the beverage ingredients are roast and ground coffee.

[0122] In the brew/mixing stage water is passed through the cartridge 1 in order to produce the beverage from the beverage ingredients 200. The temperature of the water is determined by the control processor which sends instructions to the water heater 225 to heat the water passing from the water tank 220 to the cartridge head 250. Water enters the lower part 255 of the cartridge holder 251 through the conduit 262 via the inlet valve and the inlet piercer 253 into the inlet chamber 126 of the beverage cartridge 1. Brewing and/or mixing and subsequent dispensing of the beverage from the beverage cartridge 1 is as described above with reference to the versions of the beverage cartridge 1.

[0123] The air purge comprises the blowing of pressurised air through the beverage preparation machine and the beverage cartridge 1 to ensure that all beverage is dispensed and that the flow path is cleared ready for dispensing another beverage. The air purge does not commence immediately on cessation of the brew/mixing stage to allow for the majority of the fluid to clear the flow path. This prevents an unacceptable spike in internal pressure on commencement of the air purge.

[0124] In normal operation a user manually stops the machine 201 by operating the start/stop button 241.

[0125] Once the operating cycle has been completed the consumer removes the cartridge 1 by opening the cartridge holder 251 and manually removing and disposing of the cartridge. Alternatively, the machine 201 may be provided with an automatic ejection mechanism for removing the cartridge automatically on opening the cartridge holder 251.

[0126] The delivery times for beverages using the machine 201 and cartridges 1 are typically between 10 and 120 seconds, preferably 30 to 40 seconds for roast and ground coffee, between 5 and 120 seconds, preferably 10 to 20 seconds for chocolate and between 5 and 120 seconds, preferably 10 to 20 seconds for milk.

[0127] The machine 201 may also advantageously comprise a memory in operative communication with the control processor that stores information on the type of beverage dispensed by a user. The operating cycle of the machine 201 may then be adjusted for the next cartridge 1. This is especially advantageous where two or more beverage cartridges 1 are used sequentially to form a beverage. For example a coffee cartridge may be dispensed followed by a milk cartridge to form a cappuccino beverage. Alternatively a chocolate cartridge could be used followed by a milk cartridge to produce a creamy hot chocolate beverage. By using a memory that stores information on the first beverage dispensed, the manner of dispensing the second cartridge, say a milk cartridge, may be altered to achieve an optimum beverage. In the above example the milk dispensed for hot chocolate may, typically, be diluted less than the milk added

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to the coffee. In addition, the milk dispensed for chocolate may be dispensed at a slower flow rate to lessen the degree of foaming of the beverage. Many combinations of cartridges are possible and operating parameters as will be obvious to the skilled person. In addition, the memory may be used to allow the machine 201 to 'predict' the type of beverage that a user will next want to dispense. For example, if a user predominantly drinks one beverage type then the machine can instruct the water heater to remain at the optimum temperature for that beverage type.

Claims

1. A beverage preparation machine (201) for preparing a beverage from a cartridge (1) containing one or more beverage ingredients comprising a first piercing element (253) for forming an inlet, in use, in a cartridge (1) received in the beverage preparation machine (201) and a second piercing element (254) for forming an outlet, in use, in said cartridge, **characterised in that** the first and second piercing elements (253, 254) are formed as a single removable unit.

2. A beverage preparation machine (201) as claimed in claim 1 further comprising a fixed lower part (255) and an upper part (256) rotatable relative to the lower part, the upper part being moveable from an open position, in which the upper part is disengaged from the lower part for receiving a cartridge (1), and a closed position, in which the upper part is engaged with the lower part, wherein the removable unit is mounted, in use, in the fixed lower part.

3. A beverage preparation machine (201) as claimed in claim 1 or claim 2 wherein the inlet piercer (253) and outlet piercer (254) are orientated vertically and parallel to one another.

4. A beverage preparation machine as claimed in any preceding claim wherein the inlet piercer (253) and outlet piercer (254) are made of plastics materials.

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FIG. 1.

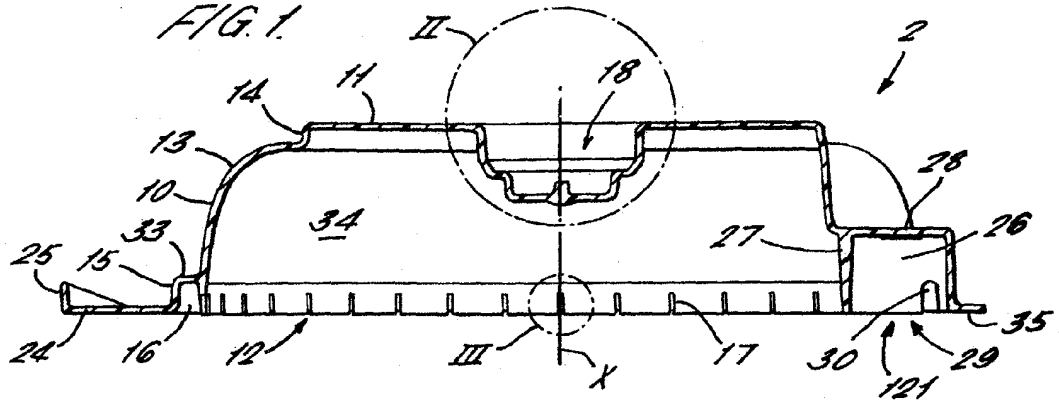


FIG. 2.

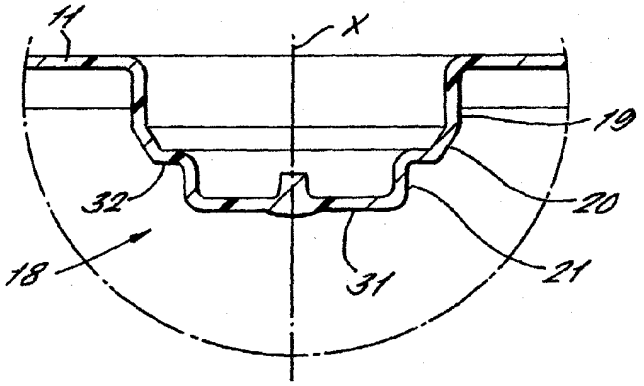
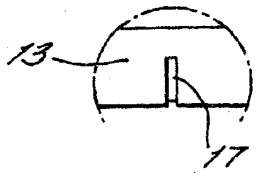


FIG. 3.



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FIG. 4.

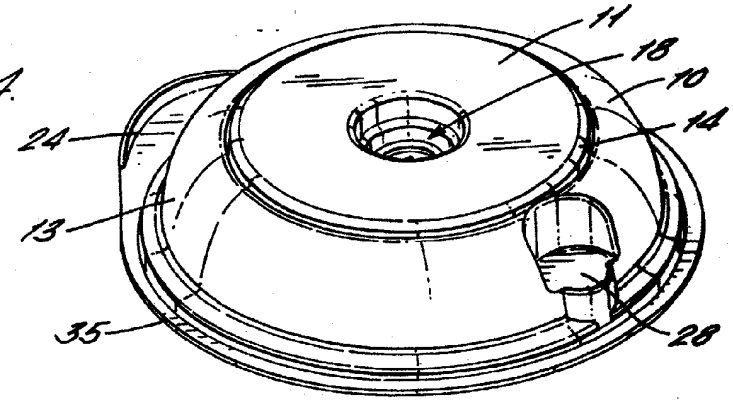


FIG. 5.

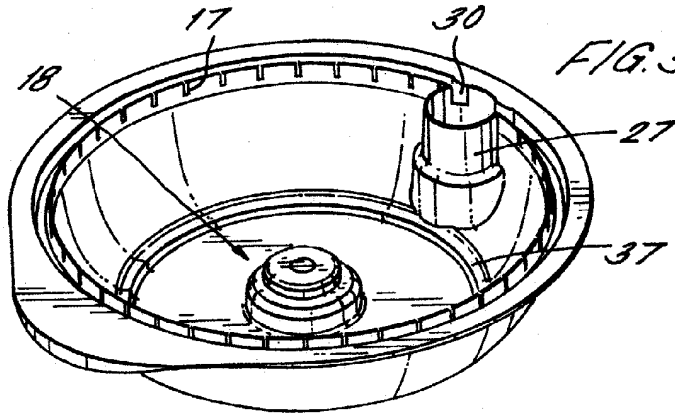
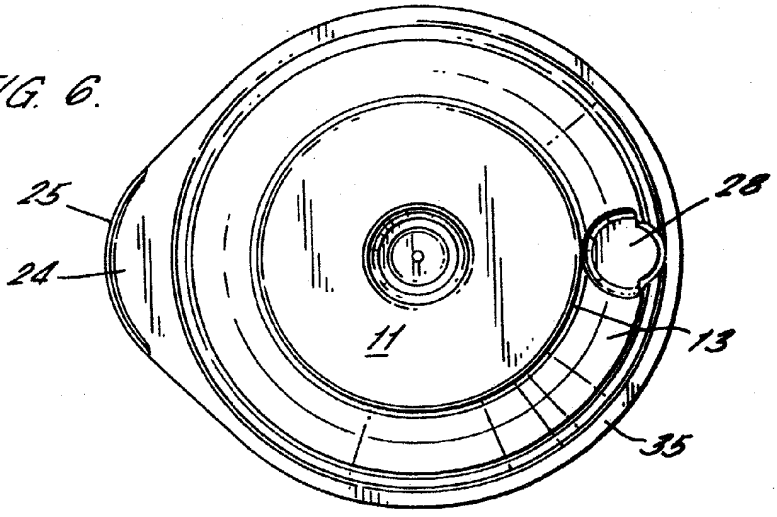


FIG. 6.



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FIG. 7.

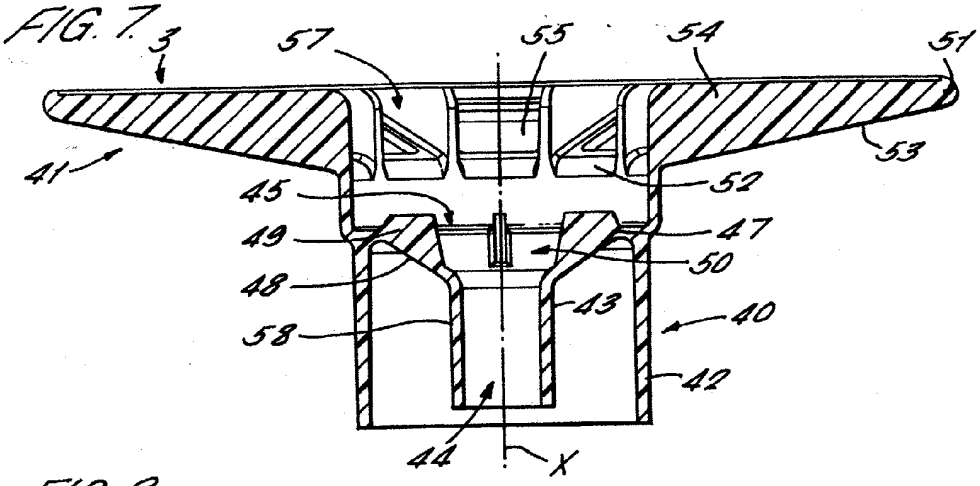


FIG. 8.

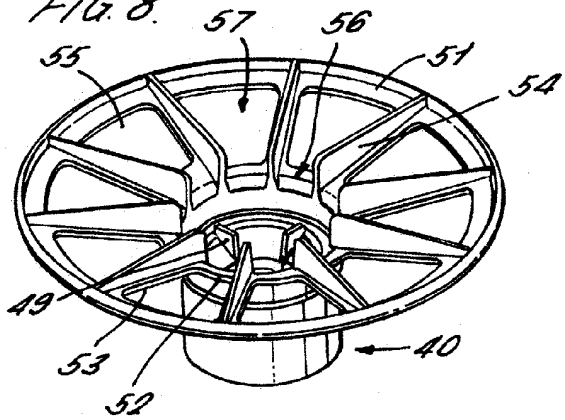


FIG. 9.

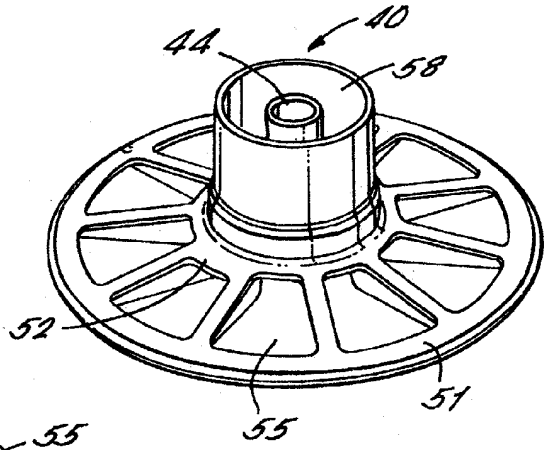
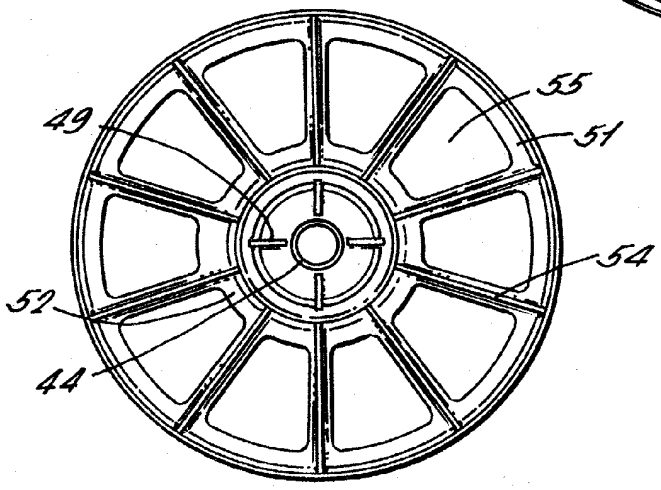


FIG. 10.



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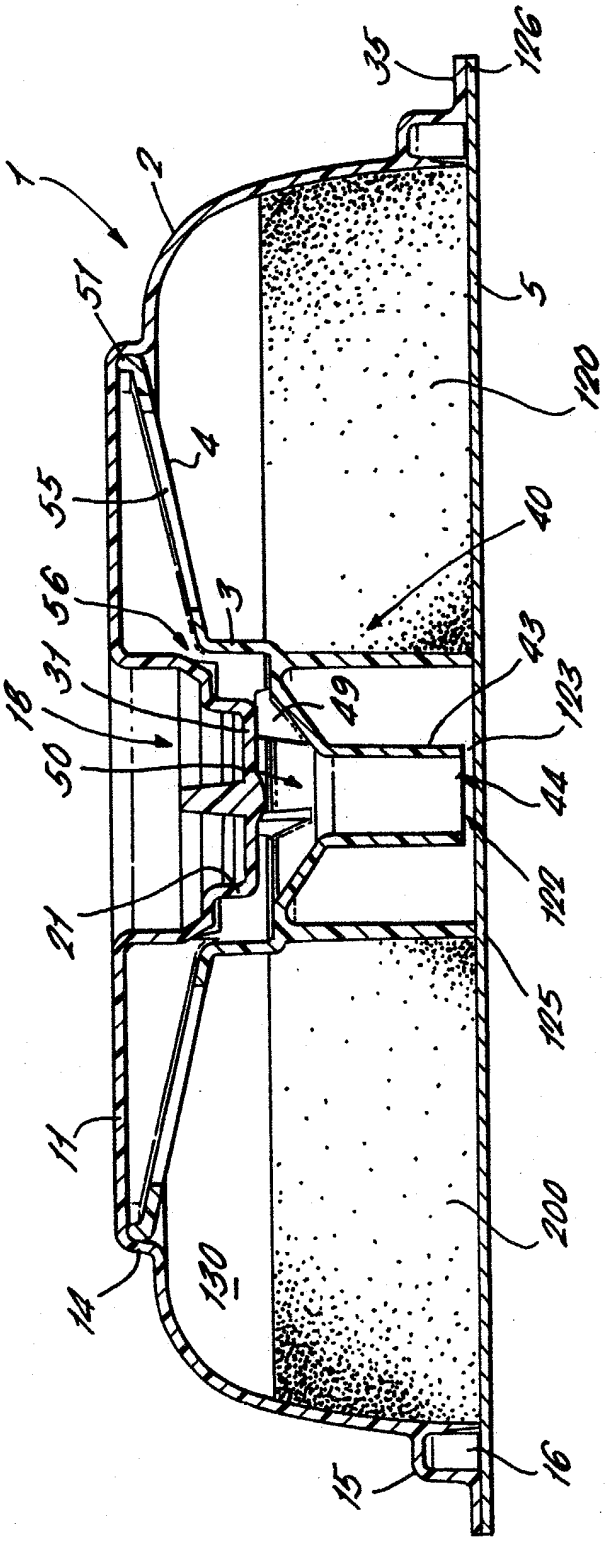


FIG. 11.

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FIG. 12.

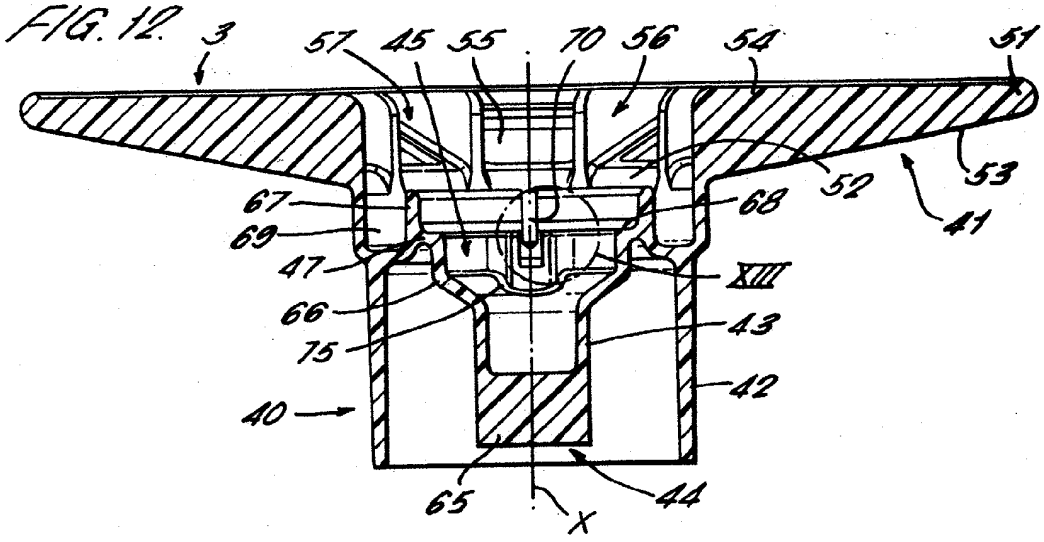


FIG. 13.

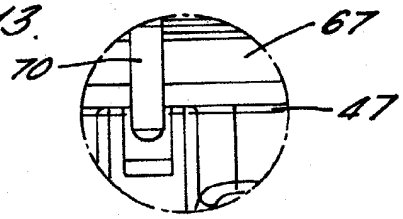


FIG. 14.

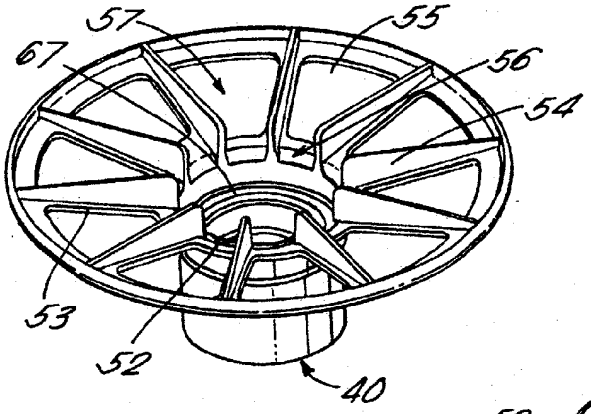
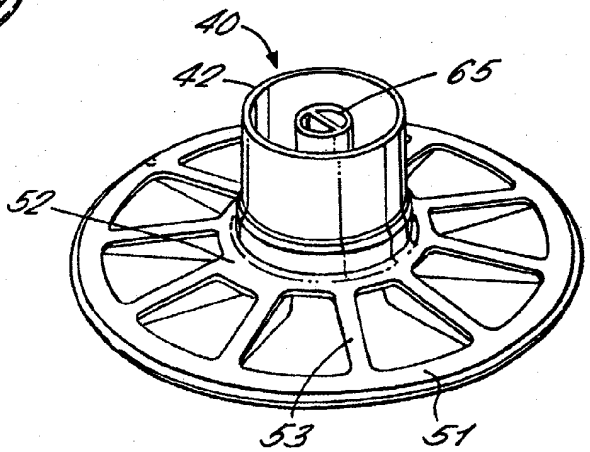


FIG. 15.



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FIG. 16.

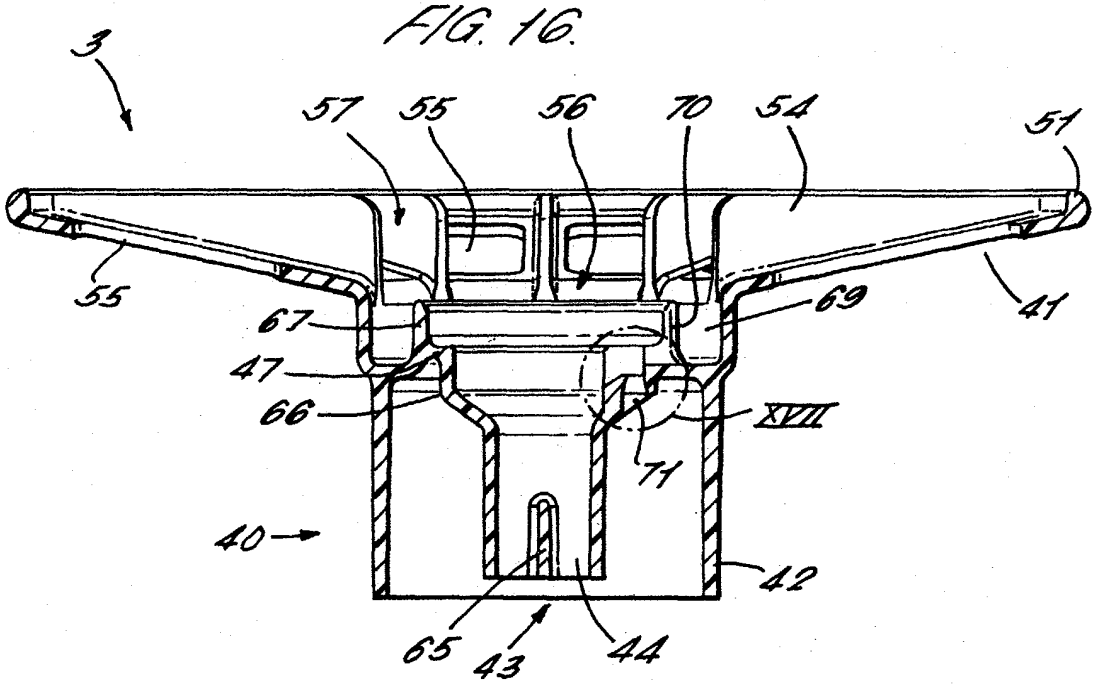
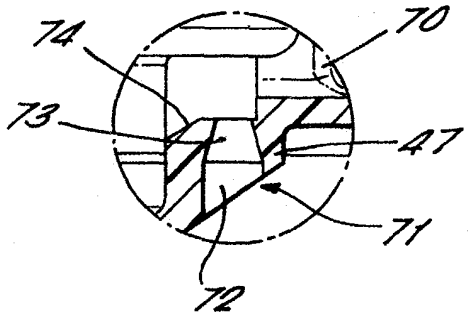


FIG. 17.



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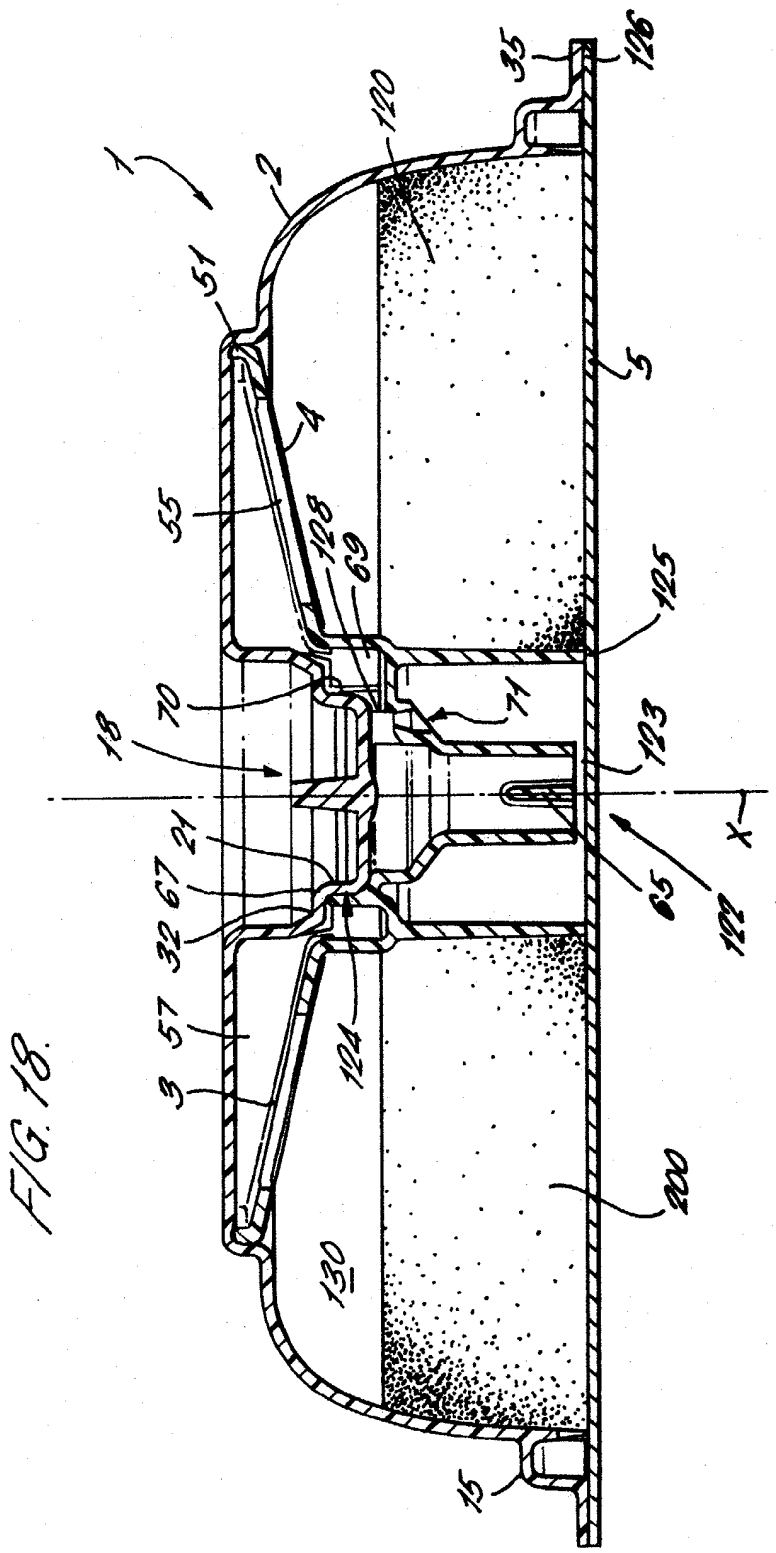


FIG. 18.

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FIG. 19.

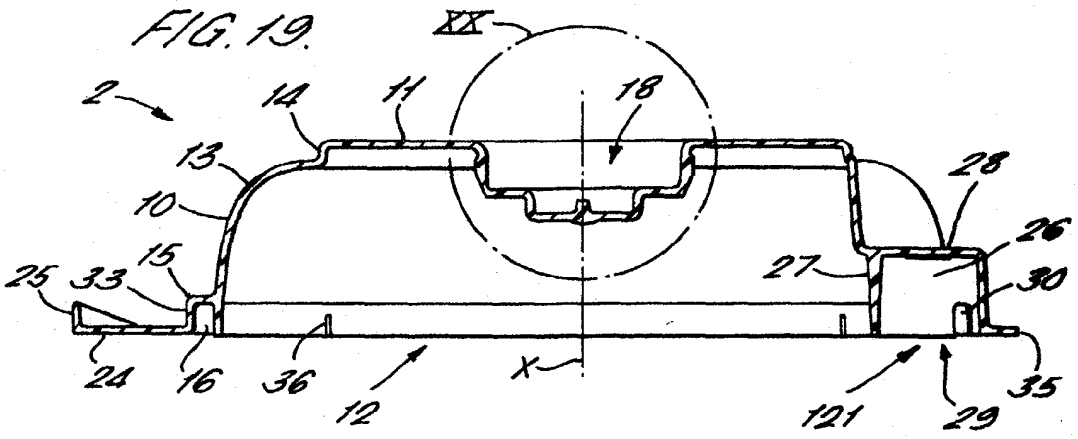
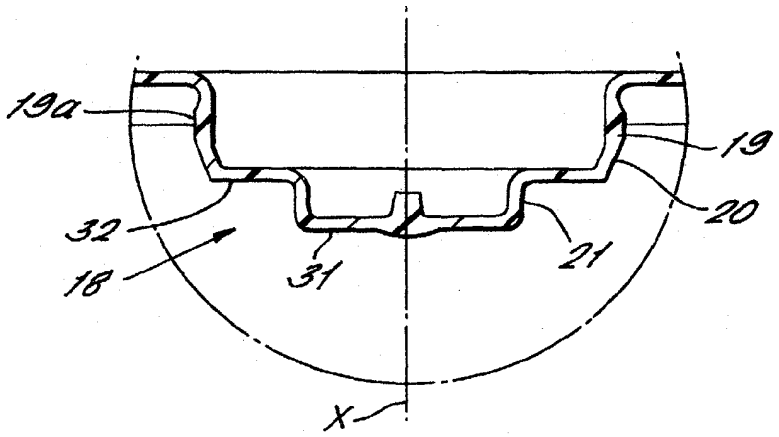


FIG. 20.



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FIG. 21.

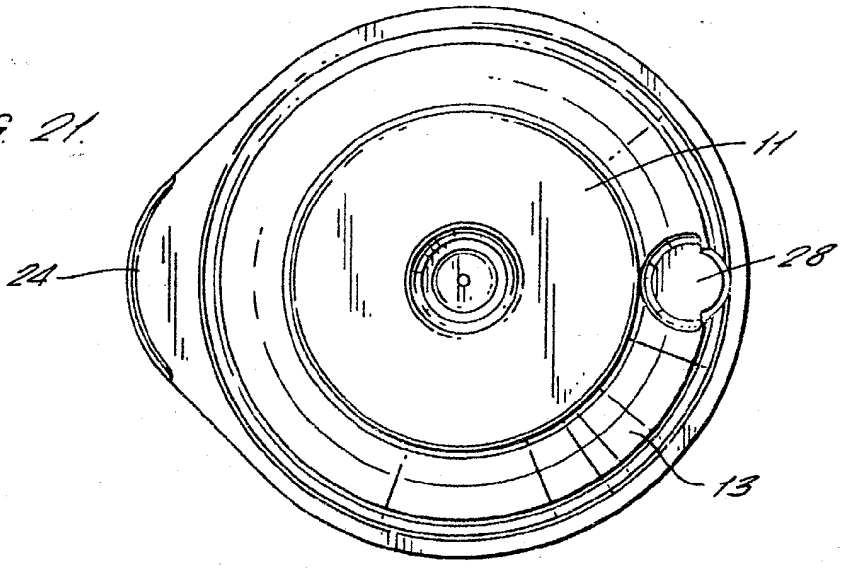


FIG. 22.

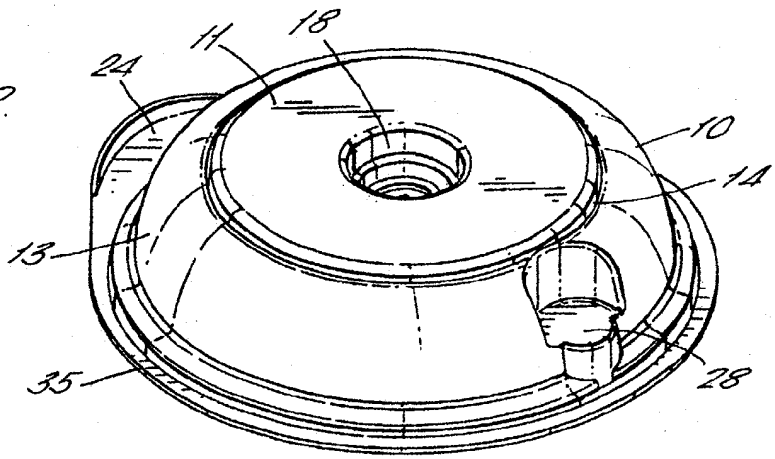
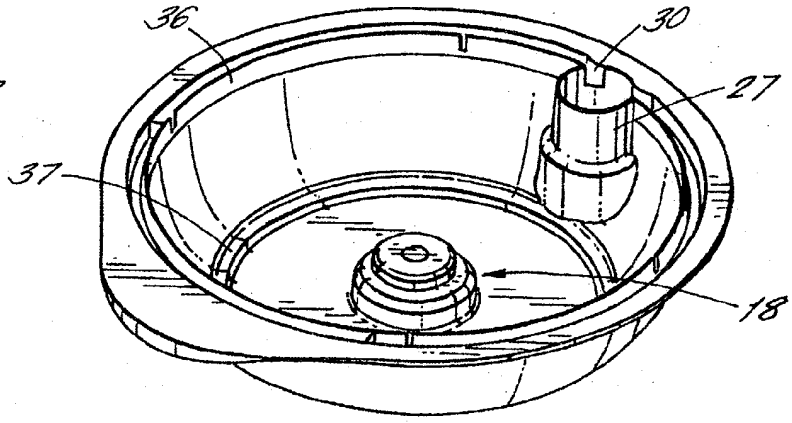


FIG. 23.



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FIG. 24.

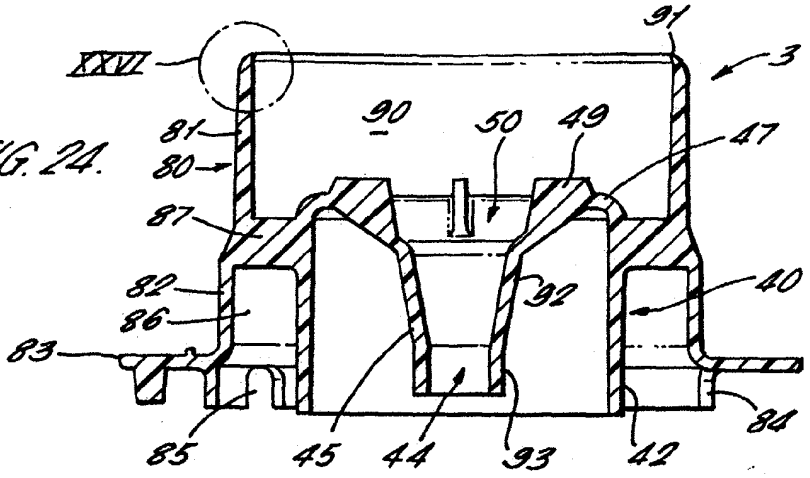


FIG. 25.

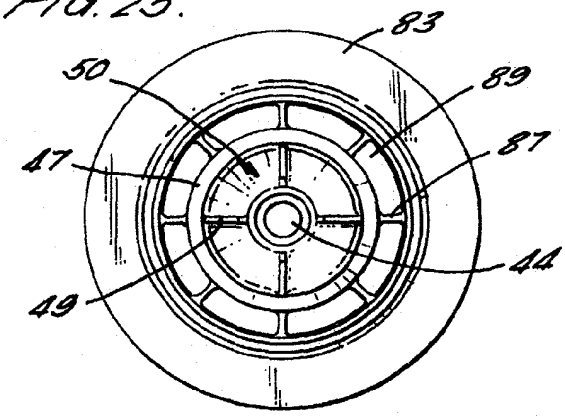


FIG. 26.

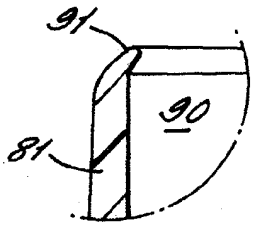


FIG. 27.

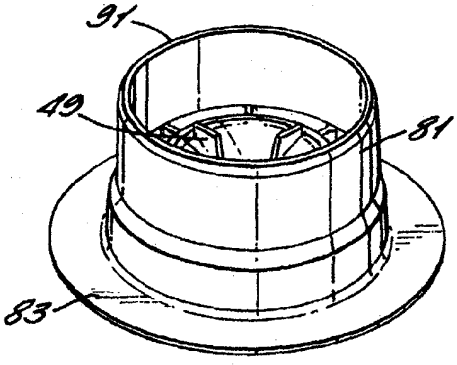
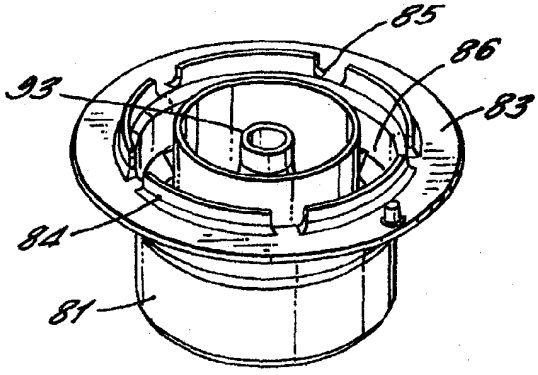


FIG. 28.



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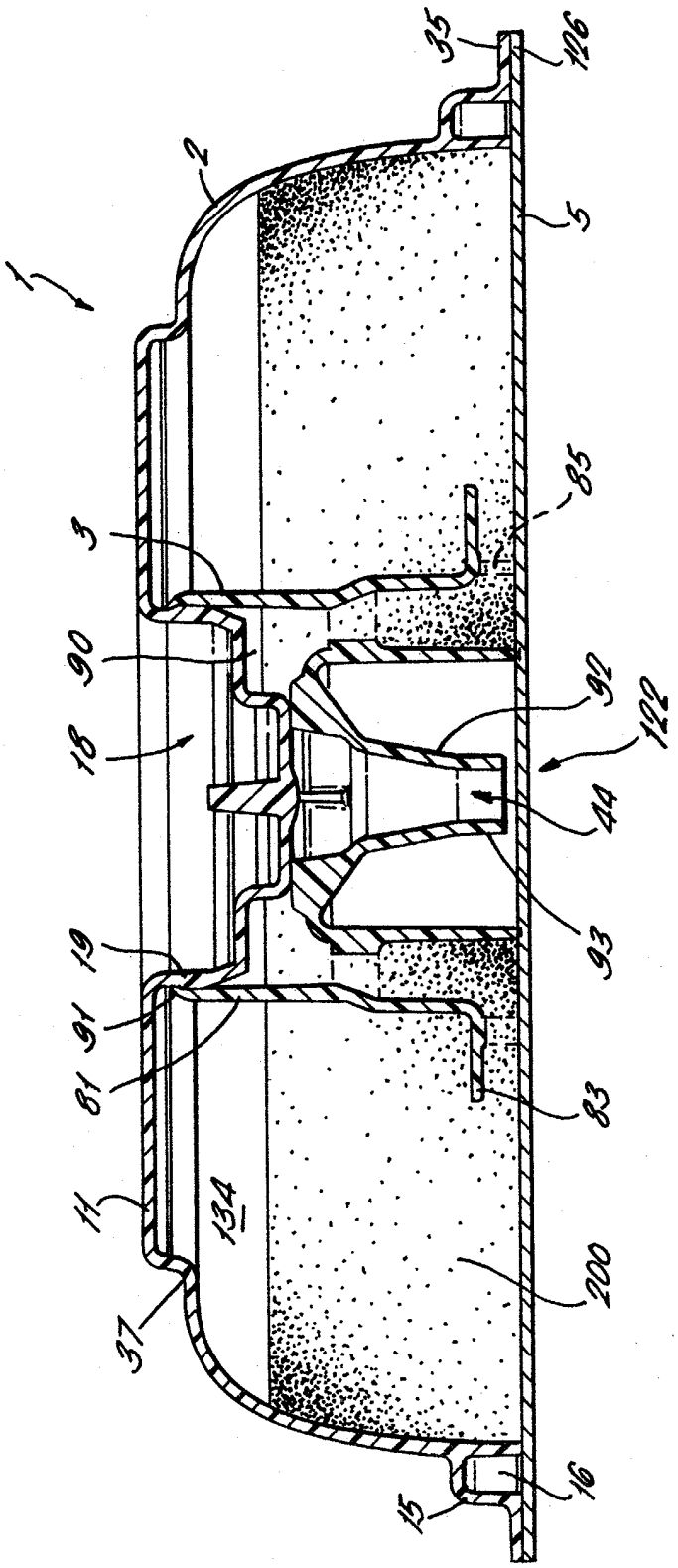


FIG. 29.

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FIG. 30.

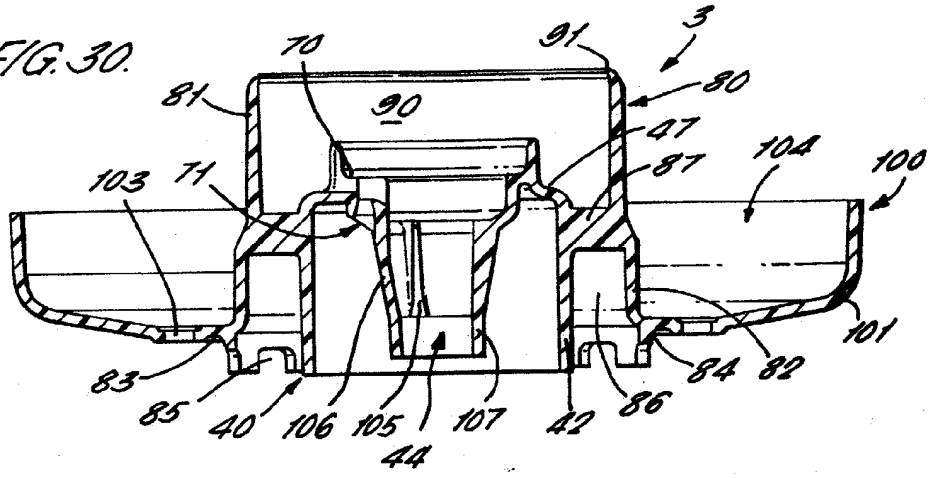


FIG. 32.

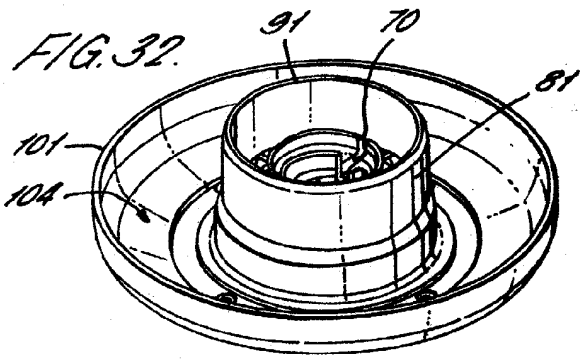


FIG. 31.

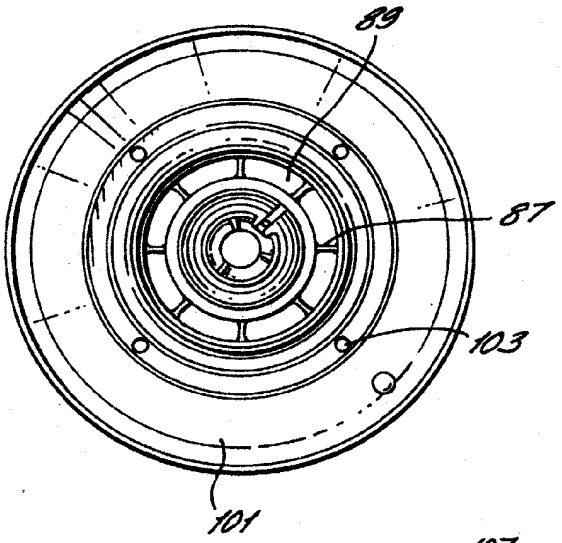
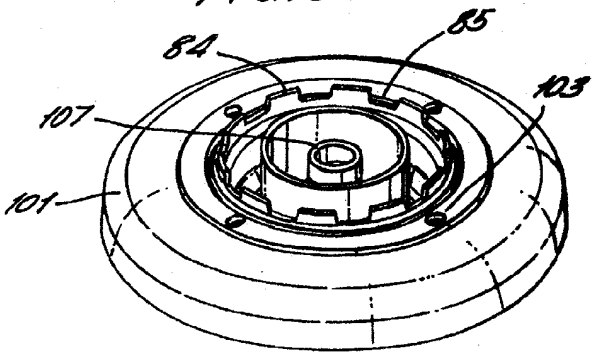


FIG. 33.



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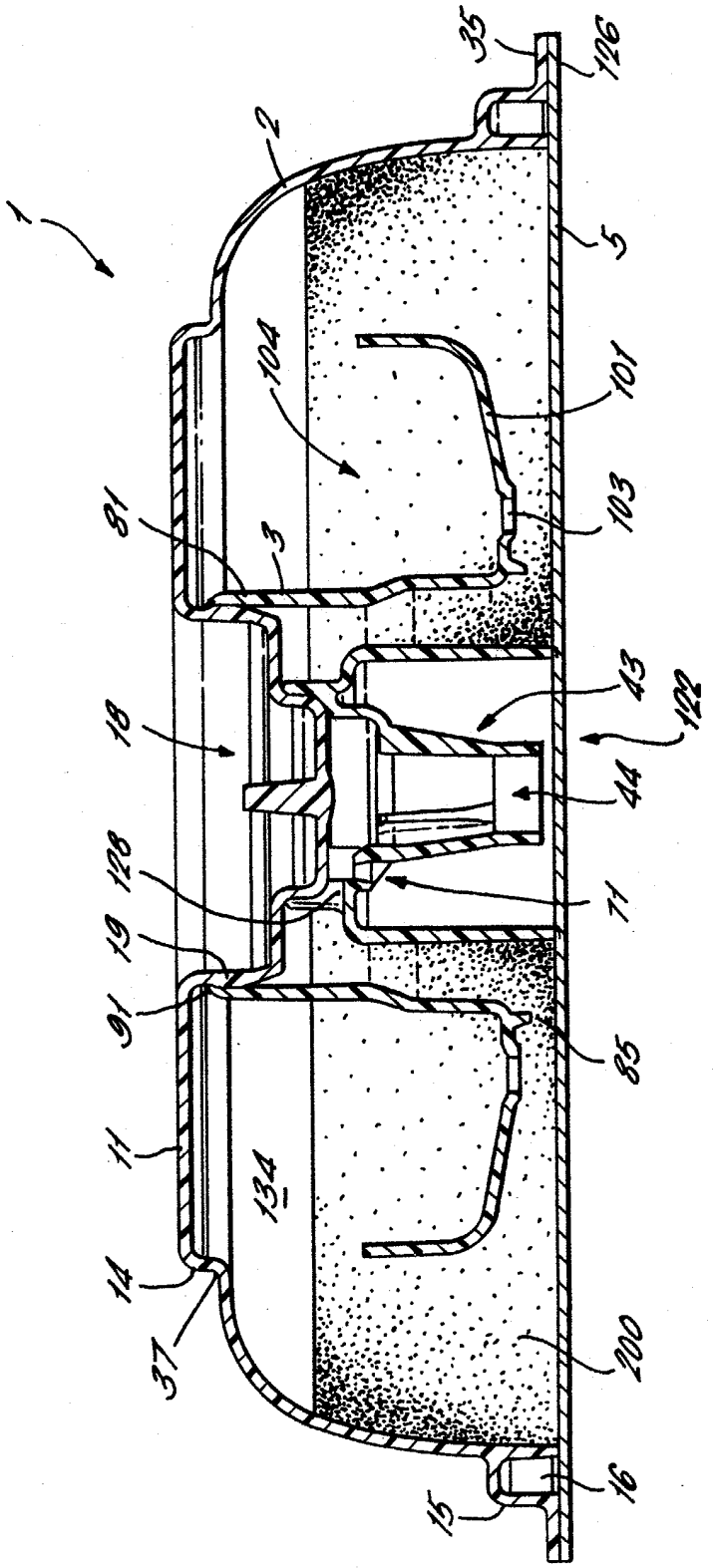
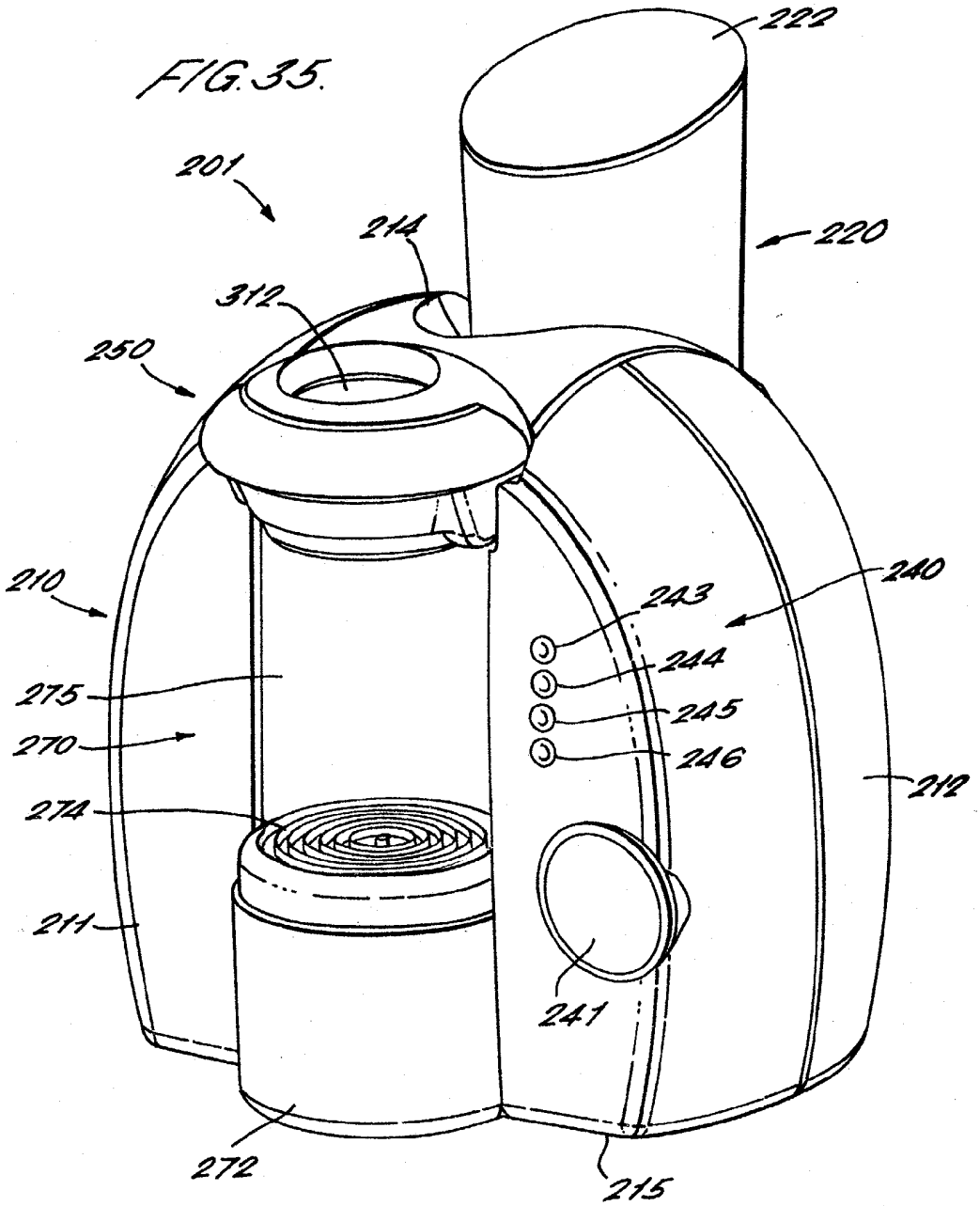


FIG. 34.

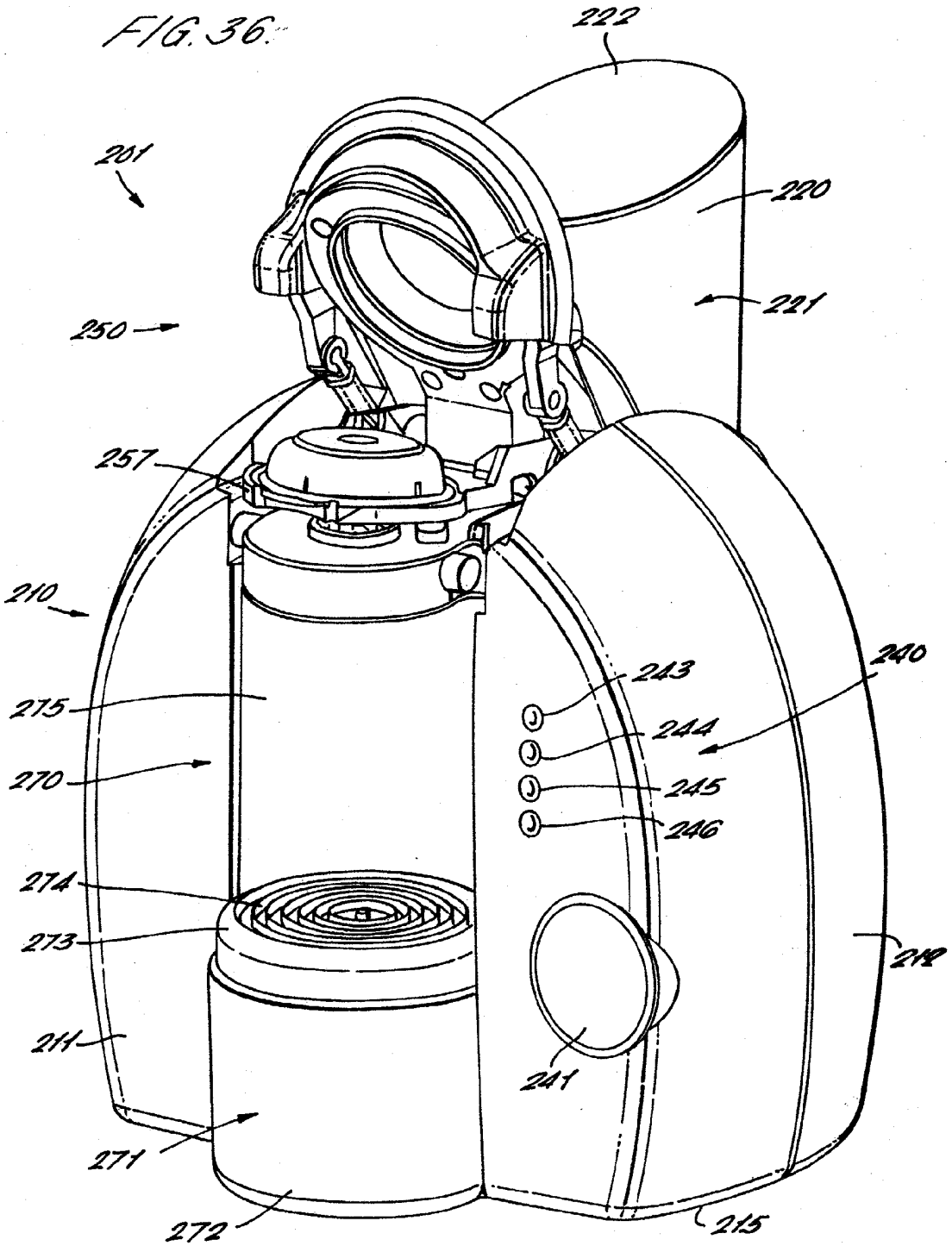
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FIG. 35.



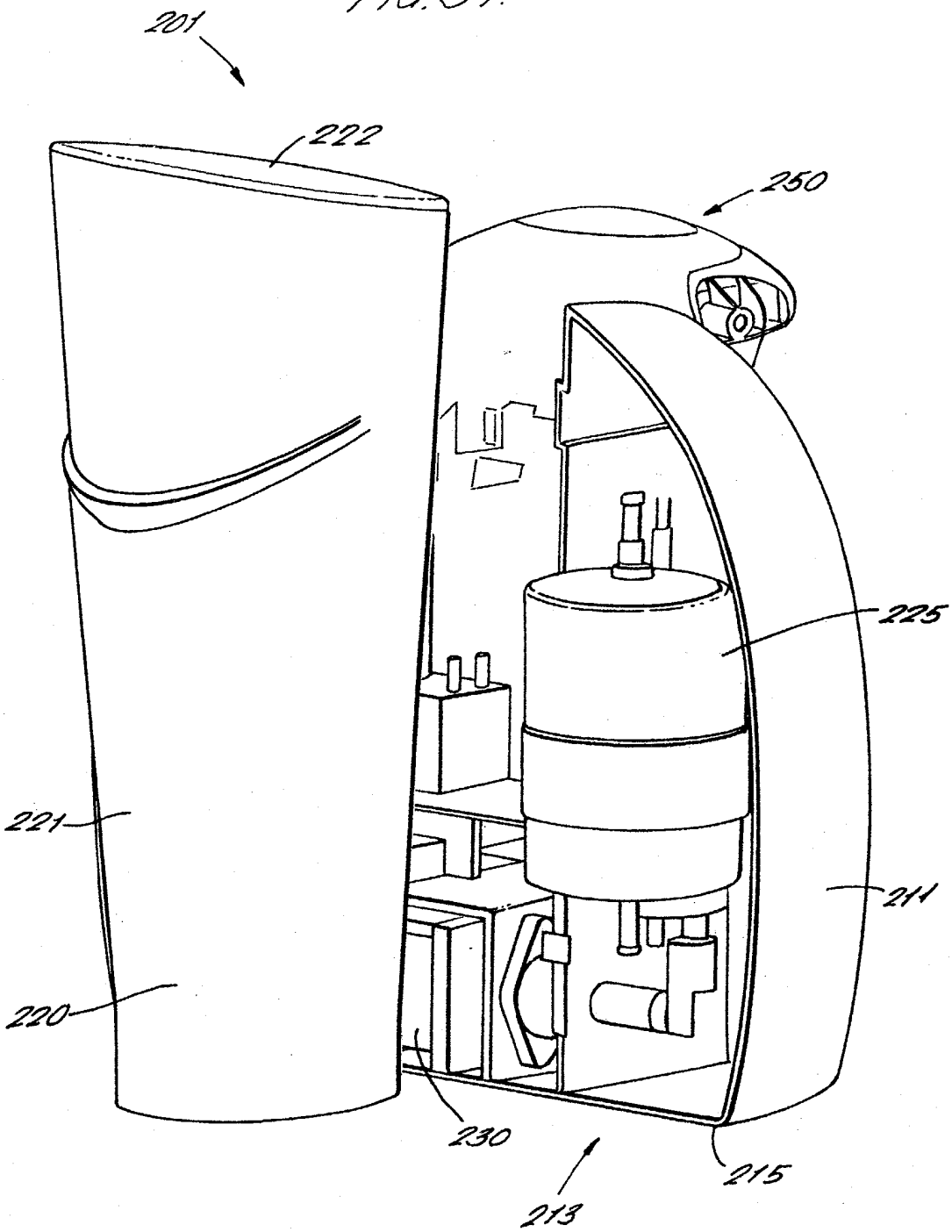
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FIG. 36.



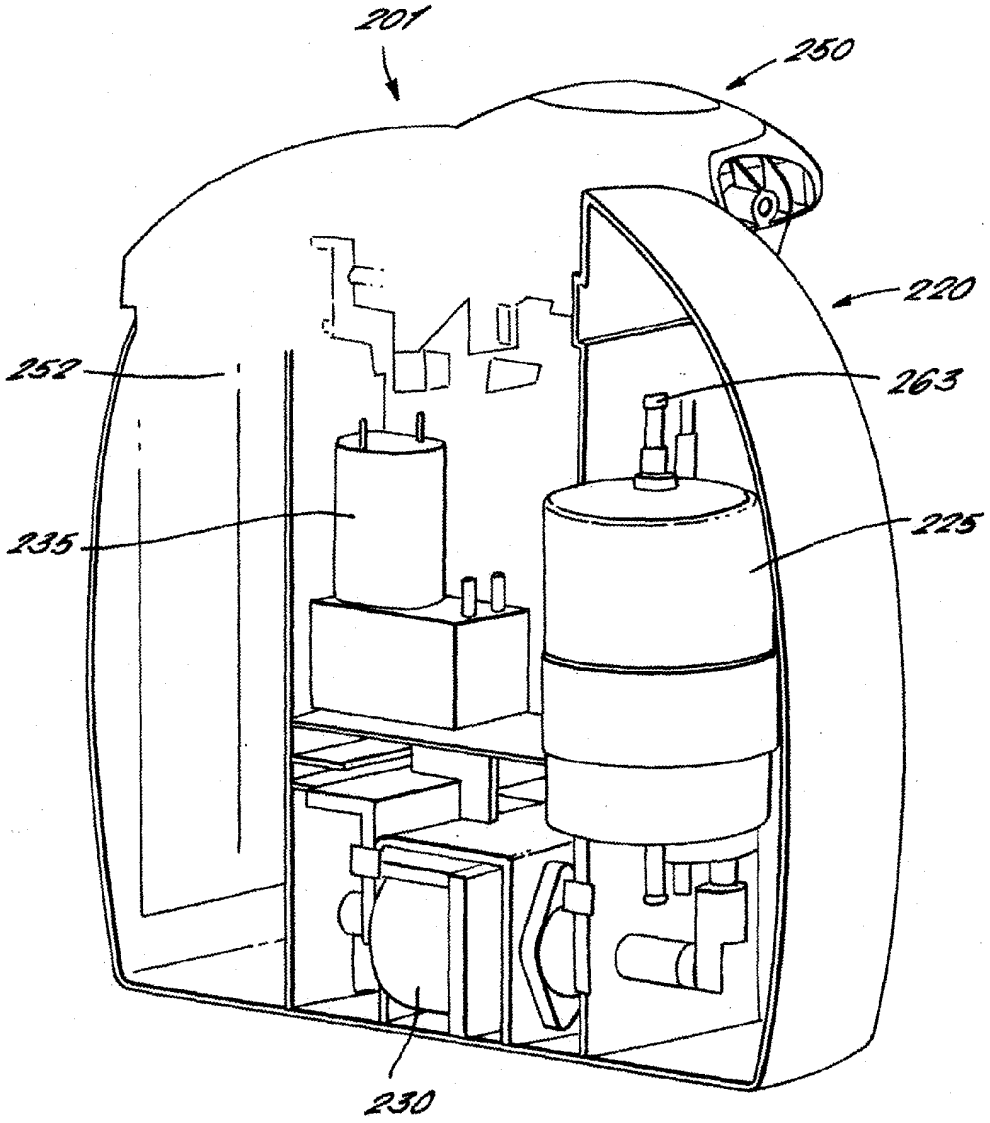
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FIG. 37.



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FIG. 38.



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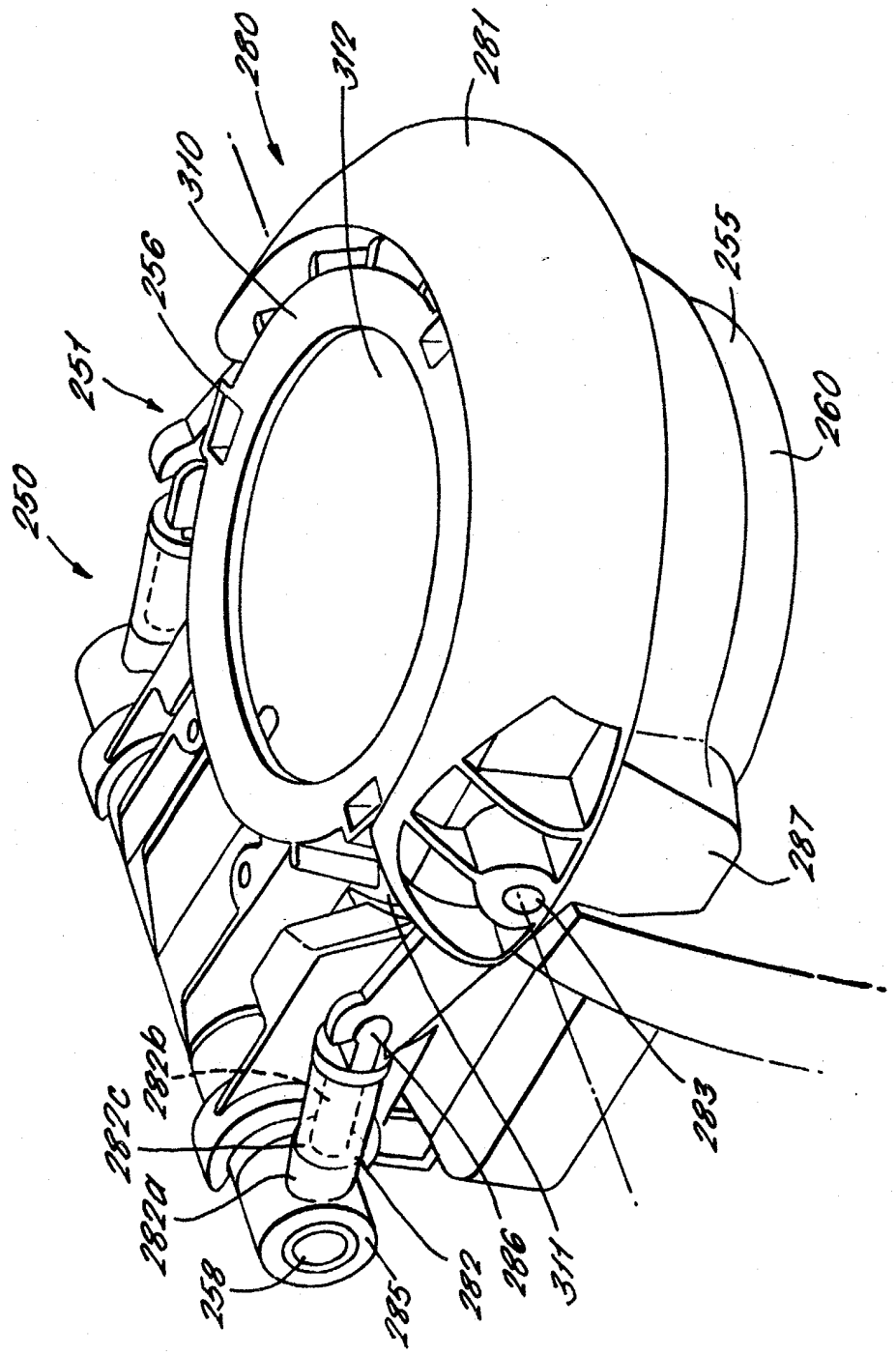
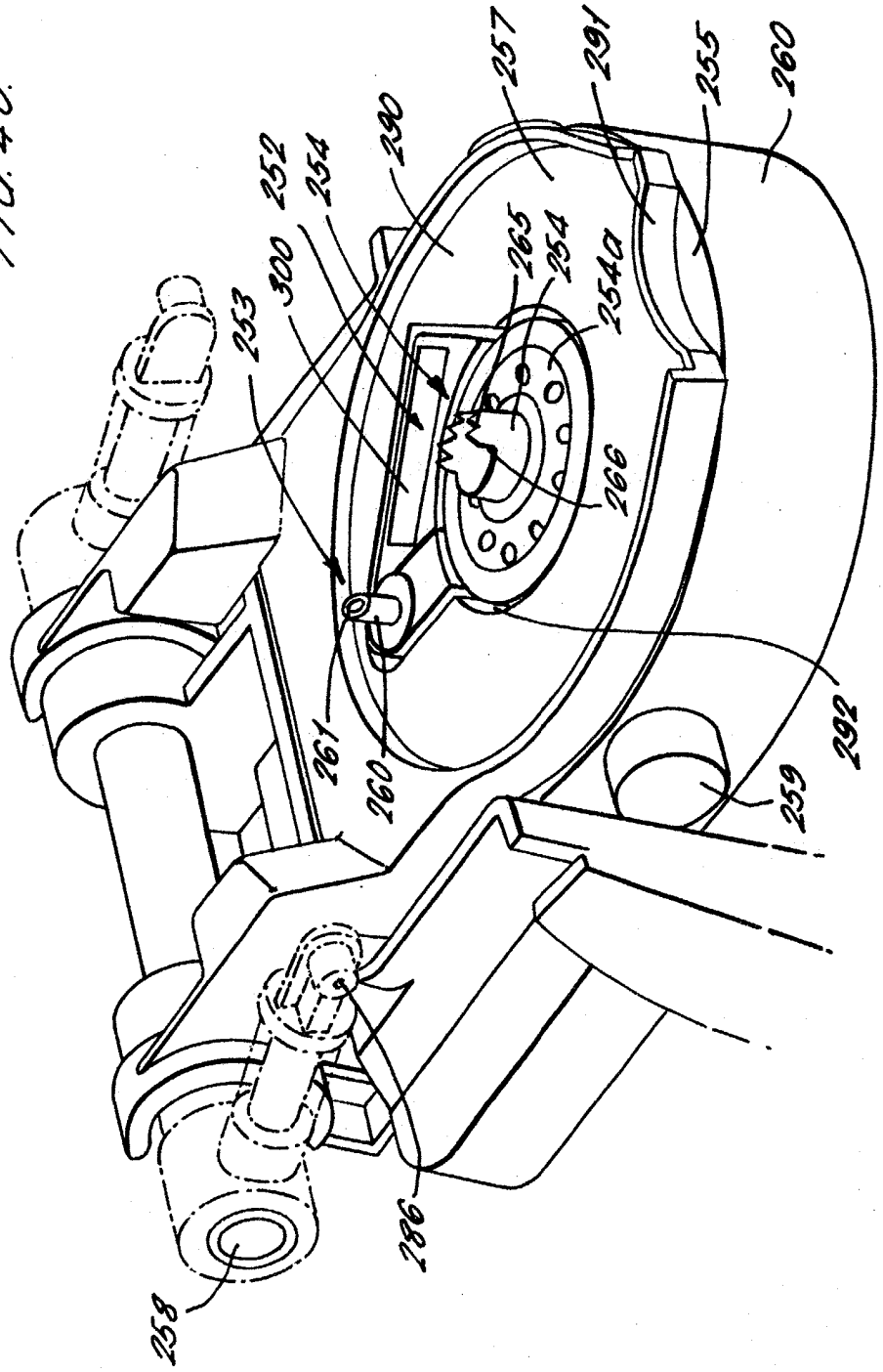


FIG. 39.

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FIG. 40.



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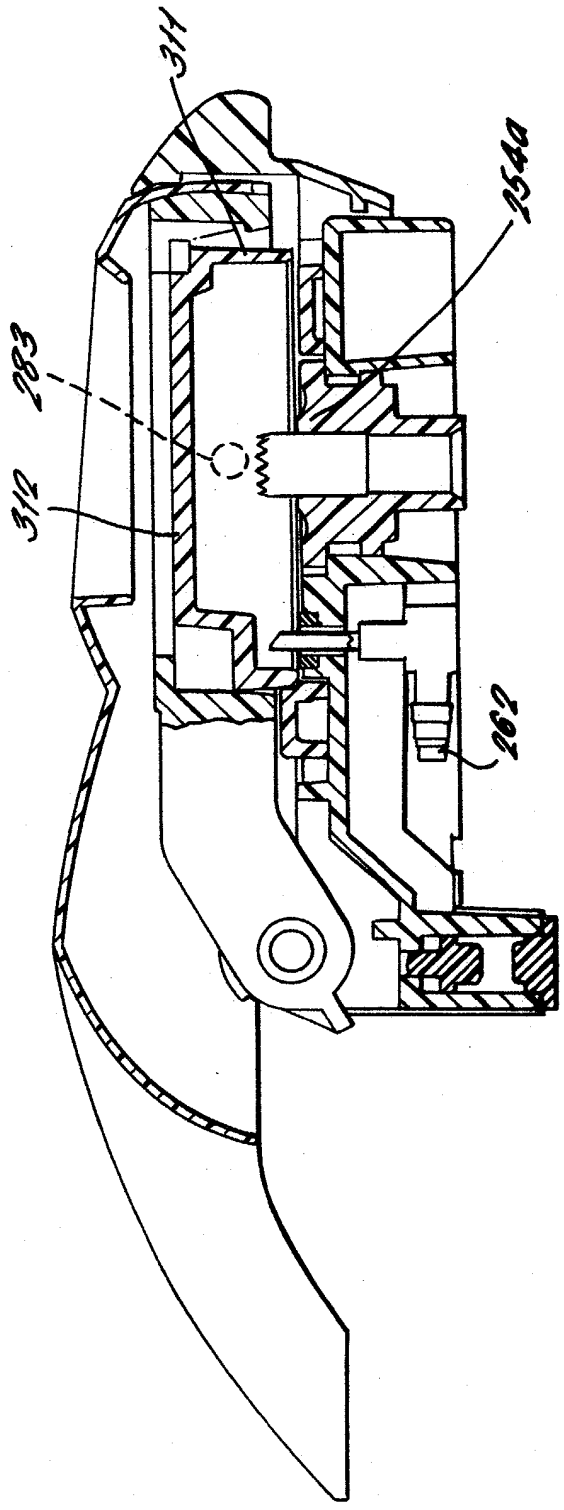
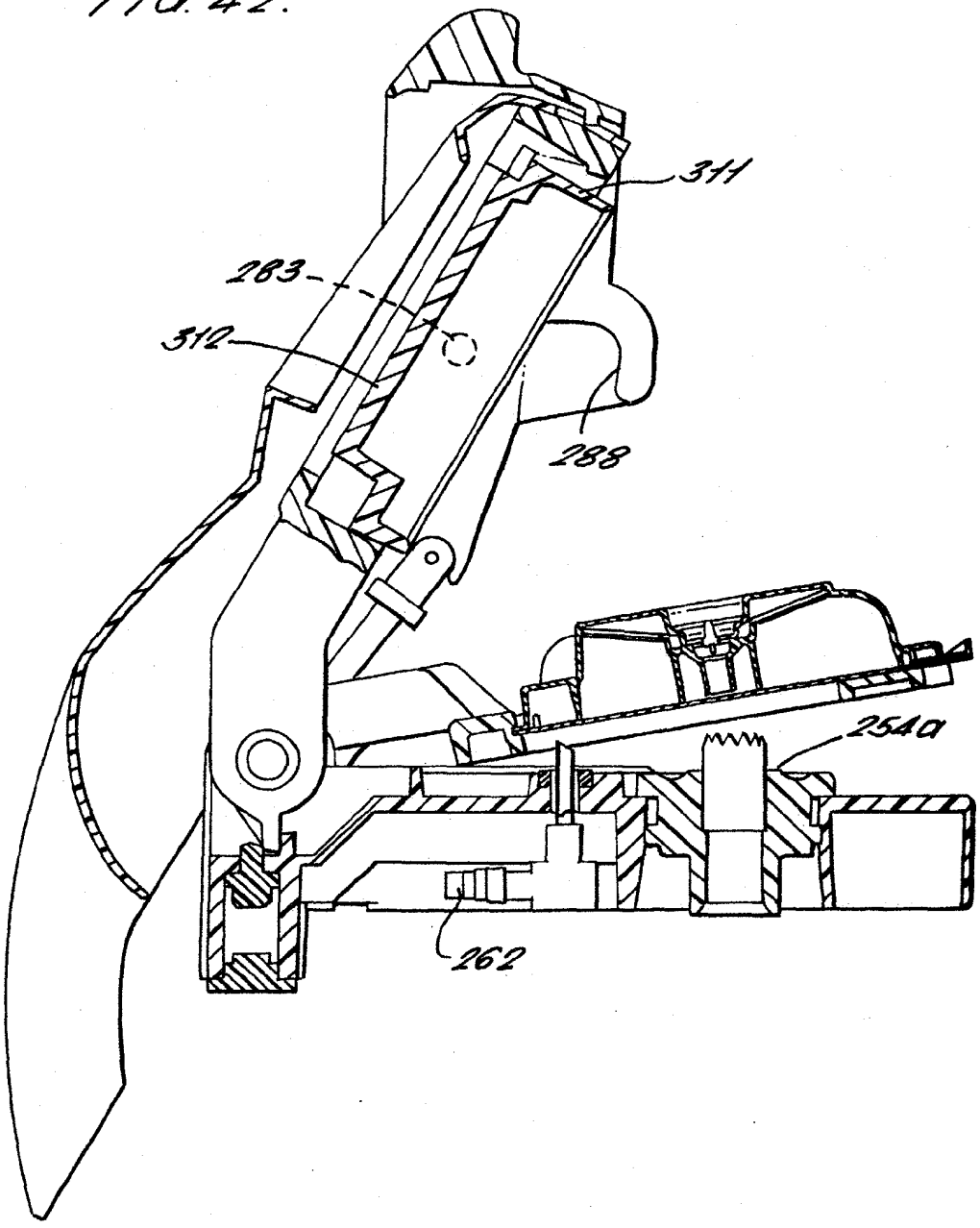


FIG. 41.

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FIG. 42.



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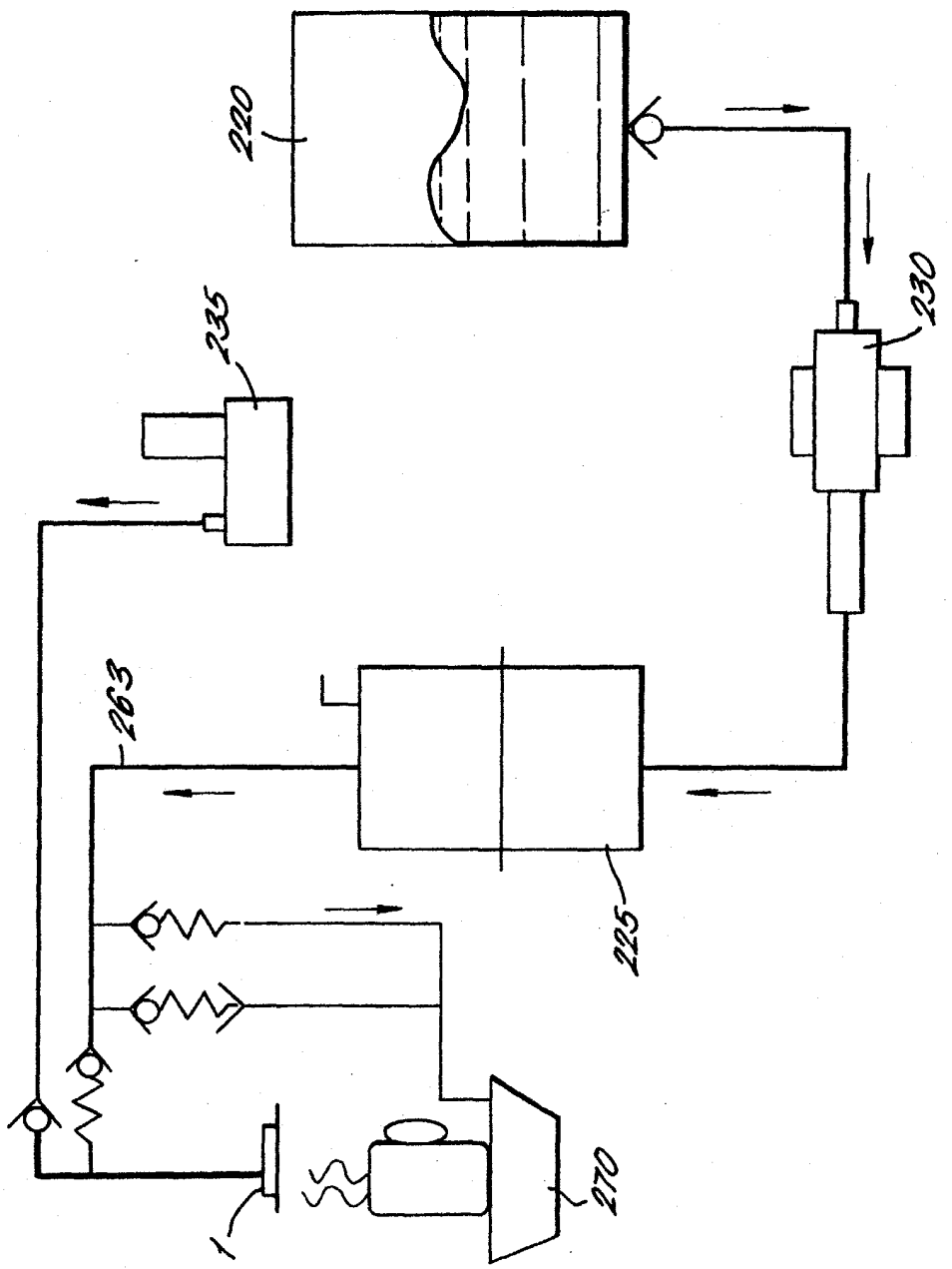


FIG. 43.

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FIG. 44a.

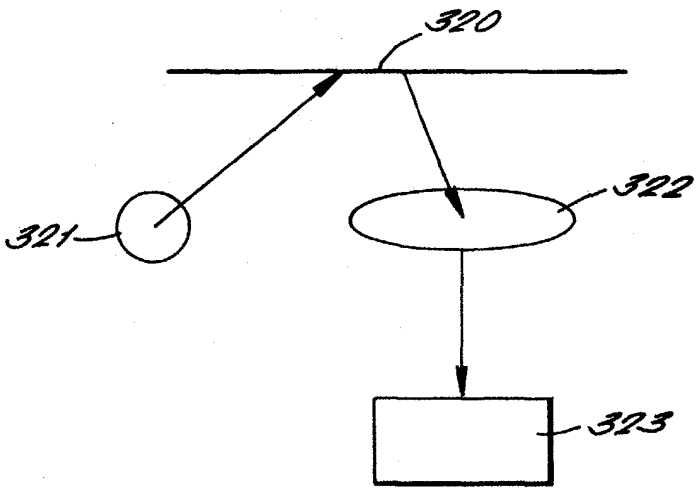
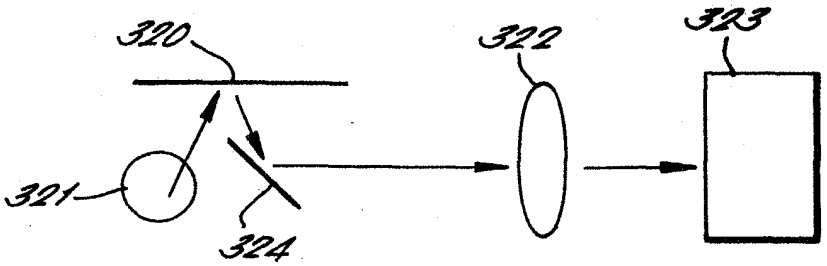
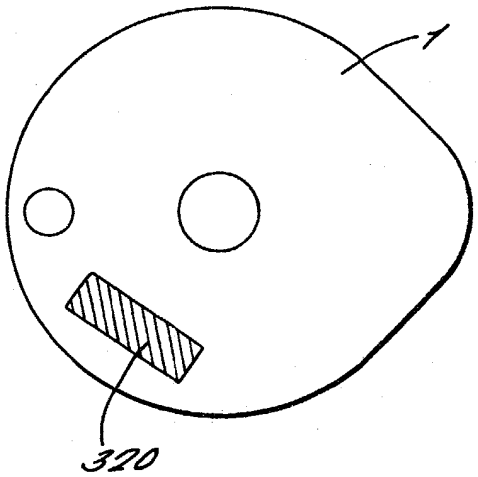


FIG. 44b.



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FIG. 45.



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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 25 0366

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)
Y	US 5 762 987 A (PLEISCH JEAN-PIERRE ET AL) 9 June 1998 (1998-06-09) * figures 10,11 * * column 3, line 57 - line 60 * * column 7, line 12 - line 19 * * column 8, line 35 - line 37 * * column 9, line 32 - line 57 * ---	1-4	A47J31/40 A47J31/06
Y	US 3 403 617 A (LAMPE WILLY G) 1 October 1968 (1968-10-01) * figures 1,2 * * column 1, line 63 - line 65 * * column 2, line 58 - line 60 * ---	1-4	
A	US 2001/048957 A1 (BEAULIEU RODERICK H ET AL) 6 December 2001 (2001-12-06) * figures 5,13 * * paragraph [0007] * * paragraph [0013] * -----	4	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	9 March 2004	Sainz Martínez, 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)

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 25 0366

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
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09-03-2004

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

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(19) RÉPUBLIQUE FRANÇAISE

INSTITUT NATIONAL
DE LA PROPRIÉTÉ INDUSTRIELLE

PARIS

(11) **N° de publication :** **2 912 124**
(à n'utiliser que pour les commandes de reproduction)

(21) **N° d'enregistrement national :** **07 53018**

(51) Int Cl[8] : ***B 65 D 85/804*** *(2006.01), G 06 K 19/067*

(12) DEMANDE DE BREVET D'INVENTION A1

(22) **Date de dépôt :** 01.02.07.

(30) **Priorité :**

(43) **Date de mise à la disposition du public de la demande :** 08.08.08 Bulletin 08/32.

(56) **Liste des documents cités dans le rapport de recherche préliminaire :** *Se reporter à la fin du présent fascicule*

(60) **Références à d'autres documents nationaux apparentés :**

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(72) **Inventeur(s) :** BLANC JEAN-PIERRE.

(73) **Titulaire(s) :**

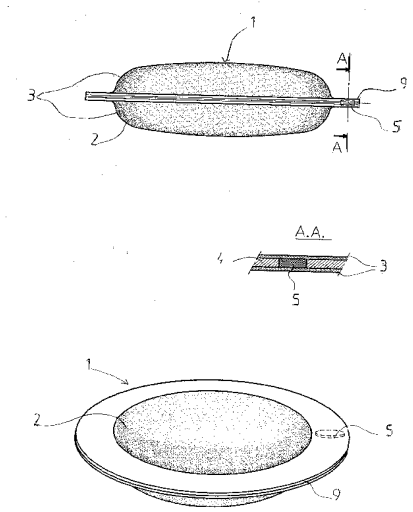
(74) **Mandataire(s) :** HAUTIER.

(54) CONDITIONNEMENT POUR LE PREPARATION DE BOISSONS MUNI D'ETIQUETTE RFID.

(57) La présente invention concerne un conditionnement (1) pour la préparation de boissons comportant une étiquette (5) du type RFID pour une lecture sans contact caractérisé par le fait que le conditionnement (1) comporte: deux couches de matière souple (3) solidarisées à leur portion périphérique (9) de sorte à délimiter un volume de réception de la matière de préparation de boissons (2), ladite portion périphérique (9) recevant l'étiquette (5) du type RFID; et un renfort (4) dans la portion périphérique (9).

L'autre objet de la présente invention est un dispositif (6) pour l'utilisation de ce conditionnement comportant des moyens de lecture (7) à distance de l'étiquette (5) du type RFID.

L'invention s'applique notamment au conditionnement de matières à infuser telles que du café moulu ou du thé ou encore de matières solubles telles que du lait ou du chocolat, utilisable avec des machines utilisant des doses du type préemballées.



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La présente invention concerne un conditionnement pour la préparation de boissons et un dispositif pour son utilisation.

Elle trouvera, en particulier, son application pour le conditionnement de matières à infuser telles que du café moulu ou du thé ou bien encore pour des matières solubles telles que du lait en poudre ou du chocolat.

Ce conditionnement est utilisable avec des machines utilisant des doses du type café moulu ou de thé préemballées.

Le document WO 2005/079638, décrit une cartouche pour la préparation de boissons comprenant une surface inférieure et une surface supérieure. Cette cartouche possède une forme particulière et ne peut être insérée dans le dispositif de préparation de boisson que dans un sens très précis. La face inférieure comprend un code-barres ou une étiquette RFID (de l'anglais Radio Frequency Identification).

Le dispositif destiné à préparer la boisson à partir de cette cartouche est lui muni d'un lecteur de code-barres ou d'étiquettes RFID.

La lecture de cet élément d'identification qu'est le code-barres ou l'étiquette RFID permet notamment d'identifier le type de cartouche et d'autoriser ou non le lancement de l'opération de la préparation de la boisson.

L'inconvénient de ce type de cartouche est le manque de facilité lors de sa fabrication ce qui augmente les coûts de production.

En effet, le code-barres ou l'étiquette RFID doit être positionné à un emplacement précis du fait de la structure de la cartouche et du dispositif pour mettre en regard l'élément d'identification et son lecteur.

De plus, l'apposition du code-barres ou de l'étiquette RFID n'est pas explicitée dans ce document.

Cette étape est pourtant complexe en particulier pour fixer l'étiquette RFID.

Il apparaît le besoin de présenter un conditionnement pour la préparation de boissons qui soit facilement identifiable et dont le temps et les coûts de fabrication seraient réduits.

A cette fin, la présente invention propose un conditionnement pour la préparation de boissons comportant une étiquette du type RFID pour une lecture sans contact caractérisé par le fait que le conditionnement comporte

deux couches de matière souple solidarisées en leur portion périphérique de sorte à délimiter un volume de réception de la matière de préparation de boissons, ladite portion périphérique recevant l'étiquette du type RFID et un renfort dans la portion périphérique.

Les étiquettes RFID sont destinées à recevoir un signal radio et à renvoyer immédiatement en réponse un signal radio différent contenant des informations pertinentes.

Elles peuvent être utilisées pour fournir des informations sur la provenance du produit, sa nature, les moyens à utiliser pour sa préparation.

L'avantage d'utiliser un conditionnement selon l'invention pour porter une étiquette du type RFID réside dans la facilité de production du conditionnement muni de l'étiquette du type RFID.

Ainsi, l'utilisation de la présente invention conduit à une réduction du coût et du temps de fabrication du conditionnement du fait que l'étiquette du type RFID est ajoutée au conditionnement lors de la solidarisation des deux couches de matière souple.

Avantageusement, l'étiquette du type RFID est reçue par le renfort. Cette disposition a l'avantage de placer l'étiquette du type RFID sur une structure sensiblement rigide.

Selon un mode de réalisation, l'étiquette du type RFID peut être placée entre une des couches de matière souple et le renfort, de cette manière l'étiquette du type RFID sera protégée par la couche de matière souple et par le renfort. Il n'y a pas de risque de détérioration lors de la manutention.

Selon un autre mode de réalisation, l'étiquette du type RFID peut être insérée au sein même du renfort, c'est-à-dire que celle-ci est déjà présente dans le renfort avant la solidarisation du renfort à la portion périphérique du conditionnement.

Avantageusement, le renfort est plan ce qui facilite l'ajout de l'étiquette du type RFID à sa surface.

L'invention a aussi pour objet un dispositif de production de boissons à partir du conditionnement tel que précédemment décrit caractérisé par le fait qu'il comporte des moyens de guidage aptes à coopérer avec la portion

périphérique du conditionnement ainsi que des moyens de lecture à distance de l'étiquette du type RFID.

Les moyens de guidage ont l'avantage de permettre le bon positionnement du conditionnement dans le dispositif et de l'amener dans sa position d'introduction. Avantageusement, lorsque le conditionnement est dans sa position d'introduction dans le dispositif, les moyens de lecture se situent dans l'axe de symétrie du conditionnement, de manière à ce que quelque soit le sens d'introduction de dudit dispositif, l'étiquette du type RFID soit sensiblement à égale distance des moyens de lecture.

D'autres buts et avantages apparaîtront au cours de la description qui suit d'un mode préféré de réalisation de l'invention qui n'en est cependant pas limitatif.

La présente invention concerne un conditionnement pour la préparation de boissons comportant une étiquette du type RFID pour une lecture sans contact caractérisé par le fait que le conditionnement comporte :

- deux couches de matière souple solidarisées en leur portion périphérique de sorte à délimiter un volume de réception de la matière de préparation de boisson, ladite portion périphérique recevant l'étiquette du type RFID ;
- un renfort dans la portion périphérique

Suivant des variantes préférées de l'invention ce conditionnement est tel que

- l'étiquette du type RFID est reçue par le renfort
- l'étiquette du type RFID est placée entre une des deux couches de matière souple et le renfort
- l'étiquette du type RFID est insérée dans le renfort
- le renfort est au moins en partie entouré par les deux couches de matière souple
- l'étiquette du type RFID est placée sur la face extérieure des deux couches de matière souple
- le renfort est à base de matière cartonnée
- le renfort est plan
- le renfort est de forme circulaire

- les couches de matière souple sont perméables
- les couches de matière souple sont à base de papier filtre
- les couches de matière souple sont imperméables

Un autre objet de l'invention est un dispositif de production de boissons à partir d'un conditionnement tel que précédemment décrit caractérisé par le fait qu'il comporte :

- des moyens de guidage aptes à coopérer avec la portion périphérique du conditionnement.
- des moyens de lecture à distance d'une étiquette de type RFID

Suivant des variantes préférées de l'invention, ce dispositif est tel que

- les moyens de lecture à distance se situent dans l'axe de symétrie du conditionnement, lorsque ledit conditionnement est en position d'introduction
- qu'il comporte des moyens de commande destinés à adapter le fonctionnement dudit dispositif selon l'identification de l'étiquette du type RFID.

Les dessins ci-joints sont donnés à titre d'exemples et ne sont pas limitatifs de l'invention. Ils représentent seulement un mode de réalisation de l'invention et permettront de la comprendre aisément.

La figure 1 illustre une vue de côté du conditionnement selon un mode de réalisation de l'invention.

La figure 2 est une vue selon la coupe AA de la figure 1 au niveau de l'étiquette du type RFID.

La figure 3 est une vue en perspective du conditionnement comportant l'étiquette du type RFID dans sa portion périphérique.

La figure 4 est une vue de côté du dispositif selon l'invention.

La figure 5 est une vue de face du dispositif selon l'invention

Tel que représenté dans les figures 1 à 5, on peut utiliser un conditionnement 1 de forme sensiblement en soucoupe avec une symétrie de révolution.

Cependant, cette configuration n'est pas limitative et on peut notamment utiliser des conditionnements (1) avec une section carrée.

Le conditionnement (1) selon l'invention est constitué de deux couches de matière souple (3) solidaires en leur portion périphérique (9) de sorte à délimiter un volume de réception de la matière de préparation de boissons (2).

A titre d'exemple préféré, la matière (2) est de la mouture de café, et les couches de matière souple (3) sont à base de papier filtre.

L'étiquette du type RFID (5) est reçue par la portion périphérique (9).

Au niveau de la portion périphérique (9) se situe un renfort (4) destiné à faire office d'armature pour donner une bonne tenue mécanique au conditionnement (1).

Le renfort (4) peut également assurer une meilleure jonction des couches de matière souple (3).

Avantageusement, l'étiquette (5) du type RFID est reçue par le renfort (4).

Selon une première possibilité, l'étiquette (5) du type RFID est placée entre l'une des deux couches de matière souple (3) et le renfort (4).

Dans ce mode de réalisation, plusieurs moyens de fabrication peuvent être utilisés :

- l'étiquette (5) du type RFID est fixée au renfort (4) entre les deux couches de matière souple (3) lors de la solidarisation.

- l'étiquette (5) du type RFID est imprimée à la surface du renfort (4) avant son assemblage aux couches de matière souple (3).

- l'étiquette (5) du type RFID est solidaire d'une couche supplémentaire qui se place sur le renfort (4). La couche supplémentaire peut être placée entre le renfort (4) et une des couches de matière souple (3) ou à l'extérieur de la couche de matière souple (3), une fois la solidarisation avec le renfort réalisée.

Avantageusement la couche supplémentaire est sensiblement de forme identique au renfort.

Selon une deuxième possibilité, l'étiquette (5) du type RFID est insérée dans le renfort (4) lors de sa fabrication ou plus tard dans le processus de fabrication du conditionnement (1). Dans ce cas, soit le renfort (4) est évidé sur un certain volume pour permettre l'insertion de l'étiquette RFID, soit l'étiquette (5) du type RFID est intégrée au matériau de préparation du renfort (4). Par

exemple, dans la pâte à papier destinée à former le renfort (4) en matière cartonnée.

A titre préféré, le renfort (4) est à base de matière cartonnée, et il est situé entre les deux couches de matière souple (3). On pourrait bien entendu utiliser d'autres matériaux pour la constitution du renfort (4) notamment un renfort (4) en matière plastique.

Selon une autre possibilité, le renfort (4) n'est pas entouré des deux couches de matière souple (3). Les deux couches de matière souple (3) sont solidarisées et le renfort (4) est rapporté pour la suite sur une des faces externes des couches de matière souple (3).

Selon ces derniers modes de réalisation décrits l'étiquette (5) du type RFID est protégée par une couche de matière souple (3) de manière à ne pas être endommagée lors de la manutention du conditionnement (1).

Selon un autre mode de réalisation, l'étiquette (5) du type RFID est placée sur la face extérieure d'une des couches de matière souple (3).

Ce mode de réalisation permet d'ajouter l'étiquette (5) du type RFID une fois la fabrication du conditionnement (1) terminée.

Le renfort (4) est avantageusement plan ce qui facilite la fabrication du conditionnement (1) et la fixation de l'étiquette (5) du type RFID à sa surface.

Selon le mode de réalisation où le conditionnement a une symétrie de révolution, le renfort (4) a une forme circulaire.

Un autre objet de la présente invention est un dispositif (6) de production de boissons à partir d'un conditionnement (1) tel que décrit précédemment caractérisé par le fait qu'il comporte des moyens de guidage (8) aptes à coopérer avec la portion périphérique (9) du conditionnement (1) ainsi que des moyens de lecture (7) à distance d'une étiquette (5) du type RFID.

Selon ce dispositif (6), la portion périphérique (9) coopère avec les moyens de guidage (8), ainsi celle-ci n'est pas en contact avec le liquide. Cette disposition a l'avantage d'éviter que l'étiquette (5) du type RFID reçue par la portion périphérique (9) soit endommagée lors de la production de boisson.

Selon une possibilité, les moyens de guidage (8) comprennent des glissières parallèles, espacées et ajustées à la taille du conditionnement (1).

A titre préféré, les moyens de lecture à distance (7) se situent dans l'axe de symétrie du conditionnement (1) lorsque celui-ci est en position d'introduction dans le dispositif (6). Ceci a l'avantage de permettre à ce que l'étiquette (5) du type RFID soit sensiblement à égale distance des moyens de lecture (7) quelque soit son sens d'introduction.

Avantageusement, il est préférable d'utiliser une étiquette (5) du type RFID dont la portée est sensiblement limitée à moins de un mètre, avantageusement, à quelques dizaines de centimètres.

En effet, ce serait un inconvénient majeur que les moyens de lecture (7) du dispositif (6) détectent des étiquettes (5) du type RFID de conditionnement (1) qui ne sont pas destinés à être utilisés immédiatement, par exemple qui sont stockées à une distance proche du dispositif ou qui sont destinées à la préparation d'une deuxième boisson.

Du fait de cette exigence, il est avantageux d'utiliser le mode de réalisation selon lequel l'étiquette (5) du type RFID est insérée dans le renfort (4) qui lui-même est entouré des deux couches de matière souple (3). Ainsi lorsque le conditionnement (1) est inséré dans le dispositif (6) quelque soit son orientation, l'étiquette (5) du type RFID émettra dans toutes les directions, et son émission ne sera pas perturbée par le renfort (4).

Selon ce mode de réalisation, avantageusement, les moyens de lecture (7) se situent au niveau de l'axe de symétrie du conditionnement (1), de manière à ce que l'étiquette (5) du type RFID soit sensiblement à égale distance des moyens de lecture (7) quelque soit le sens d'introduction du conditionnement (1) dans le dispositif (6).

Le procédé d'utilisation du conditionnement est avantageusement mis en œuvre comme suit.

Lorsque le conditionnement (1) est inséré dans le dispositif (6), les moyens de guidage (8) aptes à coopérer avec la portion périphérique (9) du conditionnement (1) vont permettre son guidage jusqu'à sa position d'introduction. Dans cette position d'introduction, le conditionnement (1) est dans la meilleure position pour que l'étiquette (5) du type RFID soit lue par les moyens de lecture (7) du dispositif (6).

Une fois l'identification de l'étiquette (5) du type RFID réalisée, le dispositif (6) comportant des moyens de commande peut adapter son fonctionnement selon l'identification de l'étiquette (5) du type RFID. Par adaptation du fonctionnement, on entend que le dispositif (6) peut adapter la température du liquide destiné à préparer la boisson, la pression avec laquelle ce liquide est amené au contact du conditionnement (1) ou encore la quantité de liquide qui est amenée pour préparer la boisson.

REFERENCES

1. Conditionnement
2. Matière de préparation de boisson
3. Couches de matière souple
4. Renfort
5. Etiquette du type RFID
6. Dispositif
7. Moyens de lecture
8. Moyens de guidage
9. Portion périphérique

REVENDICATIONS

1. Conditionnement (1) pour la préparation de boissons comportant une étiquette (5) du type RFID pour une lecture sans contact caractérisé par le fait que le conditionnement (1) comporte :

- deux couches de matière souple (3) solidarisées en leur portion périphérique (9) de sorte à délimiter un volume de réception de la matière de préparation de boisson (2), ladite portion périphérique (9) recevant l'étiquette (5) du type RFID.
- un renfort (4) dans la portion périphérique (9).

2. Conditionnement (1) selon la revendication 1 caractérisé par le fait que l'étiquette (5) du type RFID est reçue par le renfort (4).

3. Conditionnement (1) selon l'une quelconque des revendications 1 ou 2 caractérisé par le fait que l'étiquette (5) du type RFID est placée entre une des deux couches de matière souple (3) et le renfort (4).

4. Conditionnement (1) selon l'une quelconque des revendications 1 ou 2 caractérisé par le fait

que l'étiquette (5) du type RFID est insérée dans le renfort (4).

5. Conditionnement (1) selon la revendication 4 caractérisé par le fait que le renfort (4) est au moins en partie entouré par les deux couches de matière souple (3).

6. Conditionnement (1) selon la revendication 1 caractérisé par le fait que l'étiquette (5) du type RFID est placée sur la face extérieure des deux couches de matière souple (3).

7. Conditionnement (1) selon l'une quelconque des revendications précédentes caractérisé par le fait

que le renfort (4) est à base de matière cartonnée.

8. Conditionnement (1) selon l'une quelconque des revendications précédentes caractérisé par le fait

que le renfort (4) est plan.

9. Conditionnement (1) selon l'une quelconque des revendications précédentes caractérisé par le fait
que le renfort (4) a une forme circulaire.

10. Conditionnement (1) selon l'une quelconque des revendications précédentes caractérisé par le fait
que les couches de matière souple (3) sont perméables.

11. Conditionnement (1) selon la revendication 10 caractérisé par le fait
que les couches de matière souple (3) sont à base de papier filtre.

12. Conditionnement (1) selon l'une quelconque des revendications 1 à 9 caractérisé par le fait
que les couches de matière souple (3) sont imperméables.

13. Dispositif (6) de production de boissons à partir d'un conditionnement (1) selon l'une quelconque des revendications 1 à 12 caractérisé par le fait
qu'il comporte :

- des moyens de guidage (8) aptes à coopérer avec la portion périphérique (9) du conditionnement (1).
- des moyens de lecture à distance (7) d'une étiquette (5) de type RFID.

14. Dispositif (6) selon la revendication 13 caractérisé par le fait
que les moyens de lecture à distance (7) se situent dans l'axe de symétrie du conditionnement (1), lorsque ledit conditionnement (1) est en position d'introduction.

15. Dispositif (6) selon la revendication 13 ou 14 caractérisé par le fait
qu'il comporte des moyens de commande destinés à adapter le fonctionnement dudit dispositif (6) selon l'identification de l'étiquette (5) du type RFID.

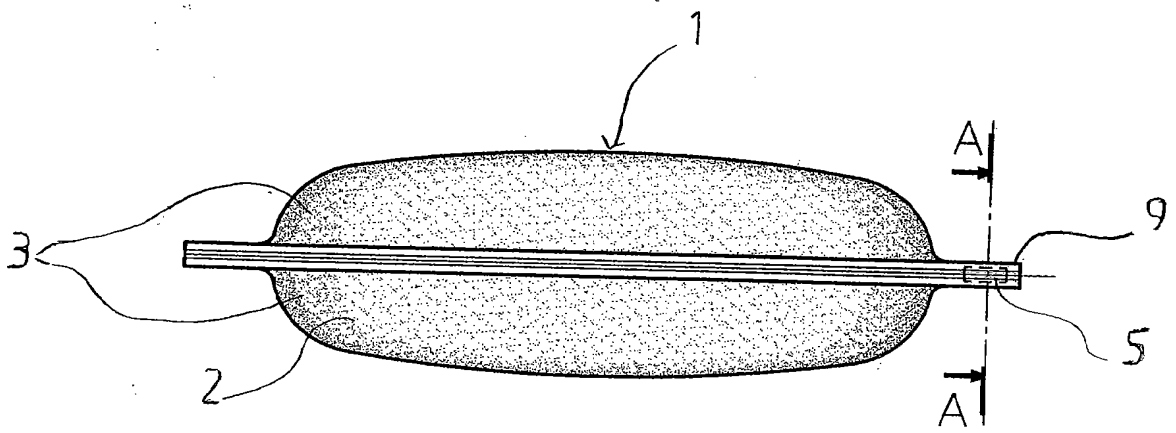


Fig 1

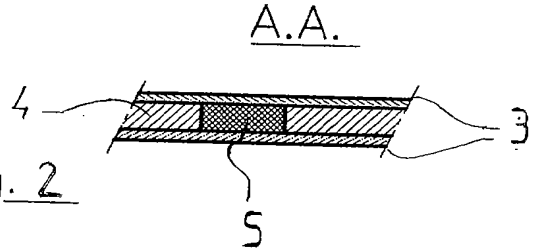


Fig. 2

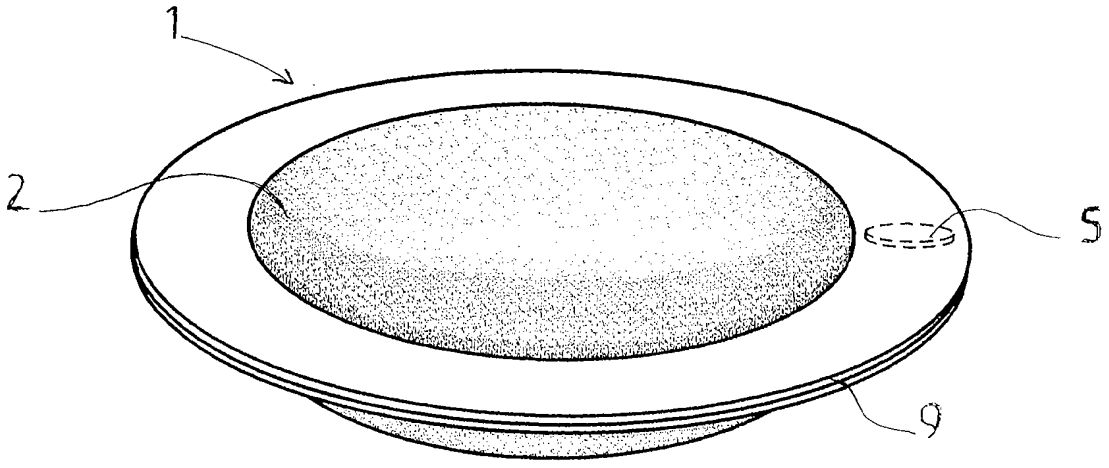


Fig. 3

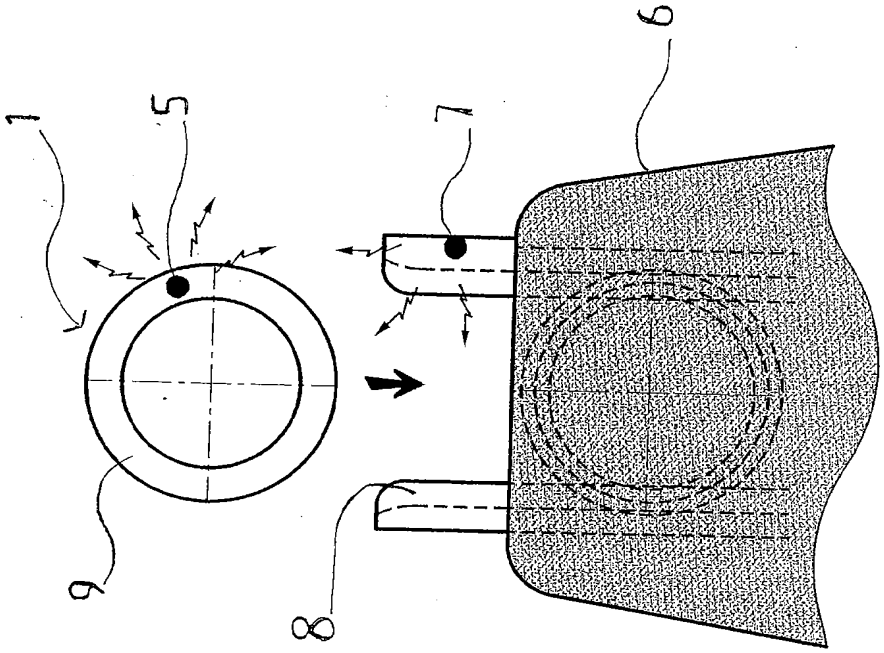


Fig. 5

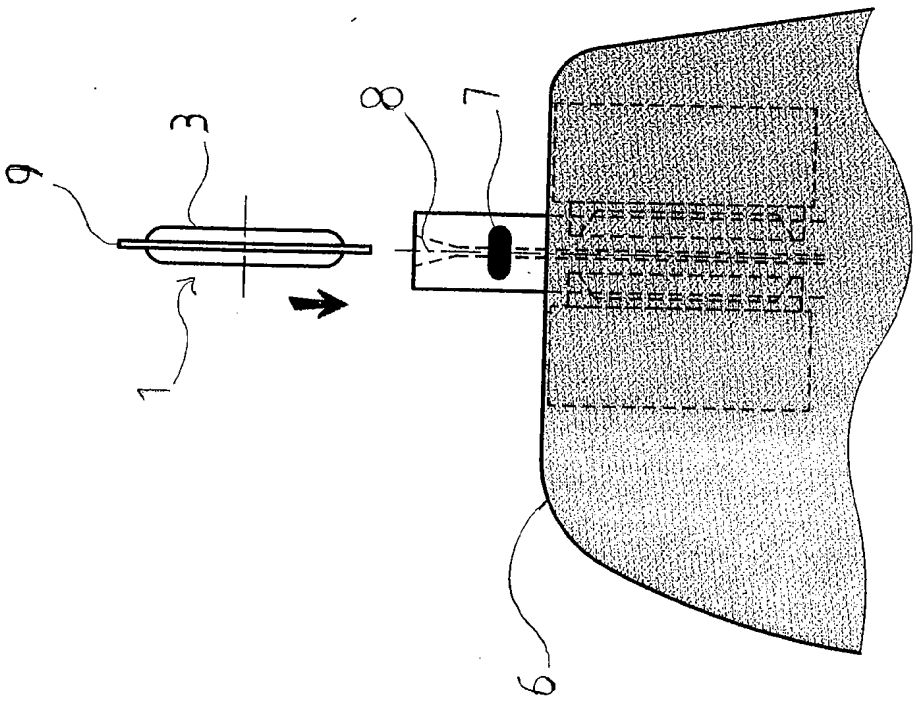


Fig. 4

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RÉPUBLIQUE FRANÇAISE

INSTITUT NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE

RAPPORT DE RECHERCHE PRÉLIMINAIRE PARTIEL

établi sur la base des dernières revendications déposées avant le commencement de la recherche

voir FEUILLE(S) SUPPLÉMENTAIRE(S)

N° d'enregistrement national

FA 690960
FR 0753018

DOCUMENTS CONSIDÉRÉS COMME PERTINENTS		Revendications concernées	Classement attribué à l'invention par l'INPI
Catégorie	Citation du document avec indication, en cas de besoin, des parties pertinentes		
X Y	WO 02/28241 A (BOYD COFFEE CO [US]) 11 avril 2002 (2002-04-11) * le document en entier * -----	1,5,6, 8-12 2-4,7	B65D85/804 G06K19/067
Y	FR 2 874 210 A1 (CIE MEDITERRANEENNE DES CAFES [FR]) 17 février 2006 (2006-02-17) * le document en entier * -----	2-4,7	
A	GB 2 416 480 A (KRAFT FOODS R & D INC [DE]) 1 février 2006 (2006-02-01) * le document en entier * -----	1-12	
A	WO 2005/044067 A (RUCHONNET JEAN-FRANCOIS [CH]) 19 mai 2005 (2005-05-19) * le document en entier * -----	1-12	
			DOMAINES TECHNIQUES RECHERCHÉS (IPC)
			B65D A47J

Date d'achèvement de la recherche	Examinateur
12 septembre 2007	Pernice, Ciro

CATÉGORIE DES DOCUMENTS CITES

X : particulièrement pertinent à lui seul
Y : particulièrement pertinent en combinaison avec un autre document de la même catégorie
A : arrière-plan technologique
O : divulgation non-écrite
P : document intercalaire

T : théorie ou principe à la base de l'invention
E : document de brevet bénéficiant d'une date antérieure à la date de dépôt et qui n'a été publié qu'à cette date de dépôt ou qu'à une date postérieure.
D : cité dans la demande
L : cité pour d'autres raisons

& : membre de la même famille, document correspondant

4

EPO FORM 1503 12.99 (P04C35)

ANNEXE AU RAPPORT DE RECHERCHE PRÉLIMINAIRE RELATIF A LA DEMANDE DE BREVET FRANÇAIS NO. FR 0753018 FA 690960

La présente annexe indique les membres de la famille de brevets relatifs aux documents brevets cités dans le rapport de recherche préliminaire visé ci-dessus.
Les dits membres sont contenus au fichier informatique de l'Office européen des brevets à la date du 12-09-2007
Les renseignements fournis sont donnés à titre indicatif et n'engagent pas la responsabilité de l'Office européen des brevets, ni de l'Administration française

Document brevet cité au rapport de recherche	Date de publication	Membre(s) de la famille de brevet(s)	Date de publication
WO 0228241 A	11-04-2002	AU 1148902 A	15-04-2002
FR 2874210 A1	17-02-2006	CA 2574259 A1	30-03-2006
		EP 1791770 A1	06-06-2007
		WO 2006032565 A1	30-03-2006
GB 2416480 A	01-02-2006	AR 055235 A1	15-08-2007
		CA 2574961 A1	09-02-2006
		EP 1796516 A2	20-06-2007
		WO 2006014936 A2	09-02-2006
WO 2005044067 A	19-05-2005	AUCUN	

EPO FORM P0465

Pour tout renseignement concernant cette annexe : voir Journal Officiel de l'Office européen des brevets, No.12/82

ABSENCE D'UNITÉ D'INVENTION
FEUILLE SUPPLÉMENTAIRE B

Numéro de la demande

FA 690960
FR 0753018

La division de la recherche estime que la présente demande de brevet ne satisfait pas à l'exigence relative à l'unité d'invention et concerne plusieurs inventions ou pluralités d'inventions, à savoir :

1. revendications: 1-12

Conditionnement pour la préparation de boissons, comportant une portion périphérique délimitant le volume de réception de la matière de préparation de boisson, ladite portion périphérique recevant une étiquette du type RFID.

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2. revendications: 13-15

Dispositif de production de boissons à partir d'un conditionnement et ayant des moyens de guidage aptes à coopérer avec la portion périphérique du conditionnement, et des moyens de lecture à distance d'une étiquette du type RFID.

La première invention a été recherchée.

La présente demande ne satisfait pas aux dispositions de l'article L.612-4 du CPI car elle concerne une pluralité d'inventions qui ne sont pas liées entres elles en formant un seul concept inventif général.

Le concept commun aux sujets 1 et 2 est "un conditionnement pour la préparation de boissons, comportant une portion périphérique". Un tel conditionnement est connu par la WO02/028241 (D1), voir aussi les autres documents dans le rapport de recherche. Le concept commun n'est donc pas nouveau.

Invention 1 (rev. 1-12)

Par comparaison de l'état de la technique divulgué par D1 avec les éléments techniques de la revendication indépendante 1, les elements suivants apparaissent comme les element techniques particuliers (ETP): ladite portion périphérique comporte une étiquette du type RFID.

Invention 2 (rev. 13-15)

Par comparaison de l'état de la technique divulgué par D1 avec les éléments techniques de la revendication indépendante 13, les elements suivants apparaissent comme les element techniques particuliers (ETP): un dispositif de production de boissons à partir d'un conditionnement et ayant des moyens de guidage aptes à coopérer avec la portion périphérique du conditionnement, et des moyens de lecture à distance d'une étiquette du type RFID.

D' aprés ces ETP, le problème a résoudre serait,

Invention 1: l' incorporation d'une étiquette du type RFID dans une partie du conditionnement, qui soit facile a identifier par un lecteur RFID.

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ABSENCE D'UNITÉ D'INVENTION
FEUILLE SUPPLÉMENTAIRE B

Numéro de la demande

FA 690960
FR 0753018

La division de la recherche estime que la présente demande de brevet ne satisfait pas à l'exigence relative à l'unité d'invention et concerne plusieurs inventions ou pluralités d'inventions, à savoir :

Invention 2: faciliter le positionnement d'un conditionnement dans un dispositif de production de boissons.

L'analyse ci dessus montre que ni les ETP, ni les problèmes objectifs à résoudre par ces inventions sont identiques ou correspondants. La demande présente donc un défautd' unité d'invention.

EPO FORM P0418

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

(11) EP 0 638 486 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
23.10.1996 Bulletin 1996/43

(51) Int. Cl.[6]: **B65D 81/34**

(21) Application number: **94305730.7**

(22) Date of filing: **02.08.1994**

(54) **Cartridge and method for the preparation of whipped beverages**

Patrone und Verfahren zur Zubereitung von verschäumten Getränken

Cartouche et méthode pour la préparation de boissons fouettées

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IE IT LI LU NL PT SE

(30) Priority: **11.08.1993 GB 9316717**

(43) Date of publication of application:
15.02.1995 Bulletin 1995/07

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(56) References cited:
EP-A- 0 455 337

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Printed by Rank Xerox (UK) Business Services
2.13.8/3.4

EP 0 638 486 B1

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Description

The present invention relates to a cartridge and method for the preparation of whipped beverages and, in particular, to sealed cartridges which are formed from substantially air- and water-impermeable materials and which contain one or more ingredients for the preparation of beverages and to a method of preparing whipped beverages from such cartridges.

It has previously been proposed to seal beverage preparation ingredients in individual air-impermeable packages. For example, cartridges or capsules containing compacted ground coffee are known for use in certain coffee making machines which are generally termed "espresso" machines. In the production of coffee using these coffee machines the coffee cartridge is placed in a brewing chamber and hot water is generally caused to pass under pressure through the cartridge, thereby extracting the aromatic coffee constituents from the ground coffee and producing a coffee beverage. Typically in the production of "espresso" coffee a brewing time of about 25 seconds is used at a pressure of about 6×10^5 Pa.

Cartridges containing roast and ground coffee in which hot water flows under gravimetric force through the cartridge are also known. A cartridge of this general type is described in British Patent No. 1397116.

In our EP-A-0272922 there is described a package which contains at least one beverage preparation ingredient, e.g. roast and ground coffee. In a preferred embodiment the package is formed from a substantially air- and water-impermeable material and comprises a sealed body portion having a compartment containing the beverage ingredient and an outlet channel, the compartment and the outlet channel co-operating in such a manner that, in use, the beverage is filtered, thereby avoiding the necessity for an external filter.

There is also described in EP-A-0272922 a method for preparing a beverage which comprises positioning the beverage containing package at a brewing station, introducing water through water introduction means into the package, allowing the water to commingle with the beverage ingredient, and collecting the beverage so-formed through an outlet formed in the package.

The beverage packages as described in EP-A-0272922 are primarily intended to be used with a beverage preparation machine which handles the packages automatically or semi-automatically. A machine of this type is described in our EP-A-0334572. The packages may contain roast and ground coffee, leaf tea or one or more powdered beverage preparation ingredients such as powdered chocolate, powdered coffee or powdered soup.

The machines described in EP-A-0272922 operate at a relatively low pressure of less than 2×10^5 Pa and thus, although by varying the amount of water introduced into packages containing roast and ground coffee it is possible to obain a coffee beverage of the same strength as "espresso" coffee, it is not possible to incorporate gases into the coffee beverage at this pressure to provide the beverage with the foamed texture and appearance of "espresso" coffee.

We have now developed a cartridge operating at relatively low pressures which is capable of producing whipped beverages.

Accordingly, the present invention provides a cartridge containing one or more beverage ingredients and being formed from substantially air- and water-impermeable materials, the said cartridge comprising an inlet for the introduction of an aqueous medium into the cartridge, a compartment containing the beverage ingredient or ingredients, an outlet for the beverage produced from the beverage ingredients characterised in that the cartridge includes whipping means provided in the path of the beverage prior to the outlet to whip the said beverage.

The cartridge which is used in the present invention may be of a known type, for example as described in EP-A-0272922 or EP-A-0455337, modified to include whipping means provided in the path of the beverage prior to the outlet.

The whipping means will preferably comprise an impeller which is adapted to engage an external driving device on the beverage preparation machine, for example a machine of the type as described in EP-A-0334573. The impeller may comprise a rotor with a plurality of radial vanes, for example from 4 to 8 radial vanes. The vanes may be regularly or irregularly spaced, flat or curled, or offset, as desired. Preferably the rotor is provided with a hollow drive shaft which is adapted for engagement with the external driving device. The rotor may be made from a moulded plastics material such as polyacetal, for example Delrin (Registered Trade Mark) from DuPont, or polyester, or from nylon.

Preferably the impeller is positioned in a whipping chamber integrally formed within the cartridge, the beverage being diverted through this chamber before passing to the outlet. The whipping chamber is preferably provided with a plurality of fixed vanes or ribs formed integrally with the walls thereof. The whipping chamber is preferably also provided with means to position the impeller therein, for example, a cylindrical hole into which a drive shaft on the impeller is adapted to fit.

The cartridge of the present invention preferably has a body portion which may be formed, for example, from a moulded plastics material such as polypropylene. The inlet and/or outlet of the cartridge may be closed by a plug of a plastics material moulded into the inlet and/or outlet nozzle during the moulding of the body portion. Alternatively, the inlet and/or outlet may be covered by a substantially air- and water-impermeable material, for example aluminium foil or a laminated material, such as a laminate of plastic material/metal foil/plastic material, prior to the opening of the inlet and/or outlet. Specific examples of materials which may be used are aluminium foil having a thickness in the range of from 30 to 60 micrometres coated with a layer

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of polypropylene or a laminate of polypropylene/aluminium foil/polyester.

The outlet in the cartridge may be prepared during the beverage preparation cycle using a cutting and piercing tool for example of the type as described in our EP-A-0334573.

Alternatively, the inlet and/or outlet may be open and the cartridge provided with an outer wrapping or the like. For example, a plurality of packages may be provided with a shrink wrapped outer layer.

In the cartridges of the present invention, the communication between the inlet and the compartment containing the beverage preparation ingredient(s) is preferably via a channel which is separated from the compartment by a wall which has a plurality of openings formed therein for the entry of a liquid medium into the compartment. The channel preferably extends along at least one side of the compartment, more preferably along three sides of the compartment. The openings in the wall are preferably in the form of elongate slots which are generally arranged in a manner such that an even distribution of the liquid medium through the beverage preparation ingredients is acheived.

The cartridge of the present invention may have a filter disposed between the compartment containing the beverage ingredient(s) and a least a part of the under surface of the top of the cartridge, one or more passages being formed between the filter and the top of the cartridge, the passages communicating with the outlet. This type of cartridge is particularly preferred when the beverage ingredient is roast and ground coffee.

The filter is preferably made from a material with a high wet strength, for example a non-woven polyester fibre material or polypropylene. Other materials which may be used include a water-permeable cellulosic material, such as a cellulosic material comprising woven paper fibres. The woven paper fibres may be admixed with fibres of polypropylene, polyvinyl-chloride and/or polyethylene. The incorporation of these plastics materials into the cellulosic material renders the cellulosic material heat-sealable. The filter material may also be coated with a material which is activated by heat and/or pressure so that it can readily be sealed to ribs formed in the under surface of the top of the package, thereby forming one or more passages which communicate with the outlet.

The beverage preparation ingredients contained in the cartridges of the invention are preferably roast and ground coffee, powdered chocolate, and according to individual taste, powdered milk or creamer, sugar or artificial sweetner.

It will be understood that it may be convenient for the compartment containing the beverage preparation ingredients to be separated into two or more sections, for example, one section containing roast and ground coffee and another section containing powdered milk or creamer. In such an arrangement the means for the entry of the liquid medium into the separate compartments would be varied to suit the requirements for filtration or dissolution of the particular ingredients.

The cartridge of the present invention, when filled with roast and ground coffee, preferably contains from 2.5 to 10 grams of roast and ground coffee, preferably from 4.5 to 7 grams for the preparation of a single cup. However, cartridges which are intended to provide multiple servings of coffee will contain an appropriate amount of roast and ground coffee, for example, packages intended to provide say five cups of coffee will contain from 20 to 50 grams of roast and ground coffee, preferably from 25 to 30 grams. The roast and ground coffee is generally compacted when the beverage package is filled in order to aid the distribution and transport of water through the package.

The cartridges of the present invention are preferably provided with at least one recognition means whereby, in use, the cartridge is identified by the machine into which it is placed for treatment and the identification of the cartridge thereby causes it to be subjected to the correct treatment steps including the introduction of the aqueous medium into the cartridge and the activation of the whipping means.

The recognition means may comprise one or more surface features formed in the body of the cartridge. For example, the cartridge body may be provided with one or more indents, cut outs, protrusions or holes which can be identified by a mechanical sensor in the beverage preparation machine, the mechanical sensor registering the presence or absence of the indents, cut outs, protrusions or holes.

The recognition means may, alternatively, comprise a system which can be sensed by a simple optical device, for example a bar code printed onto the body of the cartridge, a pattern of through holes in the cartridge, a pattern of contrasting tones or colours printed onto the cartridge or cartridges containing different comestibles being of different colours.

The recognition means may also comprise one or more strips of a magnetic material applied to the body of the cartridge which can be read by an appropriate magnetic sensor; one or more shaped or divided areas of metal foil applied to the cartridge body which cause an inductive effect on movement of the cartridge in the machine, which inductive effect can be sensed; or one or more electrically conductive areas formed on the body of the cartridge which can be sensed electrically.

As mentioned above, the cartridge of the present invention contains one or more beverage preparation ingredients, for example, roast and ground coffee or leaf tea and sugar and/or creamer, as desired. One machine which can readily be adapted for the preparation of a beverage from the preferred cartridge of the invention which includes a recognition means is described in our EP-A-0334573. The only modification required to be made to such a beverage preparation machine is to incorporate an appropriate sensor or sensors into it, the sensor or sensors being designed to read the particular coding on the cartridge and to send a signal to the con-

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troller, which then selects the appropriate beverage preparation cycle and activates the whipping means.

The sensor may be, for example, a mechanical sensor, an optical sensor, a magnetic sensor, an electrical sensor or an inductive sensor. The machine is preferably adapted so that the cartridge is handled automatically following its insertion into the machine.

The present invention also includes within its scope a method for the production of a whipped beverage from a cartridge containing one or more beverage ingredients, which method comprises introducing an aqueous medium into the cartridge, extracting constituents from the beverage ingredient(s) and/or dissolving the beverage ingredient(s) to form a beverage, whipping the beverage so produced and collecting the whipped beverage as it leaves the cartridge.

The whipping of the beverage, for example by means of an impeller, will generally incorporate air into the beverage to produce a foamy, frothy beverage. Beverages which can be produced in this manner are, for example, whipped chocolate and espresso-type coffee. Preferably the whipping of the beverage to incorporate air therein will result in from 5 to 30 percent by volume of air being incorporated into the beverage as bubbles having a bubble size preferably of below 300 micrometres, more preferably in the range of from 10 to 200 micrometres. Generally, whipped chocolate will incorporate a higher percentage of air by volume therein than whipped coffee.

Alternatively, the whipping of the beverage may be used to produce carbonated drinks. For example, the aqueous medium introduced into the cartridge may be carbonated water. On contact with powdered ingredients or a syrup for the preparation of a beverage the carbonated water will generally loose some of the carbon dioxide incorporated therein. The whipping of the beverage reintroduces into the beverage at least some of the carbon dioxide which has been lost from solution during the passage of the carbonated water through the cartridge. Alternatively, carbon dioxide may be introduced into the cartridge before the beverage is whipped, for example by direct passage into the chamber which contains the whipping means.

The present invention will be further described with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view from above of a beverage cartridge of the invention;

Figure 2 is a perspective view from below of the beverage cartridge of Figure 1;

Figure 3 is a section through the beverage cartridge of Figure 1 along the lines III-III;

Figure 4 is a section through the beverage cartridge 1 along the line IV-IV;

Figure 5 illustrates one variant of an external driving mechanism;

Figure 6 illustrates another variant of an external driving mechanism;

Figure 7 illustrates a part of the driving mechanism of Figure 6 on a larger scale; and

Figure 8 illustrates a rotor of the beverage cartridge with which the driving mechanism engages.

Referring to the drawings, a cartridge of the present invention is shown generally at 1. The cartridge is mainly formed from a moulded plastics material and has a top 2 which may be decorated to identify the contents of the capsule, or which may have foil or paper laminated thereto with appropriate identification thereon. The bottom 3 of the capsule may be formed from an aluminium foil or a laminated foil.

The cartridge 1 has an inlet 4 and an outlet 5 which are formed in use of the cartridge by piercing or cutting the material covering the inlet and outlet openings.

As best shown in Figure 4, water enters the cartridge 1 via inlet 4 where it enters channel 6 formed along the edges of the package and communicates via slots 7 with the beverage ingredients 8 which are contained in a compartment within the cartridge. The water mixes with the beverage preparation ingredients contained within compartment 9 and is forced upwardly through the beverage preparation ingredients. The beverage formed by passage of water through the beverage preparation ingredients passes through filter material 10 into a plurality of passages which are formed between ribs 12 onto which the filter paper is sealed. The sealing of the filter material onto ribs 12 prevents any short circuit and all of the beverage has to pass through the filter. The passages 11 are closed at the end remote from the outlet by transverse rib 13. The beverage collected via passages 11 is funneled in area 14 in the direction as shown by the arrows and passes through inlets 15 and 16 to a whipping chamber 17 in which a rotor 18 is disposed.

The whipping chamber 17 has a plurality of fixed vanes 20 provided therein, as best shown in Figure 2. The whipper chamber 17 is provided with a hole 21 into which rotor 18 is adapted to fit. The rotor 18 is provided with a plurality of vanes 22 positioned around the central hollow drive shaft 23. The hollow drive shaft 23 has ribs 24 which are adapted for engagement with an external driving device. The rotor has an annular ring 25 fixed to the bottom of the vanes 22 which, in use, is lubricated by the beverage and the film of liquid between the annular ring and the bottom surface 3 of the cartridge 1 acts as a bearing. The film of liquid assists in pushing the rotor upwards and assists in cooling the under surface of the ring 25.

The drive shaft 23 of rotor 18 engages by means of ribs 24, an external driving mechanism which causes the rotor to rotate at very high speeds, for example at a speed of from 10,000 to 20,000 rpm. Air is drawn into the whipping chamber by a passage through the space provided between the edges of the hole 21 and the drive shaft 23. The rotor 18 rotates freely in the whipping chamber 17 and the high speed of the rotor causes considerable turbulence with the passage of the rotor vanes

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22 close to the fixed vanes 20 in whipping chamber 17. The rotation of the rotor 18 in whipping chamber 17 causes a centrifugal/centripetal effect on the beverage which causes a negative pressure in the area of the base of the shaft 23 of the rotor 18 which draws air into the whipping chamber 17. This has two benefits, namely it obviates the need for a seal on the shaft 23 and provides the air to incorporate into the beverage in the form of bubbles. The whipped beverage then exits from the whipping chamber 17 in the direction as shown by the arrows in Figure 3 to the outlet 5 from the capsule.

The cartridge as described with reference to Figures 1 to 4 is suitable for insertion into a beverage preparation machine, for example of the type as described in EP-A-0334573 longitudinally through a slot.

The cartridge is also provided, as best shown in Figure 1 with teeth 30 moulded along one side edge of the cartridge. The teeth 30 have recessess 31 formed therebetween. The teeth 30 are intended to enable the cartridge to be driven through a beverage preparation machine by the engagement of the teeth 30 with the tooth (not shown) of a cam 35 as shown in Figure 5.

The side edge of cartridge 1 opposite to the edge provided with teeth 30 has a plurality of pegs 32, 33 and 34 provided thereon. As the package is driven into the machine by the engagement of teeth 30 with cam 35, the presence or absence of the upstanding pegs 32, 33, 34 is sensed by a sensing arm (not shown). If one or more of pegs 32, 33, 34 is not present the sensing arm will thereby identify a different type of cartridge. The sensing arm operates a switch (not shown) 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 32, 33, 34 on the cartridge thus identifies the type of cartridge to a controller which then selects the appropriate beverage preparation conditions.

When the beverage preparation machine has selected the appropriate beverage preparation conditions, the water inlet 4 of the package is pierced or cut, the outlet 5 in the package is uncovered and the foil 36 originally covering the outlet folded back into an outlet surround chamber 37. Water is caused to flow under pressure through the compartment containing the beverage ingredients and, after whipping, the chosen beverage is then collected in a cup or receptacle placed below the outlet 5 of the package.

The rotor 18 of the cartridge is driven by an external drive mechanism, one variant of which is shown in Figure 5. The external drive mechanism shown in Figure 5 comprises a drive wire 40 with a shaped end 41. The drive wire 40 is mounted through a sliding drive 42 and a bearing bush 43. The drive wire 40 is driven by motor 44 which is attached to a motor mounting arm 45. The flexible end 41 of driving wire 40 is adapted to pierce the foil covering the drive shaft 23 of the rotor and to engage the ribs 24 of the rotor 18. The flexibility of the drive wire 40 allows for some mis-alignment and also reduces noise which would be caused by any mis-alignment. The flexibility also allows for motor 44 to be non-critically mounted.

The high speed motor 44 is caused to move in an arc by a cam action from the main cam 35 of the brewing mechanism. The motor mounting arm 45 is also provided with a sensing arm 46 which senses the depth of the cartridge inserted into the brewing machine at location 50 thereof. If the depth of the ledge at 50 is the correct depth for the beverage to be produced from the capsule to require whipping, then the tip 41 of the drive wire will be caused to penetrate the foil covering the rotor drive shaft 23 and to engage the ribs 24 thereof. Accordingly, the brewing machine will then cause the motor 44 to be switched on and whip the beverage by means of the rotation of flexible drive 41 being transmitted to the rotor 18.

If the capsule is not of the type which requires whipping, i.e. if sensor 46 does not sense the correct depth of ledge 50, then an override spring arm 51 will be depressed, but the driving device will not penetrate the top foil of the cartridge and the motor 44 will not be activated.

Referring to Figure 6, a second variant of an external drive mechanism is shown. The drive mechanism comprises a driving dog 60 which is attached through ferrule 61 to a motor 62. The motor is located within a motor mount 63 by means of claws 64 and 65. The upper arm 66 of the motor mount 63 has a spherical shaped under surface (not shown) which allows the motor to rock in all directions and therefore allows the alignment of the driving dog in the rotor shaft, as more fully described below with reference to Figures 7 and 8.

The motor mount 63 is supported by a motor carriage 70 via the spherical under surface of the upper arm 66 of the motor mount, allowing the motor angular motion as discussed above.

The operation of the device to engage the driving dog 60 of the rotor described below with reference to Figure 8 is driven by a track in the main cam of a brewing mechanism as described with reference to European Patent No. 0334573 (not shown). This cam operates a peg 71 in a cam follower lever 72 which pivots on a support 73 of the side plate 74 of the brewing mechanism. The position of the cam (not shown) ensures that the capsule is correctly placed before the lever 72 is operated. The lever 72 is moved downwards and causes the motor carriage to move downwards via a spring 75 one end of which is located on peg 76 of the cam follower lever and one end of which is located on peg 77 on the motor carriage 70. The motor carriage 70 is provided with a feeler blade 78 which is adapted to sense if the capsule is of the type the beverage from which will require whipping. When the capsule is of the correct type the feeler locates at a lower position on the capsule than if it is not of the correct type which allows the driving dog to press onto and pierce the foil covering the rotor drive shaft. The motor is then switched on due

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to the sensing of the correct capsule and the electrical and software control supplying power to the motor.

The movement of the motor carriage in the vertical direction is achieved by means of two guides positioned on the side plate 74 of the brewing mechanism. One guide 79 is shown which locates in a complementary slot 80 on the motor carriage. The other guide is not shown.

At the end of the brewing cycle, when the whipping of the beverage is complete, the cam follower lever 72 bears against the ledge 81 on the motor carriage thereby to ensure that the driving dog 60 is positively removed from the capsule by the action of the lever 72.

The driving dog 60 is shown on a larger scale in Figure 7. The driving dog has a pointed end 85 which is adapted to pierce the film which covers the aperture 90 of the rotor shown in Figure 8. The driving dog has a shaft 86 which is attached to the ferrule 61 shown in Figure 6. The pointed end 85 of the driving dog is attached via a section 87 of circular cross section to a flat section 88.

In operation, the driving dog pierces the film covering the aperture 90 of the rotor 89 and enters the hollow drive shaft 91 of the rotor 89. The drive shaft 91 of the rotor 89 is provided with two opposing pairs of splines 92 and 93 which centre section 87 of the driving dog. The pair of splines 92 are higher than the opposing pair of splines 93. This arrangement ensures that as the driving dog 60 enters the shaft 91 of the rotor 89 it is rotated until the shaft 88 is in aligned between, or to one side, of the two adjacent higher splines 92. This arrangement also prevents the flattened section 88 from attempting to pass down the same side of the opposing splines, particularly if the driving dog is entering at an angle.

The rotor 89 as shown in Figure 8 is provided with a plurality of blades 95 which are connected to the central shaft 96 of the rotor and at their lower outer edges to an annular ring 97 which also acts as a liquid bearing surface. A gap 99 is provided between the annular ring 97 and the central shaft 96 of the rotor which allows passage of liquid beneath the ring to assist in lubrication of the rotor as it bears against the bottom surface 3 of the cartridge.

The rotor 89 is also provided with a plurality of lugs 98, one of which is shown in Figure 8, which assist in retaining the rotor in the capsule during the manufacturing process by means of an interference fit within the hole 21 of the capsule into which the rotor fits (see Figure 3). Alternatively, the hole 21 may be provided with a shoulder (not shown) upon which the lugs 78 rest when the rotor is located in the hole during manufacture. The film of liquid between the bottom surface of the ring 97 and the surface 3 of the cartridge assists in pushing the rotor upwards within the hole 21 of the cartridge. In one embodiment where the hole 21 is provided with a shoulder on which lugs 98 rest, the upwards movement of the rotor prevents the lugs from rubbing on the shoulder and, as previously described, assists in cooling the under surface of the annular ring 97.

Claims

1. A cartridge (1) containing one or more beverage ingredients (8) and being formed from substantially air- and water-impermeable materials, the said cartridge (1) comprising an inlet (4) for the introduction of an aqueous medium into the cartridge, a compartment containing the beverage ingredient or ingredients, an outlet (5) for the beverage produced from the beverage ingredients characterised in that the cartridge includes whipping means (18) provided in the path of the beverage prior to the outlet (5), to whip the said beverage.

2. A cartridge as claimed in claim 1 wherein the whipping means (18) comprises an impeller (23,24) adapted to engage an external driving device (40, 41, 60).

3. A cartridge as claimed in claim 2 wherein the impeller comprises a rotor (18) with a plurality of radial vanes(22).

4. A cartridge as claimed in claim 3 wherein the rotor (18) has a hollow drive shaft adapted for engagement with the external driving device (40, 41, 60).

5. A cartridge as claimed in any one of the preceding claims wherein the whipping means is positioned in a chamber (17) integrally formed within the cartridge (1).

6. A cartridge as claimed in claim 5 wherein the chamber (17) has a plurality of fixed vanes (20) provided therein.

7. A cartridge as claimed in any one of the preceding claims wherein the inlet (4) and/or outlet (5) is covered by a substantially air- and water-impermeable material prior to the formation, in use , of the inlet (4) and/or outlet (5) in the cartridge (1).

8. A cartridge as claimed in any one of the preceding claims wherein a channel (6) communicates with the inlet (4) for the entry of an aqueous medium into the cartridge, the channel (6) being separated from the compartment containing the beverage ingredient or ingredients (8) by a wall which has a plurality of openings (7) formed therein for the entry of the aqueous medium into the compartment containing the beverage preparation ingredient(s) (8).

9. A cartridge as claimed in claim 8 wherein the channel (6) extends along at least one side of the compartment containing the beverage preparation ingredient(s)(8).

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10. A cartridge as claimed in claim 8 or claim 9 wherein the channel (6) extends around three sides of the compartment containing the beverage preparation ingredient(s)(8).

11. A cartridge as claimed in any one of claims 8 to 10 wherein the openings (7) comprise a plurality of elongate slots.

12. A cartridge as claimed in any one of the preceding claims wherein a filter (10) is disposed between the compartment and at least a part of the under surface of the top of the cartridge (1), one or more passages (11) being formed between the filter (10) and the top of the cartridge (1), which passage(s) (11) communicate(s) with the outlet (5).

13. A cartridge as claimed in claim 12 wherein the filter (10) is made from a water-impermeable material.

14. A cartridge as claimed in any of the preceding claims wherein the beverage preparation ingredient (8) is powdered chocolate or roast and ground coffee.

15. A cartridge as claimed in any one of the preceding claims which is provided with at least one recognition means (32,33,34) whereby, in use, the cartridge (1) is identified by the machine into which it is placed for treatment therefrom and the identification of the cartridge (1) thereby causes it to be subjected to the correct treatment steps including the introduction of a aqueous medium into the cartridge (1) and the engagement of the whipping means (18) by an external driving device (40,41,60) incorporated into the machine.

16. A cartridge as claimed in claim 15 wherein the recognition means (32,33,34) comprises one or more surface features formed in the body of the cartridge (1).

17. A method for the production of a whipped beverage from a cartridge (1) containing one or more beverage ingredients (8), which method comprises introducing an aqueous medium into the cartridge (1), extracting constituents from the beverage ingredient(s) (8) and/or dissolving the beverage ingredient(s) (8) to form a beverage, whipping the beverage so produced and collecting the whipped beverage as it leaves the cartridge (1).

18. A method as claimed in claim 17 wherein the beverage is whipped by means of an impeller (18).

19. A method as claimed in claim 17 or claim 18 wherein the whipping of the beverage incorporates air therein.

20. A method as claimed in claim 17 or claim 18 wherein carbon dioxide is introduced into the cartridge before the beverage is whipped.

21. A method as claimed in claim 17 or claim 18 wherein the aqueous medium is carbonated water and the whipping of the beverage reintroduces into the beverage any carbon dioxide lost from solution during the passage of the aqueous medium through the cartridge.

22. A method as claimed in any one of claims 17 to 19 wherein the beverage produced is whipped chocolate or espresso-type coffee.

Patentansprüche

1. Patrone (1), die einen oder mehrere Getränkebestandteile (8) enthält und aus im wesentlichen luft- und wasserundurchlässigen Materialien gebildet ist, wobei die Patrone (1) umfaßt: einen Einlaß (4) für die Einführung eines wäßrigen Mediums in die Patrone, eine den Getränkebestandteil oder die -bestandteile enthaltende Kammer, einen Auslaß (5) für das aus den Getränkebestandteilen erzeugte Getränk,
dadurch gekennzeichnet, daß die Patrone ein Aufschäummittel (18) umfaßt, das in dem Weg des Getränks vor dem Auslaß (5) vorgesehen ist, um das Getränk aufzuschäumen.

2. Patrone nach Anspruch 1, bei welcher das Aufschäummittel (18) ein Flügelrad (23, 24) umfaßt, welches zum Eingriff mit einer externen Antriebsvorrichtung (40, 41, 60) ausgeführt ist.

3. Patrone nach Anspruch 2, bei welcher das Flügelrad einen Rotor (18) mit einer Mehrzahl von radialen Flügeln (22) umfaßt.

4. Patrone nach Anspruch 3, bei welcher der Rotor (18) eine hohle Antriebswelle aufweist, die zum Eingriff mit der externen Antriebsvorrichtung (40, 41, 60) ausgeführt ist.

5. Patrone nach einem der vorhergehenden Ansprüche, bei welcher das Aufschäummittel in einer Kammer (17) angeordnet ist, die in der Patrone (1) integral ausgebildet ist.

6. Patrone nach Anspruch 5, bei welcher die Kammer (17) eine Mehrzahl von darin vorgesehenen festen Flügeln (20) aufweist.

7. Patrone nach einem der vorhergehenden Ansprüche, bei welcher der Einlaß (4) und/oder der Auslaß (5) - vor der Bildung des Einlasses (4) und/oder des Auslasses (5) in der Patrone (1) bei Verwendung -

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von einem im wesentlichen luft- und wasserundurchlässigen Material abgedeckt ist.

8. Patrone nach einem der vorhergehenden Ansprüche, bei welcher ein Kanal (6) mit dem Einlaß (4) für den Eintritt eines wäßrigen Mediums in die Patrone in Verbindung steht, wobei der Kanal (6) von der den Getränkebestandteil oder die -bestandteile (8) enthaltenden Kammer durch eine Wand getrennt ist, in der für den Eintritt des wäßrigen Mediums in die den Getränkezubereitungsbestandteil bzw. die -bestandteile (8) enthaltende Kammer eine Mehrzahl von Öffnungen (7) ausgebildet sind.

9. Patrone nach Anspruch 8, bei welcher sich der Kanal (6) entlang wenigstens einer Seite der den Getränkezubereitungsbestandteil bzw. die -bestandteile (8) enthaltenden Kammer erstreckt.

10. Patrone nach Anspruch 8 oder 9, bei welcher sich der Kanal (6) um drei Seiten der den Getränkezubereitungsbestandteil bzw. die -bestandteile (8) enthaltenden Kammer erstreckt.

11. Patrone nach einem der Ansprüche 8 bis 10, bei welcher die Öffnungen (7) eine Mehrzahl von länglichen Schlitzen umfassen.

12. Patrone nach einem der vorhergehenden Ansprüche, bei welcher ein Filter (10) zwischen der Kammer und wenigstens einem Teil der unteren Fläche der Oberseite der Patrone (1) angeordnet ist, wobei ein oder mehrere Durchgänge (11) zwischen dem Filter (10) und der Oberseite der Patrone (1) gebildet sind, welcher bzw. welche Durchgänge (11) mit dem Auslaß (5) in Verbindung steht bzw. stehen.

13. Patrone nach Anspruch 12, bei welcher der Filter (10) aus einem wasserundurchlässigen Material hergestellt ist.

14. Patrone nach einem der vorhergehenden Ansprüche, bei welcher das Getränkezubereitungsbestandteil (8) Schokoladenpulver oder gerösteter und gemahlener Kaffee ist.

15. Patrone nach einem der vorhergehenden Ansprüche, die mit wenigstens einem Erkennungsmittel (32, 33, 34) versehen ist, durch welches die Patrone (1) bei Verwendung von der Maschine, in welche sie zur Behandlung durch diese eingesetzt ist, identifiziert wird und wobei die Identifizierung der Patrone (1) zur Folge hat, daß sie den richtigen Behandlungsschritten unterzogen wird, einschließlich der Einführung eines wäßrigen Mediums in die Patrone (1) und dem Eingriff einer externen Antriebsvorrichtung (40, 41, 60), die in der Maschine enthalten ist, mit dem Aufschäummittel (18) .

16. Patrone nach Anspruch 15, bei welcher das Erkennungsmittel (32, 33, 34) ein oder mehrere Oberflächenmerkmale umfaßt, die in dem Körper der Patrone (1) ausgebildet sind.

17. Verfahren zur Herstellung eines aufgeschäumten Getränks aus einer Patrone (1), die einen oder mehrere Getränkebestandteile (8) enthält, wobei das Verfahren umfaßt: das Einführen eines wäßrigen Mediums in die Patrone (1), das Extrahieren von Bestandteilen aus dem/den Getränkebestandteil(en) (8) und/oder das Auflösen des bzw. der Getränkebestandteile (8) zur Bildung eines Getränks, Aufschäumen des so erzeugten Getränks und Auffangen des aufgeschäumten Getränks, wenn es die Patrone (1) verläßt.

18. Verfahren nach Anspruch 17, bei welchem das Getränk mittels eines Flügelrads (18) aufgeschäumt wird.

19. Verfahren nach Anspruch 17 oder Anspruch 18, bei welchem durch das Aufschäumen des Getränks diesem Luft zugesetzt wird.

20. Verfahren nach Anspruch 17 oder 18, bei welchem vor dem Aufschäumen des Getränks Kohlensäure in die Patrone eingeführt wird.

21. Verfahren nach Anspruch 17 oder Anspruch 18, bei welchem das wäßrige Medium mit Kohlensäure versetztes Wasser ist und das Aufschäumen des Getränks in das Getränk Kohlensäure wieder einführt, die während des Durchtritts des wäßrigen Mediums durch die Patrone aus der Lösung verlorengegangen ist.

22. Verfahren nach einem der Ansprüche 17 bis 19, bei welchem das erzeugte Getränk aufgeschäumte Schokolade oder aufgeschäumter Kaffee vom Typ Espresso ist.

Revendications

1. Cartouche (1) contenant un ou plusieurs ingrédient(s) de boisson (8) et réalisée en matières sensiblement imperméables à l'air et à l'eau, ladite cartouche (1) comprenant une admission (4) pour l'introduction d'un fluide aqueux dans la cartouche, un compartiment contenant l'ingrédient ou les ingrédients de boisson, une sortie (5) de la boisson produite à l'aide des ingrédients de la boisson, caractérisée en ce que la cartouche comprend un moyen de battage (18) placé sur le trajet de la boisson au-devant de la sortie (5) pour battre ladite boisson.

2. Cartouche selon la revendication 1, dans laquelle le moyen de battage (18) consiste en une roue à

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palettes (23, 24) conçue pour s'enclencher avec un dispositif extérieur d'entraînement (40, 41, 60).

3. Cartouche selon la revendication 2, dans laquelle la roue à palettes comprend un rotor (18) comportant plusieurs palettes radiales (22).

4. Cartouche selon la revendication 3, dans laquelle le rotor (18) comprend un arbre creux d'entraînement conçu pour s'enclencher sur le dispositif extérieur d'entraînement (40, 41, 60).

5. Cartouche selon l'une quelconque des revendications précédentes, dans laquelle le moyen de battage est placé dans une chambre (17) réalisée monobloc à l'intérieur de la cartouche (1).

6. Cartouche selon la revendication 5, dans laquelle la chambre (17) comporte intérieurement plusieurs palettes fixes (20).

7. Cartouche selon l'une quelconque des revendications précédentes, dans laquelle l'admission (4) et/ou la sortie (5) est recouverte d'une matière sensiblement imperméable à l'air et à l'eau avant la formation, à l'utilisation, de l'admission (4) et/ou de la sortie (5) de la cartouche (1).

8. Cartouche selon l'une quelconque des revendications précédentes, dans laquelle un canal (6) communique avec l'admission (4) pour l'entrée d'un fluide aqueux dans la cartouche, le canal (6) étant séparé du compartiment contenant l'ingrédient ou les ingrédients de la boisson (8) par une cloison qui comporte plusieurs trous (7) pour l'entrée du fluide aqueux dans le compartiment contenant l'ingrédient ou les ingrédients (8) de préparation de la boisson.

9. Cartouche selon la revendication 8, dans laquelle le canal (6) est disposé le long d'au moins un côté du compartiment contenant l'ingrédient ou les ingrédients (8) de préparation de la boisson.

10. Cartouche selon la revendication 8 ou la revendication 9, dans laquelle le canal (6) est disposé autour de trois côtés du compartiment contenant l'ingrédient ou les ingrédients (8) de préparation de la boisson.

11. Cartouche selon l'une quelconque des revendications 8 à 10, dans laquelle les trous (7) consistent en plusieurs fentes allongées.

12. Cartouche selon l'une quelconque des revendications précédentes, dans laquelle un filtre (10) est disposé entre le compartiment et au moins une partie de la surface inférieure de la surface supérieure de la cartouche (1), un ou plusieurs passages (11) étant réalisés entre le filtre (10) et la cloison supérieure de la cartouche (1), ledit ou lesdits passage(s) (11) communiquant avec la sortie (5).

13. Cartouche selon la revendication 12, dans laquelle le filtre (10) est réalisé en une matière imperméable à l'eau.

14. Cartouche selon l'une quelconque des revendications précédentes, dans laquelle l'ingrédient de préparation de la boisson (8) est du chocolat en poudre ou du café grillé et moulu.

15. Cartouche selon l'une quelconque des revendications précédentes, qui est équipée d'au moins un moyen de reconnaissance (32, 33, 34) de manière qu'à l'utilisation, la cartouche (1) soit identifiée par la machine dans laquelle elle est placée pour son traitement et que l'identification de la cartouche (1) par celle-ci lui fasse subir les étapes correctes de traitement, y compris l'introduction d'un fluide aqueux dans la cartouche (1) et l'enclenchement du moyen de battage (18) sur le dispositif extérieur d'entraînement (40, 41, 60) incorporé dans la machine.

16. Cartouche selon la revendication 15, dans laquelle le moyen de reconnaissance (32, 33, 34) comprend une ou plusieurs structure(s) de surface réalisé(es) dans le corps de la cartouche (1).

17. Procédé de production d'une boisson battue à partir d'une cartouche (1) contenant un ou plusieurs ingrédient(s) de boisson (8), ledit procédé comprenant l'introduction d'un fluide aqueux dans la cartouche (1), l'extraction des constituants de l'ingrédient ou des ingrédients de la boisson (8) et/ou la dissolution de l'ingrédient ou des ingrédients de la boisson (8) pour former une boisson, le battage de la boisson ainsi produite et la récupération de la boisson battue lorsqu'elle quitte la cartouche (1).

18. Procédé selon la revendication 17, suivant lequel la boisson est battue à l'aide d'une roue à palettes (18).

19. Procédé selon la revendication 17 ou la revendication 18, suivant lequel le battage de la boisson incorpore de l'air dans celle-ci.

20. Procédé selon la revendication 17 ou la revendication 18, suivant lequel de l'anhydride carbonique est introduit dans la cartouche avant que la boisson soit battue.

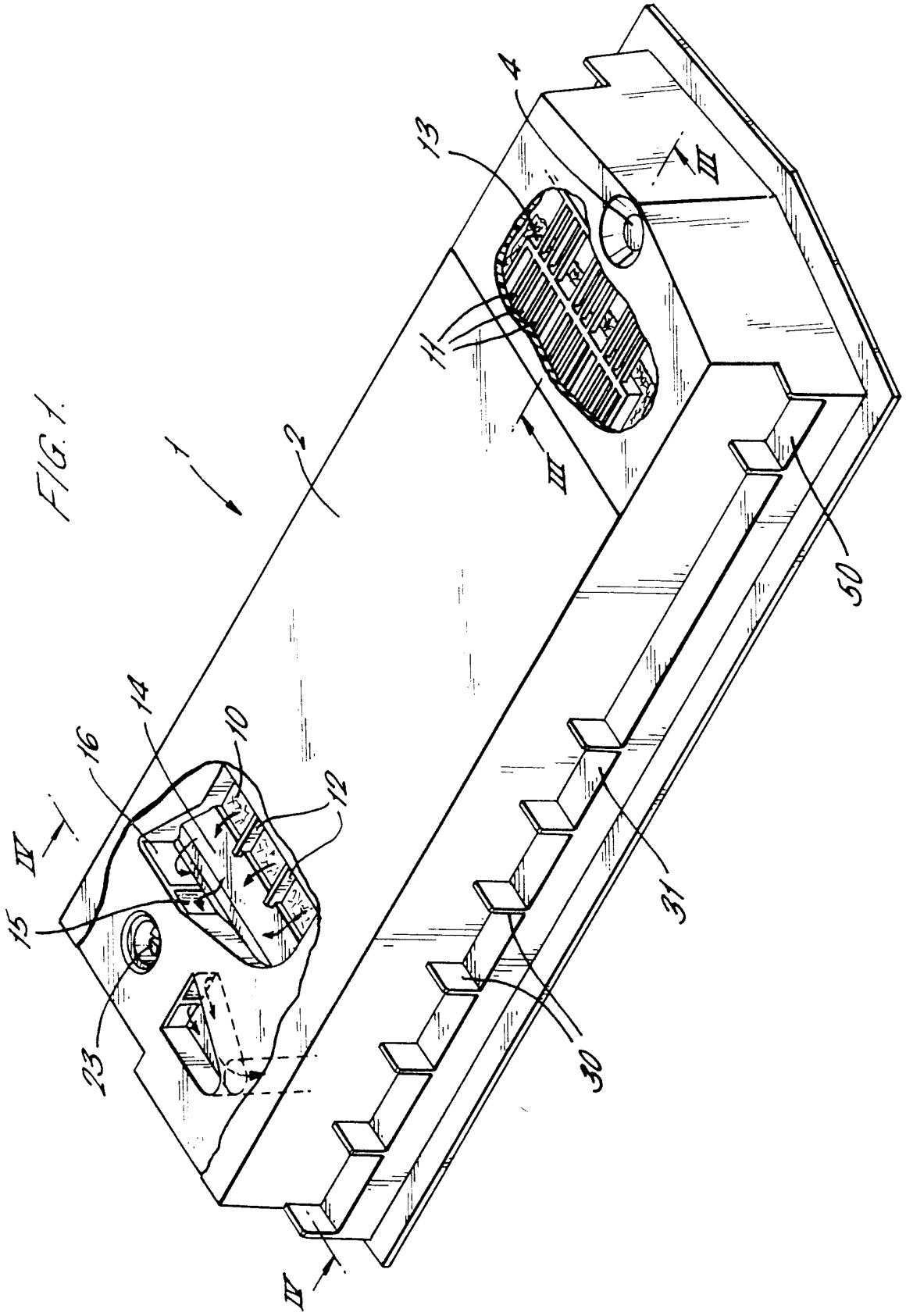
21. Procédé selon la revendication 17 ou la revendication 18, suivant lequel le fluide aqueux est de l'eau gazeuse et le battage de la boisson réintroduit dans

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la boisson tout anhydride carbonique perdu de la solution pendant le passage du fluide aqueux dans la cartouche.

22. Procédé selon l'une quelconque des revendications 17 à 19, suivant lequel la boisson produite est du chocolat ou du café de type expresso battu.

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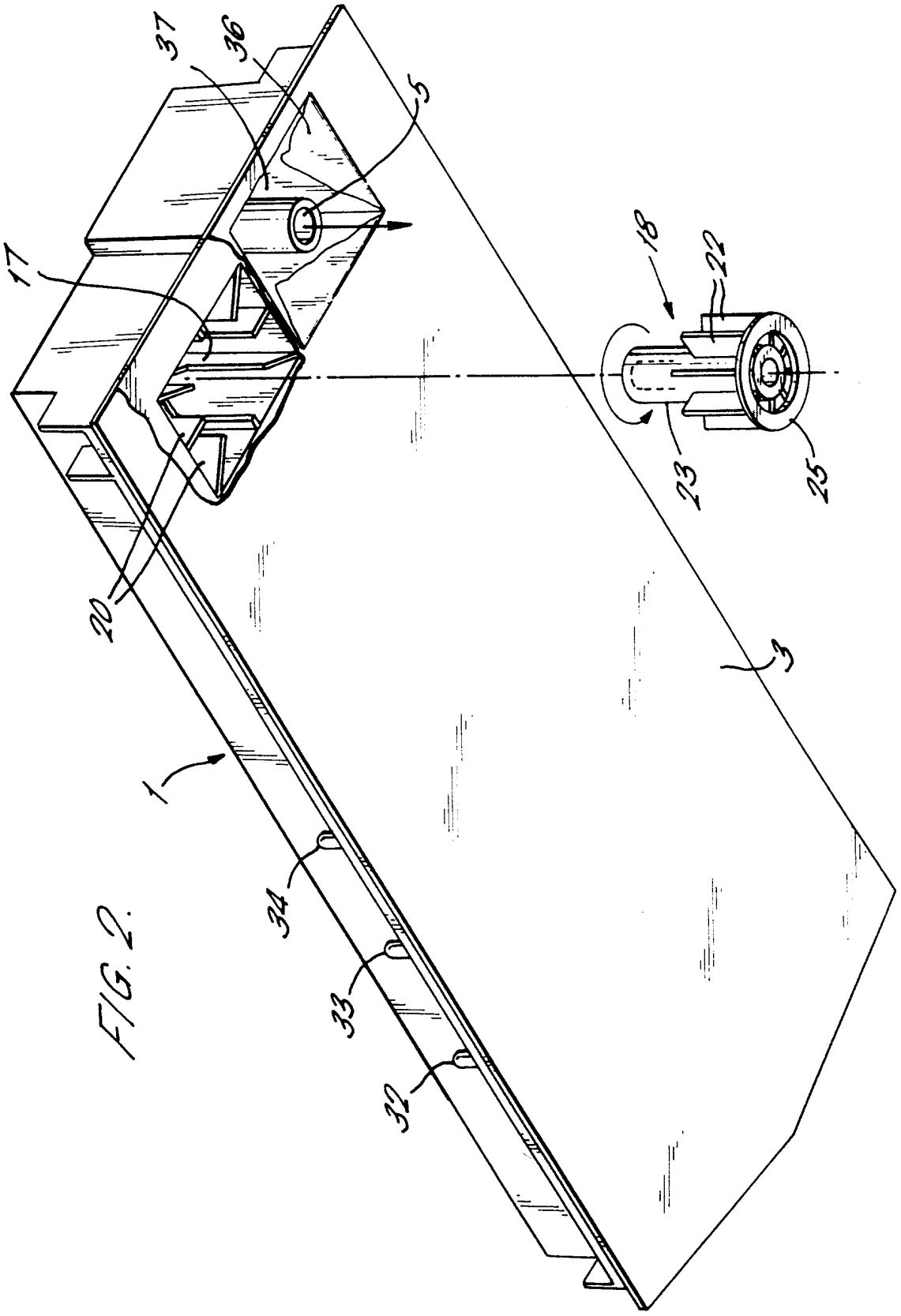


FIG. 2.

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FIG. 3.

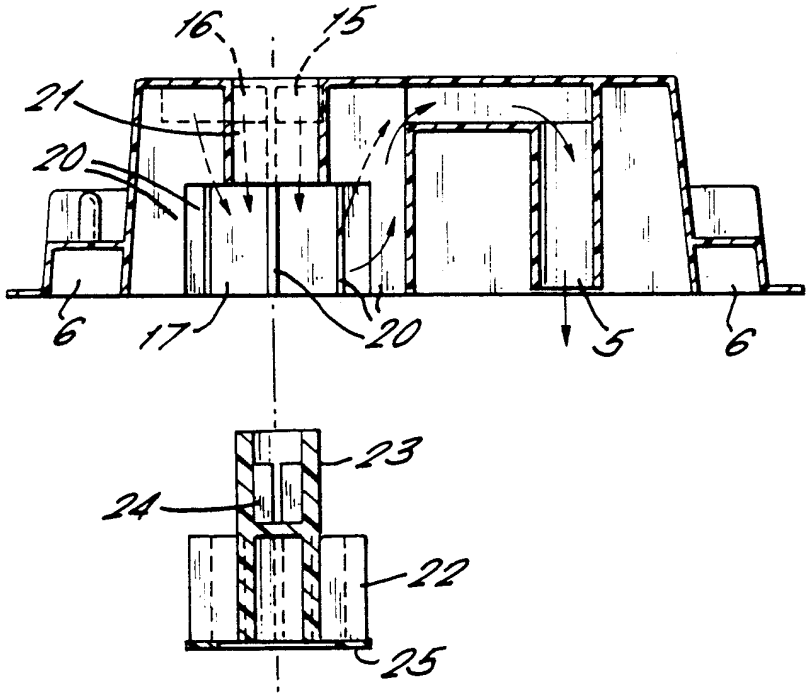
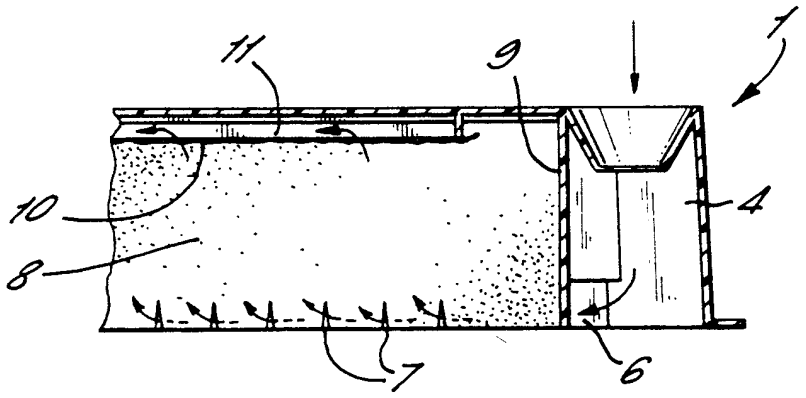
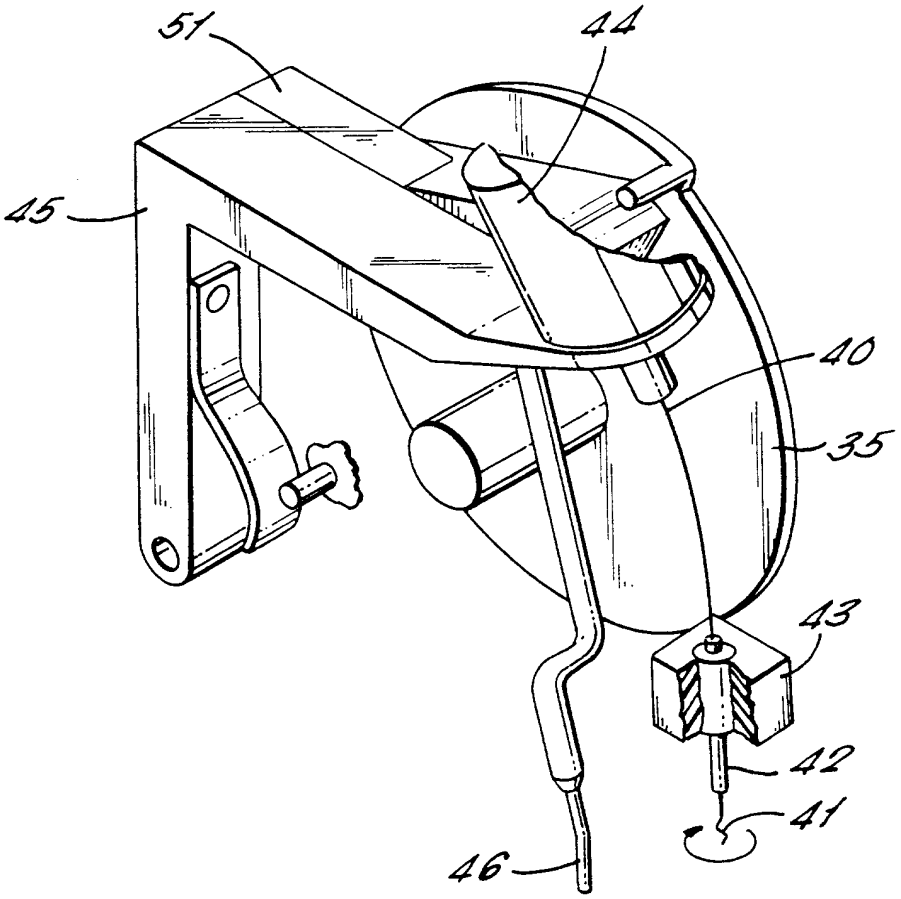


FIG. 4.



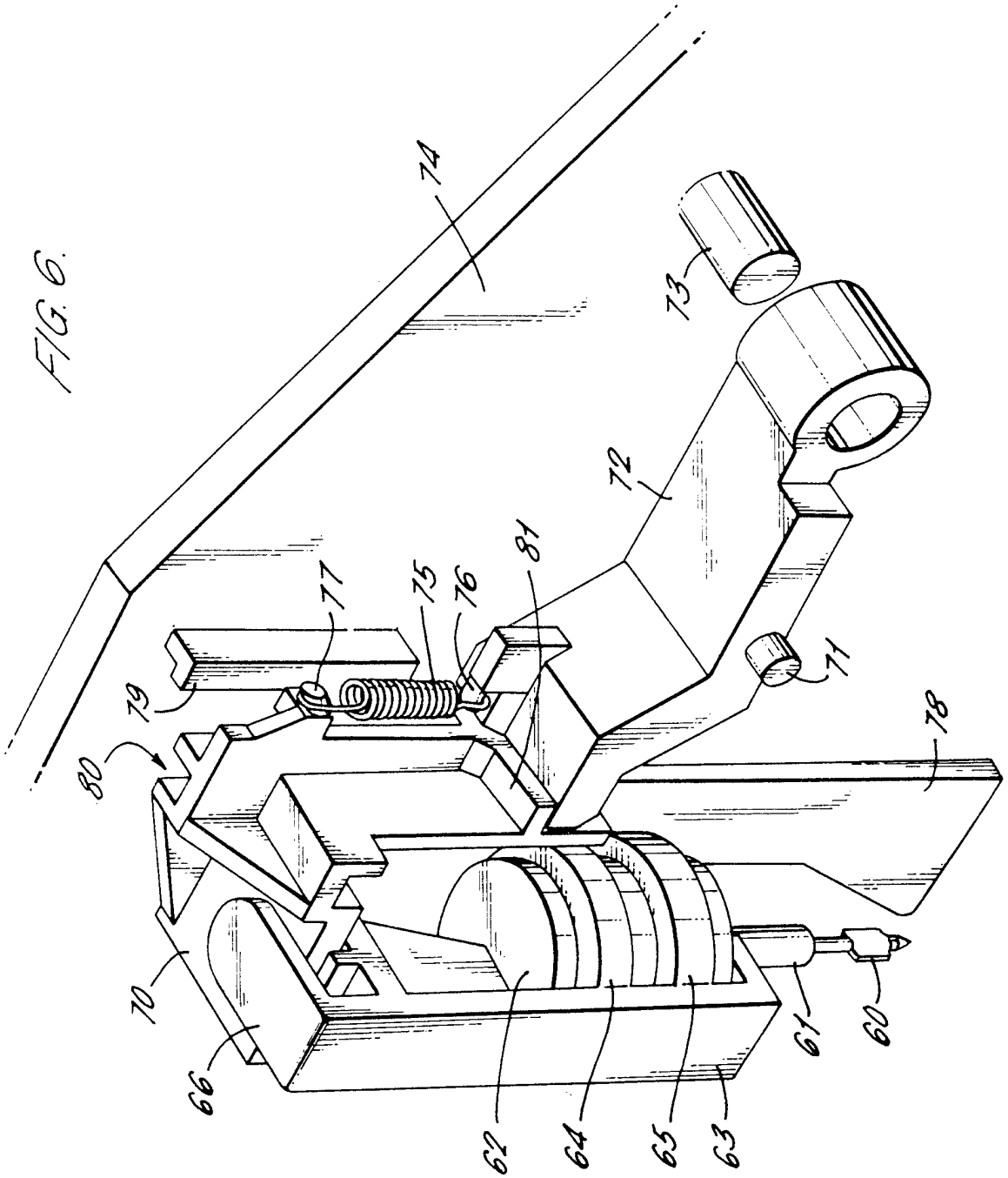
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FIG. 5.



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FIG. 6.



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FIG. 7.

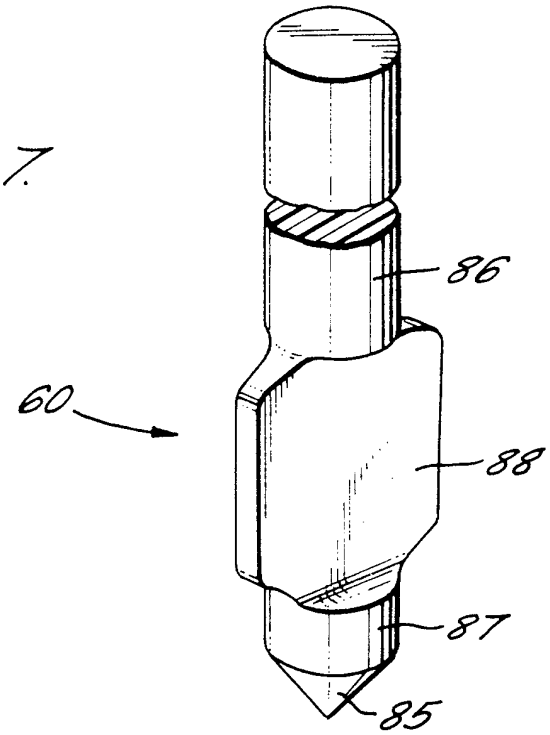
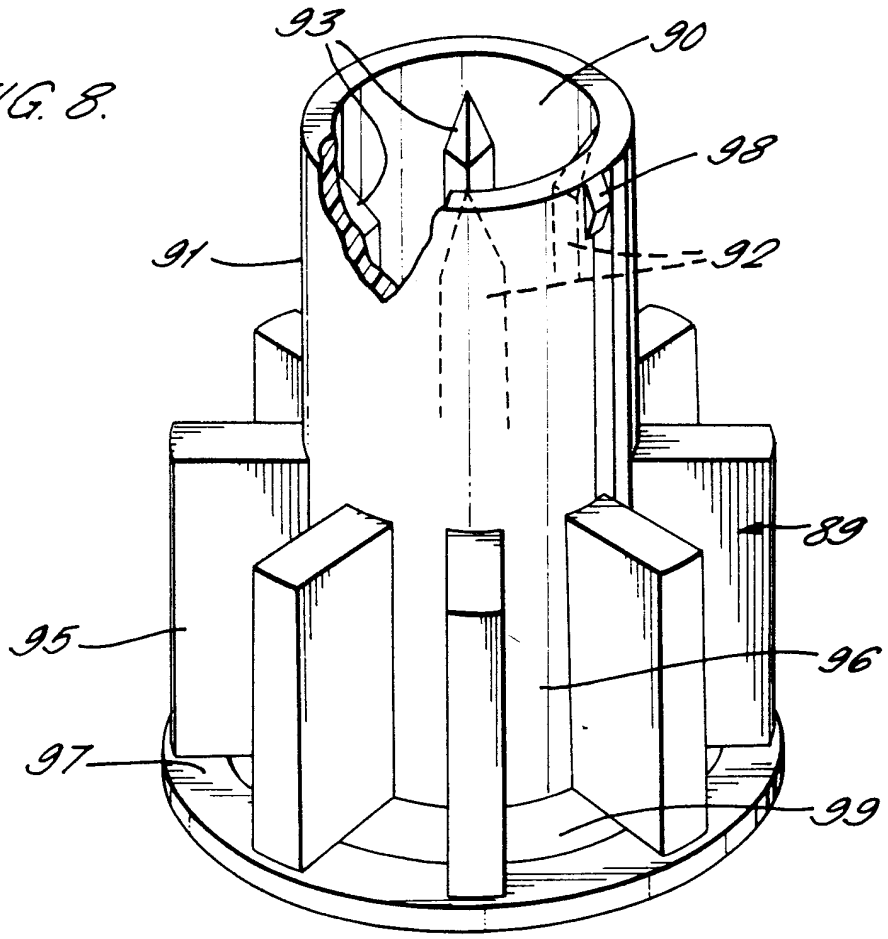


FIG. 8.



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(19) BUNDESREPUBLIK DEUTSCHLAND

DEUTSCHES PATENTAMT

(12) Gebrauchsmuster U 1

(11) Rollennummer G 86 12 623.7

(51) Hauptklasse B65F 1/14

(22) Anmeldetag 09.05.86

(47) Eintragungstag 28.08.86

(43) Bekanntmachung im Patentblatt 09.10.86

(54) Bezeichnung des Gegenstandes
Vorrichtung zum automatischen Identifizieren von Müllbehältern

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9999/la/vi

Gebrauchsmusteranmeldung

Pontech Gesellschaft für technologische Entwicklungen mbH, Borgfelder Heerstr. 50, 2800 Bremen

Vorrichtung zum automatischen Identifizieren von Müllbehältern

Die Erfindung betrifft eine Vorrichtung zum automatischen Identifizieren von Müllbehältern, die von der Schüttung eines Müllfahrzeuges in das Müllfahrzeug entleert werden.

Der Erfindung liegt die Aufgabe zugrunde, eine Vorrichtung der obengenannten Gattung zu schaffen.

Die Aufgabe ist erfindungsgemäß dadurch gelöst worden, daß am Müllbehälter ein Identifikationselement angeordnet ist, welches in einem Bereich des Müllbehälters plaziert ist, in welchem es bei in die Schüttung eingehängtem Müllbehälter mit einem am Müllfahrzeug angeordneten, elekrischen Erkennungsorgan in Wirkverbindung steht.

Das Identifikationselement wird bei in die Schüttung eingehängtem Müllbehälter vom Erkennungsorgan automatisch erfaßt, wobei das Erkennungsorgan von dem Identifikationselement Informationen erhält, durch welche der gerade an der Schüttung befindliche Müllbehälter seinem Eigentümer zugeordnet werden kann. Beispielsweise kann das Identifikationselement in einer vom Erkennungsorgan lesbaren Kodierung den Namen, eine Benutzernummer des Eigentümers des Müllbehälters oder ähnliches

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aufweisen. Eine solche Identifikation eines Müllbehälters automatisch beim Entleeren ist insbesondere dann von Vorteil, wenn die aus dem Müllbehälter entnommene Müllmenge bei der Entleerung des Müllbehälters registriert wird und aufgrund der registrierten Müllmenge für den Eigentümer des Müllbehälters automatisch eine Müllabfuhrabrechnung erstellt werden soll. Dazu können beispielsweise die bestimmte Müllmenge und die vom Erkennungsorgan erfaßte Kennung einander zugeordnet in einem Datenspeicher abgespeichert werden.

Es sind eine Vielzahl von jeweils einander zugeordneten Identifikationselementen und Erkennungsorganen denkbar und ansich bekannt, die für die erfindungsgemäße Vorrichtung verwendet werden können. Dabei kann die Information des Identifikationselements vom Erkennungsorgan beispielsweise optisch, elektrisch, magnetisch oder auf andere Weise erfaßt werden.

Da in der Regel der Müllbehälter mit einem Randbereich zur Entleerung an die Schüttung des Müllfahrzeuges angehängt wird, ist die Vorrichtung nach einer erfindungsgemäßen Weiterbildung nahe des Randes des Müllbehälters angeordnet. Damit das Identifikationselement, beispielsweise gegen Witterungseinflüsse geschützt ist, ist nach einer nächsten Weiterbildung der Vorrichtung vorgesehen, daß der Müllbehälter einen tiefergezogenen Rand aufweist und daß das Identifikationselement unter dem Rand angeordnet ist. Ein zusätzlicher Schutz des Identifikationselementes, insbesondere auch gegen mechanische Beschädigungen durch Stöße oder ähnliches bei der relativ groben Be-

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handlung des Müllbehälters, wird nach einer weiteren Weiterbildung der Vorrichtung dadurch erreicht, daß das Identifikationselement mit einer Schutzabdeckung abgedeckt ist. Sofern das Identifikationselement nicht auf optischem Wege gelesen wird, kann die Schutzabdeckung das Identifikationselement auch gegen eine Einsichtnahme und gegen einen eventuellen Diebstahl schützen.

Das Identifikationselement kann als Plakette, Marke oder ähnliches ausgebildet sein. Bei einer bevorzugten Ausbildung der erfindungsgemäßen Vorrichtung ist das Identifikationselement jedoch plattenförmig ausgebildet und in eine Aufnahme eingesetzt, die der Müllbehälter aufweist.

Ein Müllbehälter kann bereits bei der werksmäßigen Fertigung mit einem Identifikationselement ausgerüstet werden, das eventuell zu einem späteren Zeitpunkt mit der gewünschten Information versehen werden kann. Es ist jedoch auch möglich, einen Müllbehälter lediglich mit einer Aufnahme zu versehen, so daß der Müllbehälter erwünschtenfalls mit einem Identifikationselement nachgerüstet werden kann.

Vorzugsweise ist das Identifikationselement in der Aufnahme befestigt und so gegen eine Entnahme gesichert. Zur Befestigung kann das Identifikationselement, insbesondere dann, wenn der Müllbehälter mit dem Identifikationselement nachgerüstet wird, mit Hilfe einer Füllmasse, eines Klebstoffs oder eines ähnlichen Werkstoffs in einfacher Weise in der Aufnahme festgeklebt sein.

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Bei einer bevorzugten Ausbildung ist die Aufnahme eine Tasche, in die das Identifikationselement einschiebbar ist. Herkömmliche Müllbehälter können dadurch für eine erfindungsgemäße Vorrichtung tauglich gemacht werden, daß sie mit einer solchen Tasche für ein Identifikationselement nachgerüstet werden, die mit Befestigungselementen an der Außenwandung des Müllbehälter befestigt ist. Beispielsweise kann die Tasche an der Außenwandung angenietet oder angeschraubt sein. Bei einem Umzug des Eigentümers des Müllbehälter könnte ein Wechsel des Identifikationselementes notwendig werden, was in einfacher Weise durch einen Austausch des Identifikationselementes in der Tasche geschehen kann, was aber auch durch ein Auswechseln der gesamten Tasche möglich wäre.

Ausführungsbeispiele, aus denen sich weitere erfinderische Merkmale ergeben, sind in der Zeichnung dargestellt. Es zeigen schematisch:

Fig. 1 einen Schnitt durch ein erstes Ausführungsbeispiel eines Randbereiches eines Müllbebehälters mit einem Identifikationselement und einen Teil einer Schüttung eines Müllfahrzeuges mit einem Erkennungsorgan und

Fig. 2 einen Schnitt durch ein zweites Ausführungsbeispiel eines Randbereiches eines Müllbehälters.

In Fig. 1 ist ein Schnitt durch ein erstes Ausführungsbei-

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spiel eines Randbereiches eines Müllbehälters 1 dargestellt, der an der Behälteraufnahme 2 einer Schüttung eines Müllfahrzeuges angehängt ist.

Der Müllbehälter 1 weist einen tiefergezogenen Rand 3 auf, in den die Behälteraufnahme 2 bei an der Schüttung angehängtem Müllbehälter 1 von unten eingreift. Unter dem Rand weist die Wandung des Müllbehälters 1 eine Aufnahme 4 auf, in die ein Identifikationselement 5 zur Identifizierung des Müllbehälters 1 eingesetzt ist. Das Identifikationselement 4 ist nach außen mittels einer Schutzabdeckung 6 gegen Beschädigungen geschützt. Die Aufnahme 4 ist in die Wandung des Müllbehälters 1 eingeformt und das Identifikationselement 5 ist formschlüssig in die Aufnahme 4 eingefügt.

Die Aufnahme 4 ist so in der Wandung des Müllbehälters 1 plaziert, daß das in der Aufnahme 4 angeordnete Identifikationselement 5 bei an die Schüttung angehängtem Müllbehälter 1 einem Erkennungsorgan 7, welches in der Behälteraufnahme 2 integriert ist, gegenüberliegt und die Information des Identifikationselementes 5 von dem Erkennungsorgan 7 erfaßt werden kann.

In Fig. 2 ist ein Schnitt durch ein zweites Ausführungsbeispiel eines Randbereiches eines Müllbehälters 1 gezeigt, welches im wesentlichen mit dem in Fig. 1 dargestellten Ausführungsbeispiel übereinstimmt. Gleiche Bauelemente sind mit den gleichen Bezugszahlen bezeichnet wie in Fig. 1.

Der in Fig. 2 dargestellte Randbereich des Müllbehälters 1

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weist eine Aufnahme 4 auf, die so ausgestaltet ist, daß der Müllbehälter 1 mit einem Identifikationselement 5 nachgerüstet werden kann, indem das Identifikationselement 5 in die Aufnahme 4 eingeschoben und mit einer Vergußfüllmasse 8 befestigt wird. Zusammen mit dem Identifikationselement 5 kann auch im zweiten Ausführungsbeispiel eine Schutzabdeckung 6 in die Aufnahme 4 eingesetzt und in der Aufnahme 4 befestigt werden.

Über die in den Figuren dargestellten Ausführungsbeispiele hinaus sind Müllbehälter 1 denkbar, die keine in ihrer Wandung eingeformte Aufnahme 4 aufweisen, sondern an deren Wandung von außen eine separate Aufnahme 4, vorzugsweise eine Tasche, zur Aufnahme eines Identifikationselementes 5 angesetzt ist.

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Ansprüche:

1. Vorrichtung zum automatischen Identifizieren von Müllbehältern, die von der Schüttung eines Müllfahrzeuges in das Müllfahrzeug entleert werden,
d a d u r c h g e k e n n z e i c h n e t,
daß am Müllbehälter (1) ein Identifikationselement (5) angeordnet ist, welches in einem Bereich des Müllbehälters (1) plaziert ist, in welchem es bei in die Schüttung eingehängtem Müllbehälter (1) mit einem am Müllfahrzeug angeordneten elektrischen Erkennungsorgan (7) in Wirkverbindung steht.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Identifikationselement (5) nahe des Randes (3) des Müllbehälters (1) angeordnet ist.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß der Müllbehälter (1) einen tiefergezogenen Rand (3) aufweist, und daß das Identifikationselement (5) unter dem Rand (3) angeordnet ist.

4. Vorrichtung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß das Identifikationselement (5) mit einer Schutzabdeckung (6) abgedeckt ist.

5. Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Müllbehälter (1) eine Aufnahme (4) aufweist, und daß das Identifikationselement (5) platten-

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förmig ausgebildet ist und in die Aufnahme (4) eingesetzt ist.

6. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß das Identifikationselement (5) in der Aufnahme (4) befestigt ist.

7. Vorrichtung nach Anspruch 6, dadurch gekennzeichnet, daß das Identifikationselement (5) in der Aufnahme (4) festgeklebt ist.

8. Vorrichtung nach einem der Ansprüche 5 bis 7, dadurch gekennzeichnet, daß die Aufnahme (4) eine Tasche ist, in die das Identifikationselement (5) einschiebbar ist.

9. Vorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß die Tasche mit Befestigungselementen an der Außenwandung des Müllbehälters (1) befestigt ist.

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Fig. 1

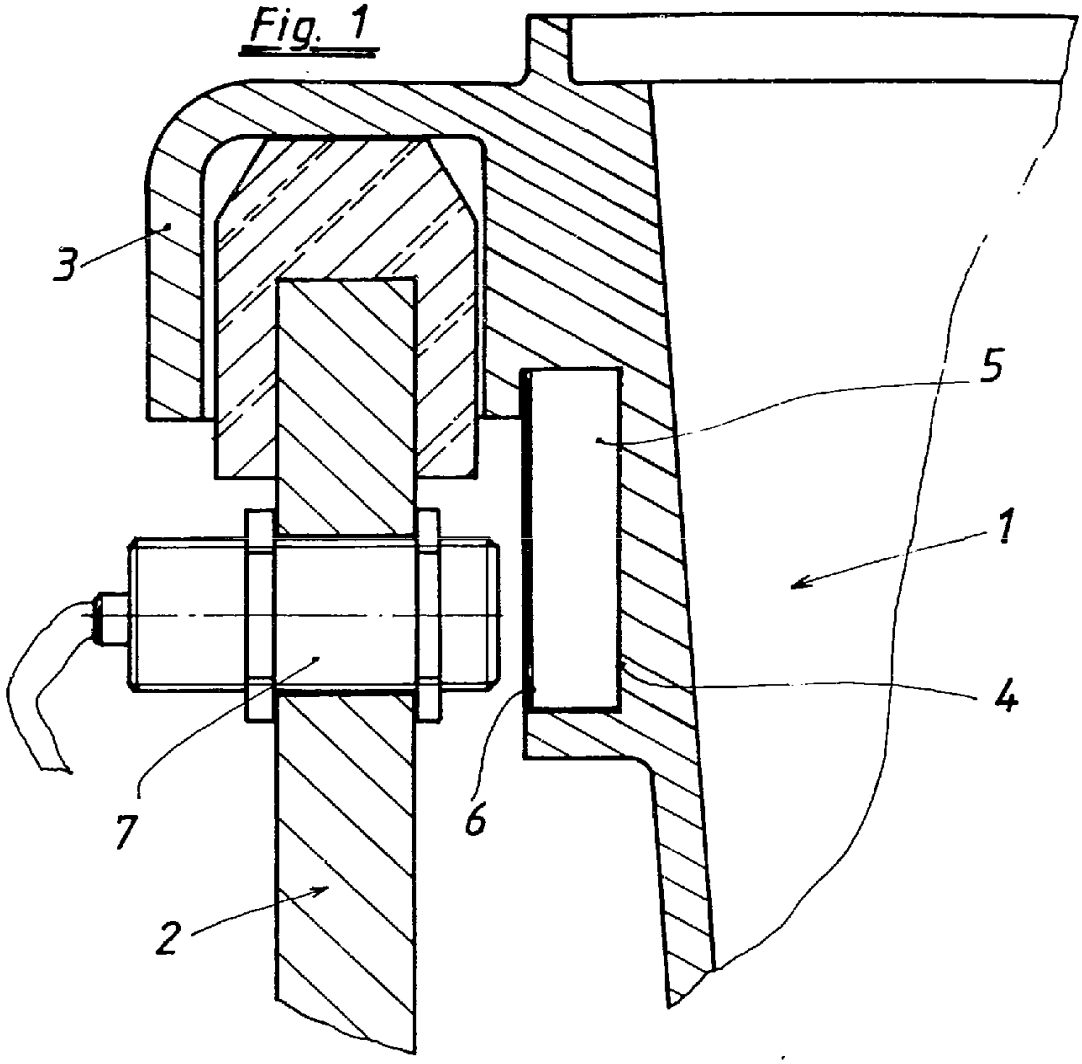
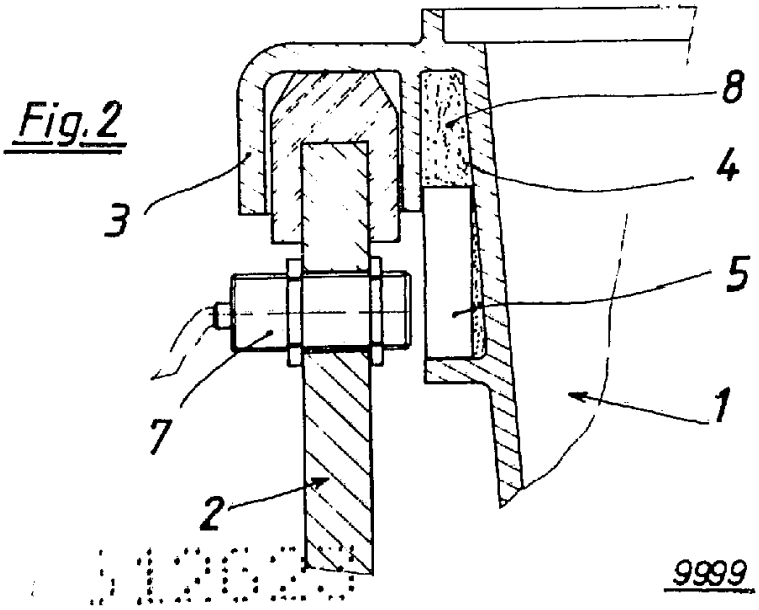


Fig. 2



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Electronic Acknowledgement Receipt

EFS ID:	36633656
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:	16:43:50
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Foreign Reference	3_DE4421910A1_USE_Active01_303560403_1.PDF	453062 3e59ae6945b6229a203a139d409a1b4c3fc8f5a5	no	8

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43	Foreign Reference	45_JP2010516364A.pdf	4093177 c859115debc0d8ac58b104253eb8937823c886ff	no	15
Warnings:					
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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 593 329 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
14.03.2007 Bulletin 2007/11

(51) Int Cl.:
A47J 31/40 *(2006.01)*

(21) Application number: **04425317.7**

(22) Date of filing: **04.05.2004**

(54) Apparatus with cartridges for the preparation of drinks, with activation following the reading of an optical code carried by the cartridge

Vorrichtung zur Zubereitung von einem Getränk aus einer Kartusche, mit Aktivierung nach Lesung eines optischen Code auf der Kartusche

Appareil avec cartouche pour la préparation d'une boisson, avec activation suite à la lecture d'un code optique porté par la cartouche

(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

(43) Date of publication of application:
09.11.2005 Bulletin 2005/45

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Printed by Jouve, 75001 PARIS (FR)

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Description

[0001] The present invention refers to an apparatus for the preparation of a plurality of drinks, at the choice of a user, from cartridges (also known as pods) specific to each drink and inserted by the user into the apparatus, in particular of the type in which a cartridge carries an optical code on one of its faces identifying the cartridge itself and the corresponding drink.

[0002] Automatic machines for the preparation of drinks are known, in which single-dose or single-use cartridges are used, containing the ingredients of the drink. To prepare a drink, a cartridge corresponding to the desired drink is inserted by the user into a cartridge path that comprises a brewing chamber, where the apparatus automatically provides for preparing the drink by making water pass through the cartridge itself. Apparatuses of this type are known and widespread above all for the preparation of hot drinks, such as coffee, tea, chocolate and the like, but sometimes the preparation of cold drinks is also provided, such as typically flat soft drinks.

[0003] The drink is obtained either by infusion of the ingredients of the cartridge into the brewing water (typical method for coffee and tea) or by dissolving of the ingredients themselves into the water (typical method for cold drinks and for some hot drinks). According to the case, the brewing water is therefore previously heated or cooled to the temperature suitable for the preparation of the specific drink.

[0004] The drink thus produced is conveyed towards a dispenser, below which a suitable container, such as a plastic cup or a jug, has previously been arranged.

[0005] The cartridges can comprise a casing made from filtrating material containing the ingredients for the drink, or else can be made from a material impermeable to air and water with a plastic body in which the ingredients for the drink are sealed by a deformable laminate sheet: in this case the brewing water is made to pass inside the cartridge after perforation of the cartridge itself at a predetermined entry point for the water and at a predetermined exit point for the drink.

[0006] According to the level of automation of the apparatus, some functions can be carried out automatically, such as the determination of amount, temperature, and possible pressure of the water, the movement of the cartridge in its path, the choice of the type of cup and its arrangement in position, the possible dispensing of sweetener and the selection thereof, the possible dispensing of a spoon and the possible dispensing of further additional products such as milk, cream, chocolate powder, etc.

[0007] To be possible to automate the preparation cycle of the drink, it is necessary for the apparatus to know what drink must be prepared from the many for which it is normally set. For such a purpose apparatuses are known that use optical readers that read codes arranged on the cartridges and that communicate the reading to a control unit of the apparatus; the control unit can thus recognise what drink must be prepared with the cartridge that has been inserted and consequently can activate the specific preparation cycle for such a drink.

[0008] Even if the preparation cycle of the drink is the same for all types of drink, the reading of the code can provide useful information to the control unit, such as the expiry date of the ingredients contained in the cartridge, the compatibility of the type of cartridge with the apparatus, etc.

[0009] By optical code we mean to indicate a group of graphical symbols through which a piece of information is coded as a sequence of white zones and black zones or else variously coloured zones, arranged according to one or more directions. Examples of such codes are barcodes, stacked codes, two-dimensional codes, colour codes and others. By optical code we also mean a string of alphanumeric characters, stamps, logos, signatures or other symbols having the function of coding information.

[0010] In general, an optical reader comprises on one side a light source and an optical illumination or scanning path that extends from the light source towards the code, and on the other side an optical sensor and an optical image formation system, arranged in an optical image reception path that extends from the code to the optical sensor; all of this is arranged in a suitable housing, provided with at least one window, through which preferably pass both the optical illumination path and the optical image reception path, i.e. both the light that goes from the light source to illuminate the code and the light that goes towards the sensor from the illuminated code. The optical image formation system is a group of optical components (such as, typically, mirrors, lenses and possibly also diaphragms) for collecting and focusing the image of the code on the sensor.

[0011] The optical code reader can be of the type comprising one or more LEDs as the light source and an optical illumination system for illuminating the optical code, and the optical sensor can be of the charge coupling device (CCD) type or of the complementary metal-oxide semiconductor (C-MOS) type for receiving the light signal coming from the code and transforming it into an electrical signal. Both types of sensor, moreover, can be of the linear or two-dimensional type. Alternatively, the reader can be of the type comprising a laser diode as the light source, an optical illumination system and scanning means for generating a scan and, therefore, illuminating the optical code, and the image sensor can comprise one or more photodiodes for receiving the light signal coming from the code and transforming it into an electrical signal. For both types of reader, the electrical signal representing the content of the code can be processed and decoded by a suitable processing system contained in the reader itself or separate from the reader, but connected to it through an electrical or radio connection.

[0012] US 6,117,471 (King) describes a machine for preparing drinks using disposable cartridges. The cartridges are made from filtrating material and can be con-

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tained in a corresponding impermeable bag, which can be opened by the user or automatically. The machine comprises automatic positioning means of the cartridge in a brewing chamber, starting from a loading position, through a corresponding guide. The cartridge can be provided with an optical code that is read by a suitable reader when it is moved along the guide, before its insertion inside the brewing chamber. The optical code contains information that the reader sends to a controller of the machine: this information can, for example, communicate to the controller whether the cartridge can be accepted by the machine, whether the ingredients contained in the cartridge are fresh, or other information linked to the cartridge and to the material contained in it.

[0013] WO 01/58786 (Kraft) describes a cartridge structure containing ingredients for drinks (to be made through brewing), made from material impermeable to air and water, comprising a liquid entry point and a drink exit point. The cartridge comprises a shaped tank made from plastic hermetically sealed in the open part by a laminate sheet. The cartridge is provided with recognition means that allow the machine to set the correct preparation cycle of the drink. The recognition means can be an optical code printed on the lower side of the cartridge made from laminate sheet.

[0014] EP 334,573 (General Foods) describes a machine for making drinks using disposable cartridges. This document is cited in document WO 01/58786 in which it is stated that the machine of EP 334,573 can be modified, associating it with an optical reader used to read codes printed on the cartridges. This patent describes a piece of equipment with extremely complicated kinematisms, which receives a cartridge in a brewing chamber, "gripping it" between two substantially parallel plates. When the cartridge is positioned between the two plates, the entry and exit points are perforated by corresponding means.

[0015] US 4,858,523 (Helbling) describes a machine for preparing drinks. The machine is loaded with filtrating cartridges containing the ingredients for the drink, and comprises a microprocessor for controlling the preparation cycles of the drinks. Amongst the inputs that the microprocessor receives there is the one sent by an optical reader for barcodes printed on the casing of the cartridge, which communicates to the microprocessor the type of drink contained in the cartridge itself, determining its preparation cycle.

[0016] EP 1,163,869 (Fianara) illustrates a machine in which a (substantially frustoconical) cartridge is inserted into a brewing chamber and held in its seat by corresponding locking means. The cartridge is perforated by suitable elements allowing the entry of the liquid and the exit of the drink.

[0017] EP 272,922 (General Foods) describes variously shaped cartridges comprising a plastic body sealed by a laminate sheet.

[0018] The problem forming the basis of the present invention is that of making the reading of an optical code provided on the cartridge more certain, more reliable and more repeatable.

[0019] Such a problem is solved by an apparatus according to claim 1. Preferred optional characteristics of such an apparatus are shown in the dependent claims.

[0020] In particular, in accordance with the invention, an apparatus is provided for preparing a plurality of drinks at the choice of a user from specific cartridges for each drink that are inserted by the user into the apparatus , in particular of the type in which a cartridge is provided with an optical code on a portion of one of its faces identifying the cartridge itself and the corresponding drink, said apparatus comprising:

- a cartridge path, extending between an insertion mouth for a new cartridge and a discharge mouth for a used cartridge,
- a reading station of the optical code of the inserted cartridge, such a reading station being arranged in the cartridge path ,
- a reading window facing the reading station,
- reading means acting on the reading station through the reading window, for reading the code of the cartridge in the reading station,
- control means, connected to said reading means, for the activation of an operating cycle for the preparation of the drink corresponding to the cartridge, and
- positioning means of the cartridge in the reading station,

characterised in that said positioning means comprise:

- an abutment plane,
- at least one stretching member of at least one portion of the face of the cartridge containing the optical code, said stretching member projecting with respect to the abutment plane,

said positioning means of the cartridge being such as to press the cartridge on the abutment plane, with the optical code arranged facing the reading window and with said at least one stretching member acting upon the face of the cartridge, to deform the face portion of the cartridge containing the code, laying it in a substantially uniform manner and arranging it in a predetermined position, facing said reading window.

[0021] The fact that the portion of the face of the cartridge containing the code is extended and stretched, arranged in a predetermined position, ensures that the optical code provided on such a face is readable in a way that is much easier, much more reliable and easier to repeat.

[0022] Problems deriving from the irregular reflections generated by the code when they are printed on a non-uniform (even extremely non-uniform) or creased surface are thus totally eliminated, or at least minimised.

[0023] Indeed, light is reflected according to different

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and unpredictable angles and positions: in these conditions, the phenomenon of reflection overlaps with the phenomenon of diffusion, and the reader, which is typically suitable for detecting the light diffused by the code (and not the reflected light) to avoid problems linked to the blinding of the sensor, is unable to discriminate the light diffused by the zones of the code with different reflectivity, making it very difficult, if not impossible, to decode the illuminated code.

[0024] The apparatus according to the invention therefore allows to solve the problems relative to the distortion of the code due to deformation of the portion of cartridge on which it is printed, as well as difficulty of illumination of the code, production of uncontrolled reflections between the reading window and the code and difficulty in focusing. Indeed, thanks to the invention, the optical code is always arranged on a regular and uniform surface, in the same predetermined arrangement provided for reading, exactly facing (in contact or spaced) the reading window; moreover, the face portion of the cartridge on which the optical code is situated is perfectly extended, without undulations, folds or creases.

[0025] Also, in the case in which the cartridge is subjected to a sterilisation and/or pasteurisation process (necessary for some ingredients that can be contained in the cartridge, such as milk or cream), the face portion on which the code is printed is even more creased and irregular, making the solution according to the invention even more advantageous for the correct operation of the apparatus.

[0026] The lying down and positioning of the code on a predetermined zone, facing (in contact or spaced) the reading window, can be obtained in different ways.

[0027] In a first preferred embodiment of the invention, the stretching member is formed from the same reading window, suitably shaped.

[0028] In such a case, the reading window, in a first embodiment thereof, is flat and arranged according to a plane that is tilted with respect to the abutment plane by a predetermined angle, preferably between 0 and 30°. In a second embodiment thereof, the reading window is flat and arranged according to a reading plane parallel to the abutment plane and raised with respect to it. In a third embodiment thereof, the reading window is convex. In further embodiments, the reading window can have a combination of the aforementioned characteristics, for example it can be raised and tilted with respect to the abutment plane, or else convex and tilted, etc. The choice amongst these embodiments of the reading window can be made according to the conditions of movement of the cartridge in the path inside the apparatus and of resistance to stresses of the material in which the face of the cartridge containing the code is made: indeed, an excessive projection of the reading window could cause the breaking of the face of the cartridge, making it unusable.

[0029] Therefore, compatibly with the resistance of the face of the cartridge, the reading window can project more or less from the abutment plane. Consequently, if the reading window has a large extension, its inclination must be contained in order to avoid it projecting too much, whereas, vice-versa, if the reading window should have a short extension, then its inclination can be greater, given that its projection would be more limited.

[0030] Of course, the extension of the reading window depends upon the reading technology used and the code to be decoded: in the case, for example, of a linear code and laser reading technology, the reading window is preferably narrow in the direction perpendicular to the reading direction and long in the reading direction, whereas in the case of a two-dimensional code and CCD reading technology, the reading window preferably has a wide extension according to the two perpendicular reading directions.

[0031] The reading window can be open, but preferably it is closed by a panel (made from transparent material or with a predetermined degree of opaqueness to obtain a diffusing effect, for example from glass or plastic), so as to obtain an optimal extension of the code on the entire extension of the window. Moreover, the panel allows the reading means to be kept protected with respect to the path of the cartridge; in such a path, indeed, relatively high temperatures can develop, sprays of liquid can occur and dirt can be deposited. Finally, the structure of the reading window (raised and tilted) allows the window to clean itself: possible drops of drink that might be deposited on it, potentially harmful for a correct reading of the code, would slide downwards, freeing the field of view of the optical reader.

[0032] Advantageously, the reading window can have rounded edges and/or corners so as to avoid the face of the cartridge from being able to be perforated during the reading step of the code.

[0033] In another preferred embodiment of the invention, the stretching member is formed from at least one shaped appendix, advantageously placed near to the reading window. The shaped appendix is such as to apply a stress on the face of the cartridge so that, when the positioning means thrust the cartridge against the abutment plane, the code is extended uniformly and is arranged on a predetermined plane.

[0034] Also in this case, the shape and size of the shaped appendix depend upon the resistance to stresses of the material with which the face of the cartridge containing the code is made.

[0035] Generally, the stretching member must be of a size and geometry such as to allow the optimal extension of the code and such as to never perforate the cartridge.

[0036] Preferably, the reading means are active to read the optical code on the cartridge in the reading station only when the positioning means press the cartridge against the stretching member.

[0037] The positioning means can be made in various ways. For example and preferably, the positioning means comprise a thruster, acting on the cartridge to press it against the stretching member.

[0038] The thruster, which can be mobile or fixed, is

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able to act upon the cartridge so as to force the portion of face on which the code is printed against the stretching member, so that the code extends facing the reading window.

[0039] The path of the cartridge comprises a drink preparation and dispensing station, which can be distinct or coincident with the reading station; when the two stations are coincident, the positioning means in the reading station are suitable for holding the cartridge in position during the preparation and dispensing of the drink. This arrangement ensures that the information read is actually that provided on the cartridge with which one is about to prepare the drink, also in the case of errors in movement of the cartridge in its path.

[0040] Preferably, the optical code can be a linear, two-dimensional or colour barcode, and the reading means can comprise a corresponding code reader.

[0041] Further characteristics and advantages of an apparatus according to the invention shall become clearer from the following description of some preferred embodiments thereof, given with reference to the attached drawings. In such drawings:

- figure 1 is a schematic view of an apparatus in accordance with the invention, for the preparation of a plurality of drinks from cartridges;
- figures 2 and 3 are schematic views of the reading station of the apparatus of figure 1, in a first embodiment, in two operating positions and with a cartridge inserted;
- figure 4 is a schematic plan view of the reading station of figures 2 and 3;
- figures 5 to 7 are detailed schematic views of three different variants of the reading window of the reading station of figures 2 to 4;
- figures 8 and 9 are schematic views of the reading station of the apparatus of figure 1, in a second embodiment, in two operating positions and with a cartridge inserted.

[0042] In the figures, an apparatus for the preparation of a plurality of drinks from cartridges K, containing the specific ingredients for the preparation of each drink, is wholly indicated with 10. The cartridges K are of a known type, such as those illustrated in the various documents previously cited.

[0043] Usually, a cartridge K is single-dose and single-use, i. e. is intended for the preparation of just one serving of drink after which it is disposed of, together with the possible remains of the product used for the preparation of the drink; nevertheless, it is also possible for the cartridge K to be reusable, and/or for it to be able to be used for the preparation of two or more servings of drink.

[0044] Each cartridge K is provided on one of its faces F with an optical code C with information on the drink that the cartridge K itself is intended to prepare; the face F can be more or less flexible and deformable, made for example from a sheet of laminate metal material. The optical code can be one of the numerous types known; preferably it is a barcode.

[0045] In the apparatus 10 a cartridge path is provided, schematically indicated with reference numeral 11 in figure 1, for the cartridge K, extending between an insertion mouth 12 for the new cartridge K and an exit mouth 13 for the used cartridge K. In the cartridge path 11 a drink preparation and dispensing station 20 is provided (also known as brewing station, because the preparation of the drink usually indeed occurs by brewing), in which the cartridge K is positioned so as to intercept a water delivery path, schematically indicated with reference numeral 21. The water crosses the cartridge K and produces (with the ingredients present in the cartridge, by percolation or by dissolving) the desired drink, which is dispensed from the spout 22.

[0046] According to the structure of the apparatus 10, the cartridge path 11 can have different configurations, more or less complex. In a particularly simple configuration, the path 11 can at the extreme comprise just the dispensing station 20 and a single mouth that acts both as an insertion mouth 12 and as an exit mouth 13.

[0047] Along the cartridge path 11 a reading station 30 of the optical code C provided on the cartridge K is provided. Facing the reading station 30, there is a reading window 40, through which reading means (for example a barcode reader, schematically indicated in the figures with 32) are active on the reading station 30. The reading station 30 is inserted into any point of the cartridge path 11, in particular it can, for example, coincide with the drink preparation and dispensing station 20.

[0048] In the reading station 30 positioning means of the cartridge K in the station 30 itself are provided. Such means comprise, for example, an abutment plane 33 and a thruster 34 opposite the abutment plane 33; preferably, at least one of the two elements 33 and 34 is mobile in the apparatus 10, so that the thruster 34 and the abutment plane 33 define an open position (figure 2), in which they are sufficiently spaced apart so as to allow the cartridge K to pass between them, allowing it to move in its path 11, and a closed position (figure 3) in which they are thrusted towards each other so as to lock the cartridge K between them.

[0049] The abutment plane 33 and the thruster 34 can also be fixed together, provided that they define an air space in which a cartridge K can be inserted (for example through a corresponding insertion guide) and inside which the portion of face F of the cartridge K on which the code C is printed is pressed on the abutment plane 33, as described better later on.

[0050] In accordance with the invention, the positioning means 33, 34 of the cartridge K in the reading station 30 are such as to press the face F of the cartridge K against a stretching member, provided in the reading station 30, with sufficient force to deform the portion of the face F of the cartridge K on which the code C is printed, extending it and positioning it in a predetermined way with the code C facing the reading window 40, but not

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such as to risk the accidental perforation of the face F.

[0051] In a first embodiment of the invention, illustrated in figures 2 to 7, the stretching member is the reading window 40 itself, made projecting from the abutment plane 33.

[0052] The reading window 40 comprises a space 41, surrounded by a perimetric wall 42 and preferably closed towards the reading station 30 by a panel 43, sealed on the perimetric wall 42, through which the reading of the code C by the reader 32 takes place. The panel 43 is made from transparent material or material with a predetermined degree of opaqueness to allow a diffusing effect, for example from glass or plastic. In a simplified variant, not illustrated, the reading window 40 can be simply open, without any closing panel; such a variant, obviously, can only be adopted in cases in which (due to the mutual positions of the various elements) there is no risk of dirtying the reader 32 and the code C is printed on an easily deformable surface.

[0053] The reading window 40 can have different configurations, as illustrated in figures 5, 6 and 7.

[0054] In particular, the reading window can be flat, tilted with respect to the abutment plane 33 by a predetermined angle, like the window 40' of figure 5. The aforementioned predetermined angle is preferably between 0 and 30°, but it can also take different values provided that they are compatible with the resistance of the material with which the face F of the cartridge K containing the code C is made.

[0055] Compatibly with the resistance and the extension of the face F of the cartridge K, the reading window 40 can project more or less from the abutment plane 33. Consequently, if the reading window 40 has a long extension, its inclination must be low so as to avoid it projecting too much and thus to avoid it being able to damage the cartridge, whereas, vice-versa, if the reading window has a short extension, then its inclination can be greater, given that its projection is shorter.

[0056] Alternatively, the reading window can be convex, like the window 40" of figure 6; with this expression we intend to indicate that the window 40" is closed by a convex panel 43". It should be noted that the illustrated transparent panel 43" is tilted with respect to the abutment plane 33, but it could also be parallel to it.

[0057] Again alternatively, the reading window can be flat, parallel and spaced with respect to the abutment plane 33 by a predetermined distance, closed by a panel 43"', like the window 40"' of figure 7.

[0058] In a further embodiment, not illustrated, the reading window 40 can be raised and tilted with respect to the abutment plane 33.

[0059] Of course, the embodiments described above of the reading window 40 can also be combined together.

[0060] As stated, the choice amongst these embodiments of the reading window can be made according to the conditions of movement of the cartridge K in the path inside the apparatus and of resistance to stresses of the material with which the face F of the cartridge K containing the code C is made.

[0061] Advantageously the edges and/or the corners of the reading window 40 can be rounded so as to avoid them damaging the cartridge K.

[0062] In another preferred embodiment of the invention illustrated in figures 8 and 9, the stretching member is a shaped appendix 44 that extends near to the reading window, indicated in this case with 140.

[0063] It should be noted that, in this case, the reading window 140 is arranged on a plane substantially coinciding with the abutment plane 33.

[0064] The shaped appendix 44 is such as to apply a stress onto the face F of the cartridge K so that, when the positioning means 33 and 34 thrust the cartridge K against the abutment plane 33, the portion of face F containing the code C is extended uniformly and is arranged on a predetermined surface, with the code C facing the reading window 140.

[0065] Also in this case, the shape and size of the shaped appendix depend upon the resistance to stresses of the material with which the face F of the cartridge K containing the code C is made.

[0066] Generally, the stretching member, 40 or 44, must be of a size and geometry such as to allow the optimal extension of the portion of the face F of the cartridge containing the code C on a predetermined surface, without ever causing the accidental perforation of the cartridge K.

[0067] Finally, the cartridge K can be either of the type with a filtrating casing or of the type with an impermeable casing; in the second case, the opening of the cartridge K can be carried out by the user, at the moment of its insertion into the apparatus 10, or else can be carried out automatically by the apparatus 10 itself (for example through cutting or perforation of the impermeable casing).

[0068] In the operation of the apparatus 10, the tension to which the face F is subjected ensures that the face F itself is extended and positioned on a predetermined surface facing the reading window 40 or 140, so that in the zone where the reading of the code C must take place possible folds, creases and the like are avoided, even if the cartridge K has a flexible casing. In the case in which the stretching member is the reading window 40 itself, the panel 43 (43', 43", 43"') defines a regular surface on which the code C extends uniformly and in a predetermined position, ensuring that the reflected light does not blind the sensor, and, consequently, allowing the reader to correctly discriminate between the light diffused by zones with different reflectivity of the code. Moreover, should the code C to be read be arranged on the reading window 40, the risks of undesired reflection shall be reduced to the minimum, even in the presence of the transparent panel 43 for protecting the reader 32.

[0069] In any case, the stretching member allows an extremely precise positioning of the code C given by the tension of the face F eliminating any problems of focusing and allowing even readers with limited depth of focus to

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be used, therefore, economically very advantageous.

[0070] Therefore, basically, the reading of the code C is made easier, much more reliable and repeatable. Consequently, the operation of the apparatus is equally more reliable.

Claims

1. Apparatus for the preparation of a plurality of drinks at the choice of a user from cartridges specific to each drink that are inserted by the user in the apparatus, in particular of the type in which a cartridge (K) is provided with an optical code (C) on one of its faces (F) identifying the cartridge (K) itself and the corresponding drink, said apparatus comprising:

   - a cartridge path (11), extending between an insertion mouth (12) for a new cartridge and a discharge mouth (13) for a used cartridge,
   - a reading station (30) of the optical code (C) of the inserted cartridge (K), such a reading station (30) being arranged in the cartridge path (11),
   - a reading window (40; 140) facing the reading station (30),
   - reading means (32) acting on the reading station (30) through the reading window (40; 140), for reading the code (C) of the cartridge (K) in the reading station (30),
   - control means, connected to said reading means (32), for the activation of an operating cycle for the preparation of the drink corresponding to the cartridge (K), and
   - positioning means (33, 34) of the cartridge (K) in the reading station (30),

   characterised in that said positioning means (33, 34) comprise:

   - an abutment plane (33),
   - at least one stretching member (40; 44) of at least one portion of the face (F) of the cartridge (K) containing the optical code (C), said stretching member (40; 44) projecting with respect to the abutment plane (33), said positioning means of the cartridge (K) being such as to press the cartridge (K) on the abutment plane (33), with the optical code (C) arranged facing the reading window (40; 140) and with said at least one stretching member (40; 44) acting with a thrust on the face (F) of the cartridge (K), to deform the portion of face (F) of the cartridge (K) containing the code (C), extending it substantially uniformly and arranging it in a predetermined position, facing said reading window (40; 140).

2. Apparatus according to claim 1, wherein said at least one stretching member is the reading window (40), and the reading window (40) is flat and arranged according to a reading plane tilted by a predetermined angle with respect to the abutment plane (33).

3. Apparatus according to claim 2, where in the predetermined angle is between 0 and 30°.

4. Apparatus according to claim 2 or 3, wherein the reading window (40) is arranged according to a reading plane inclined with respect to the abutment plane (33) and raised with respect to it.

5. Apparatus according to any one of claims 1 to 4, wherein the reading window is closed by a panel (43; 43'; 43"; 43"') made from transparent material.

6. Apparatus according to any one of claims 1 to 4, wherein the reading window is closed by a panel (43; 43'; 43"; 43"') made from a material with a predetermined degree of opaqueness to obtain a diffusing effect.

7. Apparatus according to any one of claims 1 to 4, wherein the reading window (40) is open.

8. Apparatus according to any one of claims 2 to 7, wherein said reading window (40) has smooth edges.

9. Apparatus according to claim 1, wherein said at least one stretching member comprises at least one shaped appendix (44) that extends from said abutment plane (33).

10. Apparatus according to claim 9, wherein said at least one shaped appendix (44) extends from said abutment plane (33) near to the perimetric zone of said reading window (140).

11. Apparatus according to any one of claims 1 to 10, wherein the positioning means comprise a thruster (34), acting on the cartridge (K) so that it presses it against said at least one stretching member (40; 44).

12. Apparatus according to claim 11, wherein said thruster (34) and said abutment plane (33) are mutually mobile between an open position, in which said thruster (34) and said abutment plane (33) are sufficiently spaced apart as to allow the cartridge (K) to pass between them, and a closed position, in which said thruster (34) thrusts towards the abutment plane (33) so as to lock the cartridge (K) between them.

13. Apparatus according to claim 11, wherein said thruster (34) and said abutment plane (33) are fixed together, defining an air space in which a cartridge (K) can be inserted and inside of which the portion

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of face (F) of the cartridge (K) with the optical code (C) is pressed on said at least one stretching member (40; 44).

14. Apparatus according to any one of the previous claims, wherein the reading means (32) are active to read the optical code (C) on the cartridge (K) in the reading station (30) only when the positioning means press the face (F) of the cartridge (K) with the optical code (C) against said at least one stretching member (40; 44).

15. Apparatus according to any one of the previous claims, wherein the cartridge path (11) comprises a drink preparation and dispensing station (20) coinciding with the reading station (30), and wherein the positioning means in the reading station (30) are suitable for holding the cartridge (K) in position during the preparation and dispensing of the drink.

16. Apparatus according to any one of the previous claims, wherein the optical code (C) is a barcode and the reading means (32) comprise a barcode reader.

Patentansprüche

1. Vorrichtung zur Zubereitung einer Vielzahl von Getränken nach Wahl eines Benutzers aus Kartuschen, die für jedes Getränk spezifisch sind und von dem Benutzer in die Vorrichtung eingefügt werden, insbesondere der Bauart, bei der eine Kartusche (K) mit einem optischen Code (C) auf einer ihrer Oberflächen (F) versehen ist, welche die Kartusche (K) selbst und das entsprechende Getränk identifiziert, mit folgenden Merkmalen:

ein Kartuschenweg (11), der sich zwischen einer Einsetzmündung (12) für eine neue Kartusche und einer Ausgabemündung (13) für eine verbrauchte Kartusche erstreckt, eine Lesestation (30) für den optischen Code (C) der eingefügten Kartusche (K),
wobei diese Lesestation (30) in dem Kartuschenweg (11) angeordnet ist,
ein Lesefenster (40; 140), welches der Lesestation (30) zugewandt ist,
eine Leseeinrichtung (32), die durch das Lesefenster (40; 140) auf die Lesestation (30) einwirkt, zum Lesen des Codes (C) der Kartusche (K) in der Lesestation (30),
eine Steuereinrichtung, die mit der Leseeinrichtung (32) verbunden ist, zum Aktivieren eines Betriebszyklus für die Zubereitung des Getränks, welches der Kartusche (K) entspricht, und
eine Positioniereinrichtung (32, 34) der Kartusche (K) in der Lesestation (30),

dadurch gekennzeichnet, daß die Positioniereinrichtung (33, 34) folgende Merkmale aufweist:

eine Anlageebene (33);
wenigstens ein Streckelement (40; 44) für wenigstens einen Teil der Oberfläche (F) der Kartusche (K), welche den optischen Code (C) enthält, wobei das Strekkelement (40; 44) in bezug auf die Anlageebene (33) vorsteht;
wobei die Positioniereinrichtung der Kartusche (K) so ausgebildet ist, daß sie die Kartusche (K) gegen die Anlageebene (33) drückt, wobei der optische Code (C) so angeordnet ist, daß er dem Lesefenster (40; 140) zugewandt ist, und wobei das wenigstens eine Streckelement (40; 44) mit Druck auf die Oberfläche (F) der Kartusche (K) wirkt, um den Teil der Oberfläche (F) der Kartusche (K), welche den Code (C) enthält, zu verformen und ihn somit im wesentlichen gleichmäßig auszubreiten und in einer vorgegebenen Position anzuordnen, welche dem Lesefenster (40; 140) zugewandt ist.

2. Vorrichtung nach Anspruch 1, wobei das wenigstens eine Streckelement das Lesefenster (40) ist, und das Lesefenster (40) flach ist und entlang einer Leseebene angeordnet ist, die um einen vorgegebenen Winkel in bezug auf die Anlageebene (33) geneigt ist.

3. Vorrichtung nach Anspruch 2, wobei der vorgegebene Winkel zwischen 0 und 30° liegt.

4. Vorrichtung nach Anspruch 2 oder 3, wobei das Lesefenster (40) entlang einer Leseebene angeordnet ist, die in bezug auf die Anlageebene (33) geneigt und angehoben ist.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei das Lesefenster durch ein Paneel (43; 43'; 43"; 43'") aus einem transparenten Material geschlossen ist.

6. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei das Lesefenster durch ein Paneel (43; 43'; 43"; 43'") geschlossen ist, welches aus einem Material mit einem vorgegebenen Grad an Lichtundurchlässigkeit gebildet ist, um einen Streueffekt zu erhalten.

7. Vorrichtung nach einem der Ansprüche 1 bis 4, wobei das Lesefenster (40) offen ist.

8. Vorrichtung nach einem der Ansprüche 2 bis 7, wobei das Lesefenster (40) abgerundete Ecken hat.

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9. Vorrichtung nach Anspruch 1, wobei das wenigstens eine Streckelement wenigstens einen geformten Fortsatz (44) aufweist, der sich von der Anlageebene (33) aus erstreckt.

10. Vorrichtung nach Anspruch 9, wobei der wenigstens eine geformte Fortsatz (44) sich von der Anlageebene (33) in der Nähe des Perimeters des Lesefensters (140) erstreckt.

11. Vorrichtung nach einem der Ansprüche 1 bis 10, wobei die Positioniereinrichtung ein Druckelement (34) aufweist, das auf die Kartusche (K) wirkt, so daß es diese gegen das wenigstens eine Streckelement (40; 44) drückt.

12. Vorrichtung nach Anspruch 11, wobei das Druckelement (34) und die Anlageebene (33) relativ zueinander zwischen einer offenen Position, in der das Druckelement (34) und die Anlageebene (33) ausreichend weit voneinander entfernt sind, um die Kartusche (K) zwischen diesen durchzulassen, und einer geschlossenen Position, in der das Druckelement (34) in Richtung der Anlageebene (33) drückt, um die Kartusche (K) zwischen diesen einzuschließen, beweglich sind.

13. Vorrichtung nach Anspruch 11, wobei das Druckelement (34) und die Anlageebene (33) zueinander feststehend sind und einen Luftraum definieren, in den eine Kartusche (K) eingefügt werden kann und innerhalb dessen der Teil der Oberfläche (F) der Kartusche (K) mit dem optischen Code (C) gegen das wenigstens eine Streckelement (40; 44) gedrückt wird.

14. Vorrichtung nach einem der vorangehenden Ansprüche, wobei die Leseeinrichtung (32) zum Lesen des optischen Codes (C) auf der Kartusche (K) in der Lesestation (30) nur dann aktiviert ist, wenn die Positioniereinrichtung die Oberfläche (F) der Kartusche (K) mit dem optischen Code (C) gegen das wenigstens eine Strekkelement (40; 44) drückt.

15. Vorrichtung nach einem der vorangehenden Ansprüche, wobei der Kartuschenweg (11) eine Getränkezubereitungs- und Abgabestation (20) umfaßt, die bei der Lesestation (30) liegt, und wobei die Positioniereinrichtung der Lesestation (30) die Kartusche (K) während der Zubereitung und Abgabe des Getränks in Position halten kann.

16. Vorrichtung nach einem der vorangehenden Ansprüche, wobei der optische Code (C) ein Strichcode ist und eine Leseeinrichtung (32) einen Strichcodeleser umfaßt.

Revendications

1. Appareil pour la préparation d'une pluralité de boissons au choix d'un utilisateur à partir de capsules spécifiques pour chaque boisson que l'utilisateur insert dans l'appareil, en particulier du type dans lequel une capsule (K) est équipée d'un code optique (C) sur une de ses faces (F) identifiant la capsule (K) elle-même et la boisson correspondante, ledit appareil comprenant :

   - un trajet de capsule (11), s'étendant entre une bouche d'insertion (12) pour une nouvelle capsule et une bouche de décharge (13) pour une capsule usée,
   - une station de lecture (30) du code optique (C) de la capsule (K) insérée, une telle station de lecture (30) étant disposée dans le trajet de capsule (11),
   - une fenêtre de lecture (40 ;140) faisant face à la station de lecture (30),
   - des moyens de lecture (32) agissant sur la station de lecture (30) à travers la fenêtre de lecture (40 ; 140), pour la lecture de code (C) de la capsule (K) dans la station de lecture (30),
   - des moyens de commande, reliés auxdits moyens de lecture (32), pour l'activation d'un cycle opératoire pour la préparation de la boisson correspondante à la capsule (K), et
   - des moyens de positionnement (33, 34) de la capsule (K) dans la station de lecture (30),

   caractérisé en ce que lesdits moyens de positionnement (33, 34) comprennent :

   - un plan de butée (33),
   - au moins un élément tendeur (40 ; 44) pour tendre au moins une partie de la face (F) de la capsule (K) contenant le code optique (C), ledit élément tendeur (40 ; 44) faisant saillie par rapport au plan de butée (33), lesdits moyens de positionnement de la capsule (K) étant de sorte à presser la capsule (K) contre le plan de butée (33), avec le code optique (C) disposé face à la fenêtre de lecture (40 ; 140) et avec ledit au moins un élément tendeur (40 ; 44) agissant avec une poussée sur la face (F) de la capsule (K), de façon à déformer la partie de la face (F) de la capsule (K) contenant le code (C), l'étendant sensiblement de façon uniforme et le disposant dans une position prédéterminée, face à la fenêtre de lecture (40 ; 140).

2. Appareil selon la revendication 1, dans lequel ledit au moins un élément tendeur est la fenêtre de lecture (40), et la fenêtre de lecture (40) est plate et disposée selon un plan de lecture incliné selon un angle prédéterminé par rapport au plan de butée (33).

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3. appareil selon la revendication 2, dans lequel l'angle prédéterminé est compris entre 0 et 30°.

4. appareil selon la revendication 2 ou 3, dans lequel la fenêtre de lecture (40) est disposée selon un plan de lecture incliné et remontée par rapport au plan de butée (33).

5. Appareil selon l'une quelconque des revendications 1 à 6, dans lequel la fenêtre de lecture est fermée par un panneau (43 ; 43' ; 43" ; 43"') fait à partir d'un matériau transparent.

6. Appareil selon l'une quelconque des revendications 1 à 6, dans lequel la fenêtre de lecture est fermée par un panneau (43 ; 43' ; 43" ; 43"') fait à partir d'un matériau avec un degré prédéterminé d'opacité pour obtenir un effet diffusant.

7. Appareil selon l'une quelconque des revendications 1 à 6, dans lequel la fenêtre de lecture (40) est ouverte.

8. Appareil selon l'une quelconque des revendications 2 à 9, dans lequel ladite fenêtre de lecture (40) possède des bords lisses.

9. Appareil selon la revendication 1, dans lequel ledit au moins un élément tendeur comprend au moins une protubérance usinée (44) qui s'étend depuis ledit plan de butée (33).

10. appareil selon la revendication 11, dans lequel ladite au moins une protubérance usinée (44) s'étend depuis ledit plan de butée (33) proche de la zone du contour de ladite fenêtre de lecture (140).

11. Appareil selon l'une quelconque des revendications 1 à 12, dans lequel lesdits moyens de positionnement comprennent un poussoir (34), agissant sur la capsule (K) de sorte qu'il la presse contre ledit au moins un élément tendeur (40 ; 44).

12. Appareil selon la revendication 13, dans lequel ledit poussoir (34) et ledit plan de butée (33) sont mutuellement mobiles entre une position ouverte, dans laquelle ledit poussoir (34) et ledit plan de butée (33) sont suffisamment espacés l'un de l'autre de façon à permettre à la capsule (K) de passer entre eux, et une position fermée, dans laquelle ledit poussoir (34) pousse vers le plan de butée (33) de façon à bloquer la capsule (K) entre eux.

13. Appareil selon la revendication 13, dans lequel ledit poussoir (34) et ledit plan de butée (33) sont fixés ensemble, définissant un espace d'air dans lequel une capsule (K) peut être insérée et à l'intérieur duquel on presse la partie de la face (F) de la capsule (K) avec le code optique (C) sur ledit au moins un élément tendeur (40 ; 44).

14. Appareil selon l'une quelconque des revendications précédentes, dans lequel les moyens de lecture (32) sont actifs pour lire le code optique (C) sur la capsule (K) dans la station de lecture (30) seulement lorsque les moyens de positionnement pressent la face (F) de la capsule (K) avec le code optique (C) contre ledit au moins un élément tendeur (40 ; 44).

15. Appareil selon l'une quelconque des revendications précédentes, dans lequel le trajet de capsule (11) comprend une station de préparation et de distribution de boisson (20) coïncidant avec la station de lecture (30), et dans lequel les moyens de positionnement dans la station de lecture (30) sont aptes à tenir la capsule (K) en position durant la préparation et la distribution de la boisson.

16. Appareil selon l'une quelconque des revendications précédentes, dans lequel le code optique (C) est un code à barres et les moyens de lecture (32) comprennent un lecteur de code à barres.

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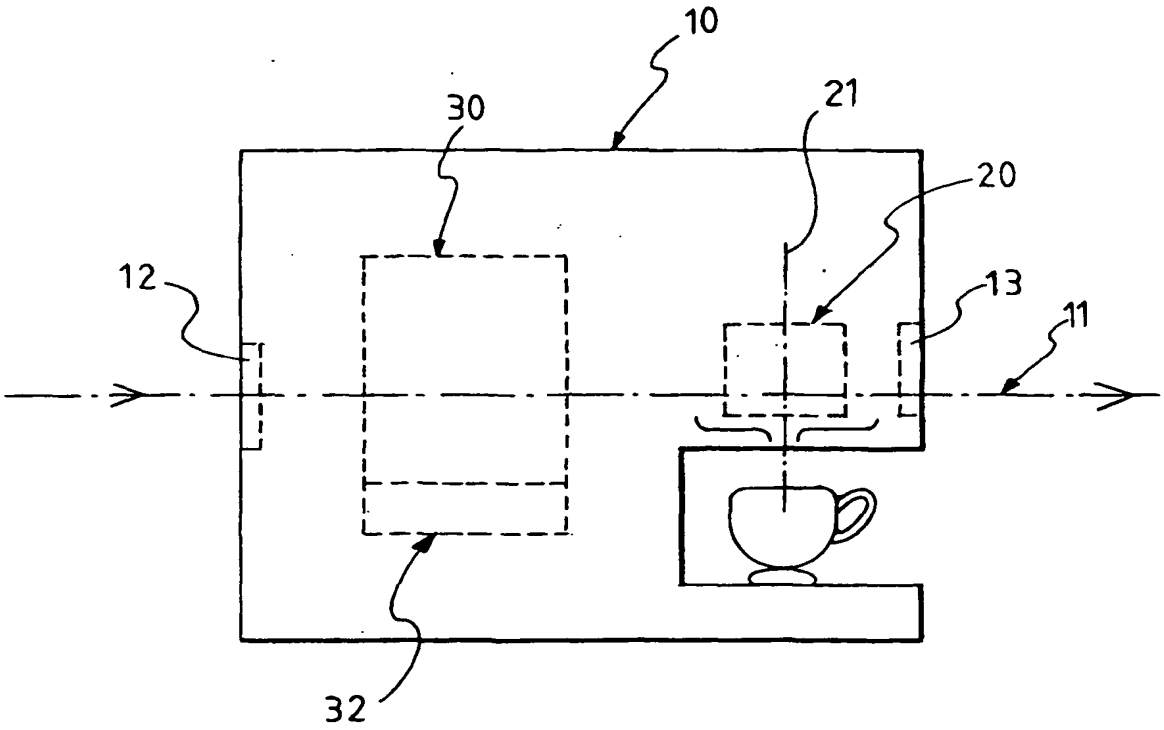


FIG.1

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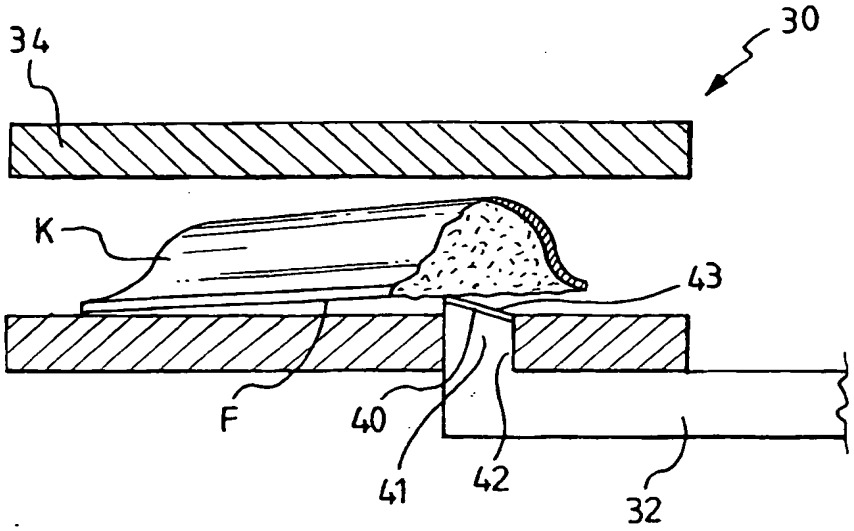


FIG. 2

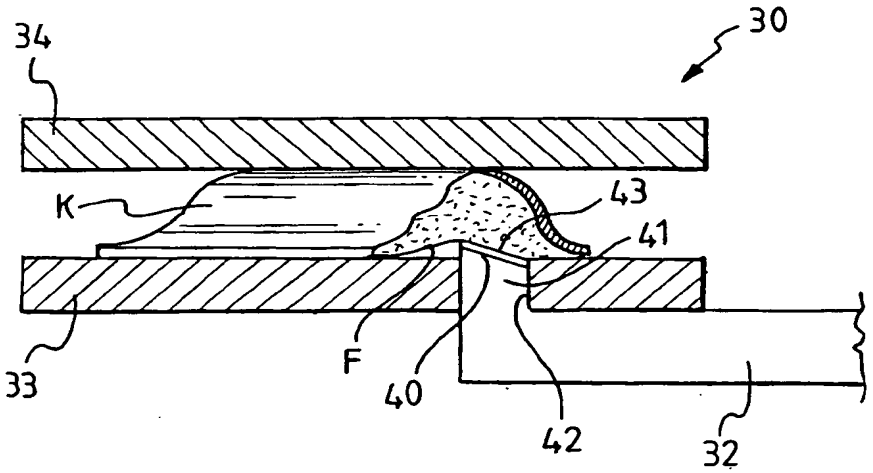


FIG. 3

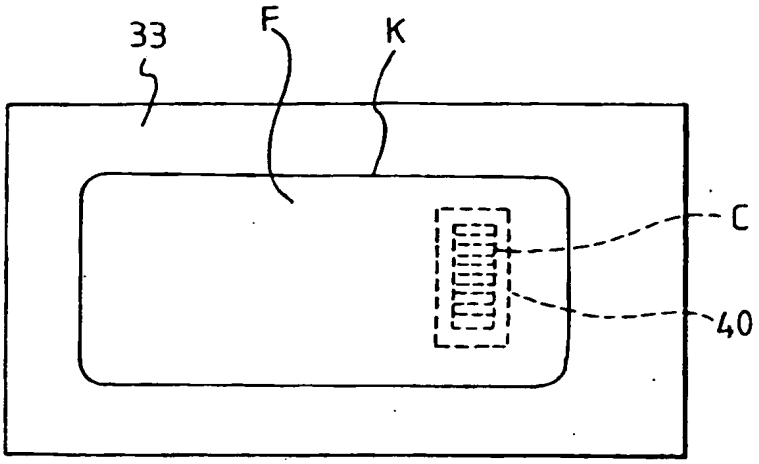


FIG. 4

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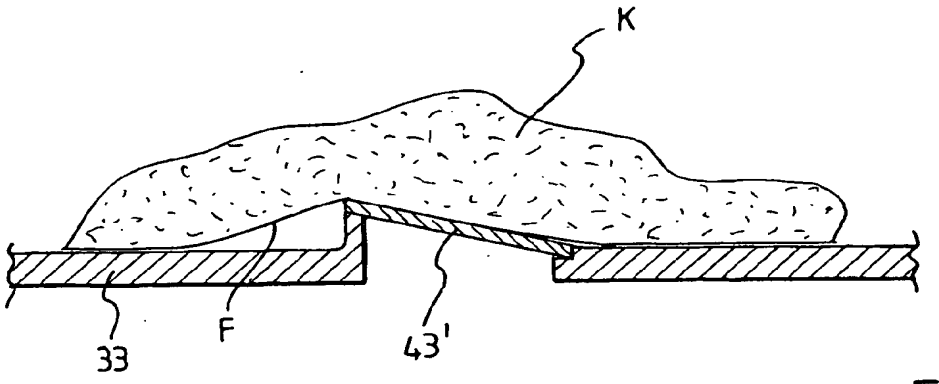


FIG.5

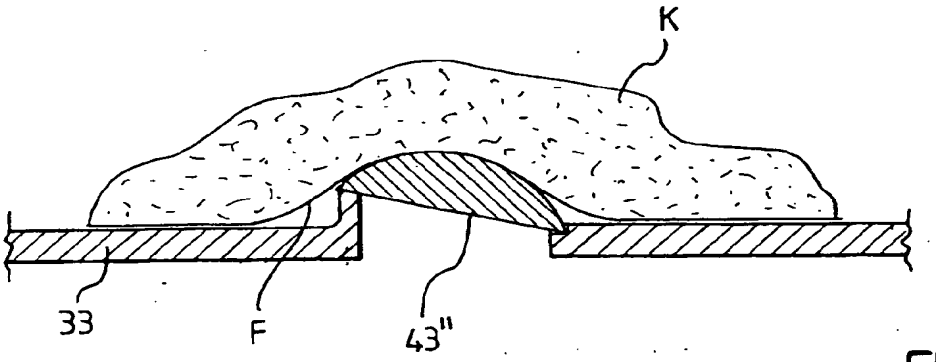


FIG.6

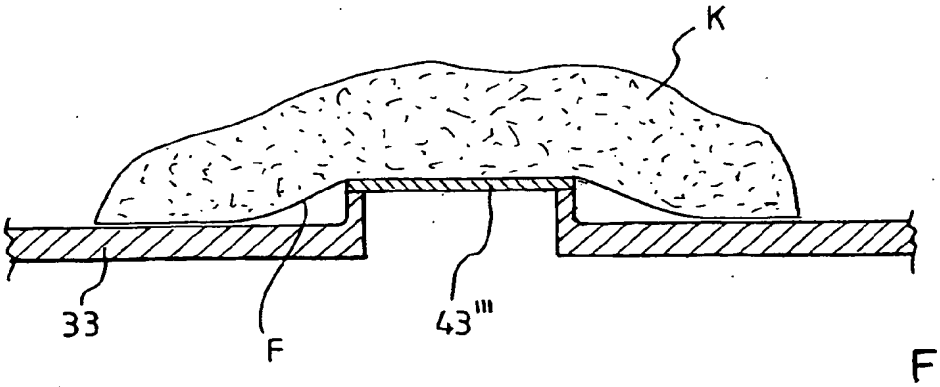


FIG.7

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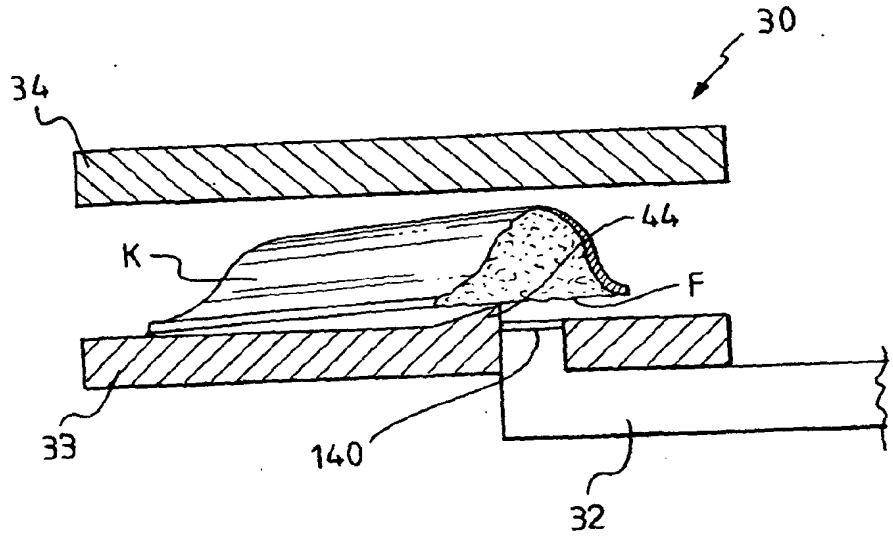


FIG.8

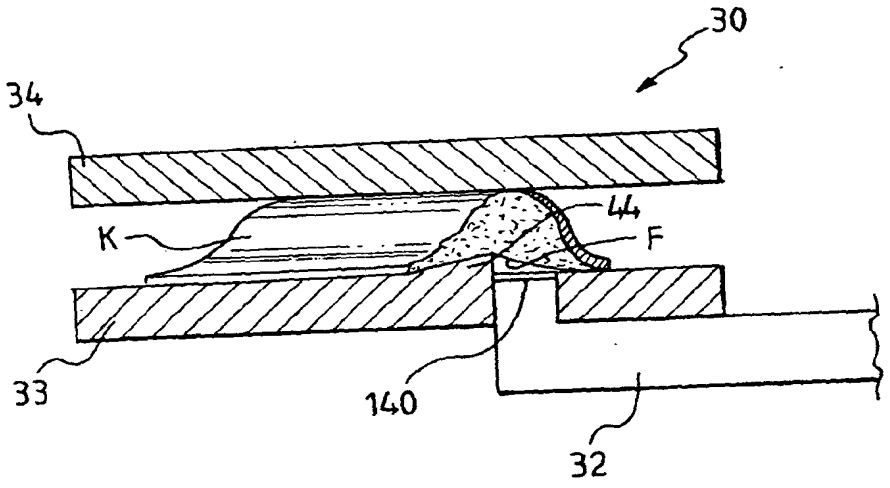


FIG.9

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(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2001－203232
（P2001－203232A）
(43)公開日　平成13年７月27日(2001.7.27)

(51)Int.Cl.[7]	識別記号	ＦＩ		テーマコード（参考）
Ｈ０１Ｌ　21/60	３０１	Ｈ０１Ｌ　21/60	３０１Ｊ	３Ｅ０６８
Ｂ６５Ｄ　85/00	３０１	Ｂ６５Ｄ　85/00	３０１	３Ｆ０５８
Ｂ６５Ｈ　75/02		Ｂ６５Ｈ　75/02	Ｂ	５Ｆ０４４

審査請求　未請求　請求項の数７　ＯＬ　（全 ６ 頁）

(21)出願番号　特願2000－13242(P2000－13242)

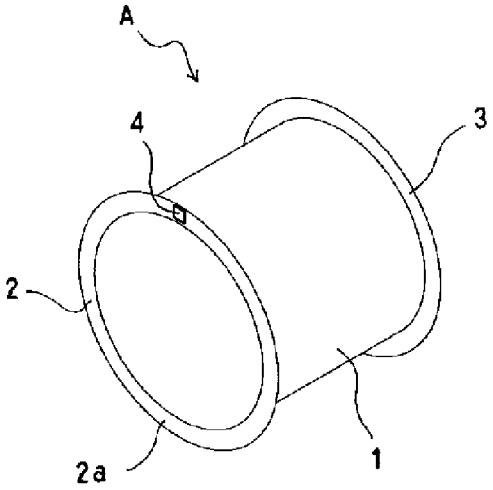
(22)出願日　平成12年１月21日(2000.1.21)

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Ｆターム(参考)　3E068 AA24 AB09 AC03 CC14 DD40
DE20 EE32 EE34 EE40
3F058 AB03 AC00 DB05 DC03 LA02
LA06
5F044 FF00

(54)【発明の名称】　ボンディングワイヤ用スプール及び二次元コードの読み取り方法

(57)【要約】
【課題】ボンディングワイヤやスプールに関する個有情報を豊富に備えたボンディングワイヤ用スプールを提供する。
【解決手段】巻き回したボンディングワイヤの仕様やスプールＡの使用履歴などに関する個有情報が、スプールＡのフランジ２に設けたマトリックス型二次元コード４に記録されるので、それら個有情報を備えたスプールＡが提供される。



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【特許請求の範囲】
【請求項１】　ボンディングワイヤを巻き回す胴部の一端又は両端にフランジを有するボンディングワイヤ用スプールであって、前記フランジにおける胴部と反対側の面にマトリックス型二次元コードを備えたことを特徴とするボンディングワイヤ用スプール。
【請求項２】　上記マトリックス型二次元コードが、上記フランジに刻設されたものである請求項１記載のボンディングワイヤ用スプール。
【請求項３】　上記ボンディングワイヤ用スプールが繰り返し使用されるものであって、該スプールのフランジに備えたマトリックス型二次元コードに少なくともスプール重量を記録して、スプールごとのボンディングワイヤ重量を管理し得るよう形成した請求項１又は２記載のボンディングワイヤ用スプール。
【請求項４】　上記ボンディングワイヤ用スプールが繰り返し使用されるものであって、該スプールのフランジに備えたマトリックス型二次元コードに少なくともスプール番号を記録して、スプールごとのボンディングワイヤ仕様を追跡管理し得るよう形成した請求項１又は２記載のボンディングワイヤ用スプール。
【請求項５】　上記マトリックス型二次元コードが、スプールの胴部に巻き回したボンディングワイヤの端部の止着部材に形成されている請求項１記載のボンディングワイヤ用スプール。
【請求項６】　上記マトリックス型二次元コードに、スプールの胴部に巻き回したボンディングワイヤの仕様を記録することにより、スプールごとのボンディングワイヤ仕様を管理し得るよう形成した請求項５記載のボンディングワイヤ用スプール。
【請求項７】　ボンディングワイヤ用スプールのフランジに刻設したマトリックス型二次元コードの読み取り方法であって、前記マトリックス型二次元コードに対し読み取り光を所定の傾斜角度をもって当てることを特徴とするボンディングワイヤ用スプールのフランジに刻設した二次元コードの読み取り方法。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、例えば半導体装置の組立てにおいて、チップ電極と外部リードを配線するためのボンディング用ワイヤを巻き回すスプールに関し、詳しくは、そのスプールに巻き回されたボンディングワイヤの仕様やスプールの個有情報を備えたボンディング用ワイヤスプールに関する。
【０００２】
【従来の技術】従来から、半導体装置の組立て等に用いるボンディングワイヤ用のスプールとして、円筒状の胴部の一端又は両端にフランジを有するものが知られている。ボンディングワイヤは前記胴部に巻き回され、その巻始め側と巻終り側の端部を、接着テープにより胴部内側又はフランジに止着して巻き崩れが防止されている。胴部にボンディングワイヤを巻き回したスプールは、スプールケースに収納した状態で搬送、保管などが行なわれる。そうして、半導体装置の組立て現場などにおいては、前記スプールをケースから出してボンディング装置に装着した後、接着テープを剥がして巻終り側の端部を引き出し、ボンディング装置のワイヤ繰出し経路に導くようになる。上記接着テープは裏面に接着剤を塗布した接着テープであって、フランジの側面が幅４ｍｍ程度の微細寸法であると共に、剥がした後の残留接着剤がボンディングワイヤに付着すると好ましくない等の理由から、３×３ｍｍ程度にカットされた極小のものである。
【０００３】
【発明が解決しようとする課題】処で、上記スプールは通常、アルミなどの金属で一体成形されるが、巻き回されたボンディングワイヤの仕様や繰り返し使用されるスプールの個有情報を書き込むスペースが無く、また上記したように接着テープも極小のものであるため大量の情報を記入することは困難であり、スプールごとの管理としては前記接着テープを色別にして識別する程度が限界であった。そのため従来においては、前記したワイヤ仕様を書き込んだラベルをスプールケースに貼り付けていたが、使用時にスプールとケースが離れてしまうため、複数のスプールを扱う半導体装置組立て工場などにおいては実用性に問題があった。
【０００４】すなわち、ケースから離れてしまったスプールのボンディングワイヤについて詳細な仕様を確認する必要性が生じた場合、その確認が困難であるという問題が生じる。具体的には、使用中のボンディングワイヤの一部に異常が生じた時などの製造ロット番号の確認が難しく、追跡調査が出来ないなどの問題がある。また、ボンディングワイヤは金ワイヤが主体的に使用されているが、高価な貴金属を取り扱うにもかかわらず、重量管理はボンディングワイヤの直径と長さからの換算値により重量を算出して行っている。これに対し、スプールに巻き回されたボンディングワイヤの重量管理をより正確に行うことが求められているが、半導体装置の組立て現場等において、スプールに巻き回したボンディングワイヤのみの重量管理のために、スプールのみの重量と、ボンディングワイヤを巻き回したスプールの重量を測定することは、生産性に支障を来すなどの理由から困難である。さらに、半導体装置組立て工場において、ケースから離れてしまったボンディングワイヤの残部を使用する場合、詳細なワイヤ仕様が確認できないという問題がある。
【０００５】本発明は上述したような従来事情に鑑みてなされたもので、その目的とする処は、ボンディングワイヤを巻き回したスプールが、スプールごとやボンディングワイヤごとの個別情報を備え、好ましくはその個別情報として、スプールごとの通し番号、スプールのみの

重量、巻き回されたボンディングワイヤのワイヤ仕様に係る豊富な情報などを備えたボンディングワイヤ用スプールを提供することにある。

【０００６】

【課題を解決するための手段】上記目的を達成するために、本発明のボンディングワイヤ用スプールは、請求項１では、フランジにおける胴部と反対側の面にマトリックス型二次元コードを備えたことを特徴とする。ここで、マトリックス型二次元コードをフランジに備える手段としては、マトリックス型二次元コードを印刷したシールをフランジに貼り着ける手段、マトリックス型二次元コードを直接フランジに印刷する手段、マトリックス型二次元コードをフランジに刻設する手段などが例示できる。マトリックス型二次元コードとしては、記録できる情報量と、設ける箇所が幅４ｍｍ程度の円弧面（フランジの側面）であることなどを考慮すると、短辺側が４ｍｍ未満である正方形又は長方形のマトリックス型二次元コードが好ましく、例えばＤａｔａＭａｔｒｉｘ、ＶｅｒｉＣｏｄｅ、Ｍｉｃｒｏ　ＱＲ　Ｃｏｄｅ、ＡｚｔｅｃＣｏｄｅ等が例示できる。この中でも、Ｍｉｃｒｏ　ＱＲ　Ｃｏｄｅ（マイクロＱＲコード）を用いることが好ましい。

【０００７】請求項１の構成によれば、スプールの個有情報を、スプールのフランジに設けたマトリックス型二次元コードに記録できるので、それら情報をスプール自体に個々に保持させることができる。

【０００８】請求項２では、上記マトリックス型二次元コードが、上記フランジに刻設されたものであることを特徴とする。フランジにマトリックス型二次元コードを刻設する手段としては、レーザによるマーキング手段が好ましく例示できる。

【０００９】請求項２の構成によれば、マトリックス型二次元コードがフランジに直接刻設されるので、スプールの洗浄を含む繰り返し使用によるマトリックス型二次元コードの剥がれや脱落、薄れによる読み取り不能などを防止できる。また、マトリックス型二次元コードをフランジに刻設した場合、コードを構成するパターンが凹凸により形成されるが、このようなマトリックス型二次元コードに読み取り光を所定の傾斜角度をもって当てることで、前記凹部内にて読み取り光が乱反射し、読み取りのための反射光の量が安定する。よって、巻き回されたボンディングワイヤの線径や組成などを認識し易くするために各種色彩のスプールが用意された場合においても、一つの読み取り装置を用いて、スプールの色別に読み取りのための設定を変えること無く、情報の読み取り作業を行うことができる。

【００１０】上記ボンディングワイヤ用スプールが繰り返し使用されるものである場合、請求項３のように、スプールのフランジに備えたマトリックス型二次元コードに少なくともスプール重量を記録して、スプールごとのボンディングワイヤ重量を管理し得るよう形成すると良い。この場合、ボンディングワイヤを巻き回したスプールの総重量を測定し、該測定値からスプール重量を引くことで、巻き回したボンディングワイヤのみの重量を算出することができる。

【００１１】上記ボンディングワイヤ用スプールが繰り返し使用されるものである場合、請求項４のように、スプールのフランジに備えたマトリックス型二次元コードに少なくともスプールごとの通し番号を記録して、スプールごとのボンディングワイヤ仕様を追跡管理し得るよう形成すると良い。この場合、スプールごとの通し番号に対応させて、当該スプールに巻き回したボンディングワイヤの製造ロット等のワイヤ仕様を、例えばコンピュータなどに保存しておくことで、スプールごとのボンディングワイヤ仕様を追跡調査することが可能になる。スプールごとの通し番号に対応させて保存する情報としては、前記以外にも、スプールの製造年月日，製造メーカ，型番、巻き回されたボンディングワイヤの品種、線径、長さなどをあげることができる。

【００１２】上記マトリックス型二次元コードは請求項５記載のように、スプールの胴部に巻き回したボンディングワイヤの端部の止着部材に設けることも出来る。止着部材は、ボンディングワイヤの端部をフランジに止着できるものであれば良く、例えば従来から用いられる接着テープでも良い。また、本願出願人による先提案の特願平１１－１００３０８号に記載される弾性嵌合治具、伸縮性を有する環状部材、非接着テープ、クリップなどの非接着手段を用いることもできる。

【００１３】請求項６のように、スプールに巻き回したボンディングワイヤの仕様を、上記止着部材に設けたマトリックス型二次元コードに記録して、スプールごとのボンディングワイヤ仕様を管理し得るよう形成すると良い。ここでボンディングワイヤの仕様とは、製造ロット番号、品種、線径、長さなどをあげることが出来る。この場合、ケースから取り出して使用しているスプールに巻き回されたボンディングワイヤの詳細な仕様を、読み取り装置を用いて確認することができる。

【００１４】本発明に係るスプールは、その胴部にボンディング用金ワイヤを巻き回した状態で、透明又は半透明のスプールケースに収納し、搬送や保管に供すると良い。

【００１５】前述したように、スプールのフランジに刻設したマトリックス型二次元コードに対し、読み取り光を所定の傾斜角度をもって当てる読み取り方法が好ましく用いられる。

【００１６】

【発明の実施の形態】以下、本発明の実施形態の例を説明する。図１はボンディングワイヤ用スプールを示し、該スプールＡは、胴部１の両端にフランジ２、３を有するタイプのもので、一方のフランジ２における胴部１と

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反対側の面２ａにマトリックス型二次元コード、本例ではマイクロＱＲコード４を備える。

【００１７】マイクロＱＲコード４は図２に示すように、四角の中にセルパターンを格子状に配列して情報としたもので、それ自体は公知であるため詳述しないが、本例では前記フランジ面２ａにレーザ刻印により刻設してなる。

【００１８】スプールＡの寸法は各種存在するが、半導体装置の組立てにおいては、フランジ２、３の側面幅が４mm程度のものが好ましく用いられ、マイクロＱＲコード４は、２．５×２．５mm～４×４mm未満程度の大きさのものが好ましい。

【００１９】またマイクロＱＲコード４には、数字であれば５～４０字程度、英数字であれば５～２０字程度、漢字であれば４～１２字程度の情報を記録することができ、スプールの個有情報として当該スプールＡの個有番号（通し番号）、重量、製造年月日、製造メーカ、型式などに関する各種情報を記録することが好ましい。

【００２０】この情報を読み取る場合は、マイクロＱＲコード用読取装置を用いるが、その読み取り方法は、マイクロＱＲコード４に対しほぼ正面から読み取り光を当て、反射光を受光して読み取る通常の読み取り方法でも可能である。

【００２１】処で、半導体装置の組立てにおいては、スプールＡに巻き回したボンディングワイヤの線径を認識し易くするするために、ボンディングワイヤの線径別にスプールの色彩を変えることが通常行なわれており、その色彩は１０種類程度になる。このような状況において、前記した従来の読み取り方法で情報を読み取る場合、スプールＡの色彩に応じて反射光の光量が変化するので、その色彩ごとに複数の読み取り装置を用意するか、または読み取りのための設定を調整できる一つの読み取り装置を用いてスプールＡの色彩に応じて設定を変える必要がある。

【００２２】そこで本例では、図３に示すように、マイクロＱＲコード４に対し、読取装置の光源部１０から出射される読み取り光１１を所定の傾斜角度θをもって当てる方法を採用する。傾斜角度θとしては、３０度～６０度の範囲が例示でき、好ましくは４５度程度である。この方法によれば、マイクロＱＲコード４のセルパターンを形成する凹部４ａ内にて読み取り光１１が乱反射し、読取装置の受光部１２で受光する読み取りのための反射光１３の量が安定する。よって、各種色彩のスプールＡが存在しても、一つの読取装置を用いて、スプールの色別に読み取りのための設定を変えること無く、情報の読み取り作業を容易に行うことができる。

【００２３】図４では、マイクロＱＲコード４を、胴部１に巻き回したボンディングワイヤとしての金ワイヤＢの端部ｂをフランジ２、３に止着するための止着部材に設けた例を示す。この場合、マイクロＱＲコード４には、胴部１に巻き回したボンディングワイヤの線径、品種、巻き回し長さ等のワイヤ仕様に係る情報を記録する。止着部材としてこの例では、前記端部ｂをフランジ２、３に挟んで止めるクリップ状部材２０を例示し、そのクリップ状部材２０の一方の側面にマイクロＱＲコード４を刻設している。止着部材として、従来から用いられる接着テープを用いることも出来、その場合、該接着テープにマトリックス型二次元コードを印刷して使用することが好ましい。

【００２４】マトリックス型二次元コードに記録する情報について以下に説明する。図１に示すように、スプールＡのフランジ２にマトリックス型二次元コードを設ける場合、少なくとも当該スプールＡの重量を記録しておく。このようにすれば、ボンディングワイヤを巻き回したスプールの総重量を測定し、読み取り装置でスプール重量のみを検出して差し引くことで、巻き回したボンディングワイヤの重量管理を正確に行うことが出来るようになる。

【００２５】また、フランジ２にマトリックス型二次元コードを設ける場合、少なくとも当該スプールＡの通し番号を記録しておく。そして、半導体製造装置の組立て工場などにおいて、コンピュータに前記通し番号と、ボンディングワイヤの製造ロット番号を対比させて入力保存しておくことにより、スプールがスプールケースから離れてしまっても、スプールにボンディングワイヤを巻き回した状態のままで、製造ロットの追跡調査が可能になる。また、スプールＡの製造年月日、製造メーカ、型番などを、前記スプール通し番号と対比させてマトリックス型二次元コードに記録しても良いし、工場のコンピュータなどに入力保存しても良い。これにより、スプールＡにおける個有の使用履歴の管理が出来、スプールの廃棄基準が明確に出来てボンディングワイヤの品質向上に寄与する。

【００２６】図４のように、マトリックス型二次元コードを止着部材に設けた場合、前述の如く、ボンディングワイヤの製造ロット番号、品種、直径、巻き回し長さ等のボンディングワイヤ仕様を記録しておく。このようにすれば、スプールケースから離れてしまったスプールにおいて、巻き回されたボンディングワイヤの残部を使用する場合、読み取り装置を使用することにより詳細なワイヤ仕様が確認できるようになる。

【００２７】図５では、図１～図３で説明したスプールＡの胴部１に金ワイヤＢを巻き回し、そのスプールＡを、透明又は半透明のスプールケースＣに収納したボンディングワイヤ用スプールの収納構造の一例を示す。スプールケースＣは、特開平１１－２７４２１８号、特開平１１－６７８１４号などに開示されるように、スプールＡの一方のフランジ３を容器本体C-1側に着脱自在に保持し、他方のフランジ２、すなわちマトリックス型二次元コードを設けたフランジ２が露呈するよう、スプー

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ルＡを保持できるものが好ましく用いられる。C-2は容器本体C-1に着脱自在に嵌合する蓋体である。このようなスプールケースＣを用いれば、容器本体C-1にスプールＡを保持した状態で、マトリックス型二次元コード４に記録された情報の読み取りを行うことができる。

【００２８】以上、本発明の実施形態の数例を説明したが、本発明は図示例に限定されず、本発明の各々の請求項に記載される技術的思想の範囲内において、各種の変更が可能であることは云うまでもない。

【００２９】

【発明の効果】本発明は以上のように構成したので、以下の効果を奏する。請求項１によれば、スプールの個有情報をスプール自信が保持するので、ボンディングワイヤの製造現場におけるスプールの管理が容易になるなどの効果がある。

【００３０】請求項２によれば、マトリックス型二次元コードの剥がれや脱落、薄れによる読み取り不能などを防止することができ、特に、使用後のスプールを回収し洗浄、乾燥などの工程に供して繰り返し使用する場合に極めて有用である。また、マトリックス型二次元コードを形成するパターンの凹凸の凹部内で読み取り光が乱反射し読み取りのための反射光の量が安定するので、ボンディングワイヤの線径別、組成別などに応じてスプールの色彩を変えたとしても、一つの読み取り装置を用いて、スプールの色別に読み取りのための設定を変えること無く、情報の読み取り作業を簡単に行うことができる。

【００３１】請求項３によれば、スプールに巻き回したボンディングワイヤごとの重量管理を正確に行え、特に金ワイヤなどの高価な貴金属を取り扱う場合に有用である。

【００３２】請求項４によれば、スプールに巻き回したボンディングワイヤごとの仕様等の確認を行うことができ、該ボンディングワイヤの仕様等を追跡調査する必要性が生じた場合などに有用である。

【００３３】請求項５によれば、巻き回したボンディングワイヤの端部の止着部材に、ボンディングワイヤの個有情報を記録することができる。

【００３４】請求項６によれば、巻き回したボンディングワイヤの端部の止着部材に、ボンディングワイヤ仕様に係る個有情報を記録することができ、該ボンディングワイヤ仕様を追跡調査する必要性が生じた場合などに有用である。

【００３５】請求項７の方法によれば、ボンディングワイヤの線径別、品種別などに応じてスプールの色彩を変えたとしても、一つの読み取り装置を用いて、スプールの色別に読み取りのための設定を変えること無く、情報の読み取り作業を簡単に行うことができる。

【図面の簡単な説明】

【図１】本発明の実施形態の一例を示す斜視図。

【図２】図１の要部拡大正面図。

【図３】図２の（Ｘ）―（Ｘ）線に沿う断面図で、読取装置による読み取り状態を簡略して示す。

【図４】本発明の実施形態の一例を示す斜視図。

【図５】本発明の実施形態の一例を示す斜視図。

【符号の説明】

Ａ：スプール

１：胴部

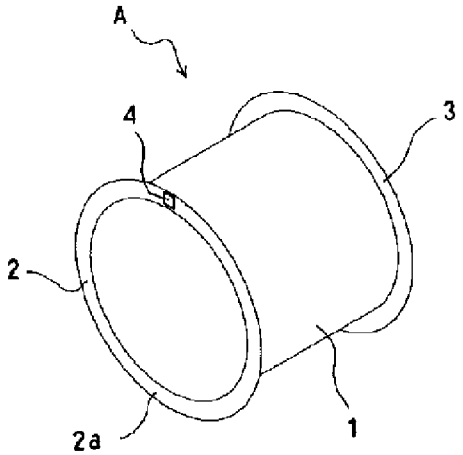
２，３：フランジ

４：マイクロＱＲコード（マトリックス型二次元コード）

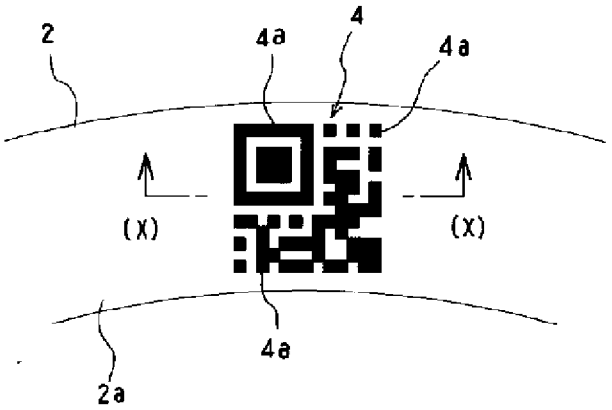
Ｂ：ボンディングワイヤ

Ｃ：スプールケース

【図１】

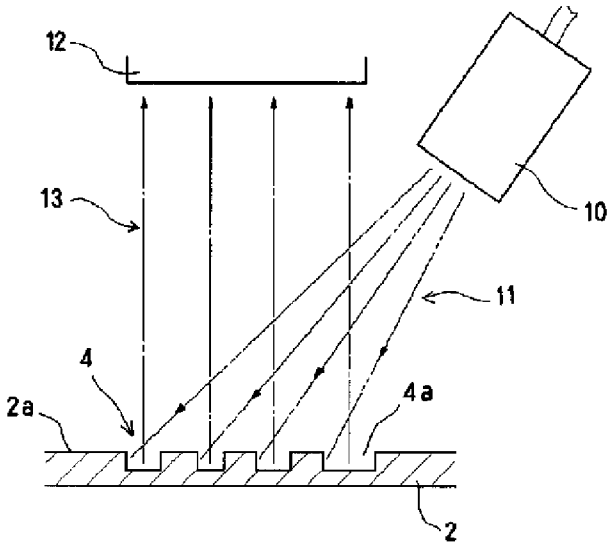


【図２】

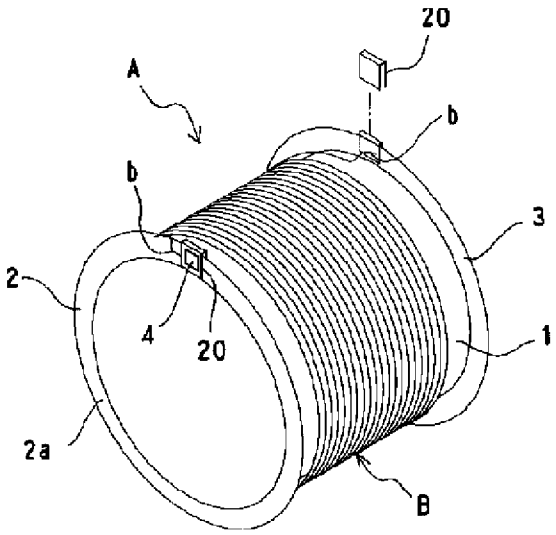


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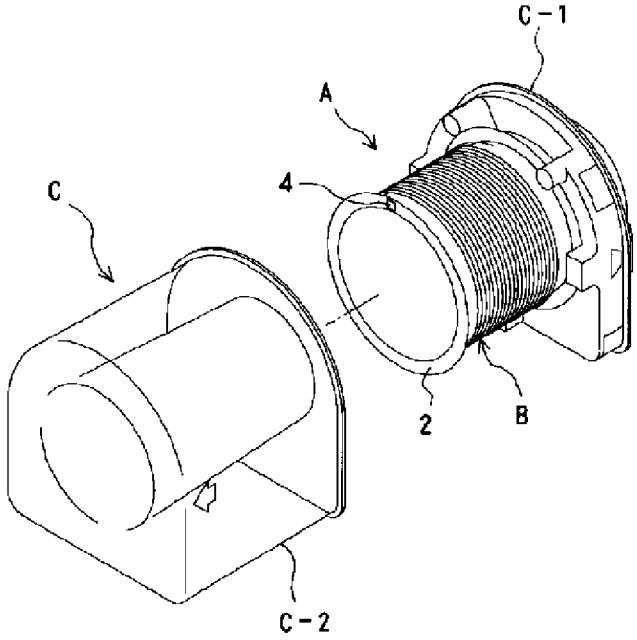
【図３】



【図４】



【図５】



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IPR2023-00502, U.S. PATENT 10,994,923

(19)日本国特許庁(JP)　(12)特　許　公　報(B2)　(11)特許番号
特許第4459542号
(P4459542)
(45)発行日　平成22年4月28日(2010.4.28)　(24)登録日　平成22年2月19日(2010.2.19)

(51)Int.Cl.		F I		
B65D 81/34	(2006.01)	B65D	81/34	Z
B65D 1/00	(2006.01)	B65D	1/00	B
B65D 1/26	(2006.01)	B65D	1/26	C

請求項の数 1　(全 11 頁)

(21)出願番号　特願2003-71314(P2003-71314)
(22)出願日　平成15年3月17日(2003.3.17)
(65)公開番号　特開2004-276964(P2004-276964A)
(43)公開日　平成16年10月7日(2004.10.7)
審査請求日　平成18年2月27日(2006.2.27)

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(54)【発明の名称】包装容器

(57)【特許請求の範囲】
【請求項１】
ホットウォーマーによる加熱保存に適したインモールドラベル射出成形体またはインモールドラベル二軸延伸ブロー成形体からなる包装容器であって、該インモールドラベル成形用ラベルが、少なくとも紫外線防止層を含む積層体で、かつ、該インモールドラベル成形用底面ラベルが、少なくともアルミニウムを含む積層体で形成されると共に、該包装容器が、該包装容器の接地面に接触しない底板を有し、該底板の少なくとも主要部と包装容器の接地面の間の間隙ｈは０ｍｍ＜ｈ＜１ｍｍであることを特徴とする包装容器。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】
本発明は、チルド又は常温で流通販売され、約４５℃乃至７０℃に温めて食される、例えばスープ、ミルク、コーヒー、ミルクコーヒー、ミルクティー、果汁等の食品用の包装容器に関する。
【０００２】
【従来の技術】
チルド又は常温で流通販売され、約４５℃乃至７０℃に温めて食される、例えばスープ、ミルク、コーヒー、ミルクコーヒー、ミルクティー、果汁等の食品はカップ型容器又はプラスチック成形容器等の包装容器で包装容器で包装され、コンビニエンスストアに設置されたホットウォーマー内で加熱保存され販売されている。

【０００３】
図１は従来用いられているカップ型包装容器の一例を示す。この包装容器は側壁１、フランジ２及び底板３からなり、底板３の全域がホットウォーマーのホットプレート７に接触している。このような包装容器においては底板３の全面がホットプレート７に接触するために内容物の加温効率は極めてよいが包装容器の落下強度が低く落下時に亀裂８が入り易い欠点がある。
【０００４】
特許文献１には、図２に示すように、２軸延伸ブロー成形されたポリエステル樹脂製瓶において、底部１２が底部周縁から底部中央へかけて複数の同心円状湾曲部１３ａ、１３ｂ、１３ｃを介して段状に立ち上がっており、且つ底部１２の下面中央１４に成形凸部１５を設けたポリエステル樹脂成形瓶が記載されている。尚、１１は側壁を示す。
【０００５】
【特許文献１】
実開昭５６－３２０１５号公報
【０００６】
【発明が解決しようとする課題】
この包装容器は底部が容器内方へ立ち上がっているので、落下時に底部が受ける衝撃は少ないが接地面積が少なく、しかも底部の主要部とホットプレートの間の間隙が大きいためホットプレートによる内容物の加温効率が悪くホットウォーマーによる加熱保存、販売には適していない。
【０００７】
【課題を解決するための手段】
請求項１は上記の課題を解決するもので、ホットウォーマーによる加熱保存に適したインモールドラベル射出成形体またはインモールドラベル二軸延伸ブロー成形体からなる包装容器であって、該インモールドラベル成形用ラベルが、少なくとも紫外線防止層を含む積層体で、かつ、該インモールドラベル成形用底面ラベルが、少なくともアルミニウムを含む積層体で形成されると共に、該包装容器が、該包装容器の接地面に接触しない底板を有し、該底板の少なくとも主要部と包装容器の接地面の間の間隙ｈは０ｍｍ＜ｈ＜１ｍｍであることを特徴とする包装容器を要旨とする。
【０００８】
【課題を解決するための手段】
請求項１は上記の課題を解決するもので、ホットウォーマーによる加熱保存に適したインモールドラベル射出成形体またはインモールドラベル二軸延伸ブロー成形体からなる包装容器であって、該インモールドラベル成形用ラベルが、少なくとも紫外線防止層を含む積層体で形成されると共に、該包装容器が、該　包装容器の接地面に接触しない底板を有し、該底板の少なくとも主要部と包装容器の接地面の間の間隙ｈは０ｍｍ＜ｈ≦１ｍｍであることを特徴とする包装容器を要旨とする。
【０００９】
本発明の包装容器においては、底板は包装容器の接地面に接触しないので、包装容器の落下時に底板が受ける衝撃は少なく亀裂等が入る確率は低いのみならず、底板の主要部と包装容器の接地面であるホットプレート８の面の間の間隙ｈは０ｍｍ＜ｈ≦２ｍｍであり、ホットプレートに接近しているので、ホットプレートによる内容物の加温効率は良好である。これに対し、間隙ｈが２ｍｍを超えるとホットプレートによる内容物の昇温がしにくくなる。好ましい間隙ｈの範囲は、０ｍｍ＜ｈ≦１．５ｍｍ、特に好ましくは０ｍｍ＜ｈ≦１．０ｍｍである。
【００１０】
本発明の包装容器には、プラスチックを射出成形してなる容器又は二軸延伸ブロー成形してなる容器を適用することができるが、成形容易性の面から射出成形容器が好ましい。又、本発明の包装容器は、その包装内容物が約４５℃乃至７０℃に温めて食される、例えばスープ、ミルク、コーヒー、ミルクコーヒー、ミルクティー、果汁等の食品であることか

らバリア性を有することが望まれ、望ましくはバリア層を有するインモールドラベル成形用ラベルを用いて形成したインモールドラベル射出成形容器又はインモールドラベル二軸延伸ブロー成形容器が良い。

【００１１】

【発明の実施の形態】

図３（Ａ）、（Ｂ）は本発明の包装容器の第１、第２の実施の形態を示し、（Ａ）は第１の実施の形態を示す包装容器の縦断面図であり、（Ｂ）は第２の実施の形態を示す包装容器の縦断面図である。

【００１２】

図３（Ａ）に示す第１の実施の形態に係る包装容器の容器本体は、側壁１と底板４とからなり側壁１の上端にはフランジ２が設けられている。底板４の底板主要部４ａはその周囲の底板周辺部４ｂよりも包装容器の接地面であるホットプレート７の面のほうへ接近しており、ホットプレート７の面と底板主要部４ａ間の間隙ｈは、０ｍｍ＜ｈ≦２ｍｍ、好ましくは０ｍｍ＜ｈ≦１．５ｍｍ、特に好ましくは０ｍｍ＜ｈ≦１．０ｍｍである。

【００１３】

第１の実施の形態の包装容器は接地面であるホットプレート７の面に接する部分は側壁下端のみであり、容器の落下時に容器底部が受ける衝撃は少なく亀裂等が入る確率は低いのみならず、底板の主要部と包装容器の接地面の間の間隙ｈは０ｍｍ＜ｈ≦２ｍｍであり、ホットプレート７に接近しているので、ホットプレート７による内容物の加温効率は良好である。

【００１４】

本発明の包装容器は、その包装内容物が約４５℃乃至７０℃に温めて食される、例えばスープ、ミルク、コーヒー、ミルクコーヒー、ミルクティー、果汁等の食品であることからバリア性を有することが望まれ、望ましくは図３（Ｂ）に示すようなバリア層を有するインモールドラベル成形用側面ラベル２１ａ及びインモールドラベル成形用底面ラベル２１ｂを用いて形成したインモールドラベル射出成形容器又はインモールドラベル二軸延伸ブロー成形容器が適している。図３（Ｂ）に示す第２の実施の形態の包装容器は、インモールドラベル成形用ラベル２１ａ、２１ｂを用いてなるインモールドラベル成形体である点を除いては第１の実施の形態と同様である。尚、図３（Ｃ）は底面図を示し、又、図においてＧは射出成形装置のゲート位置に対応する底面ラベル２１ｂのゲート穴を示す。

【００１５】

図４（Ａ）、（Ｂ）は本発明の包装容器の第３、第４の実施の形態を示し、（Ａ）は第３の実施の形態を示す包装容器の縦断面図であり、（Ｂ）は第４の実施の形態を示す包装容器の縦断面図である。

【００１６】

図４（Ａ）に示す第３の実施の形態の包装容器の容器本体は、側壁１と底板５とからなり側壁１の上端にはフランジ２が設けられている。底板５全体と包装容器の接地面であるホットプレート７の面の間には間隙があり、ホットプレート７の面と底板主要部４ａ間の間隙ｈは、０ｍｍ＜ｈ≦２ｍｍ、好ましくは０ｍｍ＜ｈ≦１．５ｍｍ、特に好ましくは０ｍｍ＜ｈ≦１．０ｍｍである。

【００１７】

第３の実施の形態の包装容器は接地面であるホットプレート７の面に接する部分は側壁１の下端のみであり、容器の落下時に容器底部が受ける衝撃は少なく亀裂等が入る確率は低いのみならず、底板５全体と包装容器の接地面の間の間隙ｈは０ｍｍ＜ｈ≦２ｍｍであり、ホットプレート７に接近しているので、ホットプレート７による内容物の加温効率は良好である。

【００１８】

本発明の包装容器は、その包装内容物が約４５℃乃至７０℃に温めて食される、例えばスープ、ミルク、コーヒー、ミルクコーヒー、ミルクティー、果汁等の食品であることからバリア性を有することが望まれ、望ましくは図４（Ｂ）に示すようなバリア層を有するイ

ンモールドラベル成形用ラベルを用いて形成したインモールドラベル射出成形容器又はインモールドラベル二軸延伸ブロー成形容器が適している。図４（Ｂ）に示す第４の実施の形態の包装容器は、インモールドラベル成形用ラベル２１を用いてなるインモールドラベル成形体である点を除いては第３の実施の形態と同様である。

【００１９】

図５（Ａ）、（Ｂ）は本発明の包装容器の第５、第６の実施の形態を示し、（Ａ）は第５の実施の形態を示す包装容器の縦断面図であり、（Ｂ）は第６の実施の形態を示す包装容器の縦断面図である。

【００２０】

図５（Ａ）に示す第５の実施の形態の包装容器の容器本体は、側壁１と中央部が容器内方へ膨らんでいる曲面状の底板６とからなり、側壁１の上端にはフランジ２が設けられている。底板６の中央部と包装容器の接地面であるホットプレート７の面の間の間隙ｈは、０ｍｍ＜ｈ≦２ｍｍ、好ましくは０ｍｍ＜ｈ≦１．５ｍｍ、特に好ましくは０ｍｍ＜ｈ≦１．０ｍｍである。

【００２１】

第５の実施の形態の包装容器は接地面であるホットプレート７の面に接する部分は側壁下端のみであり、容器の落下時に容器底部が受ける衝撃は少なく亀裂等が入る確率は低いのみならず、底板全体と包装容器の接地面の間の間隙ｈは０ｍｍ＜ｈ≦２ｍｍであり、ホットプレート７に接近しているので、ホットプレート７による内容物の加温効率は良好である。

【００２２】

本発明の包装容器は、その包装内容物が約４５℃乃至７０℃に温めて食される、例えばスープ、ミルク、コーヒー、ミルクコーヒー、ミルクティー、果汁等の食品であることからバリア性を有することが望まれ、望ましくは図５（Ｂ）に示すようなバリア層を有するインモールドラベル成形用ラベル２１を用いて形成したインモールドラベル射出成形容器又はインモールドラベル二軸延伸ブロー成形容器が適している。図５（Ｂ）に示す第２の実施の形態の包装容器は、インモールドラベル成形用ラベル２１を用いてなるインモールドラベル成形体である点を除いては第５の実施の形態と同様である。

【００２３】

本発明の第１乃至第６の実施の形態の包装容器は、（ａ）ポリプロピレン、ポリエチレン、アクリル樹脂等の熱可塑性樹脂を射出成形してなる成形体、（ｂ）ポリエチレンテレフタレート、ポリプロピレン、ポリカーボネート、ポリスチレン等の樹脂を二軸延伸ブロー成形してなる成形体で構成することができるが特に射出成形体からなるものが望ましい。

【００２４】

次に図３（Ｂ）、図４（Ｂ）、図５（Ｂ）に示す実施の形態におけるインモールドラベル成形用ラベル２１の構成について説明する。

【００２５】

先ずインモールドラベル二軸延伸ブロー成形に用いるインモールドラベル成形用ラベルについて説明する。

図６（Ａ）乃至（Ｅ）は、インモールドラベル成形用ラベル２１の構成を示す断面図であり、図６（Ａ）は、インモールドラベル成形用ラベル２１の基本的な構成を示す略断面図である。インモールドラベル成形用ラベル２１は基材２２と接着層２３からなり、接着層２３は１３０℃以下で軟化して溶融し延伸ブロー成形品の表面に接着する熱接着性材料からなるものである。

【００２６】

ここにおいて、熱接着性材料として、（ａ）低密度ポリエチレン、中密度ポリエチレン、高密度ポリエチレン、線状低密度ポリエチレン、メタロセン触媒を使用して重合したエチレン－α・オレフィン共重合体、ポリプロピレン、エチレン－酢酸ビニル共重合体、アイオノマー樹脂、エチレン－アクリル酸エチル共重合体、エチレン－メチルメタクリル酸共重合体、エチレン－アクリル酸共重合体、エチレン－メタクリル酸共重合体、エチレン－

プロピレン共重合体、メチルペンテンポリマー、ポリエチレンまたはポリプロピレン等のポリオレフィン系樹脂をアクリル酸、メタクリル酸、無水マレイン酸、フマール酸その他の不飽和カルボン酸で変性した酸変性ポリオレフィン系樹脂、ポリ（メタ）アクリル系樹脂、熱可塑性ポリエステル系樹脂、熱可塑性ポリアミド系樹脂の１種乃至複数種からなるもの、（ｂ）ヒートシール層を有する、ポリエチレン、ポリプロピレン、ポリエチレンテレフタレート等の未延伸又は延伸プラスチックフィルム、（ｃ）エチレン－酢酸ビニル共重合体を含むホットメルト接着剤層、或いは（ｄ）エチレン－酢酸ビニル共重合体を含むヒートシール剤層などを適用することができる。

【００２７】

基材２２は、バリア層、紫外線防止層、印刷基材層などを含むもので、これに関して以下に説明する。

【００２８】

図６（Ｂ）は、基材２２がバリア層２４及び印刷基材層２５からなるラベル２１を示す。この場合、印刷基材層２５には印刷模様層２６が設けられている。バリア層２４及び印刷基材層２５の各層は、それぞれ独立して製膜し、接着剤を介してドライラミネートするか、または、その一部または全部の層を共押出することにより形成することができる。尚、印刷基材層２５は。用途・目的に応じて省略することができる。

【００２９】

バリア層２４は、（ａ）アルミニウム箔、（ｂ）金属または金属酸化物の蒸着層を被着した、ポリエチレン、ポリプロピレン、ポリエチレンテレフタレート等の未延伸または延伸プラスチックフィルム、例えば、酸化硅素蒸着延伸ポリエチレンテレフタレートフィルム、酸化アルミニウム蒸着延伸ポリエチレンテレフタレートフィルム、（ｃ）その他、ポリアクリロニトリル系樹脂、エチレン－酢酸ビニル共重合体鹸化物、ポリ塩化ビニリデンフィルム、ポリ塩化ビニリデンコート二軸延伸プラスチックフィルム、ＭＸＤ６系ナイロン（メタキシレンジアミンとアジピン酸との重縮合反応で生成するアミド構造単位を９０モル％以上含有するポリアミド若しくはポリアミド共重合体）等からなるものである。前記したバリア性材料の中から、選択して所望の性能を備えるバリア層を形成することができる。

【００３０】

また、印刷基材層２５として用いるフィルムは一般に使用可能なものであれば特に限定されず、例えば、ポリエチレンテレフタレート、ポリプロピレンフィルム、ナイロンフィルムなどの未延伸または延伸フィルム等を適用し得る。

【００３１】

バリア層２４を含むインモールドラベル成形用ラベルを用いることにより、ポリエステル樹脂容器の酸素や炭酸ガスなどのガスに対するバリア性の不足を補い、酸素の影響を受けやすい内容物、例えば果汁、清酒、ワインなどの包装に適したポリエステル樹脂容器を提供することがてきる。

【００３２】

その場合に置いて、酸化硅素蒸着プラスチックフィルム、酸化アルミニウム蒸着プラスチックフィルム、ポリアクリロニトリル系樹脂、エチレン－酢酸ビニル共重合体鹸化物、ポリ塩化ビニリデンフィルム、ポリ塩化ビニリデンコート二軸延伸プラスチックフィルム等からなるバリア層を含むインモールドラベル成形用ラベルを用いることにより容器の透明性を損なうことなくバリア性を持ったポリエステル樹脂容器を提供することができる。

【００３３】

インモールドラベル成形用ラベル２１において、器材２２として二軸延伸ブロー成形すべき樹脂と同質のプラスチックフィルムからなるものを用いることができる。例えば、成形品本体がポリエチレンテレフタレートからなる場合、バリア層として酸化硅素蒸着ポリエチレンテレフタレートフィルムを用い、バリア層に積層する印刷基材層もポリエチレンテレフタレートフィルムを用い、バリア層に積層する印刷基材層もポリエチレンテレフタレートで構成することができる。

【００３４】
基材２２が二軸延伸ブロー成形すべき樹脂と同質のプラスチックフィルムからなるインモールドラベル成形用ラベルを用いることにより、二軸延伸ブロー成形品の材質とラベルの材質の違いによる収縮差に起因するラベルの剥がれ等を防止することができる。
【００３５】
図６（Ｃ）は基材２２が紫外線防止層２７及び印刷基材層２５からなるインモールドラベル２１を示す。
【００３６】
紫外線防止層２７は、例えばポリエチレン、ポリプロピレン、ポリエチレンテレフタレート、ナイロンフィルムなどの未延伸または延伸プラスチックフィルムにポリサリチル酸エステル、ベンゾフェノン、ベンゾトリアゾール、アクリロニトリル系の紫外線吸収剤を含む印刷層を設けたものを用いることができる。
【００３７】
紫外線防止層１７を含むインモールドラベル成形用ラベルを用いることにより、ビタミンＣ含有食品（オレンジ等）の紫外線による劣化を起こす内容物の包装容器を形成することができる。
【００３８】
図６（Ｄ）は、基材２２がバリア層２４、紫外線防止層２７及び印刷基材層２５からなるインモールドラベル成形用ラベル２１を示す。
【００３９】
このインモールドラベル成形用ラベル２１はバリア性と紫外線防止機能を備えたインモールドラベル成形用ラベルを提供するものである。
【００４０】
図６（Ｅ）は、基材２２がバリア層２４、印刷基材層２５からなり、更に表面保護層２８を備えるインモールドラベル成形用ラベルを示す。表面保護層２８としてポリエチレン、ポリプロピレン、ポリエチレンテレフタレートなどのフィルムを用いることができる。
【００４１】
また、前記したインモールドラベル成形用ラベルは、インモールドラベル成形用ラベルの接着層をそれにシリコーン、マイクロクリスタリンワックス、炭酸カルシウム等の無機充填剤を添加して弱接着性層とすることにより二軸延伸ブロー成形体から剥離可能にした易剥離性ラベルを構成することができる。このように形成した易剥離性ラベルは容器本体から剥離可能であるので、特にポリエステル樹脂容器の場合、容器の廃棄時にインモールドラベル成形用ラベルを容器本体から剥離した後容器本体をリサイクルすることができる。
【００４２】
次にインモールドラベル成形用ラベルの例を挙げる。
【００４３】
１）　延伸ポリプロピレンフィルム（印刷基材層）（３０μｍ）／ポリエチレンテレフタレート（１２μｍ）／酸化硅素蒸着延伸ポリエチレンテレフタレートフィルム（バリア層）（１２μｍ）／エチレン－酢酸ビニル共重合体を含むヒートシール層を有する延伸ポリプロピレンフィルム（接着層）（３０μｍ）、
２）　ポリエチレンテレフタレートフィルム（１２μｍ）／酸化硅素蒸着ポリエチレンテレフタレートフィルム（１２μｍ）／エチレン－酢酸ビニル共重合体を含むヒートシール剤層（接着層）（５０μｍ）、
３）　延伸ポリプロピレンフィルム（印刷基材層）（２５μｍ）／アルミニウム箔（バリア層）（１５μｍ）／エチレン－酢酸ビニル共重合体を含むヒートシール層を有する延伸ポリプロピレンフィルム（２５μｍ）、
４）　延伸ポリプロピレンフィルム（印刷基材層）（２５μｍ）／酸化硅素蒸着ポリエチレンテレフタレートフィルム（１２μｍ）（バリア層）／エチレン－酢酸ビニル共重合体を含むヒートシール層を有する延伸ポリエチレンテレフタレートフィルム（接着層）（２５μｍ）、

５）　延伸ポリプロピレンフィルム（２５μｍ）／ポリエチレンテレフタレートフィルム（印刷基材層）（１２μｍ）／酸化硅素蒸着ポリプロピレンテレフタレートフィルム（バリア層）（１２μｍ）／エチレン－酢酸ビニル共重合体を含むヒートシール層を有する延伸ポリプロピレンフィルム（接着層）（２５μｍ）、
６）　延伸ポリプロピレンフィルム（印刷基材層）（２５μｍ）／酸化硅素蒸着延伸ポリエチレンテレフタレートフィルム（バリア層）（１２μｍ）／エチレンメタクリル酸共重合体（接着層）（２５μｍ）、
７）　延伸ポリプロピレンフィルム（印刷基材層）（２５μｍ）／酸化硅素蒸着延伸ポリエチレンテレフタレートフィルム（バリア層）（１２μｍ）／エチレンアクリル酸共重合体（接着層）（２５μｍ）、
８）　延伸ポリプロピレンフィルム（印刷基材層）（２５μｍ）／酸化硅素蒸着延伸ポリエチレンテレフタレートフィルム（バリア層）（１２μｍ）／エチレン－酢酸ビニル共重合体を含むホットメルト剤層（接着層）（５０μｍ）、
９）　延伸ポリプロピレンフィルム（６０μｍ）／エチレン－酢酸ビニル共重合体を含むホットメルト剤層（接着層）（２５μｍ）、
１０）　延伸ポリプロピレンフィルム（６０μｍ）／エチレン－酢酸ビニル共重合体を含むホットメルト剤層（接着層）（２５μｍ）。

【００４４】

次にインモールドラベル射出成形に用いるインモールドラベル成形用ラベルについて説明する。

インモールドラベル射出成形に用いるインモールドラベル成形用ラベルは、一般に、印刷基材層、バリア層、射出樹脂との接着層からなる。これらの各層は、それぞれ独立して製膜し、接着剤を介してドライラミネートするか、または、その一部もしくは全層を共押出することで形成することができる。また、用途・目的に応じて印刷基材層を省略することができる。

【００４５】

印刷基材層としてのフィルムは、一般に印刷可能なものであれば特に限定されず、ポリエチレンテレフタレート、ポリプロピレン、ナイロン等のからなるフィルムを適用することができる。

【００４６】

バリア層としては、（ａ）アルミニウム箔、（ｂ）金属または金属酸化物の蒸着層を被着した、ポリエチレン、ポリプロピレン、ポリエチレンテレフタレート等の未延伸または延伸プラスチックフィルム、例えば、酸化硅素蒸着延伸ポリエチレンテレフタレートフィルム、酸化アルミニウム蒸着延伸ポリエチレンテレフタレート、アルミニウム蒸着延伸ポリエチレンテレフタレートフィルム、（ｃ）その他、ポリアクリロニトリル系樹脂、エチレン－酢酸ビニル共重合体鹸化物、ポリ塩化ビニリデンフィルム、ポリ塩化ビニリデンコート二軸延伸プラスチックフィルム、ＭＸＤ６系ナイロン等からなるものが挙げられる。前記したバリア性材料の中から、選択して所望の性能を備えるバリア層を形成することができる。

【００４７】

接着層としては、射出樹脂と接着するものであれば特に限定されないが、通常、射出樹脂と同材質のプラスチックや、エチレン－酢酸ビニル共重合体を含有するポリエチレン等の接着性を有する樹脂を共押出加工、或いはコーティング加工したプラスチックフィルム等が好適である。

【００４８】

上記の印刷基材層、バリア層、射出樹脂との接着層の各層は、常法に従い、ドライラミネート法、押出コーティング法、その他のコーティング法に従って形成される。

【００４９】

次にインモールドラベル射出成形に用いるインモールドラベル成形用ラベルの例を挙げる。

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１）　延伸ポリプロピレンフィルム（印刷基材）（２５μｍ）／アルミニウム箔（バリア層）（１５μｍ）／ヒートシール性を有する延伸ポリプロピレンフィルム（接着層）（２５μｍ）、
２）　延伸ポリプロピレンフィルム（印刷基材）（２５μｍ）／酸化硅素蒸着ポリエチレンテレフタレートフィルム（バリア層）（１２μｍ）／ヒートシール層を有する延伸ポリプロピレンフィルム（接着層）（２５μｍ）、
３）　未延伸ポリプロピレンフィルム（３０μｍ）／ポリエチレンテレフタレートフィルム（印刷基材）（１２μｍ）／未延伸ポリプロピレンフィルム（接着層）（３０μｍ）、
４）　延伸ポリプロピレンフィルム（２５μｍ）／ポリエチレンテレフタレートフィルム（印刷基材）（１２μｍ）／酸化硅素蒸着ポリエチレンテレフタレートフィルム（バリア層）（１２μｍ）／ヒートシール層を有する延伸ポリプロピレンフィルム（接着層）（２５μｍ）、
５）　未延伸ポリプロピレンフィルム（３０μｍ）／ポリエチレンテレフタレートフィルム（印刷基材）（１２μｍ）／アルミニウム箔（バリア層）（９μｍ）／ポリエチレンテレフタレートフィルム（１２μｍ）／未延伸ポリプロピレンフィルム。

【００５０】

本発明の包装容器は、図３乃至図５に示したようなフランジ付容器に限定されることなく、図７に示すような容器側壁の上端がカールした丸型環状縁部９を有する容器、又はフランジのない容器であってもよい。

【００５１】

【発明の効果】

以上詳細に説明したたように、本発明の包装容器は、ホットウォーマーによる加熱保存に適した包装容器であって、包装容器の接地面に接触しない底板を有し、底板の少なくとも主要部と包装容器の接地面の間の間隙ｈは０ｍｍ＜ｈ≦２ｍｍであることを特徴とし、底板は包装容器の接地面に接触しないので、包装容器の落下時に底板が受ける衝撃は少なく亀裂等が入る確率は低いのみならず、底板の主要部と包装容器の接地面であるホットプレート８の面の間の間隙ｈは０ｍｍ＜ｈ≦２ｍｍであり、ホットプレートに接近しているので、ホットプレートによる内容物の加温効率は良好であるという利点を有する。

【図面の簡単な説明】

【図１】従来の底板全部が接地面に接触する包装容器は落下強度が弱いことを示す説明図である。

【図２】特許文献１（実開昭５６－３２０１５号公報）に記載の包装容器の縦断面図である。

【図３】本発明の包装容器の第１、第２の実施の形態を示し、（Ａ）は第１の実施の形態を示す包装容器の縦断面図であり、（Ｂ）は第２の実施の形態を示す包装容器の縦断面図であり、（Ｃ）は底面図である。

【図４】本発明の包装容器の第３、第４の実施の形態を示し、（Ａ）は第３の実施の形態を示す包装容器の縦断面図であり、（Ｂ）は第４の実施の形態を示す包装容器の縦断面図である。

【図５】本発明の包装容器の第５、第６の実施の形態を示し、（Ａ）は第５の実施の形態を示す包装容器の縦断面図であり、（Ｂ）は第６の実施の形態を示す包装容器の縦断面図である。

【図６】インモールドラベル成形用ラベルを示し、（Ａ）はインモールドラベル成形用ラベルの基本的構成を示す断面図、（Ｂ）はインモールドラベル成形用ラベルの第１の例を示す断面図、（Ｃ）はインモールドラベル成形用ラベルの第２の例を示す断面図、（Ｄ）はインモールドラベル成形用ラベルの第３の例を示す断面図、（Ｅ）はインモールドラベル成形用ラベルの第４の例を示す断面図である。

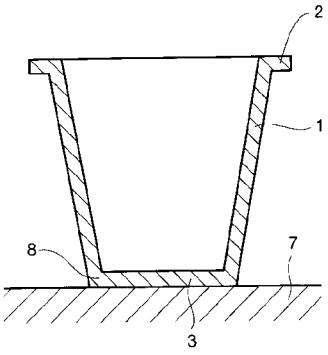
【図７】本発明の丸型環状縁部付容器の縦断面図である。

【符号の説明】

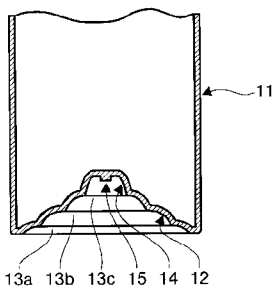
１　　側壁

２　フランジ
３　底板
４　底板
４ａ　底板の主要部
４ｂ　底板周辺部
５　底板
８　亀裂
９　丸型環状縁部
１１　側壁
１２　底部
１３ａ　同心円状湾曲部
１３ｂ　同心円状湾曲部
１３ｃ　同心円状湾曲部
１４　底部の下部中央
１５　成形凸部
２１、２１ａ、２１ｂ　インモールドラベル成形用ラベル
２２　基材
２３　接着層
２４　バリア層
２５　印刷基材層
２６　印刷模様層
２７　紫外線吸収層
２８　表面保護層
Ｇ　ゲート穴

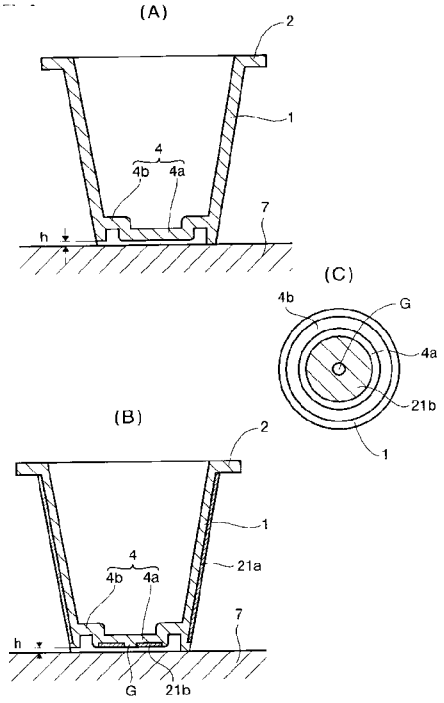
【図１】



【図２】

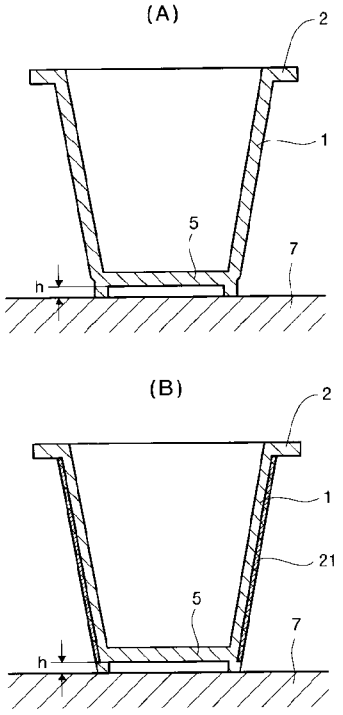


【図３】

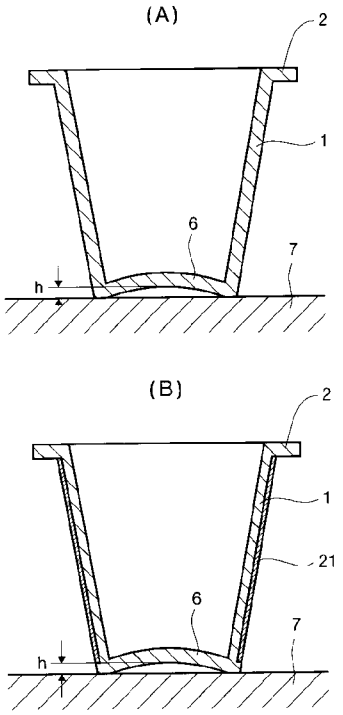


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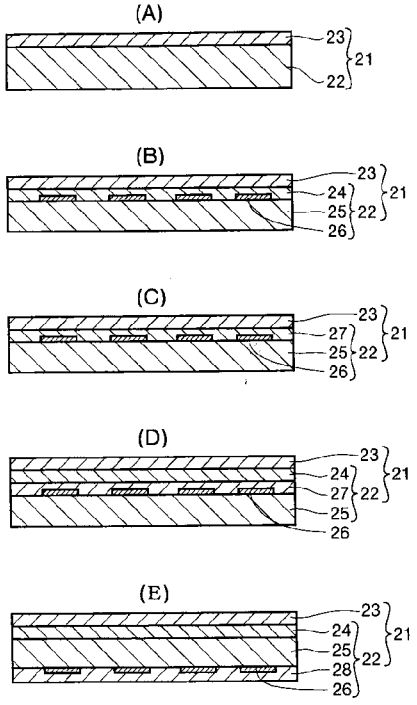
【図４】



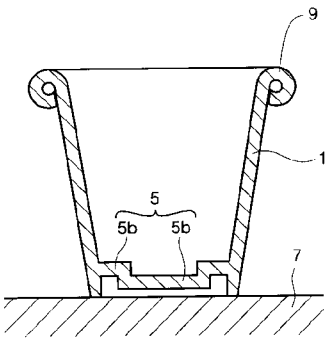
【図５】



【図６】



【図７】



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フロントページの続き

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(56)参考文献 特開２００１－０１０６７７（ＪＰ，Ａ）
特開２００１－０４８１４９（ＪＰ，Ａ）
特開２００３－３４１７５２（ＪＰ，Ａ）

(58)調査した分野(Int.Cl.，ＤＢ名)
B65D 81/34
B65D 1/00
B65D 1/26

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(19)日本国特許庁（ＪＰ）　(12) **公開実用新案公報**（Ｕ）　(11)実用新案出願公開番号

実開平5－40112

(43)公開日　平成５年(1993)５月28日

(51)Int.Cl.[5]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｂ６５Ｂ　57/02		Ｃ　8407－3Ｅ		

審査請求　未請求　請求項の数３(全　２　頁)

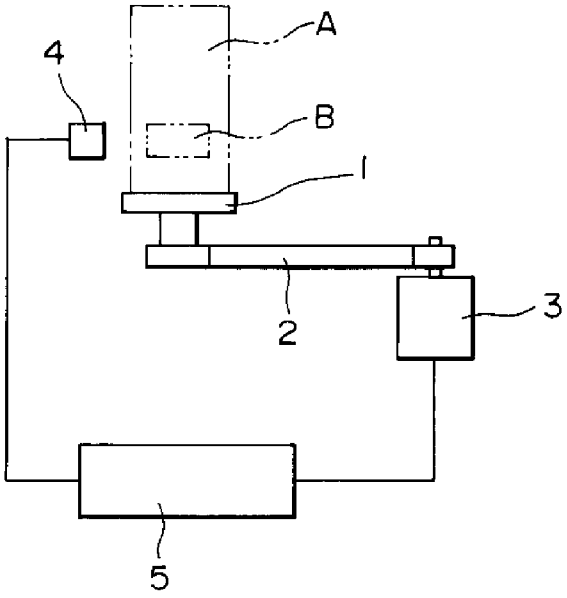
(21)出願番号　実願平3－31488

(22)出願日　平成３年(1991)５月８日

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(54)【考案の名称】　円筒容器の位置決め装置及び位置決め方法

(57)【要約】
【目的】　円筒容器を特定の方向に精度良く揃えることができる円筒容器の位置決め装置及び位置決め方法を提供することを目的とする。
【構成】　円筒容器Ａを軸方向を中心として回転させ、この回転中にバーコードＢを検出し、この検出結果に基づいて円筒容器Ａの位置を特定する。



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【実用新案登録請求の範囲】

【請求項１】　バーコードが側面に印刷された円筒容器を特定方向に位置決めする円筒容器の位置決め装置において、前記円筒容器が載せられ前記円筒容器を軸方向を中心として回転させるターンテーブルと、前記円筒容器の側面に対向して設けられ前記バーコードを検出するバーコード検出器と、このバーコード検出器からの信号に基づいて前記ターンテーブルの回転を停止させる制御装置とを備えたことを特徴とする円筒容器の位置決め装置。

【請求項２】　バーコードが側面に印刷された円筒容器を特定方向に位置決めする円筒容器の位置決め装置において、前記円筒容器が載せられ前記円筒容器を軸方向を中心として回転させるターンテーブルと、前記円筒容器の側面に対向して設けられ前記バーコードを検出するバーコード検出器と、このバーコード検出器からの信号に基づいて前記円筒容器が所定位置になった旨の信号を発する制御装置とを備えたことを特徴とする円筒容器の位置決め装置。

【請求項３】　バーコードが側面に印刷された円筒容器を特定方向に位置決めする円筒容器の位置決め方法において、前記円筒容器を軸方向を中心として回転させ、この回転中に前記バーコードを検出し、この検出結果に基づいて円筒容器の位置を特定することを特徴とする円筒容器の位置決め方法。

【図面の簡単な説明】

【図１】本考案の一実施例の全体構成を示す図である。

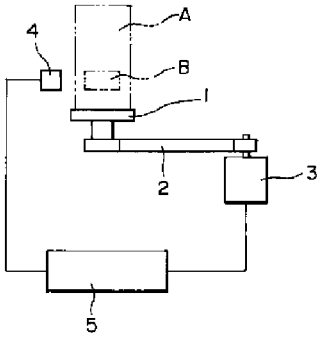
【図２】本考案の一実施例の作用を説明するための平面図であって、バーコードを判別できない状態を示す図である。

【図３】本考案の一実施例の作用を説明するための平面図であって、バーコードを判別できる状態を示す図である。

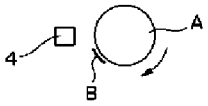
【符号の説明】

１　ターンテーブル
２　ベルト
３　モータ
４　バーコードリーダ
５　制御装置

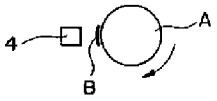
【図１】



【図２】



【図３】



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【考案の詳細な説明】

【０００１】

【産業上の利用分野】

本考案は、たとえばアルミ缶のような円筒容器を特定方向に位置決めする円筒容器の位置決め装置及び位置決め方法に関する。

【０００２】

【従来の技術】

従来、アルミ缶のような円筒容器の表面にはその内部に充填される清涼飲料水等の銘柄を印刷するようにしている。

【０００３】

【考案が解決しようとする課題】

ところで、アルミ缶をその表面の印刷面を特定方向に揃えようとした場合には、アルミ缶が円筒状をしているので、印刷面に基準点を設けることができず、アルミ缶を特定方向に揃えることができなかった。また、印刷の始点も決められないので、アルミ缶の表面に施された印刷状況を自動的に検査することができなかった。

【０００４】

本考案は、上記事情に鑑みてなされたもので、円筒容器を特定の方向に精度良く揃えることができるとともに印刷された銘柄が異なっていても適用できる円筒容器の位置決め装置及び位置決め方法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】

本願の請求項１に記載の考案は、バーコードが側面に印刷された円筒容器を特定方向に位置決めする円筒容器の位置決め装置において、前記円筒容器が載せられ前記円筒容器を軸方向を中心として回転させるターンテーブルと、前記円筒容器の側面に対向して設けられ前記バーコードを検出するバーコード検出器と、このバーコード検出器からの信号に基づいて前記ターンテーブルの回転を停止させる制御装置とを備えたことを特徴とする。

【０００６】

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本願の請求項２に記載の考案は、バーコードが側面に印刷された円筒容器を特定方向に位置決めする円筒容器の位置決め装置において、前記円筒容器が載せられ前記円筒容器を軸方向を中心として回転させるターンテーブルと、前記円筒容器の側面に対向して設けられ前記バーコードを検出するバーコード検出器と、このバーコード検出器からの信号に基づいて前記円筒容器が所定位置になった旨の信号を発する制御装置とを備えたことを特徴とする。

【０００７】

本願の請求項３に記載の考案は、バーコードが側面に印刷された円筒容器を特定方向に位置決めする円筒容器の位置決め方法において、前記円筒容器を軸方向を中心として回転させ、この回転中に前記バーコードを検出し、この検出結果に基づいて円筒容器の位置を特定することを特徴とする。

【０００８】

【作用】

本願の考案によれば、円筒容器はその軸方向を中心として回転させられ、円筒容器の側面に印刷されたバーコードが検出される。ここで、バーコードは円筒容器の所定位置に設けられているので、バーコードの検出結果から円筒容器の位置が特定される。

【０００９】

【実施例】

以下に図面を参照して本考案の一実施例について説明する。

【００１０】

図１に示すように、ターンテーブル１がベルト２を介してモータ３に連結されている。ターンテーブル１上には円筒容器としてのアルミ缶Ａが載せられるようになっており、モータ３を駆動するとターンテーブル１が回転し、アルミ缶Ａが軸方向を中心として回転するようになっている。ターンテーブル１上に載ったアルミ缶Ａの側面に印刷されたバーコードＢに対向するように、バーコードリーダ４が設けられている。このバーコードリーダ４は制御装置５に接続されており、制御装置５はモータ３と接続されている。制御装置５では、バーコードＢの判別できない状態から判別できる状態に変化したとき、又は、バーコードＢの判別で

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きる状態から判別できない状態に変化したときに、モータ３に対して停止信号を発するようにしている。

【００１１】

次に、本実施例の作用について説明する。

【００１２】

図２及び図３に示すように、ターンテーブル１上のアルミ缶Ａは軸方向を中心として回転する。この際、アルミ缶Ａの側面に印刷されたバーコードＢも一緒に回転する。図３に示すように、回転するバーコードＢがバーコードリーダ４に対向したときに、バーコードＢが判別できる状態になり、図２に示すように、バーコードＢがバーコードリーダ４に対向しない状態になったときには、バーコードＢが判別できない状態になる。バーコードリーダ４による検出結果は制御装置５に入力され、バーコードＢの判別できない状態から判別できる状態に変化したとき、又は、バーコードＢの判別できる状態から判別できない状態に変化したときに、制御装置５からモータ３に向けて停止信号が発せられる。この結果、モータ３により駆動されているターンテーブル１の回転が停止させられ、アルミ缶Ａがバーコードリーダ４と所定の相対位置をもって停止する。したがって、アルミ缶Ａの位置がバーコードリーダ４に対して特定され、この特定結果にしたがって後の処理たとえばアルミ缶Ａの表面に施した印刷の検査処理を行う。

【００１３】

上記実施例では、バーコードＢの判別できない状態から判別できる状態に変化したとき、又は、バーコードＢの判別できる状態から判別できない状態に変化したときに、制御装置５からモータ３に向けて停止信号が発せられるようにしているが、モータ３に停止信号を発することなく、アルミ缶Ａがバーコードリーダ４に対して所定位置になった旨の信号を制御装置から発するようにしてもよい。この信号により、自動的にアルミ缶Ａの表面に施された印刷を検査するようにしてもよい。

【００１４】

【考案の効果】

以上説明したように、本考案によれば、円筒容器を軸方向を中心として回転さ

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せ、この回転中にバーコードを検出し、この検出結果に基づいて円筒容器の位置を特定するようにしたので、印刷の銘柄が異なっても適用できる。

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(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
14 July 2005 (14.07.2005)

PCT

(10) International Publication Number
WO 2005/063091 A1

(51) International Patent Classification[7]: A47J 31/40

(21) International Application Number:
PCT/IB2004/052828

(22) International Filing Date:
16 December 2004 (16.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
03258180.3 23 December 2003 (23.12.2003) EP

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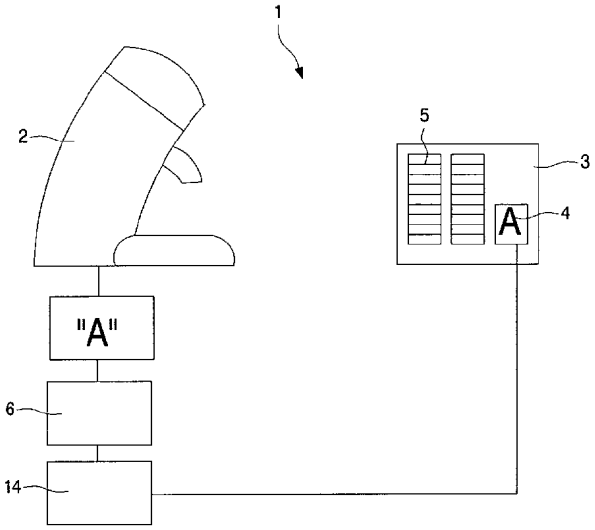
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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,

[Continued on next page]

(54) Title: SYSTEM FOR PREPARING A BEVERAGE



(57) Abstract: The invention relates to a system (1) for preparing a beverage from a beverage base material (5), comprising an apparatus (2) for preparing a beverage extract from a beverage base material (5) and a liquid and a container (3) for containing the beverage base material (5) during storage, the container (3) comprising an identifier (4) provided with data (A), which apparatus (2) comprises a reader (14) for reading the data (A) in said identifier (4) and a controller (6) for controlling a beverage brewing process in dependence on the data (A) during operation of the apparatus (2). In this manner the brewing process parameters for the beverage extract can be optimized for the specific variety of beverage in a user-friendly manner.

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PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, 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).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

System for preparing a beverage

The invention relates to a system for preparing a consumable matter, comprising an apparatus for preparing the consumable matter, and a container for containing a basis material for the consumable matter during storage.

The invention further relates to an apparatus for preparing a consumable matter, a container for containing a basis material for the consumable matter during storage, and an identifier, for use with the system according to the invention.

A system for preparing a consumable matter as described in the opening paragraph is known from EP0904718. The known system comprises an apparatus for preparing a coffee extract from ground coffee and water. The ground coffee is contained in a pouch made of a filter material, which pouch is placed in a holder in the apparatus. During operation hot water passes through the pouch to create a coffee extract which is then transported into a cup. The coffee pouches are sold in a container, in this case a bag, which contains a number of pouches. Numerous varieties of coffee pouches are offered to the consumer, who can select his or her preferred cup of coffee. These varieties may comprise for example coffee with special flavors (vanilla, chocolate etc.), coffee of varying strengths, or coffee without caffeine.

It is a drawback of the current system that it is not possible to obtain an optimal beverage result for all varieties of beverage with the system. Especially since new varieties of pouches are being developed which may contain, for example, ground coffee with milk powder, or even other types of beverage base material such as chocolate powder, this becomes an issue. The brewing process to obtain optimal beverage results for a strong coffee variety is different from the brewing process of, for example, hot chocolate, or a cappuccino variety. The parameters of the brewing process in the known system, such as water temperature and flow rate, are fixed and will thus be used for all different varieties of beverages. When different varieties of beverage are to be prepared with this system and these parameters, this will result in a number of extracted beverages which do not have the taste they might be expected to have, had they been brewed using the right parameters.

It is an object of the invention to provide a system for preparing a consumable matter in which the parameters can be tailored to their optimum for the specific variety of consumable matter, in a user-friendly manner.

To achieve this object, a system according to the invention is characterized in that the container comprises an identifier provided with data, and the apparatus comprises a reader for reading the data in said identifier, and a controller for controlling a preparation process during operation of the apparatus based on the data. When a user wants to prepare a consumable matter, such as a cup of beverage, for example coffee, the container is picked up and placed in the vicinity of the apparatus, to take out the basis material, in this case coffee pad. This basis material is then placed in the apparatus for preparing a consumable matter, for example an apparatus for preparing a beverage. When the container is present at a certain predetermined distance from the apparatus, the reader in the apparatus is able to read the data that are provided in the identifier comprised in the container. Based on this information, the controller in the apparatus controls a preparation during operation of the apparatus, which is based on the data in the identifier. In this manner the parameters of the preparation process can be tailored to their optimum, to obtain an optimum result for the prepared consumable matter.

An embodiment according to the invention is characterized in that the container comprises an identifier provided with data, and the apparatus comprises a reader for reading the data in said identifier and a controller for controlling a beverage brewing process in dependence on the data during operation of the apparatus. When a user wants to prepare a cup of beverage, for example coffee, the container is picked up and placed in the vicinity of the apparatus, and the beverage base material is taken out. This beverage base material is then placed in the apparatus for preparing a beverage. When the container is present at a certain predetermined distance from the apparatus, the reader in the apparatus is able to read the data provided in the identifier comprised in the container. Based on this information, the controller in the apparatus controls a beverage brewing process during operation of the apparatus, which is based on the data in the identifier. In this manner the parameters of the brewing process can be optimized so as to obtain an optimum beverage result.

An embodiment of a system according to the invention is characterized in that the data comprise information identifying the type of beverage base material comprised in the

container. In this manner the brewing process parameters can be optimized for the specific type of beverage such as, for example, coffee or hot chocolate.

An embodiment of a system according to the invention is characterized in that the data comprise information identifying a storage life of the beverage base material. Next to identification of the type of beverage, the identifier comprised in the container may serve to identify the storage life, and thus the freshness, of the beverage base material in the container. If, for example, a container is identified to have a packaging date before a pre-determined date in the past, a warning may be given to the user that the taste of the resulting beverage may be less than optimum because of the age of the beverage base material. Another possibility is that the parameters of the brewing process are adjusted to provide a beverage extract which is of good quality, even when the beverage base material is less fresh.

It is advantageous when the identifier comprises an identifier chosen from a group of radio frequency transponders and bar codes, and the reader comprises a reader chosen from a group of radio frequency readers and bar code readers.

An embodiment of a system according to the invention is characterized in that said controller comprises a processing unit which comprises a plurality of pre-programmed brewing process parameters, from which a selection is made during operation in dependence on the data as read. Various brewing processing parameters for different beverage types are pre-programmed into the processing unit and are assigned different integers. The integer corresponding to the most appropriate program for the beverage base material in the container is present as the data in the identifier and is read as such by the reader when the container is present at a certain predetermined distance from the apparatus. Based on this read integer, the program with appropriate brewing processing parameters is then activated in the apparatus by the controller for preparing a beverage extract.

An embodiment of a system according to the invention is characterized in that the identifier comprises an element which is detachably connected to the container. In this manner the user is offered the option to bring only the identifier itself in the vicinity of the apparatus, while the container may remain at another location. Furthermore, this offers the possibility of storing the identifier with the reader in the apparatus, which is advantageous if a user has the habit of preparing only one type of beverage.

It is advantageous when said element comprises one of a group of tags comprising tags with dielectric values, tags with punched holes, and tags with resistance values, and the reader comprises one of a group of readers comprising capacitor

arrangements for receiving dielectric tags, optical and mechanical readers, and resistance measuring arrangements.

The invention further relates to a container for containing a beverage base material during storage, for use with the system according to the invention, characterized in that said container comprises an identifier provided with data, said data being readable by a reader in an apparatus for preparing a beverage, and a beverage brewing process being controlled in dependence on the data during operation of the apparatus.

The invention further relates to an apparatus for preparing a beverage extract from beverage base material and a liquid, for use with the system according to the invention, characterized in that said apparatus comprises a reader for reading data in an identifier which is comprised in a container for containing a beverage base material, and a controller for controlling a beverage brewing process in dependence on the data during operation of the apparatus.

The invention further relates to an identifier for use with the system according to the invention, characterized in that said identifier comprises a separate element for inclusion in a container for containing the beverage base material during storage, which element is provided with data which are readable by a reader in an apparatus for preparing a beverage, and a beverage brewing process being controlled in dependence on said data during operation of the apparatus.

The invention will be described in more detail below with reference to the drawings, in which:

Fig. 1 is a schematic view of a system according to the invention, and

Fig. 2a is a schematic view of a container according to the invention,

Figs. 2b and c show embodiments of an identifier according to the invention, and

Figs. 3a, 3b and 3c are perspective views of further embodiments of an identifier according to the invention.

Figure 1 is a schematic view of a system 1 according to the invention, comprising an apparatus 2 in this embodiment an apparatus for preparing a beverage extract from beverage base material 5 and a liquid, and a container 3 for containing the beverage

base material 5 during storage. In this embodiment, the beverage base material 5 comprises a plurality of pouches 51 made of filter material and containing ground coffee. One or two pouches, depending on whether one or two cups of beverage are to be prepared, are placed in a holder in the apparatus, to prepare a coffee extract from the ground coffee and water that flows through the pouch during the brewing process in the apparatus. It is noted, however, that the beverage base material 5 may comprise alternative types of beverage base material, with or without an enclosure of filter material such as, for example, loose ground coffee, chocolate milk powder, or tea leaves in a teabag. The container 3 in this embodiment comprises a flexible bag comprising a plurality of coffee pouches, but it is noted that this container may comprise any known type of container such as, for example, tins, canisters, boxes, etc., for containing any type of beverage base material.

The container 3 comprises an identifier 4 provided with data A, and the apparatus 2 comprises a reader 14 for reading the data A in said identifier. The identifier in this embodiment comprises a radio frequency transponder which can be read by a radio frequency reader comprised in the apparatus. In this embodiment, a radio frequency transponder is placed in every bag, and a radio frequency reader incorporated into the beverage maker. There are several methods of identifying objects using RFID, but the most common one is to store a serial number that identifies a product, and perhaps other information, on a microchip that is attached to an antenna (the chip and the antenna together are called an RFID transponder or an RFID tag). The reader sends out electromagnetic waves that induce a current in the tag's antenna, powering the chip, and enabling transmission of the identification information back to the reader. The reader demodulates the radio waves returned from the RFID tag, then interprets the serial number. In this application, the range of the reader will be limited so that data stored on the tag can be read by bringing the bag into close proximity with the beverage maker, avoiding any conflict with other bags the user may have purchased.

Interpretation of the tag's data will lead to verification of the manufacturer and unique identification of the variety of beverage within the pad, so that the brewing parameters can be optimized for the drink. This optimization can be achieved either by selection of pre-programmed parameters, or by interpretation of the data provided by the RF tag into brewing instructions, increasing brewing versatility and allowing the introduction of new beverage types after manufacture of the beverage maker. If no tag or a tag of some unrecognized format is detected, default brewing parameters will be adopted.

It is noted that other known types of identifier technologies, such as bar codes on the container and a bar code reader in or connected to the apparatus, may also be applied. The apparatus 2 further comprises a controller 6 for controlling a beverage brewing process "A" during operation of the apparatus 2 based on the data A. This will be further illustrated with an example.

In this embodiment, the data A comprise information identifying the type of beverage base material present in the container, for example, 'regular roast coffee'. A user will pick up the container and bring it into the vicinity of the apparatus for preparing a beverage, in this embodiment coffee extract. When the container is in a certain pre-determined area around the apparatus, said area being defined by the chosen identifier and reader, the reader 14 in the apparatus is able to read the type of beverage base material that is contained in the container, in this case 'regular roast coffee'. After reading of this data, the controller 6 in the apparatus 2 is ready to initiate a beverage brewing process which is especially designed for this specific type of beverage. The specific beverage brewing process comprises the optimum parameters such as fluid temperature, fluid pressure, and fluid pass-through rate for this specific type of beverage, which ensure an optimal cup of 'regular roast coffee' resulting from the beverage brewing process in the apparatus 2. It is noted that the specific brewing process in the apparatus may start after activation of the on/off button of the apparatus by the user, after a certain pre-determined period of time starting from the moment the data are read, or upon detection of a pouch being placed in the holder of the apparatus.

In this embodiment, the controller 6 comprises a processing unit which comprises a plurality of pre-programmed brewing process parameters from which a selection is made during operation dependent on the data as read. The processing unit in the apparatus comprises various pre-programmed brewing processes, which are assigned different integers. The data in the identifier in each container comprise an integer corresponding to the most appropriate brewing process for the specific type of beverage base material comprised in the container. After reading out of the integer by the reader, the correct pre-programmed brewing process is selected by the controller in dependence on that integer, to control the operation of the apparatus. In another embodiment, the data in the identifier itself comprise specific brewing parameters such as a pre-selected fluid quantity, fluid temperature, and fluid pass-through rate, which are read out by the reader and transferred to the control unit 6 to control the beverage brewing process.

Furthermore, the apparatus may comprise a function to add additives such as milk, sugar, cream, and the like to the beverage extract, which addition can be controlled by reference to the data in the identifier.

The data A comprised in the identifier may also comprise information to identify a storage life of the beverage base material in addition to or instead of information on the type of beverage. In this manner the freshness of the beverage base material present in the container can be determined. The time period during which the beverage base material has been contained in the container has an important influence on the taste of the finally resulting beverage extract. Coffee extract resulting from a recently packaged coffee pouch has a different taste from coffee extract resulting from an 'older' coffee pouch which has been stored for some time in a container. In the system according to the invention, optimum brewing parameters can be chosen in dependence on the storage life information so as to obtain a good beverage extract result even if the beverage base material has been stored for some time.

Furthermore, this data may comprise in addition, or in itself, information identifying the company which supplies the container with the beverage base material. The apparatus is specifically designed to provide optimum beverage results from certain specially developed beverage base materials. In this manner a certain quality standard can be offered to the users and be maintained over a long period of time. If other companies sell comparable beverage base materials for use in the apparatus, there is a risk that this quality standard cannot be maintained because of a lower-quality beverage base material. This will also cause the apparatus to produce a beverage extract of a lower quality, which is undesirable. Hence, it is preferable that the best beverage extract results are obtainable by using an apparatus with a container according to the invention. The brewing parameters to obtain this optimum beverage extract results are controlled on the basis of the data read from the identifier comprised in the container. If no container with an identifier according to the invention is used, or if the identifier offered is not recognized by the apparatus, default brewing parameters will be adopted.

Figure 2a is a schematic view of a container 3' for containing a beverage base material during storage, for use with a system according to the invention. Said container 3' comprises an identifier 4' provided with data A', said data A' being readable by a reader in an apparatus for preparing a beverage, and a beverage brewing process during operation of the apparatus being controlled in dependence on the data. In this embodiment, the identifier 4' comprises an element 41 which is detachably connected to the container 3'. The element 41 in

this embodiment is connected to the container via a perforated line and can be torn off the container 3'. It is noted that the element 41 may also be detachably connected to the container by means of other known types of connections, the element for example comprising a sticker or a clip which is removably attached to the container.

In another embodiment, the identifier comprises a separate element for inclusion in a container for containing the beverage base material during storage, which element is provided with data which can be read by a reader in an apparatus for preparing a beverage, and a beverage brewing process during operation of the apparatus being controlled in dependence on said data.

Thus, the identifier may comprise an element which is detachably connected to the container, or a separate, loose element which is placed in the container together with the beverage base material during production. These detachable or loose elements may comprise, for example, a tag 42 with a number of punched holes, as shown in Figure 2b. The pattern of holes on this tag 42 can be read optically or mechanically, so as to select a pre-determined beverage brewing program or to determine the processing parameters. Furthermore, these elements may comprise, for example, a tag 43 with a printed conduction track or a resistive wire insert, as shown in Figure 2c. This tag 43 can be inserted into a recess in the body of the beverage making apparatus, where pins connect to each end of the resistive track. The resistance of this system is measured, and the range into which it falls is used to define the beverage processing program.

Other embodiments of these elements are shown in Figures 3a and 3b. Figure 3a shows a rigid tag 44 with a flange positioned at a variable distance from its free end, which tag is included in the container with the beverage base material. This tag 44 can be inserted into a recess in the body of the beverage making apparatus, where it operates a spring-loaded sliding switch that indicates the length of the tag and thus controls the beverage processing parameters. Figure 3b shows a rigid tag 45 with a notch positioned a variable distance from an orientation feature at one side of the tag, which is included in the container with the beverage base material. This tag can be inserted into a recess in the beverage making apparatus, where it operates a sliding switch that indicates the position of the notch and thus controls the beverage brewing parameters.

Figure 3c shows a further embodiment of an identifier according to the invention. A limited selection of cross sections, none of which can pass through any of the others, is defined, and each section is assigned to a different beverage brewing program. A rigid key element 46 with a pre-determined cross section from this selection, chosen in

dependence on the type of beverage to be made, is included in the container with the beverage base material. This key element 46 interfaces with a unique mating hole 56 in the beverage making apparatus, operating a switch that selects the desired beverage brewing program.

It is noted that, in addition to systems for preparing coffee extract from ground coffee and water, the invention is also advantageously applicable to other systems for preparing a beverage extract from beverage base material and a liquid. The beverage base material may comprise, for example, other types of beverage base material such as milk powder, chocolate milk powder, soft drink syrup, tea leaves, dried soup, etc. These materials may be in loose form, or may be enclosed in a filter material or a capsule. The liquid may comprise, for example, other types of liquid such as milk, beer, carbonated water, etc. It is noted that the term beverage brewing process is not limited to the preparation of hot beverage extracts such as coffee, but that the preparation of cold drinks such as soft drinks is also included. The specific brewing parameters that are controlled via the identifier are dependent on the type of beverage extract to be prepared.

With a system, an apparatus, a container, and an identifier according to the invention, the brewing process parameters for the beverage extract can be optimized for the specific variety of beverage in a user-friendly manner. The user does not have to press numerous buttons nor have to remember the correct settings of all relevant parameters for the brewing process in dependence on the type of beverage in order to obtain a beverage extract according to his or her preferences with an optimum taste. The system assures an optimization of the beverage brewing process for each specific type of beverage in a way which is easy and comfortable for users.

This optimization can be achieved either by selection of pre-programmed parameters with assigned different integers, which integers are included in the identifier, or by conversion of the data provided by the identifier into brewing instructions. In this manner the brewing versatility is increased. Furthermore, this allows the introduction of new beverage types after the manufacture of the beverage making apparatus, because the pre-programmed beverage brewing processes in the apparatus may be updateable via a connection to a public switching network such as the Internet. Alternatively, this update may take place in that the identifier transfers new beverage brewing programs to the controller in the apparatus.

It is noted that not only the control of the brewing process parameters, but also other functions of the apparatus may be activated by reading of the data comprised in the

identifier. The addition of additives to the beverage extract was described above. If, for example, a display is provided on the apparatus, this display may show the type of beverage extract being prepared on the basis of the data in the identifier. Furthermore, the display may show, for example, the status of the brewing process during operation of the apparatus.

It is noted that until now a specific embodiment of a system for preparing a beverage from a beverage base material, comprising an apparatus for preparing a beverage extract from beverage base material and a liquid, and a container for containing the beverage base material during storage has been described.

It is noted however that next to an application with beverage base material and liquid, the invention also relates to other types of applications with consumable matter. In stead of a beverage base material in the container, and a liquid being delivered to that material by the apparatus and preparing a consumable matter, being a cup of beverage, using certain optimal brewing parameters defined by the identifier, in another embodiment the basis material in the container may already comprise a liquid, namely beer.

In this embodiment, a system according to the invention is characterized in that the container, in this embodiment a beer keg, comprises an identifier provided with data, and the apparatus, in this case a beer tapping device, comprises a reader for reading the data in said identifier, and a controller for controlling the preparation during operation of the apparatus based on the data. The identifier comprises for example information as to what kind of temperature the apparatus should cool the beer, before the beer is tapped into a glass, and the correct pressure to be applied in the apparatus. In this manner the parameters to be used in the tapping device for the tapping process can be tailored to their optimum, to obtain an optimum result of the tapped beer. Different types of beer may for example require, among other things, different tapping temperatures and pressures.

It is noted furthermore that next to an application with beverage base material and liquid, the invention also relates to other types of applications with consumable matter, such as for example a system for baking bread. In this embodiment, a system according to the invention is characterized in that the container, in this embodiment a container holding bread flour mix, comprises an identifier provided with data, and the apparatus, in this case a bread baking device, comprises a reader for reading the data in said identifier, and a controller for controlling the preparation of a baked bread during operation of the apparatus based on the data. The parameters controlled here may comprise for example baking temperature, duration of baking, rising time of dough, duration of kneading, etc., depending on the type of bread flour mix present in the container.

CLAIMS:

1. A system (1) for preparing a consumable matter, comprising:
- an apparatus (2) for preparing the consumable matter, and
- a container (3) for containing a basis material for the consumable matter during storage,
characterized in that the container (3) comprises an identifier (4) provided with data (A), and the apparatus (2) comprises a reader (14) for reading the data (A) in said identifier (4), and a controller (6) for controlling a preparation process during operation of the apparatus (2) based on the data (A).

2. A system according to claim 1, wherein the system is a system (1) for preparing a beverage from a beverage base material (5), comprising:
- an apparatus (2) for preparing a beverage extract from a beverage base material (5) and a liquid, and
- a container (3) for containing the beverage base material (5) during storage,
and wherein the container (3) comprises an identifier (4) provided with data (A), and the apparatus (2) comprises a reader (14) for reading the data (A) in said identifier (4) and a controller (6) for controlling a beverage brewing process in dependence on the data (A) during operation of the apparatus (2).

3. A system as claimed in claim 2, characterized in that the data comprise information identifying the type of beverage base material present in the container (3).

4. A system as claimed in claim 2 or 3, characterized in that the data (A) comprise information identifying a storage life of the beverage base material (5).

5. A system as claimed in claim 1, characterized in that the identifier (4) comprises an identifier chosen from a group of radio frequency transponders and bar codes, and the reader (14) comprises a reader chosen from a group of radio frequency readers and bar code readers.

6. A system as claimed in claim 2, characterized in that said controller (6) comprises a processing unit which comprises a plurality of pre-programmed brewing process parameters, from which a selection is made during operation in dependence on the data as read.

7. A system as claimed in claim 1, characterized in that the identifier (4) comprises an element (41) which is detachably connected to the container (3).

8. A system as claimed in claim 7, characterized in that said element (41) comprises one from among a group of tags comprising tags with dielectric values, tags with punched holes, and tags with resistance values, and the reader (14) comprises one of a group of readers comprising capacitor arrangements for receiving dielectric tags, optical and mechanical readers, and resistance measuring arrangements.

9. A container (3) for containing a beverage base material during storage, for use with the system according to any of the preceding claims, characterized in that said container (3) comprises an identifier (4) provided with data, said data being readable by a reader (14) in an apparatus (2) for preparing a beverage, the beverage brewing process being controlled in dependence on the data during operation of the apparatus.

10. An apparatus (2) for preparing a beverage extract from beverage base material and a liquid, for use with the system according to any of the preceding claims, characterized in that said apparatus (2) comprises a reader for reading data in an identifier (4) which is present in a container (3) for containing a beverage base material and a controller (6) for controlling the beverage brewing process in dependence on the data during operation of the apparatus (2).

11. An identifier (4) for use with the system according to any of the preceding claims, characterized in that said identifier (4) comprises a separate element (42, 43, 44, 45, 46) for inclusion in a container (3) for containing a basis material for the consumable matter during storage, which is provided with data which are readable by a reader (14) in an apparatus (2) for preparing a consumable matter, and a preparation process during operation of the apparatus (2) being controlled based on said data.

12. An identifier (4) for use with the system according to any of the preceding claims, characterized in that said identifier (4) comprises a separate element (42, 43, 44, 45, 46) for inclusion in a container (3) for containing a beverage base material during storage, which is provided with data which are readable by a reader (14) in an apparatus (2) for preparing a beverage, the beverage brewing process being controlled in dependence on said data during operation of the apparatus (2).

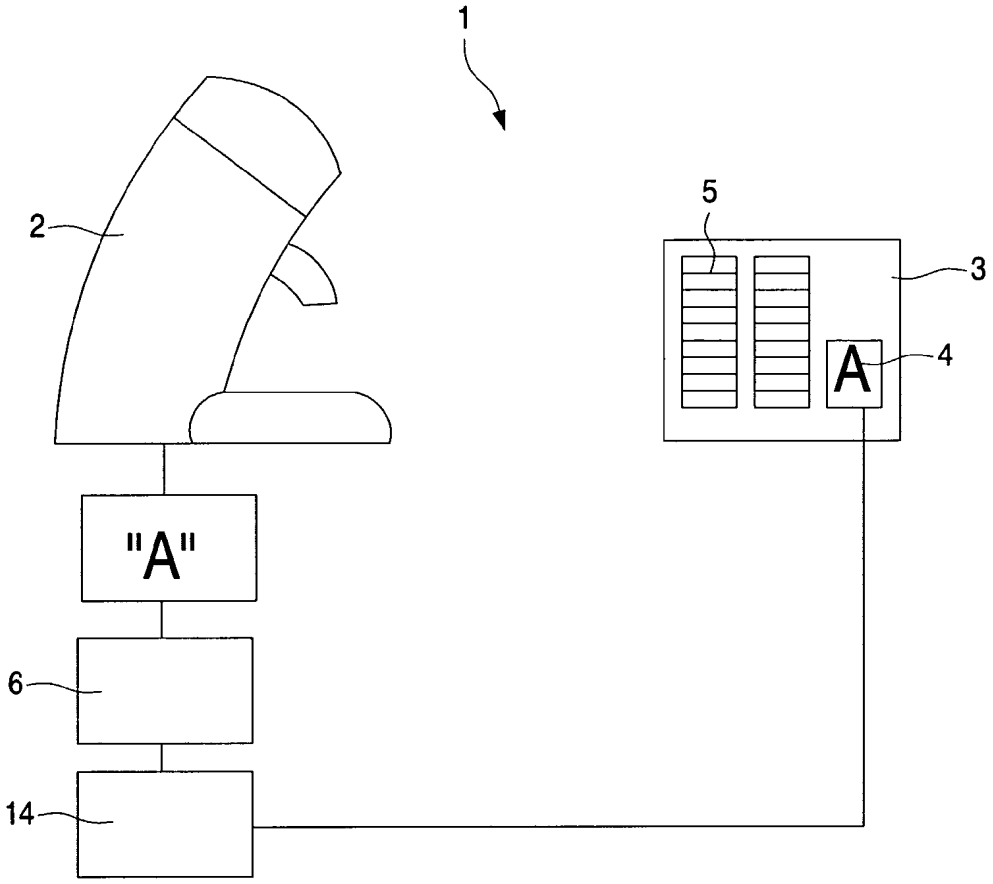


Fig.1

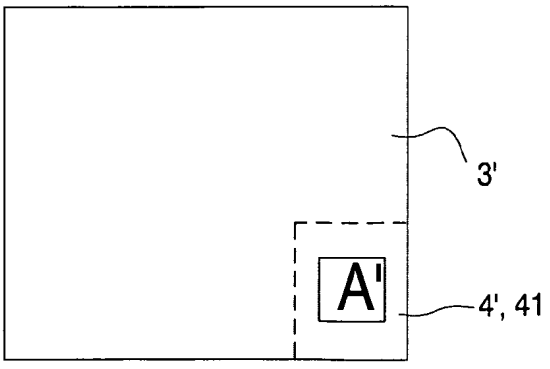


Fig.2a

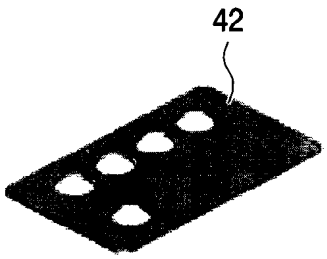


Fig.2b

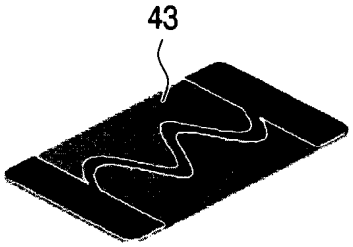


Fig.2c

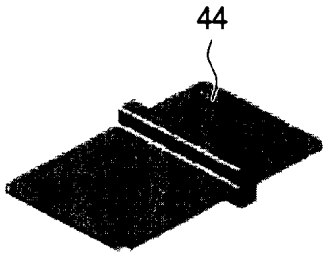


Fig.3a

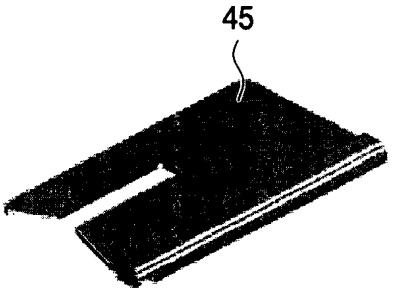
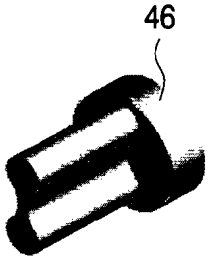


Fig.3b



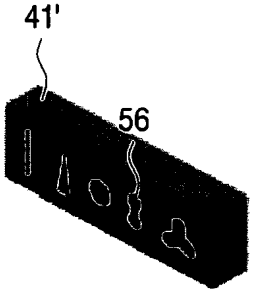


Fig.3c

INTERNATIONAL SEARCH REPORT

tional Application No
'IB2004/052828

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A47J31/40

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A47J B65D

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/129286 A1 (KNEPLER JOHN T) 10 July 2003 (2003-07-10) paragraph '0042! - paragraph '0044! paragraph '0047! paragraph '0049! paragraph '0065! - paragraph '0066!; figure 1	1-12
X	EP 0 638 486 A (GENERAL FOODS LIMITED; KRAFT JACOBS SUCHARD LTD) 15 February 1995 (1995-02-15) column 4, line 21 - column 5, line 26; figure 1	1-3,5,6, 8-10
A	DE 201 21 494 U1 (EUGSTER/FRISMAG AG, ROMANSHORN; MAHLICH, GOTTHARD) 17 October 2002 (2002-10-17) abstract	

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

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
22 March 2005	31/03/2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Lehe, J

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INTERNATIONAL SEARCH REPORT

nformation on patent family members

International Application No
IB2004/052828

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

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特許協力条約に基づいて公開された国際出願

(51) 国際特許分類 4
B65D 8/22, B29C 51/08, 65/02
B29C 65/72

A1

(11) 国際公開番号 WO 88/04262

(43) 国際公開日 1988年6月16日 (16.06.88)

(21) 国際出願番号 PCT/JP87/00936
(22) 国際出願日 1987年12月2日 (02. 12. 87)
(31) 優先権主張番号 特願昭61-287438
特願昭62-117723
特願昭62-183156
(32) 優先日 1986年12月2日 (02. 12. 86)
1987年5月14日 (14. 05. 87)
1987年7月22日 (22. 07. 87)
(33) 優先権主張国 JP

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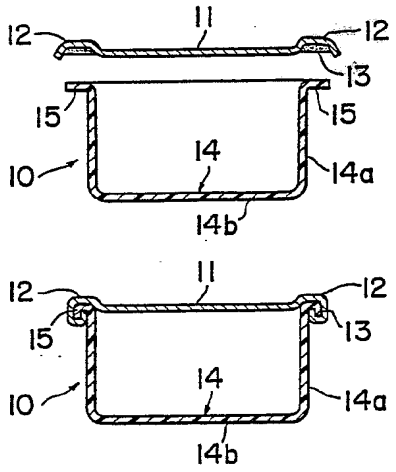
(81) 指定国
AT (欧州特許), BE (欧州特許), CH (欧州特許),
DE (欧州特許), FR (欧州特許), GB (欧州特許),
IT (欧州特許), LU (欧州特許), NL (欧州特許),
SE (欧州特許), US.
添付公開書類 国際調査報告書

(54) Title: CONTAINER EQUIPPED WITH METALLIC LID AND PRODUCTION THEREOF

(54) 発明の名称 金属蓋付容器およびその製造方法

(57) Abstract

Container (10) which can be produced easily, has high sealability and is equipped with a metallic lid (11) having a peripheral portion (12) for gripping a container main body (14) having a plastic flange (15). The present invention relates also to a method of producing a container equipped with a metallic lid, which comprises the steps of covering the inner surface of a peripheral portion (12) of the metallic lid (11) with a heat-fusible material (13) such as a modified polyolefin, having the lid (11) fastening the grip of a flange (15) of a plastic container main body (14) from under and fusing the flange (15) to the peripheral portion (12) of the metallic lid (11) by heating means such as radio frequency heating. The present invention relates further to a production apparatus equipped with a mold, as a molding apparatus for press-molding the plastic container main body (14), which mold consists of a bottom force (104) having an inclined surface extending from the upper peripheral portion of the inner periphery of a metal mold to an outer periphery portion (103) at an angle of inclination of 5 to 40° and a top force (111) having a clamp (105) for clamping a plastic sheet and a plug (106) for pushing the sheet.



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(57)要約

本発明は、プラスチック製のフランジ部（１５）を有する容器本体（１４）を巻締める周縁部（１２）を備えた金属蓋（１１）とから成る製造が簡単で且つ密封性の良い容器（１０）、及び金属蓋（１１）の周縁部（１２）内面に変性ポリオレフィンその他の熱融着材（１３）を被覆し、該蓋（１１）をプラスチック容器本体（１４）のフランジ部（１５）に巻締める工程と高周波その他の加熱手段によりフランジ部（１５）と金属蓋（１１）の周縁部（１２）とを融着させる工程とから成る金属蓋付容器の製造方法、及びプラスチック容器本体（１４）をプレス成形するための成形装置として、金型内周上縁部（１０２）から外周縁部（１０３）へ5°～40°の傾斜面を有する下型（１０４）とプラスチックシートを挟持するためのクランプ（１０５）と該シートを押圧するためのプラグ（１０６）とを有する上型（１１１）とから成る成形型を備えた製造装置に関するものである。

情報としての用途のみ

PCTに基づいて公開される国際出願のパンフレット第1頁にPCT加盟国を同定するために使用されるコード

AT オーストリア
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明　　細　　書

金属蓋付容器およびその製造方法

技術分野

本発明はプラスチック製のフランジ部を有する容器本体と、この容器本体に巻締められた金属蓋とを備えた金属蓋付容器とその製造方法に関する。

背景技術

金属製の容器、例えば金属缶は種々の形態を有するものがあるが、缶体の構造から３ピース缶と２ピース缶とに区分することができる。３ピース缶はブリキバンダ缶とも言われ、円筒状胴部とふた及び底部を二重巻締めで密封した構造である。一方、２ピース缶はブリキ打抜き缶とも言われ、胴部及び底部（容器本体）を一体成形したものにふたを二重巻締めする構造である。

これら金属缶は食品包装容器として各種食品缶詰，ジュース，清涼飲料，ジャム類，乾燥食品等の容器に使用され、密封，保存機能が特に優れた剛性容器である。しかしながら、金属缶には、下記のような改善すべき点がある。即ち、

① 金属缶であるために、軽量化に限界がある。

② 衝撃を受けた時、一度つぶれると復元性がなく、変形してしまう。

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③ プラスチック製容器に比べて、その製造上のエネルギーコストが高い。

④ 容器外装のディスプレイ効果が金属の場合、自由に変えることができず、外装手段は印刷によるしかない。

⑤ 内容物を開缶せずに確認できるような透明容器をつくることは不可能である。

このような従来の金属缶における欠点を解決するため、プラスチック製の容器本体に金属蓋を取付けてなる金属蓋付容器が考えられる。

しかしながら、プラスチック製の容器本体に、金属蓋を簡単にかつ密閉性良く取付けることはむずかしい。

発明の開示

本発明の第１の目的は、簡単に製造することができかつ密閉性の高い、プラスチック製の容器本体と金属蓋とを備えた金属蓋付容器を提供することである。

本発明の第２の目的は、プラスチック製の容器本体に金属蓋を密閉性良く取付けることができる金属蓋付容器の製造方法を提供することである。

本発明の第３の目的は、プラスチック製の容器本体に金属蓋を巻締める際加えられる力に耐えるに充分な座屈強度と耐熱性を有する金属蓋付容器の製造方法を提供することである。

本発明の第４の目的は、プラスチック製の容器本体に金属蓋を確実に取付けることができ、かつ大量生産に適

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した金属蓋付容器の製造方法を提供することである。

本発明の第５の目的は、プラスチック製の容器本体を略真球状にすることができる金属蓋付容器の製造方法を提供することである。

本発明の第６の目的は、金属蓋の巻締めに適したプラスチック製の容器本体を容易に製造することができる金属蓋付容器の製造装置を提供することである。

（１） 本発明の第１の特徴は、プラスチック製のフランジ部１５を有する容器本体１４と、前記フランジ部１５を巻締める周縁部１２を有する金属蓋１１とからなる金属蓋付容器である。

（２） 本発明の第２の特徴は、金属蓋１１の周縁部１２内面に、変性ポリオレフィン，アイオノマー樹脂，エチレン・アクリル酸共重合体の１種以上よりなるヒートシーリングコンパウンド１３をコーティングする工程と、該金属蓋１１をプラスチック製の容器本体１４のフランジ部１５に巻締める工程と、高周波・超音波・電熱・スチームなどの加熱によりフランジ部１５と金属蓋１１の周縁部１２とを融着させる工程とからなる金属蓋付容器の製造方法である。

（３） 本発明の第３の特徴は、結晶促進核剤を含むポリエチレンテレフタレート層を含むシートブランクを用いて容器本体を熱成形する工程からなり、該ポリエチレンテレフタレート層の結晶化度が１０～４０％になる

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ように熱成形することを特徴とする金属蓋付容器の製造方法である。

（４） 本発明の第４の特徴は、シートフォーミングによってフランジ部１５を有するプラスチック製の容器本体１４を熱成形する工程と、容器本体１４のフランジ部１５の厚みをプレス熱成形によって薄くする工程と、フランジ部１５の幅が一定のフランジ幅となるようフランジ部１５の周端部を打抜く工程と、このフランジ部１５に金属蓋１１の周縁部１２を巻締める工程とからなる金属蓋付容器の製造方法である。

（５） 本発明の第５の特徴は、フランジ部１５を有するプラスチック製容器本体１４内に内容物を充填する工程と、フランジ部１５に金属蓋１１の周縁部１２を巻締めて容器本体１４を密封する工程と、容器本体１４をガラス転移点以上であって容器本体１４の融点以下に加熱する工程とからなり容器本体１４を略真球状にする金属蓋付容器の製造方法である。

（６） 本発明の第６の特徴は、外周上端１０２から上方に向って延びるキャビティ上縁部１０３を有するキャビティ１０４と、このキャビティ１０４内にプラスチックシートを押下げるプラグ１０６と、前記キャビティ上縁部１０３に当接してプラスチックシートを挟持するクランプ１０５とを備え、前記キャビティ上縁部１０３は$5° < \theta < 40$の角度をもって上方へ延び、前記キャ

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ビティ１０４の外周上端１０２から前記クランプ１０５の内周面までの距離ℓが５㎜＜ℓ＜２０㎜となることを特徴とする金属蓋付容器の製造装置である。

図面の簡単な説明

第１図（ａ）（ｂ）（ｃ）～第３図は、本発明に係る金属蓋付容器の第１の実施例のヒートシーリングコンパウンドを有する金属蓋付容器を示す図、

第４図～第８図は、ヒートシーリングコンパウンドを有する金属蓋付容器の他の実施例を示す図、

第９図～第１２図は、本発明に係る金属蓋付容器の第２の実施例のガスバリヤ性のシートブランクを有する金属蓋付容器を示す図、

第１３図および第１４図は、本発明に係る金属蓋付容器の第３の実施例の結晶度が１０～４０％であるポリエチレンテレフタレート層を含むシートブランクの金属蓋付容器を示す図、

第１５図～第２０図は、本発明に係る金属蓋付容器の第４の実施例のポリエチレンテレフタレートおよびポリアリレートの積層シートからなる金属蓋付容器を示す図、

第２１図～第２３図は本発明に係る金属蓋付容器の第５の実施例のフランジ部が射出成形された積層シートからなる金属蓋付容器を示す図、

第２４図～第２９図は、本発明に係る金属蓋付容器の第６の実施例の底部が外方へ突出する凸形状に形成され

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た金属蓋付容器を示す図、

第３０図～第３８図は、本発明に係る金属蓋付容器の第７の実施例の容器本体がリブを有する金属蓋付容器を示す図、

第３９図および第４０図は、容器本体がリブを有する金属蓋付容器の他の実施例を示す図、

第４１図および第４２図は、本発明に係る金属蓋付容器であってフランジ部がプラスチック製円筒体の両端を外方に広げて形成されている金属蓋付容器を示す図、

第４３図は、本発明に係る金属蓋付容器であってフランジ部上に金属蓋のイーシーオープン用ハーフカット線を設けた金属蓋付容器を示す図、

第４４図～第５０図は、本発明に係る金属蓋付容器の製造方法の第１の実施例を示す図、

第５１図（ａ）（ｂ）（ｃ）は、本発明に係る金属蓋付容器の製造方法の他の実施例を示す図、

第５２図～第５４図は、本発明に係る金属蓋付容器の製造装置の実施例を示す図である。

発明を実施するための最良の形態

§１．　金属蓋付容器の第１の実施例

（ヒートシーリングコンパウンドを有する金属蓋付容器）

１．１　基本構造

本発明に係る金属蓋付容器の第１の実施例の構造を第

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1図（a）（b）（c）乃至第3図に示す。

金属蓋付容器10は、金属蓋11の周縁部12内面に変性ポリオレフィン・アイオノマー樹脂，エチレン・アクリル酸共重合体の1種以上よりなるヒートシーリングコンパウンド13をコーティングし、該コーティングされた金属蓋の周縁部12をプラスチック製容器本体14のフランジ部15に巻締めた後、高周波・超音波・電熱・スチームなどの加熱により容器本体14のフランジ部15と金属蓋11の周縁部12とを融着させることによって得られる。

本実施例において用いられるプラスチック製容器本体14は特に限定されたものである必要はなく、巻締めに耐える充分な硬度、強度を有するものであればよく、オレフィン系樹脂、ポリプロピレンを主体とした積層材料等が用いられる。好ましくは、先に本出願人のなした日本国特願昭61-194850号明細書に記載の二重巻締めが可能なフランジ部15を有する容器本体14が用いられる。該容器本体14は、フランジ部15の厚みが0．2～1．0㎜であって、フランジ幅が1．0～2．5㎜のフランジ部15を有する胴部14aと底部14bが一体に形成されたものである。このような容器本体14は、キャビティ17内に上記のような寸法のフランジ部15を形成することができる段部18を設けた二段成形方法によって製造することができる。

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金属蓋１１の周縁部１２内面にコーティングするヒートシーリングコンパウンド１３としては、その主成分とするものは、変性ポリオレフィン樹脂、アイオノマー樹脂、エチレン・アクリル酸共重合体等が考えられ、特に変性ポリオレフィン樹脂を用いることが好ましい。

ポリオレフィンとしては、エチレン、プロピレン等のα－オレフィンの単独重合体又は他のα－オレフィンとの共重合体例えば、エチレン－プロピレンランダム共重合体，エチレン－ブテン－１共重合体、エチレン－プロピレン－ブテン－１共重合体等のαオレフィン同志の結晶性共重合体或いはこれらの重合体の混合物を用いる。変性の方法は、不飽和カルボン酸又は無水物を、上記のポリオレフィンにグラフト重合することで得られる。不飽和カルボン酸又は無水物としてはアクリル酸，マレイン酸，フマール酸，イタコン酸，クロトン酸，シトラコン酸，ソルビン酸又はそれらの無水物等が挙げられる。特にアクリル酸又は無水マレイン酸を用いることが望ましい。

変性ポリオレフィン中の改質モノマーの割合は、ポリオレフィン含量（未変性ポリオレフィン＋改質ポリオレフィン）に対し、０．０１～１重量％がよい。

これら変性ポリオレフィンは、金属蓋１１との接着が良好であると共に、プラスチック製容器本体１４（オレフィン系樹脂）と熱融着する。

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これら変性ポリオレフィンを金属蓋１１の周縁部１２の内面にコーティングする形体としては、溶融してスプレーコートすることは勿論のこと、ディスパージョンの形で水又は溶剤下でコロイド化して、つけることもできる。コーティング量は、３～４mg／cm²とする。これは一般の金属缶の場合と同様である。

１．２　製造方法

以下に図面を参照して本実施例による金属蓋付容器１０の製造方法を簡単に説明する。

まず、金属蓋１１の周縁部１２の内面にヒートシーリングコンパウンド１３として、例えば変性ポリオレフィンをコーティングする（第１図（ａ））。次に例えばポリプロピレンを主とする容器本体１４のフランジ部１５に金属蓋１１の周縁部１２を二重巻締めによって巻締める（第１図（ｂ））。

次に、巻締めを行った周縁部１２を高周波ウェルダ１６により加熱してヒートシーリングコンパウンド１３である変性ポリオレフィンによって金属蓋１１の周縁部１２と容器本体１４のフランジ部１５を構成するポリプロピレンとを完全に融着せしめる（第１図（ｃ））。

１．３　具体例

（具体例１－３－１）

次に具体例によって本実施例による金属蓋付容器１０について説明する。

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金属蓋１１としてアルミニウム金属蓋を使用し、ヒートシーリングコンパウンド１３としてアイオノマー樹脂（三井石油化学㈱製，商品名ケミパール　Ｓ－１１０）をコーティングする。更にその上にエチレン酢酸ビニル共重合体（三井石油化学㈱製，商品名ケミパールＶ－３００）をコーティングする。コーティング量は４㎎／㎠である。蓋サイズは３０７号缶用であった。

容器本体１４として第２図に示すようにポリプロピレン／エチレンビニルアルコール共重合体／ポリプロピレンを主体とする層構成の１．２㎜のシートを熱成形によって成形したものを用いる。そして上記の金属蓋１１をセミオートシーマー（図示せず）で二重巻締めをする。本実施例において用いた容器本体１４は第３図に示すような二段成形方法によって成形を行って得られたものである。即ち、キャビティ１７に段部１８を設け、容器本体１４のフランジ部１５は段部１８によって形成される。二段成形方法は、先ず、プラグ１９がシート２０をキャビティ１７内に置き、次いでキャビティ１７及びコア２１によってシート２０を保持し、しかる後、圧空空気がキャビティ１７内にシート２０を密着させることによって行われる。得られた成形物を打抜いて、フランジ幅が金属蓋１１を二重巻締めするのに好ましい値となるような容器本体１４を得る。

この場合、シート２０を保持するようキャビティ１７

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およびコア２１が停止する以前にプラグ１９がキャビティ１７内に侵入することによって、周囲のシート２０がキャビティ１７内に引き込まれる。このことによって容器本体１４の底部１４ｂおよび胴部１４ａと底部１４ｂの接合部分の厚みを厚くし、二重巻締めに耐えるよう容器の座屈強度を大きくすることができる。また、キャビティ１７上端面とコア２１間に挟持されるシート２０の厚みが大きくても段部１８上に形成されるフランジ部１５となる箇所の厚みは０．４㎜程度に薄くなり、二重巻締めに適した容器本体１４が得られる。

二重巻締めを行った容器本体１４は高周波誘導加熱装置１６（高周波ウェルダー，精電舎電子工業㈱製）により５ＫＷ，１０ＫＨｚにて高周波をフランジ部１５にあてることで完全融着された。結果はシールが完全になされており良好であった。

（具体例１－３－１～１７および比較例）

金属蓋１１にコーティングするヒートシーリングコンパウンド１３を変えてシールの完全性についての試験を行った。また、比較例としてコーティングを行わないものについても試験を行った。結果を下表に示す。

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具体例	ヒートシーリングコンパウンド			シール性良否
	樹脂成分	溶媒	商品名	
1	アイオノマー樹脂/EVA	(1)水性	ケミパールS／ケミパールV（三井石油化学㈱製）	◎
2	EAA	〃	ザイクセン-A（製鉄化学㈱製）	◎
3	EAA	〃	ザイクセン-AC（製鉄化学㈱製）	◎
4	EAA	〃	ザイクセン-L（製鉄化学㈱製）	◎
5	EAA	〃	ザイクセン-N（製鉄化学㈱製）	◎
6	アイオノマー樹脂	〃	ケミパールS（三井石油化学㈱製）	○
7	アイオノマー樹脂/PE	〃	ケミパールS／ケミパールA（三井石油化学㈱製）	◎
8	変性ポリオレフィン	(2)有機溶剤	モノプライムAD-78LJ8A（東洋モートン㈱製）	◎
9	変性ポリオレフィン	〃	モノプライムAD-78LJ10（東洋モートン㈱製）	◎
10	変性ポリオレフィン	(3)樹脂	アドマーQE050（三井石油化学㈱製）	◎
11	EVA	〃	アドマーVE300（三井石油化学㈱製）	○
12	PE	〃	アドマーNE060（三井石油化学㈱製）	○
13	変性ポリプロピレン	〃	モデイックP-100F（三菱油化㈱製）	◎
14	変性ポリプロピレン	〃	モデイックP-300M（三菱油化㈱製）	◎
15	変性ポリプロピレン	〃	AP-270L（三菱化成㈱製）	◎
16	変性ポリプロピレン	〃	AP-070L（三菱化成㈱製）	◎
17	変性ポリオレフィン	〃	デュミランC-1570（タケダ薬品工業㈱製）	◎
比較例1	コーティングなし			×

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注） ＥＡＡ：エチレン・アクリル酸共重合体
ＥＶＡ：エチレン酢酸ビニル共重合体
ＰＥ　：ポリエチレン
(1) 水　　性：水系に樹脂成分がエマルジョン化しているもの。
(2) 有機溶剤：有機溶媒に樹脂成分が分散化しているもの。
(3) 樹　　脂：樹脂成分を加熱溶融するもの。

１．４　効　果

この第１の実施例によれば、次のような効果が得られる。

①　金属蓋１１の周縁部１２がプラスチック製容器本体１４のフランジ部１５に巻締めによって固着される。

②　更に金属蓋１１の周縁部１２と容器本体１４のフランジ部１５の間に存在するヒートシーリングコンパウンド１３が高周波加熱によって金属蓋１１と容器本体１４を完全に融着するので密封性がきわめて良好であり、

③　液体もガス体も透過せず、外力が加わった場合も金属蓋１１が剥離したりする恐れがない。

④　また、容器本体１４がプラスチックで形成されているので透明性があり、内容物の確認が容易である他、商品の美感を向上せしめることも出来る。

１．５　ヒートシーリングコンパウンドを有する金属蓋付容器の他の実施例

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（１－５－１　他の実施例１）

ヒートシーリングコンパウンドを有する金属蓋付容器の他の基本構造を第４図、第５ａ図および第５ｂ図に示す。

第４図に示すようにヒートシーリングコンパウンド１３がコーティングされた金属蓋１１の周縁部１２と、プラスチック製容器本体１４のフランジ部１５とが多重に巻締められている。また、金属蓋付容器の巻締め部を第５図（ａ）（ｂ）に示す。

本実施例によれば、第５図（ａ）に示すように、あらかじめ金属蓋１１の周縁部１２の下方に切欠１２ａを形成しておくことにより、第５図（ｂ）に示すように巻締め作業を容易に行うことができる。また周縁部１２は切欠１２ａで折曲がるため、折曲げ位置が一定となり安定した折曲げ作業を行うことができる。

（１－５－２　他の実施例２）

さらに金属蓋付容器の他の基本構造を第６図乃至第８図に示す。

第６図に示すように、金属蓋１１の内面略全域にエポキシ系樹脂２３ａおよび変性ポリオレフィン２３ｂの積層体（ヒートシーリングコンパウンド）２３があらかじめコーティングされている。

第７図に示すように金属蓋１１の周縁部１２と容器本体１４のフランジ部１５とを多重に巻締めた後、この巻

締め箇所を熱処理することにより、周縁部１２とフランジ部１５との間の隙間を埋めることができる。第８図は第７図のＡ部拡大図である。第８図に示すように、周縁部１２とフランジ部１５との間の隙間は、エポキシ系樹脂２３ａおよび変性ポリオレフィン２３ｂの積層体２３によって埋められている。

本実施例によれば、周縁部１２とフランジ部１５との間の隙間を広範囲に埋めることができ、このため密封性を更に高めることができる。

§２．　金属蓋付容器の第２の実施例

（ガスバリヤ性のシートブランクを有する金属蓋付容器）

２．１　基本構造

本発明に係る金属蓋付容器の第２の実施例の構造を第９図乃至第１２図に示す。

第９図に本発明による金属蓋付容器の容器本体１４を示す。容器本体１４は、フランジ部１５およびピラー部２７を有する胴部１４ａと、底縁部２９を有する底部１４ｂとから構成されている。このうち、フランジ部１５、ピラー部２７および底縁部２９は熱可塑性樹脂２８よりなり、また胴部１４ａおよび底部１４ｂはシートブランク２６と熱可塑性樹脂２８よりなっている。

本実施例による容器本体１４に用いるシートブランク２６は、熱可塑性樹脂コートを含む構成であれば、どの

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ような仕様であってもよい。但し、インジェクション成形品を形成する樹脂２８とシートブランク２６内面の構成樹脂は、同一のものであるか、又は熱により融着するものでなければならない。シートブランク２６の基本的構成としては、容器本体１４の外面より内面に向って順次、次のように構成された熱可塑性樹脂の積層シートを用いることができる。

ポリエチレンテレフタレート／アルミ箔／ポリプロピレン（ＣＰＰ）　（ドライラミネート）

合成紙（ＰＰ）／アルミ箔／ポリプロピレン（ＣＰＰ）　（ドライラミネート）

ポリエチレンテレフタレート／塩化ビニリデン共重合体／ポリプロピレン（ＣＰＰ）　（ドライラミネート）

ポリエチレンテレフタレート／エチレンビニルアルコール共重合体／ポリプロピレン（ＣＰＰ）　（ドライラミネート）

ポリプロピレン（ＯＰＰ）／ポリエチレンイクストルージョンコーティング紙／アルミ箔／ポリプロピレン（ＣＰＰ）　（ドライラミネート）

ポリプロピレン（Ｏ.ＰＰ）／ポリプロピレン（ＣＰＰ）／ポリプロピレン・エチレンビニルアルコール共重合体・ポリプロピレンの共押出シート　（ドライラミネート及びヒートラミネート）

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上記積層シートの厚みは１００μ～８００μまで如何なるものでもよい。本実施例に用いるシートブランク２６は第１０図に示すような形状に上記積層シートを打抜いたものであって、くせおり部２６ａで曲げられて金型内にインサートされるので、該部に予めくせおりを入れておくことが好ましい。

次に本実施例による容器本体１４を得るためのインジェクション成形について説明する。シートブランク２６はコア３０に第１２図に示すようにバキューム３１に引かれて取付けられる。取付けられたシートブランク２６はそのままキャビティ１７内にインサートされて樹脂がゲート１７ａより導入される。本実施例においては、二重巻締めが可能となるようにフランジ部１５周辺の成形精度が重要である。本実施例においては、第１１図に示すようにフランジ幅w_1は１．０～２．５㎜、フランジ厚みt_1は０．２～０．９㎜の範囲であることが必要である。インジェクション成形に用いる樹脂２８としては、ポリプロピレン，ポリエチレン，ポリスチレン，ポリカーボネート，ナイロン，ポリエチレンテレフタレート等が挙げられるが、一般的に熱可塑性樹脂であればどのような樹脂であってもよい。上記のようにインジェクション成形に用いる樹脂２８はシートブランク２６内面構成樹脂と融着するものでなければならないので、シートブランク２６内面がポリプロピレンである場合はポリプロ

ピレンを選定し、逆にポリエチレンテレフタレートをインジョクション用樹脂２８として選定した場合には、シートブランク２６内面は、ポリエチレンテレフタレート系にすることが望ましい。

２．２　具体例

（具体例２－２－１）

次に具体例によって本実施例による金属蓋付容器について説明する。

シートブランク２６として

２０μのポリプロピレン（ＯＰＰ）／印刷／６０μのポリプロピレン／４０μのポリプロピレン・エチレンビニルアルコール共重合体／３２０μのポリプロピレンの共押出シート

で構成され、ドライラミネート及びヒートラミネートによって積層した４００μのシートを用い、第１０図に示すような形状に打抜く。第１２図に示すような金型を使用し、第９図に示す形状にインジェクション成形する。フランジ幅w_1は１．８㎜、フランジ厚みt_1は０．５㎜であった。

樹　　脂：ポリプロピレン（ＭＦＲ　８．０）

樹脂温度：２１０～２４０℃

金型温度：１５℃

得られた成形品を２１１金属蓋で二重巻締めしたところ、良好に二重巻締めができた。

（具体例２－２－２）

シートブランク２６として

３１０μのポリプロピレン合成紙（王子油化㈱製ユポ／９μのアルミ箔／８０μのポリプロピレン（ＣＰＰ））で構成された積層シートを使用し、熱可塑性樹脂としてポリプロピレン樹脂（ＭＦＲ　８．０）を用いて（具体例２－２－１）と同様の形体にインジェクション成形して二重巻締め可能な容器を得た。

（具体例２－２－３）

シートブランク２６として

１２μのポリエチレンテレフタレート／９μのアルミ箔／３８０μのポリエチレンテレフタレート

で構成された積層シートを使用し、熱可塑性樹脂としてポリエチレンテレフタレートを用いて（具体例２－２－１）と同様の形体にインジェクション成形を行って二重巻締め可能な容器を得た。

（具体例２－２－４）

シートブランク２６として

ポリプロピレン１４５μ／接着層４０μ／エチレンビニルアルコール共重合体４０μ／接着層４０μ／ポリプロピレン１４５μの層厚み４１０μの共押出しシートを用い、第１０図に示すような形状に打抜く。第１２図に示すような金型を使用し、第９図に示す形状にインジェクション成形する。フランジ幅w_1は１．８㎜、フラン

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ジ厚み t_1 は０．５㎜であった。

樹　　脂：ポリプロピレン（ＭＦＲ　８．０）

樹脂温度：２１０～２４０℃

金型温度：１５℃

得られた成形品を２１１金属蓋で二重巻締めしたところ、良好に二重巻締めができた。

（ガスバリヤ性　２－２－５）

上記のようにして（具体例２－２－１～４）によって得られたプラスチック容器（ツナ３号缶、容積１００cc）のガスバリヤー性を測定した。以下の結果は１００cc容器当りである。

容　　器	O_2バリヤ	H_2Oバリヤ
実施例１	０．２	０．０５
実施例２	０．２	０．０１
実施例３	０．１	０．０４

O_2バリヤ：単位、cc／１００cc，２４hrs．atm，
２０℃９０％RH（Mocon oxtranにて測定）

H_2Oバリヤ：単位、ｇ／１００cc，２４hrs.atm，
４０℃，９０％ＲＨ

（保存性　２－２－６）

（具体例２－２－１～４）によって得られた容器本体１４にミートソースを入れ、二重巻締めによって密封し、レトルト殺菌を行った。常温で６ケ月保存テストを行ったところ、何れも保存性は良好であった。

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2．3　効　果

この第２の実施例によれば、次のような効果が得られる。

①　プラスチック製容器本体１４のフランジ部１５は、インジェクション成形によって形成されるため、フランジ部１５の厚み、幅を所定の寸法に精度よく形成することができるので、金属蓋１１による二重巻締めに充分耐えることができる。

②　容器本体１４の胴部１４ａ，底部１４ｂは、ガスバリヤ性の高い積層シートブランク２６を併用し、インサートインジェクション成形によって成形されるものである。従って容器本体１４は、酸素ガスバリヤ性が０．８cc／１００cc，２４hrs．atm（２０℃，９０％RH）以下であり、水蒸気ガスバリヤ性が０．２ｇ／１００cc，２４hrs.atm（４０℃，９０％RH）以下であって、極めて保存性に優れたものとなる。

§．３　金属蓋付容器の第３の実施例

（結晶化度が１０～４０％であるポリエチレンテレフタレート層を含むシートブランクの金属蓋付容器）

３．１　基本構造

本発明に係る金属蓋付容器の第３の実施例の構造を第１３図および第１４図で説明する。

第１３図および第１４図において、金属蓋付容器１０は、フランジ部１５を有するプラスチック製の容器本体

１４と、フランジ部１５を巻締める周縁部１２を有する金属蓋１１とから構成されている。プラスチック製容器本体１４は、加熱によって結晶化するポリエチレンテレフタレート、即ち、結晶促進核剤を含むポリエチレンテレフタレート層を含むシートブランクを用い、ポリエチレンテレフタレートの結晶化度が１０～４０％になるように熱成形を行うことによって製造することができる。

本実施例に用いるポリエチレンテレフタレートは、ポリエチレンテレフタレートに、加熱時に急速に結晶化するように結晶促進核剤を添加した結晶性ポリエチレンテレフタレート（以下Ｃ－ＰＥＴという）である。核剤としてはオレフィン系樹脂、例えばポリエチレン系樹脂、ポリプロピレン系樹脂などが少量約０．５～２．０％程度添加される。本実施例においてはＣ－ＰＥＴ層を設けることにより、成形品の容器の強度が向上し耐熱性も二重巻締めに充分耐えるものとなる。

またポリエチレンテレフタレートは、ガスバリヤ性にも優れる水蒸気バリヤ性を高めるために、ポリプロピレン等のオレフィン樹脂との共押出シート又は更にガスバリヤ性を向上するするためには、エチレン－ビニルアルコール共重合体層を含むシートを用いることが望ましい。これらシートブランクの厚みは０．８～１．４㎜の範囲であることが好ましい。

例えば、本実施例のＣ－ＰＥＴを含むシートブランク

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としては、

Ⅰ） Ｃ－ＰＥＴ単層又はＣ－ＰＥＴ／ＰＥＴ

Ⅱ） Ｃ－ＰＥＴ／接着層／ポリプロピレンの共押出シート

Ⅲ） Ｃ－ＰＥＴ／接着層／エチレン－ビニルアルコール共重合体／接着層／ポリプロピレンの共押出シート

Ⅳ） Ｃ－ＰＥＴ／接着層／ポリプロピレンの共押出シートとポリプロピレン／接着層／エチレン－ビニルアルコール共重合体／接着層／ポリプロピレン共押出シートとのヒートラミネートシート

が挙げられ、ガスバリヤ性を高める構成としてはⅢ），Ⅳ）のシートを用いることが好ましい。

３．２ 製造方法

上記のようなシートブランクを用い、熱成型によって金属蓋１１の巻締めが可能なフランジ部１５を有する容器を形成する。成型方法は好ましくは二段成型法により、加熱金型を用いて成型する。上記のＣ－ＰＥＴは、例えば１７０℃で加熱すると３～８秒で結晶化度１０～４０％となる。

一例を挙げると加熱金型は、１８０℃に加熱した金型と、１０℃に冷却した金型の二段で行い、シート温度１３０℃に加熱されたシートブランクを加熱金型内で成型，結晶化後、１０℃の冷却金型で容器本体１４を固定化する。金属蓋を二重巻締めするためには、成型容器本

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体１４は０．２～１．０㎜のフランジ厚みを有するよう成型し、固定化後フランジ幅が１．０～２．５㎜となるよう打抜くことが望ましい。得られた成型容器は内容物を充填し、金属蓋を二重巻締めすることにより密封する。

３．３　具体例

（具体例３－３－１）

シートブランクとしてポリプロピレン１重量％を含むＣ－ＰＥＴ層を有する、Ｃ－ＰＥＴ（５００μ）／ＰＥＴ（５００μ）を使用した。また、１８０℃に加熱した金型と、１０℃に冷却した金型を使用し、シート温度１３０℃に加熱して加熱金型内にシートブランクを圧入し、約５秒間加熱，結晶化を行った後、冷却金型内で固定化を行った。シートブランク中のポリエチレンテレフタレートの結晶化度は３０～４０％であった。固定化後、フランジ幅w_2が１．８㎜ように打抜く。得られた容器本体１４は第１３図に示すような形状を有し、容器本体深さｈ≒３０㎜，フランジ厚t_2は０．５㎜であった。この容器本体１４はフランジ部１５に金属蓋１１を用い、二重巻締めを行うことによって密封した。

（具体例３－３－２および３－３－３）

シートブランクを以下のように変える以外は（具体例３－３－１）と同様にしてプラスチック製の容器本体１４を得た。尚、用いたＣ－ＰＥＴは（具体例３－３－１）と同じものである。

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シート仕様

〔C-PET／接着層／PP〕＝〔500μ／40μ／480μ〕

……具体例3－3－2

〔C-PET／接着層／PP／ヒートラミネート／PP／接着層／EVOH／接着層／PP〕＝〔500μ／40μ／100μ／120μ／40μ／40μ／40μ／120μ〕

……具体例3－3－3

得られた容器本体14は金属蓋11を用い二重巻締めを行って密封した。

（3－3－4ガスバリヤ性、耐熱性、保存性）

以下に、（具体例3－3－1～3）によって得られた容器のガスバリヤ性、耐熱性、保存性について記載する。

耐　熱　性：60℃のミートソースを充填、125℃で30分レトルト殺菌後冷却を行って、加熱及び冷却に対する耐性を調べた。

保　存　性：上記ミートソースを常で6ケ月保存後、良品として官能テストに耐えるかどうかについて試験した。

ガスバリヤ性：O_2ガスバリヤ、単位cc／100cc・24hrs. atm（20℃，90%RH）

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具体例	ガスバリヤ（O_2）	耐熱性	保存性
1	0．15	○	○
2	0．25	○	○
3	0．05	○	◎

3．4　効　果

この第３の実施例によれば、次のような効果が得られる。

①　容器本体を形成するシートブランクに広範な温度範囲において優れた物理的機械的性質を示すポリエチレンテレフタレートを用い、更に成型品とした際のポリエチレンテレフタレートの結晶化度が１０～４０％となるようにして成型を行ったものであるので、本実施例による容器本体１４は巻締め時に加えられる力に耐えるに充分な座屈強度と耐熱性を有するものである。

②　また、容器本体１４を形成するシートブランクを、ポリエチレンテレフタレートに加えてガスバリヤ性を更に高めるために他の合成樹脂との複合シートとして構成する場合は、容器本体１４の保存性をより高めることができる。

§４．　金属蓋付容器の第４の実施例

（ポリエチレンテレフタレートおよびポリアリレートの積層シートからなる金属蓋付容器）

４．１　基本構造

本発明に係る金属蓋付容器の第４の実施例を第１５図

乃至第２０図で説明する。

本実施例による金属蓋付容器の容器本体は、ポリエチレンテレフタレートとポリアリレートの積層シートを熱成形したものである。

本実施例におけるポリアリレートとは、テレフタル酸，イソフタル酸およびビスフェノールＡからなる芳香族ポリエステルを言う。ポリアリレートとポリエチレンテレフタレートとは、接着層を含まなくても共押出しで一体のシートとして成膜加工することが可能である。また、ポリエチレンテレフタレートとポリアリレートとをブレンドすれば、よりポリエチレンテレフタレートに近似した成形性を持たせることもできる。

上記構成の積層シートは熱成形によって透明でしかも耐熱性に優れたプラスチック容器とすることができる。プラスチック容器の形状は、特に二重巻締めできるフランジを有するのが好ましい。該容器は、プラスチック缶として食品保存等に使用される。

４．２　具体例

（具体例４－２－１）

以下、具体例を挙げて説明するが、本発明はこれらの具体例に限定されるものではない。本実施例において使用する上記ポリアリレートとしては、市販のユニチカ株式会社製のＵポリマー（Ｕ－８０００）（商品名）を使用することができる。該Ｕポリマーと市販のポリエチレ

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ンテレフタレート（三井ペット㈱製、Ｊ－１２５）を用いて第１８図に示すように共押出しによりポリエチレンテレフタレート３３及びポリアリレート３４をシリンダー３５，３５′からフィードブロック３６を介してダイス３７より押出して積層シート３８を得た。ダイス温度は２９０℃、シリンダー温度は下記のように設定した。

	Ｕポリマー	ポリエチレンテレフタレート
シリンダー温度C_1	２４０℃	２２０℃
シリンダー温度C_2	２６０℃	２３０℃
シリンダー温度C_3	２８０℃	２３０℃

積層シート３８の層構成は任意に設定できる。第１５図に示すように、ポリエチレンテレフタレート層３３，３３′間にポリアリレート層３４を設けた積層シートＤ－１、第１６図に示すようにポリエチレンテレフタレート層３３とポリアリレート層３４を積層してなる積層シートＤ－２、第１７図に示すようにポリアリレート層３４，３４′間にポリエチレンテレフタレート層３３を設けた積層シートＤ－３を得て、各シートを用いて熱成形を行った。成形は一般の圧空真空成形によるが、上記シートは予熱成型を行う。予熱は積層シートＤ－１についてはシート上面下面を構成するポリエチレンテレフタレート層３３，３３′の上方及び下方より該層温度が１２０～１４０℃なるように加熱すると、ポリアリレー

ト層３４は１００～１２０℃となる。一方、積層シートＤ－２においてはポリエチレンテレフタレート層３３を１００～１２０℃に加熱し、ポリアリレート層３４は１２０～１４０℃となるように加熱する。積層シートＤ－３は、ポリアリレート層３４，３４′の上方及び下方より該層が１２０～１４０℃となるように加熱する。予熱された積層シートは下記のような方法で熱成形を行うが最適熱成形温度はポリアリレートとポリエチレンテレフタレートとでは約２０℃の差があり、ポリアリレートの方が２０℃程度高い。上記積層シートＤ－１，Ｄ－２，Ｄ－３については積層シートＤ－２，Ｄ－３の方がＤ－１に較べて成形が容易である。

熱成形は、従来より公知のいかなる方法によってもよいが、以下に本出願人によってなされた金型を使用し、補助プラグ法によって熱成形を行う方法を説明する。

このような金型を使用すると二重巻締め可能なフランジを有するプラスチック容器を製造することができる。即ち、第１９図（ａ）（ｂ）（ｃ）に示す金型は、キャビティ外周上端４１から上方に向って、$5° < \theta < 40°$ の角度をもって延びるキャビティ上縁部４２と、プラグ１９の下降に先立って該キャビティ上縁部４２に当接してプラスチックシート３８を挟持するクランプ２１を、キャビティ外周上端４１からクランプ内周面までの距離ℓが$5\,mm < \ell < 20\,mm$となるように設けたもの

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である。このような金型を使用し補助プラグ法により熱成形を行う工程を説明する。

① まず、上記のように加熱されたシート３８に対してキャビティ外周上端４１から上方に向って延びるキャビティ上縁部４２を有するキャビティ１７が上昇すると共にクランプ１９が下降する（第１９図（ａ））。

② クランプ２１が下降してシート３８をキャビティ上縁部４２との間に挟持する。次いでプラグ１９が下降してキャビティ１７内に入り始める（第１９図（ｂ））。

③ プラグ１９がシート３８をキャビティ１７内に押し下げ、真空４３でキャビティ１７内にシート３８を吸引させる。この際、シート３８の厚さt_3に比較してフランジ部を形成する部分１５の厚さt_4が薄くなる（第１９図（ｃ））。

上記のようにして成型された容器本体１４の部分１５を所定の幅となるように抜くことにより二重巻締め可能なフランジを有するプラスチック製容器本体を得る。

積層シートＤ－２を用い、上記のようにして熱成形した第２０図に示す容器本体１４について熱水充填テストを行って、容器本体１４の深さｈの収縮率を測定した。収縮後の容器の深さｈをh_0とすると

収縮率＝（ｈ－h_0）／ｈ×１００（％）

で表わされ、測定の結果を下表に示す。

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充填熱水温度（℃） PET／U ポリマー層比	60	70	80	90
20／0（比較例）	2	5	12	15
20／1	0．6	4	10	15
18／1	0．5	4	10	15
15／1	0．2	2	5	10
10／1	0．1	0．8	1．0	1．5
8／1	0．1	0．4	0．5	0．8
5／1	0	0．3	0．4	0．6
2／1	0	0．2	0．4	0．5

上記の結果より収縮率が1．5％以下であれば、実用上問題がなく、成形性等を考慮すると、ポリエチレンテレフタレート（PET）／ポリアリレート（Uポリマー）の比が15：1～5：1の範囲にあることが好ましい。

第20図に示した容器本体14であって層比8：1の積層シートを使用したものにオレンジゼリーを80℃で充填し、金属蓋（図示せず）を容器本体14のフランジ部15に二重巻閉めした金属蓋付容器を製作した。金属蓋付容器は80℃での熱充填にも耐え、良好な巻締め適性を示した。

4．3 効 果

この第4の実施例によれば、次のような効果が得られる。

① 容器本体１４は、ポリエチレンテレフタレート３３とポリアリレート３４とを含む積層シート３８を熱成形したものであるので、ポリエチレンテレフタレート単独の成型容器に比較して熱充填時の熱収縮が少なく、透明性、強度にも優れている。

② 容器本体１４は熱成形によって成形するものであるので大量生産に適し、適当な熱成形方法を選択することによってフランジ部１５を二重巻締め可能な厚さに成型し、金属蓋を密封性良く巻締めて食品等の保存等を適切に行うことができる。

§５． 金属蓋付容器の第５の実施例

（フランジ部が射出成形された積層シートからなる金属蓋付容器）

５．１ 基本的構造

本発明に係る金属蓋付容器の第５の実施例を第２１図乃至第２３図で説明する。

本実施例による金属蓋付容器１０は、第２１図に示すように、底部１４ｂ、胴部１４ａとを一体に形成し、胴部 １４ａの上端周縁に溶着されたフランジ部１５とよりなる容器本体１４を、第２２図（ａ）（ｂ）に示すようにフランジ部１５に金属蓋１１の周縁部を巻締めて密封したものである。

本実施例の容器本体の成形工程を第２３図（ａ）～（ｄ）を参照して述べる。

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容器本体１４の底部１４ｂ及び胴部１４ａは、第２３図（ａ）の熱可塑性樹脂シート２６を公知の真空成形、圧空成形、プラグアシスト成形等の単独、又は併用によって第２３図（ｂ）に示すような形状に熱成形後、第２３図（ｃ）のようにカットを行うことによって得られる。熱可塑性樹脂のシート２６は、ポリプロピレン、ポリカーボネート、ポリスチレン、ポリエチレンテレフタレート、ポリビニルクロライドなど何れの樹脂であってもよいが、容器本体１４にガスバリヤ性が要求される場合には、バリヤ性に優れた樹脂を共押出したり、ドライラミネートなど公知の方法で積層した積層シートを使用することができる。特に食品保存用の容器本体１４としては、酸素透過係数が5×10^{-9}以下の、例えばナイロン樹脂、塩化ビニリデン共重合体、ポリビニルアルコール、エチレンビニルアルコール共重合体等を使用し、前記の剛性，強度に優れる前記の樹脂をベース樹脂とし、ベース樹脂とバリヤ性樹脂との接着力が弱い場合は、酸変性ポリオレフィン等の接着性を有する樹脂を介したり、ポリウレタン系接着剤で貼着してもよい。

次に第２３図（ｃ）のようにカットされた胴部１４ａおよび底部１４ｂを射出成形の金型にインサートした後、フランジ部１５のみを射出成型する。射出成型に使用するフランジ部１５形成用樹脂は、胴部１４ａ及び底部１４ｂと同じか、接着性のあるものを用いる。射出と同

時にフランジ部１５が形成され、胴部１４ａ，底部１４ｂとも溶着が行われ、一体化された容器本体１４が得られる。このようにして成型された容器本体１４は、胴部１４ａ，底部１４ｂが必要に応じガスバリヤ性を具備すると共に寸法安定性の良いフランジ部15が形成され、該フランジ部１５に金属蓋１１の周縁部１２を巻締めることにより充分な密封性が得られ、不良品の生じることがない。

５．２　具体例

（具体例５－２－１）

次に具体例によって、本実施例による金属蓋付容器について説明する。

ポリプロピレン／登録商標“アドマー”（三井石油化学㈱製）／エチレンビニルアルコール共重合体／“アドマー”／ポリプロピレンより構成される総厚味１．５㎜共押出５層シートをフィードブロック式Ｔダイ成膜機で得、コスミック形真空成形機（浅野研究所製）を用いて内径６７．０㎜，深さ３０㎜の胴部１４ａ，底部１４ｂを第２３図（ａ）～（ｃ）のようにして成形し、日精樹脂工業株式会社製の射出成形機（型締力１２０ｔ）に上記のようにして成形した胴部１４ａおよび底部１４ｂをインサートし、ポリプロピレンを射出成形しフランジ部１５を形成し、第２１図に示す容器本体１４を得た。得られた容器本体１４に水を充填し、第２２図（ａ）（ｂ）

に示すようにセシトロンシーマーでアルミ製の缶詰用金属蓋１１を巻締め、１２０℃，３０分間のレトルト殺菌を行ったところ、巻締め状態は良好で、内容物の漏れ、容器の変形は全くみとめられなかった。

（具体例５－２－２）

ポリエチレンテレフタレート／登録商標“Ｕポリマー”（ユニチカ株式会社，８０００番グレード）／ポリエチレンテレフタレートより構成される総厚味１．０㎜の３層シートをマルチマニホールド形Ｔダイ成膜機で成膜した。このものを用いて（具体例５－２－１）に記載と同様にポリエチレンテレフタレートを使用してフランジ部１５を射出成形によって形成した第２１図に示す容器本体１４を得た。（具体例５－２－１）と同様に金属蓋１１を巻締め後、８０℃，２０分間ボイル殺菌したところ、巻締め状態は良好で内容物の漏れ，容器の変形は全くみられなかった。

５．３　効　果

この第５の実施例によれば、次のような効果が得られる。

①　容器本体１４の胴部１４ａおよび底部１４ｂが熱成形によって成形されるので、容器本体１４内に充填する内容物に応じて、任意の特性を備えた積層シートを選択することにより、容器本体１４が該積層シートで形成され、容器本体１４に望ましいガスバリヤ性、保香性等

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を持たせることができる。

② 容器フランジ部１５は射出成形によって成形されるので成形精度が高く、金属蓋１１の周縁部１２の巻締めに適した形状，寸法のフランジ部１５を形成でき、巻締め不良が生じることがない。

③ フランジ部１５は射出成形時に容器本体１４に溶着され、一体化されるので、製造工程が簡単である。

§６． 金属蓋付容器の第６の実施例

（底部が外方へ突出する凸形状に形成された金属蓋付容器）

６．１ 基本構造

本発明に係る金属蓋付容器の第６の実施例の構造を第２４図乃至第２９図で説明する。

第２４図に示された、本実施例による金属蓋付容器の容器本体１４は、シートブランクを用いてインジェクション成形によって容器胴部１４ａ，底部１４ｂを形成してなり、更に熱可塑性樹脂よりなるフランジ部１５，ピラー部２７，底縁部２９を有する。

シートブランクは、インジェクション成形品を形成する樹脂と同一か又は熱により融着する熱可塑性樹脂コートを含む構成のガスバリヤ性積層シートが用いられ、該積層シートは金型内にインサートされる。

容器本体１４の形成は、シートブランク２６を、底部１４ｂが凸形状に形成されるよう、先端の突出した形状

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を有する金型のコア３０に取付けることが重要である。コア３０にバキューム３１に引かれて取付けられたシートブランク２６は、そのままキャビティ１７内にインサートされて樹脂２８がゲート１７ａより導入される。第２５図，第２６図にインジェクション成形の第１例を示す。第２７図はインジェクション成形に用いるブランク設置のためのコア３０の第２例を示す断面図であって、該コア３０を用いてインジェクション成形された底部１４ｂの断面を第２８図に示す。

また第２９図（ａ）（ｂ）に示すように、容器本体１４は二重巻締めが可能となるようにフランジ幅w_5は１．０～２．５mm，フランジ厚みt_5は0.25～0.9mmの範囲であることが好ましい。インジェクション成形に用いる樹脂としては、ポリプロピレン，ポリエチレン，ポリスチレン、ポリカーボネート，ナイロン，ポリエチレンテレフタレート等が挙げられるが、一般的に熱可塑性樹脂であればどのような樹脂であってもよい。

上記のようにして得られた本発明の二重巻締め可能なフランジ部１５を有し、ガスバリヤ性のシートブランクを含むように形成されたプラスチック製容器本体１４は、底部１４ｂのシートブランク２６が凸形状に形成され、該凸形状の底部１４ｂは、二重巻締め時の容器内の減圧により容器内部に引込まれ、内部に向って突出する。

即ち、第２９図（ａ）に示すように内容物４５を充填

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した容器本体１４は、金属蓋１１の周縁部フランジ部１５に４０cmHg下で二重巻締め後常圧下に戻すと、底部１４ｂの形状が第２９図（ａ）から第２９図（ｂ）に示すように変形する。このように変形することにより容器本体１４全体の形状が変形するのを防止することができる。

６．２　具体例

（具体例６－２－１）

次に具体例によって、本実施例による金属蓋付容器について説明する。

シートブランクとして、

ポリプロピレン（ＯＰＰ）／ポリプロピレン／接着層／エチレンビニルアルコール共重合体／接着層／ポリプロピレン

により構成された厚さ０．４mmの積層シートを用い、第２５図，第２６図に示すような金型を使用し、ポリプロピレン樹脂を用いてインジェクション成形を行った。得られた容器本体１４は、厚み０．５mm，幅１．８mmのフランジ部１５を有し、底部１４ｂが容器外部に向って突出した凸形状に形成されたものであった。水をヘッドスペース高さ４mmとなるように上部に空間を残して充填し、金属蓋１１を４０cmHg下で真空巻締めを行った。

巻締め後の容器本体１４は、底部１４ｂが凹んだ以外は形状に変化がなく、容器全体としての形状が確実に保

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持された。本容器を１２０℃で３０分レトルト殺菌した後も、変形等は認められなかった。

６．３　効　果

この第６の実施例よれば、次のような効果が得られる。

容器本体１４の底部１４ｂのシートブランク２６が容器外部に向って突出する凸形状に形成されたものであるので、金属蓋１１の周縁部１２をフランジ部１５に真空巻締めを行う際に、凸形状に形成された底部１４ｂが減圧によって容器本体１４内部に引込まれ、容器本体１４内部に向って凹形状となることによって容器本体１４の形状が他の部分で変形するのを防止できる。

§７．　金属蓋付容器の第７の実施例

（容器本体がリブを有する金属蓋付容器）

７．１　基本構造

本発明に係る金属蓋付容器の第７の実施例の構造を第３０図乃至３８図で説明する。

本実施例による金属蓋付容器の容器本体を第３０図に示す。容器本体１４はフランジ部１５の下方に容器本体１４内側面に突出するリブ５０を有する。このようなリブ付き容器本体１４を熱成型法によって製造する方法を第３１図乃至第３４図を参照して説明する。

（１）　キャビティ１７内部に熱可塑性樹脂シート２６をプラグ１９により押し込む（第３１図）。或る程度まで押し込んだら圧空エアをふく。この場合圧空のか

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わりに真空としてもよく、又は圧空，真空の併用でもよい。

（２） 圧空，真空によりキャビティ１７の内壁面にシート２６が押圧される。このタイミングは成形が精度よく行えるタイミングで行う（第３２図）。

（３） プラグ１９が落下すると同時にプラグ１９上部に設けられている段部ａ，ｂがシートに圧接するように進入する。

段部ａは、下記に規定するクリアランスｃがキャビティ１７とプラグ１９の段部ａとの間に生じるように形成されている。

キャビティ１７に設けられた段部ａによりシート２６が押圧され、リブ５０が形成される。一方、キャビティ１７に設けられた段部ｂによってシート２６が押圧され、リブ５１が形成される（第３３図）。

（４） 上記のようにして基本的成形を終了したらリブ５１の内側（矢印５２）で抜き、目的とする容器本体１４を得る（第３４図）。

上記（１）～（４）の成形工程による容器製造において使用する熱可塑性樹脂シート２６の厚みｔとクリアランスｃとを変化させた場合、形成されるリブ５０の状態を調べて第３５図に示した。第３５図のグラフにおいてｃとｔが曲線ｏ－ｏで表わされる関係にある場合、リブの状態が良好であり、この関係は次式で表すことができ

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る。

$$0.1 \leqq t - c \leqq 0.3 \text{（mm）}$$

即ち、シートの厚みからクリアランスの幅を引いた値が０．１～０．３mmであることが望ましい。この場合、リブ５０の高さh_1とリブ上部の容器側面の厚みh_2は、第３６図において$h_1 \fallingdotseq h_2$にすると得られた容器本体１４は良好な剛性と成形性を示す。

シート厚みｔとクリアランスｃの関係においてシート厚みｔが厚くてクリアランスｃが小さい場合、即ち第３５図ｘ－ｘの下方領域においては$h_1 >> h_2$となって、リブ高さh_1がフランジ側部厚みh_2より各段に大きくなると、容器剛性が劣り、多量の樹脂がリブ形成にあたって押し出されるとリブの形状がくずれてしまう。一方、シート厚みｔが薄く、クリアランスｃが大きい場合、即ち第３５図ｘ－ｘの上方領域においては、$h_2 >> h_1$となってフランジ側部厚みh_2が厚くなり、リブ高さh_2が低く、容器に充分な剛性を付与することができない。

本実施例においては、リブ５０を容器本体１４の内側面に設けることによりヒートシールの際のフランジ幅を狭くすることもできる。第３７図および第３８図に示すように、同一のシートシール幅ｄを確保するのに、リブ５０が容器外側面に設けられていると、ヒートシールのリテーナー５３にリブ５０が当接し、フランジ幅ｄをリ

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プ分ｅだけ広くする必要が生じるが、リブ５０を容器内側面に設ければそのような不都合がない。又、本実施例の容器本体１４の製造においては、更にリブ５１を形成することが好ましく、プラグ１９に設けた段部ｂによって容器本体１４のフランジ部１５を押圧することによってフランジ面が安定で平滑となり、金属蓋の周縁部とのヒートシールが確実になされる。

７．２　具体例

次に具体例によって本実施例による金属蓋付容器について説明する。

（具体例７－２－１）

厚さ１．２㎜の（ポリスチレン）シートブランクを上端部直径６０㎜，底面直径５５㎜，深さ６０㎜のカップ状キャビティを用いて成型を行った。

先ず、クリアランス２ｃ＝１．０㎜にて上記のような方法で成型した容器本体を１４Ａとする。容器本体１４Ａにおいてh_1＝０．５㎜，h_2＝０．４㎜，即ちリブ５０の高さは０．５㎜であった。

比較のため、従来法により成型して容器本体１４Ｂを得た。リブ５０を有しない容器本体のフランジ部１５下方における側面の厚みはh_2＝０．８であった。

容器本体１４Ａ，１４Ｂを比較すると下表のようであり、容器本体１４Ａは容器本体横方向から容器本体側面に加えた力に対する剛性，シール安定性共に優れている

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ことが判明した。

	容器１４Ａ	容器１４Ｂ
h_1	０．５㎜	－
h_2	０．４㎜	０．８㎜
フランジ厚み	０．８㎜	１．２㎜
横剛性	○	×
シール安定性	○	×

７．３　効　果

この第７の実施例によれば、次のような効果が得られる。

リブ５０を容器本体１４のフランジ部１５下方の内側面に円周状に設けることによって、成型に使用する熱可塑性樹脂シート２６の厚さを変えることなく、容器本体１４横方向から容器本体１４側面に加えられる力に対して優れた剛性を有し容器本体１４の変形を防止することができる。

７．４　容器本体がリブを有する金属蓋付容器の他の実施例

第３９図および第４０図に容器本体がリブを有する金属蓋付容器の他の実施例を示す。

第３９図は容器本体１４の底面図の下半分を示す図であり、第４０図は容器本体１４の底面部分を示す側面図である。第３９図および第４０図に示すように、容器本体１４の底部１４ｂには多数の同心円状に形成された環

状溝５５からなるリブが設けられている。また容器本体１４の胴部１４ａの下部は８等分され、各分割された部分に凹凸部５６よりなるリブが、設けられている。

本実施例のプラスチック製容器本体１４は、フランジ部１５に金属蓋１１の周縁部１２を減圧下で巻締めすると、減圧により容器本体胴部１４ａに設けた凹凸部５６の凹部分が更に内部に引込まれて減圧分を吸収するので、容器本体１４全体としての変形が防止される。また、容器本体底部１４ｂに環状溝５５を設けた場合は、容器本体底部１４ｂが巻締め時の減圧により容器本体１４内部に向って引込まれることによって減圧分を吸収するので容器本体１４の変形を防止することができる。

§８．　金属蓋付容器の第８の実施例

（フランジ部の形状に特徴を有する金属蓋付容器）

８．１　フランジ部がプラスチック製円筒体の両端を外方に広げて形成された金属蓋付容器の基本構造

第４１図および第４２図にプラスチック製の円筒体の両端からフランジ部を形成した金属蓋付容器１０を示す。

第４１図に示すように、上端部と下端部の口径が等しい容器本体１４はプラスチックで形成され、容器本体１４の上端及び下端のフランジ部１５には金属蓋１１の周縁部１２がそれぞれ巻締められている。このような容器の製造法を工程順に説明する。

第４２図（ａ）に示す円筒体６０は、パイプ状ダイス

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より樹脂を溶融押出し、真空チャンバー内で真円性を出し、冷却後切断して円筒状とする。使用する樹脂は熱可塑性のポリエチレン，ポリプロピレン，ポリスチレン，ポリエチレンテレフタレート等が挙げられる、又、内容物の保存性を高めるため、酸素バリヤ性のよい、ナイロン，塩化ビニリデン共重合体，エチレン・ビニルアルコール共重合体などを共押出し法で積層すると保存性の向上が著しい。このような積層において、主体となる樹脂とバリヤ性樹脂は相互の接着が悪い場合が多く、そのような場合には、酸変性ポリオレフィン，エチレン酢酸ビニル共重合体などを接着層とすればよい。容器に対するガスバリヤ性の要求度合に応じて、ナイロン，塩化ビニリデン共重合体，エチレン・ビニルアルコール共重合体を随時選択使用する。溶融，押出されたパイプ状樹脂は、一定長さに輪切りにして円筒体６０を得る。次いで、加熱型により第４２図（ｂ）に示すように両端部を広げてフランジ部１５を形成する。フランジ部１５の角度は水平から４５° 位が好ましい。軟らかい樹脂の場合は、角度は４５° より大きくてもよいが、硬い樹脂程水平に近い方が望ましい。これは巻締め時にフランジ部１５が割れ易いためである。容器本体１４の両端にフランジ部１５を形成後、先ず片側のフランジ部１５に金属蓋１１の周縁部１２を巻締め、内容物を充填後に他側のフランジ部１５に金属蓋１１の周縁部１２を巻締める。

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（具体例８－１－１）

３種の材料を５つの層として押出す３種５層のパイプ押出機で

ポリプロピレン（３５０μ）／接着性樹脂（３０μ）／エチレン・ビニルアルコール共重合体（５０μ）／接着性樹脂（３０μ）／ポリプロピレン（３５０μ）の仕様で内径６５㎜φで共押出し、輪切りにして長さ８３㎜の円筒状の容器本体１４とした。次いで容器本体１４の片側を加熱した円錐金型（図示せず）で加圧してフランジ部１５を形成した。容器本体１４の他端も同様に加圧してフランジ部１５を形成した。片側に缶詰用金属蓋１１，呼称２１１の周縁部１２をセミトロンシーマーで二重巻締めした。容器を反転して水を満杯となるように充填し、同様に金属蓋１１の周縁部１２を二重巻締めした。密封した容器をロートマート形レトルト釜（西独，ストック社製）にて熱水１２０℃，３０分間の殺菌を行ったが、結果は良好であった。

（具体例８－１－２）

ポリエチレンテレフタレート７００μの単層よりなる円筒を容器本体１４として、他は（具体例８－１－２）と同様に加工処理してバターピーナッツを充填し、脱酸素剤（商品名“エージレス”）を同封して密封した。容器は透明であって剛度もあり、保存性も良好であった。

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（具体例８－１－３）

ポリエチレンテレフタレート（３００μ）／ポリアリレート（１００μ）／ポリエチレンテレフタレート（３００μ）を用い、（具体例８－１－３）と同様にして容器本体１４を得、これを加工して片側に金属蓋１１の周縁部１を二重巻締めし、ゼリーを充填して他端も金属蓋１１の周縁部１２で巻締め密封した。レトルト釜で８５℃，１５分間の殺菌処理を行ったが結果は良好であった。尚，ポリアリレートはユニチカ株式会社製、商品名“Ｕポリマー”を使用した。

８－１－４　効　果

本実施例によれば、パイプ押出法によって作成された円筒体６０を用いて、容易に容器本体１４を製造することができる。

８．２　フランジ部上に金属蓋のイージーオープン用ハーフカット線を設けた金属蓋付容器の基本構造

第４３図にフランジ部上に金属蓋のイージーオープン用ハーフカット線を設けた金属蓋付容器１０を示す。金属蓋付容器１０は、プラスチック製容器本体１４のフランジ部１５に、金属蓋１１の周縁部１２を巻締めて形成したものである。金属蓋１１には、容器本体１４の胴部１４ａの上端内径６４より外側６３にイージーオープン用ハーフカット線６１が設けられている。

また、フランジ部１５は容器本体１４の胴部１５ａ上

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端から外側に向う段部１５ａと、この段部１５ａから上方へ伸びる巻締部１５ｂとからなっている。

金属蓋１１はアルミ，ブリキ等よりなり、厚味は０．２～０．３㎜が好適である。金属蓋１１は必要に応じ外側になる面と汚れ防止のトップコート、内側には腐蝕防止と食品に直接接触するので変質防止のため、エポキシ系樹脂，ビニル系樹脂等がコーティングされる。金属蓋１１に設けられたイージーオープン用ハーフカット線６１は、所謂フルオープン型が望ましい。

プラスチック製容器本体１４は、熱可塑性樹脂による射出成形の他、一旦シートを形成後真空成形のような熱成形で成形してもよい。容器本体１４の材料は、単層の樹脂でも、また、バリヤ性，耐熱性などの要求度合に応じてそれぞれの性質を持つ樹脂を適宜積層した多層の樹脂材料であってもよい。使用出来る樹脂としては、例えばポリプロピレン，ポリスチレン，ポリエチレンテレフタレート，ポリ塩化ビニル等が挙げられる。

多層の樹脂材料としては、

ポリプロピレン／接着層／エチレン・ビニルアルコール共重合体／接着層／ポリプロピレン；

ポリスチレン／接着層／エチレン・ビニルアルコール共重合体／接着層／ポリスチレン；

ポリエチレンテレフタレート／ポリアリレート／ポリエチレンテレフタレート

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などが挙げられる。

上記単層の樹脂材料を使用する場合はＴダイ法で成膜し熱成形するか、射出成形により公知の方法で成形を行い、多層の樹脂材料を使用する場合は共射出成形又は共押出Ｔダイ成膜後熱成形する等の方法で成形する。

成形された容器本体１４は内容物を充填し、セミオートシーマー等で巻締めする。巻締めは二重巻締めの他、一重巻締めであってもよい。

本実施例においては、容器上端に巻締められた金属蓋１１のイージーオープン用ハーフカット線６１が容器本体１４の胴部１４ａ上端の内径６４より外側６３に設けられている。従って、金属蓋１１に設けられたタブ（図示せず）を引いて開缶し、容器本体１４上端を覆っている金属蓋１１のイージーオープン用ハーフカット線６１の内側部分を取除いた場合、容器本体１４に付着してるフランジ部１５に巻締められた金属蓋１１の切断端は、容器本体１４の胴部１４ａ上端の内側面より外側に位置する。このため、容器本体１４を反転してゼリーやプリン等の内容物を皿上に取出す際に内容物が切断端に触れることがなく、簡単に取り出すことが出来る。また、開缶後に該金属蓋１１の切断端は容器本体１４に続いて設けられたフランジ部１５の段部１５ａ上にあるので、指等を傷つける恐れがない。

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§９．　金属蓋付容器の製造方法

９．１　基本原理

本発明に係る金属蓋付容器の製造方法の第１の実施例を第４４図乃至第５０図に示す。

まず容器本体１４の製造工程の概略を第４４図に示す。

工程（Ａ）

一般的な熱成形法により、容器形成に必要な厚みを有するプラスチックシート７１を加熱７２し、金型７３を用いて一般的な成形法により成形品７４を成形する。成形方法は、圧空成形，真空成形又はその併用の何れであってもよい。得られた成形品７４を構成する１個の容器本体１４の断面は、第４６図に示すように容器本体１４の胴部１４ａ，底部１４ｂは二重巻締め時に加えられる圧力に充分耐える厚みと強度を有しているが、フランジ部１５は厚み t_6 が大き過ぎて二重巻締めには適さない。また、容器本体１４の内径は ℓ_6 、高さはｈとなっている。

容器本体１４を形成するプラスチックシート７１は、食品保存用容器を製造する場合は、酸素ガス，水蒸気の透過率が少なくなるように構成されたプラスチック積層シートを使用する。食品保存用容器（容積１００cc）としては、容器の酸素ガスバリヤ性が０．８cc／１００cc・２４hrs. atm（２０℃，９０％RH）以下であり、

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H_2Oバリヤが0．2g／100cc・24hrs．atm（40℃，90%RH）以下であることが望ましい。

工程（B）

工程（A）において成形された成形品74を熱プレスしてフランジ厚みt_6を薄くすると同時に精度を向上させる。即ち、成形された容器本体14を第47図（a）に示すようにキャビティ79内に入れる。キャビティ79内は加熱されており、さらに離型性を良くするために、表面はテフロン加工等の処理がなされている。次いで上部より加熱されたプラグ80が下降し、フランジ部15を押潰す（第47図（b））。プラグ80の駆動は油圧でもエアー圧でも良い。

フランジ部15が所定の厚さになった時点で、プラグ80は上昇し、プレスによるフランジ潰しは終了する。フランジ部15の厚みt_7は0．25～0．9mmとすることが好ましい。熱プレス成形時の一般的なクリアランスは、フランジ部15の厚みt_7が0．5mm，フランジ下部81の厚みは0．8mmに設定される。

また、第47図（a）（b）に示すように、上記プレス時にフランジ下の容器胴部14a又は底部14b等に印刷されたラベル82等をキャビティ79内に挿入してフランジ形成と共にラベル82を融着することもできる。ラベル82は、先に成形した容器本体14と同一の樹脂又は熱により融着できる層をラベル82内層に位置させ

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て容器本体１４上に融着せしめる。

工程（Ｃ）

工程（Ｂ）において第４８図に示すように、フランジ部１５を所定の厚みに調整した成型品７４は、刃８３を有するプラグ８４によってフランジ幅w_8が所定の幅となるように抜かれる。フランジ幅w_8は一般的に１．０～２．５㎜である。この抜きの工程は、上記工程（Ｂ）と合わせて行なうこともできる。即ち、第４９図に示すようにプラグのプレス面に刃８５をつけたプラグ８６を使用すれば、工程（Ｂ），（Ｃ）を同時に行なって目的とする容器本体１４を製造することができる。

このようにして形成された容器本体１４のフランジ部１５に金属蓋の周縁部を巻締めて金属蓋付容器が形成される。

なお、成形品７４からフランジ部１５を切断する方法として、第５０図に示すように同一外径を有するキャビティ７９とプラグ８０との間に成形品７４を挟んで熱プレスしフランジ部１５を所定の厚みとし、冷却後キャビティ７９の外径に沿ってシェア刃８７を上方へ移動させて切断してもよい。この場合は、同一外径を有するキャビティ７９とプラグ８０との間に成形品７４を挟持するので、フランジ部１５を精度良く切断することができる。

９．２　具体例

（具体例９－２－１）

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ポリプロピレン／接着層／エチレンビニルアルコール共重合体／接着層／ポリプロピレンよりなり、各層の厚さが、６４０μ／４０μ／４０μ／４０μ／６４０μ、全体の厚さが１４００μである積層シートを用い、第４６図においてℓ_6＝６５㎜，ｈ＝３０．０㎜，t_6＝１３００μの寸法を有する容器を加熱成形した。成形は、プラグアシスト圧空成形によって行なった。

次いで、熱プレスを行なってフランジ厚みt_7＝５００μとすると同時に、印刷されたポリエチレンテレフタレート／ポリプロピレン／ポリプロピレン（キャスト）が１２μ／１００μ／６０μの厚みをもって積層されたラベル８２を金型内に挿入して容器胴部14aに融着せしめた。

フランジ厚みを所定の寸法に調整した容器本体１４は、フランジ幅w_8＝２．０㎜となるように抜いた。得られた容器本体１４に水を充填し、金属蓋の周縁部をシーマーにて容器フランジに二重巻締めした。これを１２０℃で３０分間レトルト殺菌を行なったが容器の形状，内容物の保存状態に変化はなく、良好な結果が得られた。

９．４　効　果

この製造方法によれば、次のような効果が得られる。

熱成形法により積層シートから容器本体１４を成型し、次いでプレス熱成型によってフランジ部１５の厚みのみを二重巻締めに適した厚さに調整するものであるので、

大量生産に適すると共に、フランジ部１５の厚みを任意にしかも正確に設定することができる。

９．５　金属蓋付容器の製造方法の他の実施例

金属蓋付容器の製造方法の他の実施例を第５１図（ａ）（ｂ）（ｃ）に示す。

本発明の方法を工程順に説明する。

第５１図（ａ）に示したフランジ１５を有するプラスチック製容器本体１４は、熱可塑性樹脂によってシーティング，熱成形，射出成形等公知の方法によって成形されたものを用いる。ガスバリヤ性や耐熱性の向上のためには、ガスバリヤ性の高いエチレン・ビニルアルコール共重合体，塩化ビニリデン共重合体，ナイロン等の樹脂及び耐熱性の良好なポリアリレートのような樹脂を含む多層より構成された積層シートを使用する。このような多層シートとしては、例えばポリプロピレン／接着層／エチレン・ビニルアルコール共重合体／接着層／ポリプロピレン；ポリエチレンテレフタレート／ポリアリレート／ポリエチレンテレフタレートが挙げられる。この場合は、積層又は多層共押出し法等によって得られたシートを熱成形法によって容器本体１４とする。容器本体１４が単層のプラスチックである場合は、熱成形の他に射出成形で成形してもよい（工程Ｉ）。次に第５１図（ｂ）に示すように容器本体１４に内容物９０を充填してフランジ１５に金属蓋１１の周縁部１２を巻締める

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（工程Ⅱ）。巻締めはセミトロンシーマー，ｏ型シーマーなど缶詰の巻締め機を使用する。巻締めは、一重巻締め，二重巻締めの何れであってもよい。次いで第５１図（ｃ）に示すように、巻締め後熱処理を行って本発明の球状容器本体１４とする（工程Ⅲ）。

熱処理は、温度の調整が重要である。熱処理は容器本体１４を構成するプラスチックのガラス転移点以上であって、融点以下の温度で行う。例えば、ポリエチレンテレフタレートの容器本体１４を用いたものは、８０℃以上で熱水等により処理するとポリエチレンテレフタレートのガラス転移点（T_G ＝８１℃）以上で軟化する。この段階では、容器本体１４の強度は或る程度は残っており、容器本体１４自体が破壊することはない。容器本体１４はこの状態で、容器本体１４全体が最少表面積となる力が作用し、真球状に変形がなされる。融点以上に温度が上昇すると容器本体１４は破壊されてしまう。

（具体例９－５－１）

１，０００μのポリエチレンテレフタレートフィルムをＴダイ法で成膜し、真空圧空成形によって内口径６６mm，フランジ幅１．８mm，深さ３０mmの容器を作り、水を１００cc（満杯）入れてセミトロンシーマーで二重巻締めした。これを熱水式のレトルト殺菌釜（西独連邦共和国，ストック社製）で８５℃，３０分間熱処理し、冷却後取出したところ第５１図（ｃ）に示すような略真球

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状容器本体が得られた。

（具体例９－５－２）

ポリエチレンテレフタレート（５００μ）／ポリアリレート（１００μ）／ポリエチレンテレフタレート（５００μ）よりなる積層シートを用い、加熱温度１１５℃，加熱時間３０分間とする以外は（具体例９－５－１）と同様にして処理をしたところ，第５１図（ｃ）に示すような略真球状容器本体が得られた。

（具体例９－５－３）

二軸延伸ポリスチレン（５００μ）／接着層（３０μ）／エチレン・ビニルアルコール共重合体（５０μ）／接着層（３０μ）／二軸延伸ポリスチレン（５００μ）よりなる積層シートを用い、二重巻締後の加熱温度８０℃，加熱時間３０分間とする以外は（具体例９－５－１）と同様の方法により、略半球状の容器本体が得られた。

９－５－４　効　果

本実施例によれば、従来製造が極めて困難であった略真球状の容器本体１４を非常に簡単な工程で製造することができ、このものは別工程で脚部を成形し、脚付の容器本体１４とすれば、意匠効果に優れた容器とすることができる。又、略半球状の容器本体１４は、蓋をフルオープンエンド化すれば内容物９０をそのまゝ取出すことが極めて容易で、皿に盛った場合の外観もよい。

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§１０．　金属蓋付容器の製造装置

（容器本体成形用金型）

１０．１　基本原理

本発明に係る金属蓋付容器の製造装置の実施例を、第１９図および第５２図乃至第５４図で説明する。

金属蓋を巻締めて密封されるプラスチック製の容器本体１４を補助プラグ法による熱成形で製造する工程を第１９図で説明する。

①　まず、加熱されたシート３８に対してキャビティ外周上端４１から上方に向って延びるキャビティ上縁部４２を有するキャビティ１７が上昇すると共にクランプ２１が下降する。

②　クランプ２１が下降してシート３８をキャビティ上縁部４２との間で挟持する。次いでプラグ１９が下降してキャビティ１７内に入り始める。

③　プラグ１９がシート３８をキャビティ１７内に押し下げ、圧空真空４３でキャビティ１７内にシート３８を吸着させる。この際、シート３８の厚さt_3に比較して容器フランジ部を形成する部分１５の厚さt_4が薄くなる。　上記のように二重巻締めが可能なフランジを形成するには、シートの厚さt_3及び容器本体の側部、底部に比較してフランジ部１５の厚さt_4を薄くすることが重要である。本実施例においてキャビティ上縁部４２の上方へ向って傾斜する角度θと、キャビティ外周上端

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４１からクランプ２１の内周面まで距離ℓを、特定の範囲で選択することによってフランジ厚さt_4を二重巻締めに適した厚さとすることができた。

金型の全体の構造を示す第１の実施例を第５２図に示す。本実施例においては、シートを挟持する個別クランプ１０５がまずシリンダー１０９によって駆動され、シートをキャビティ上縁部１０３との間に挟持した後にプラグ１０６が下降する。プラグ１０６は金型１１１と一体に構成され、１１０より圧空エアーが吹込まれ、１０７より真空排気される。１０２はキャビティ１０４の外周上端である。

第２の実施例を示す第５３図においてはクランプ１２５は金型１３１の一部として構成されている。金型１３１が閉じてシートをクランプ１２５とキャビティ上縁部１２３との間に挟持した後にプラグ１２６がシリンダー１２９によって駆動され、シートをキャビティ１２４に押付ける。次いで圧空エアー１３０が吹込まれ、１２７より真空排気される。第１，第２何れの実施例であってもシートを挟持後プラグが下降してシートをキャビティ内に押込むものであればよい。

上記第１の実施例の金型を使用し、t_3＝１．３㎜のポリプロピレンシートを用い、キャビティ上縁部の傾きθ、キャビティ外周上端からクランプの内周面までの距

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離ℓ、フランジ厚さt_4の関係を調べ、その結果を第５４図に示した。二重巻締めに適するフランジ厚さt_4は一般に０．４mm＜t_4＜０．７mmであり、第５４図のグラフにおいてt_4の好ましい範囲Ｄに対応するℓの範囲Ｌは５mm＜ℓ＜２０mm、θは５°＜θ＜４０°であることがわかる。尚、グラフ中の曲線Ａ～Ｇは下記のθに設定したキャビティを用いて測定されたものである。

曲　線	A	B	C	D	E	F	G
θ（°）	0	5	10	20	30	40	50

成形されたプラスチック容器本体の形状は、深さＸと直径ＹとがＹ／Ｘ≒２程度のものであり、通常二重巻締めに耐える強度を有する容器を形成するためにはシートの厚さt_3は１．０～１．６mm程度が好ましく、このような厚さのシートを使用し、上記θとℓの範囲の金型を使用すれば、二重巻締めに適したフランジ厚みt_4が０．４＜ｄ＜０．７である容器を成型することができる。

１０．２　具体例

第５２図に示した金型を使用し、シート厚さ$t_3$１．３mmポリプロピレンシートを用いててθ＝２０°，ℓ＝１０mmで成形したところ、フランジ厚みt_4＝０．５mmのプラスチック容器が得られた。該容器本体１４のフランジ部１５に金属蓋１１の周縁部１２を二重巻締めした。ミートソースを充填し、１２５℃で３０分間レトルト殺菌を行ったところ容器の形状に変化がなく

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保存性良好なプラスチック缶が得られた。

10.4 効 果

この製造装置によれば、次のような効果が得られる。

① 本実施例による金型を使用して、シートの厚さ t_3 ＝1.0～1.6㎜のプラスチックシートを熱成形すれば容器本体14のフランジ部15の厚さ t_4 が0.4㎜から0.7㎜程度となり、金属蓋11の周縁部を二重巻締めして簡単に金属蓋付容器を製造することができる。

② 本実施例による金型を使用すれば、一つの金型を使用するのみでフランジ部15の厚さを薄くすることができ、プラスチック製容器本体14を安価に大量に生産することができる。

産業上の利用可能性

本発明に係る金属蓋付容器は、各種食品、例えばジュース、清涼飲料、ジャム類、乾燥食品等を包装するための食品包装容器として用いることができる。

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請求の範囲

1. プラスチック製のフランジ部（15）を有する容器本体（14）と、前記フランジ部（15）を巻締める周縁部（12）を有する金属蓋（11）とからなる金属蓋付容器。

2. 金属蓋（11）の少なくとも周縁部（12）内面にコーティングされたヒートシーリングコンパウンド（13，23）を有し、このヒートシーリングコンパウンド（13，23）により容器本体（14）のフランジ部（15）と金属蓋（11）の周縁部（12）とが融着されることを特徴とする請求の範囲第1項に記載の金属蓋付容器。

3. 容器本体（14）はプラスチックで形成され、容器本体（14）のフランジ部（15）は二重巻締め可能となっており、容器本体（14）の胴部（14a）および底部（14b）はガスバリヤ性のシートブランク（26）を含むことを特徴とする請求の範囲第1項に記載の金属蓋付容器。

4. 二重巻締め可能な容器本体（14）のフランジ部（15）の幅が1．0乃至2．5㎜の範囲であり、該フランジ部（15）の厚みが0．25乃至0．9㎜の範囲であることを特徴とする請求の範囲第3項に記載の金属蓋付容器。

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5. 容器本体（14）のフランジ部（15）を二重巻締めによって密封した際の容器の酸素ガスバリヤ性が0.8cc／100cc・24hrs. atm（20℃, 90%RH）以下であり、水蒸気ガスバリヤ性が0.2g／100cc・24hrs. atm（40℃, 90%RH）以下であることを特徴とする請求の範囲第3項に記載の金属蓋付容器。

6. 容器本体（14）は結晶化度が10～40%であるポリエチレンテレフタレート層を含むプラスチックで形成されたことを特徴とする請求の範囲第1項に記載の金属蓋付容器。

7. 容器本体（14）を形成するプラスチックが、結晶化度が10～40%であるポリエチレンテレフタレート層とオレフィン層とを含むものである請求の範囲第6項に記載の金属蓋付容器。

8. 容器本体（14）を形成するプラスチックが、結晶化度が10～40%であるポリエチレンテレフタレート層、オレフィン層、エチレン-ビニルアルコール共重合体層とを含むものであることを特徴とする請求の範囲第6項に記載の金属蓋付容器。

9. 容器本体（14）を形成するプラスチックは、ポリエチレンテレフタレート（33）およびポリアリレート（34）よりなる積層シート（38）を熱成形したものであることを特徴とする請求の範囲第1項に記載の金属蓋付容器。

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10. ポリエチレンテレフタレート（33）およびポリアリレート（34）よりなる積層シート（38）の層構成が、ポリエチレンテレフタレート（33）／ポリアリレート（34）である請求の範囲第9項に記載の金属蓋付容器。

11. 積層シート（38）の層の厚さの比がポリエチレンテレフタレート（33）：ポリアリレート（34）＝15：1～5：1である請求の範囲第10項に記載の金属蓋付容器。

12. ポリエチレンテレフタレート（33）およびポリアリレート（34）よりなる積層シート（38）の層構成が、ポリエチレンテレフタレート（33）／ポリアリレート（34）／ポリエチレンテレフタレート（33）である請求の範囲第9項に記載の金属蓋付容器。

13. ポリエチレンテレフタレート（33）およびポリアリレート（34）よりなる積層シート（38）の層構成が、ポリアリレート（34）／ポリエチレンテレフタレート（33）／ポリアリレート（34）である請求の範囲第9項に記載の金属蓋付容器。

14. 容器本体（14）の胴部（14a）および底部（14b）が積層シート（26）を用いて熱成形され、容器本体（14）のフランジ部（15）が胴部（14a）の上端周縁に沿うインサート射出によって形成されていることを特徴とする請求の範囲第1項に記載の金属蓋付

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容器。

15. 該積層シート（26）が、酸素透過係数が5×10^{-9}以下である層を少なくとも一層有し、最外層がポリプロピレンであるガスバリヤ性積層シートであって、フランジ部（15）がポリプロピレンの射出によって形成されていることを特徴とする請求の範囲第14項に記載の金属蓋付容器。

16. 該積層シート（26）が、酸素透過係数が5×10^{-9}以下である層を少なくとも一層有し、最外層がポリエチレンテレフタレートであるガスバリヤ性積層シートであって、フランジ部（15）がポリエチレンテレフタレートの射出によって形成されていることを特徴とする請求の範囲第14項に記載の金属蓋付容器。

17. 容器本体（14）はプラスチックで形成され、容器本体（14）の底部（14b）が容器本体（14）の外方に向って突出する凸形状に形成されていることを特徴とする請求の範囲第1項に記載の金属蓋付容器。

18. 容器本体（14）はプラスチックで形成され、フランジ部（15）下方の容器本体（14）の胴部（14a）内側面に円周状リブ（50）を設けたことを特徴とする請求の範囲第1項に記載の金属蓋付容器。

19. 円周状リブ（50）高さh_1と円周状リブ（50）の設けられたフランジ部（15）下方の胴部

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（１４ａ）側面の厚みh_2とが

$$|h_1 - h_2| \leq 0.3 \text{（mm）}$$

の関係にあることを特徴とする請求の範囲第１８項に記載の金属蓋付容器。

２０．　容器本体（１４）はプラスチックで形成され、容器本体（１４）の胴部（１４ａ）および底部（１４ｂ）のいずれか、または両方に凹凸部（５５，５６）よりなるリブを設けたことを特徴とする請求の範囲第１項に記載の金属蓋付容器。

２１．　容器本体（１４）はプラスチック製の円筒体からなる胴部（１４ａ）と、前記円筒体の両端を外方に広げてなるフランジ部（１５）とを有することを特徴とする請求の範囲第１項に記載の金属蓋付容器。

２２．　容器本体（１４）のフランジ部（１５）は容器本体（１４）の胴部上端から外側に向う段部（１５ａ）とこの段部から上方へ伸びる巻締部（１５ｂ）とからなり、金属蓋（１１）のイージーオープン用ハーフカット線（６１）を該段部（１５ａ）上であって容器本体（１４）の胴部（１４ａ）の上端内径（６３）より外側（６４）に設けたことを特徴とする請求の範囲第１項に記載の金属蓋付容器。

２３．　金属蓋（１１）の周縁部（１２）内面に、変性ポリオレフィン，アイオノマー樹脂，エチレン・アクリル酸共重合体の１種以上よりなるヒートシーリングコ

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ンパウンド（１３）をコーティングする工程と、該金属蓋（１１）をプラスチック製の容器本体（１４）のフランジ部（１５）に巻締める工程と、高周波・超音波・電熱・スチームなどの加熱によりフランジ部（１５）と金属蓋（１１）の周縁部（１２）とを融着させる工程とからなる金属蓋付容器の製造方法。

２４．　結晶促進核剤を含むポリエチレンテレフタレート層を含むシートブランクを用いて容器本体を熱成形する工程からなり、該ポリエチレンテレフタレート層の結晶化度が１０～４０％になるように熱成形することを特徴とする金属蓋付容器の製造方法。

２５．　シートブランクが、結晶促進核剤を含むポリエチレンテレフタレート層とオレフィン層とを含む層構成を有するものである請求の範囲第２４項に記載の金属蓋付容器の製造方法。

２６．　シートブランクが、結晶促進核剤を含むポリエチレンテレフタレート層，オレフィン層，エチレン－ビニルアルコール共重合体層とを含む層構成を有するものである請求の範囲第２４項に記載の金属蓋付容器の製造方法。

２７．　シートフォーミングによってフランジ部（１５）を有するプラスチック製容器本体（１４）を熱成形する工程と、容器本体（１４）のフランジ部（１５）の厚みをプレス熱成形によって薄くする工程と、フラン

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ジ部（１５）の幅が一定のフランジ幅となるようフランジ部（１５）の周縁部を打抜く工程と、このフランジ部（１５）に金属蓋（１１）の周縁部（１２）を巻締める工程とからなる金属蓋付容器の製造方法。

２８．　容器本体（１４）熱成形時に、金型内にラベルをインサートし、容器本体の胴部にラベルを貼着することを特徴とする請求の範囲第２７項に記載の金属蓋付容器の製造方法。

２９．　フランジ部（１５）プレス熱成形工程により、フランジ部（１５）の厚みを０．２５～０．９㎜とし、フランジ部（１５）の打抜工程により、フランジ幅が１．０～２．５㎜となるようにしたことを特徴とする請求の範囲第２７項に記載の金属蓋付容器の製造方法。

３０．　フランジ部（１５）を有するプラスチック製容器本体（１４）内に内容物を充填する工程と、フランジ部（１５）に金属蓋（１１）の周縁部（１２）を巻締めて容器本体（１４）を密封する工程と、容器本体（１４）をガラス転移点以上であって容器本体（１４）の融点以下に加熱する工程とからなり容器本体（１４）を球状にする金属蓋付容器の製造方法。

３１．　外周上端（１０２，１２２）から上方に向って延びるキャビティ上縁部（１０３，１２３）を有するキャビティ（１０４，１２４）と、このキャビティ（１０４，１２４）内にプラスチックシートを押下げる

プラグ（１０６，１２６）と、前記キャビティ上縁部（１０３，１２３）に当接してプラスチックシートを挟持するクランプ（１０５，１２５）とを備え、前記キャビティ上縁部（１０３，１２３）は$5° < \theta < 40$の角度をもって上方へ延び、前記キャビティ（１０４，１２４）の外周上端（１０２，１２２）から前記クランプ（１０５，１２５）の内周面までの距離ℓが$5\,mm < \ell < 20\,mm$となることを特徴とする金属蓋付容器の製造装置。

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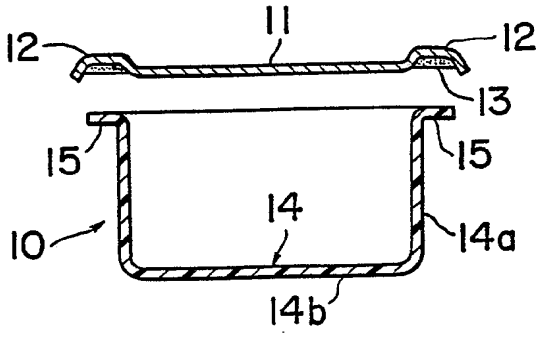


FIG. 1(a)

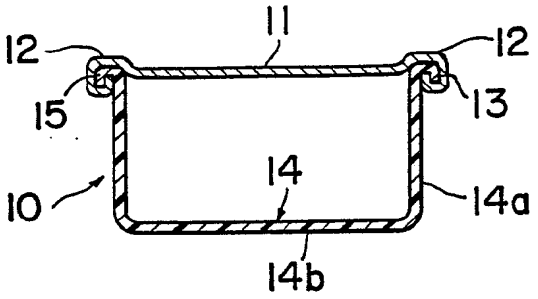


FIG. 1(b)

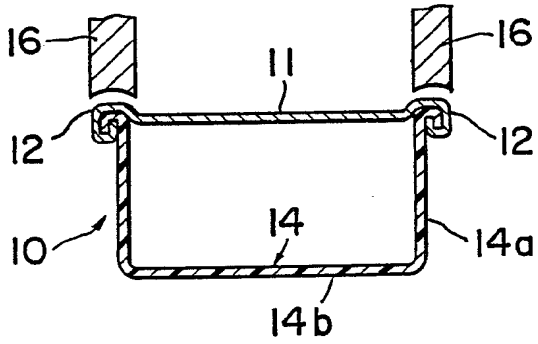


FIG. 1(c)

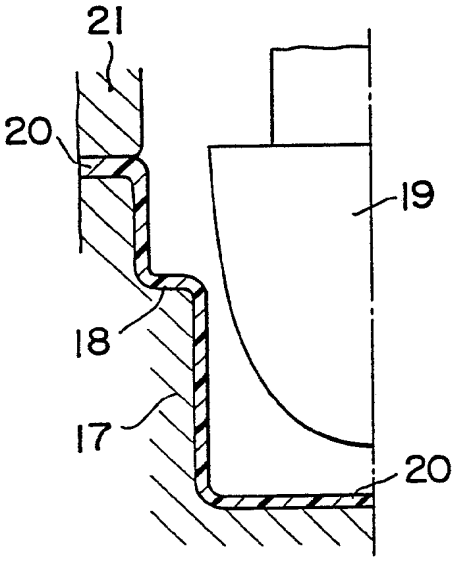


FIG. 3

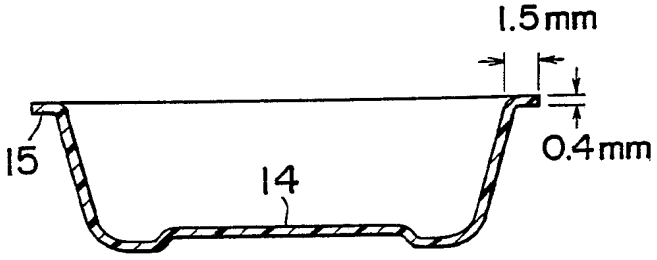


FIG. 2

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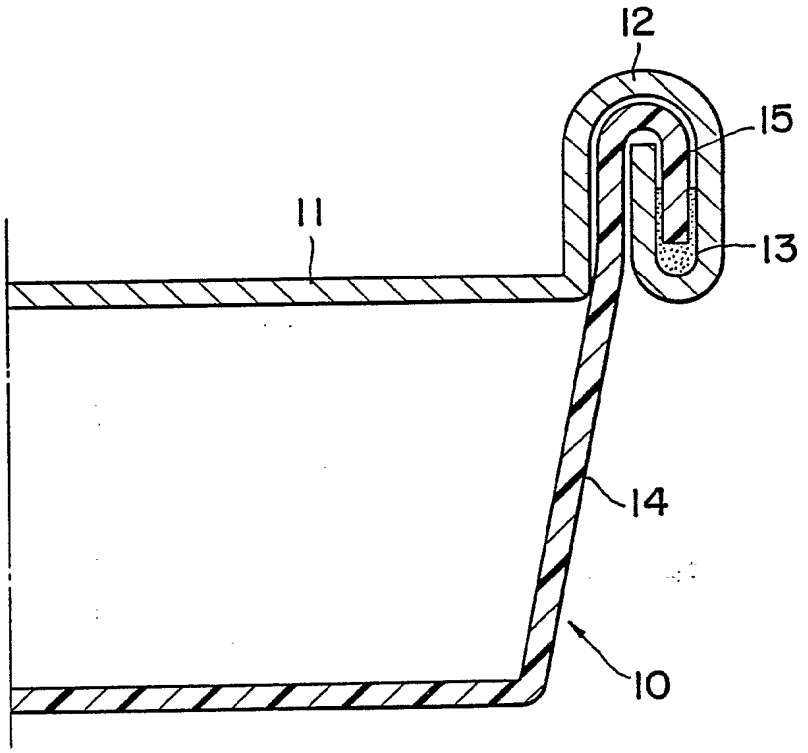


FIG. 4

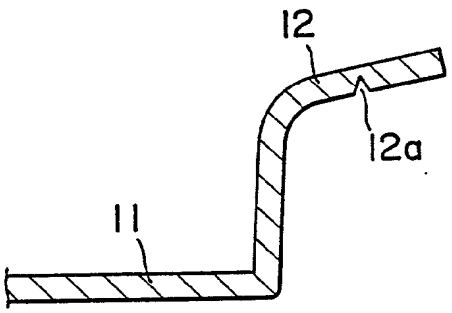


FIG. 5 (a)

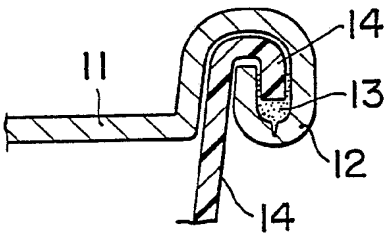


FIG. 5 (b)

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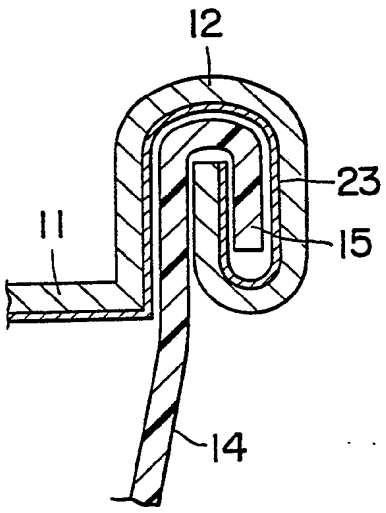


FIG. 6

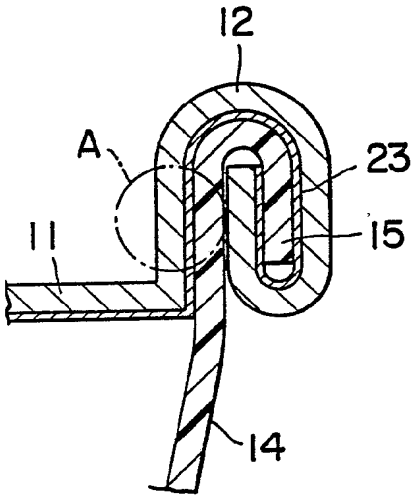


FIG. 7

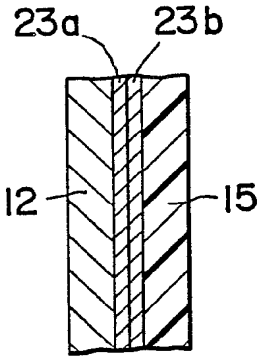


FIG. 8

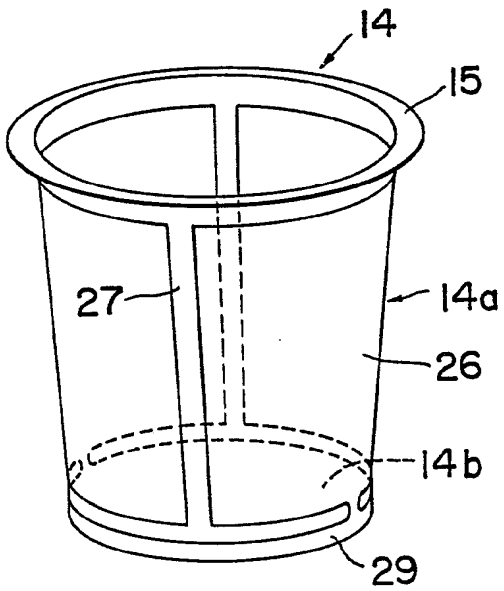


FIG. 9

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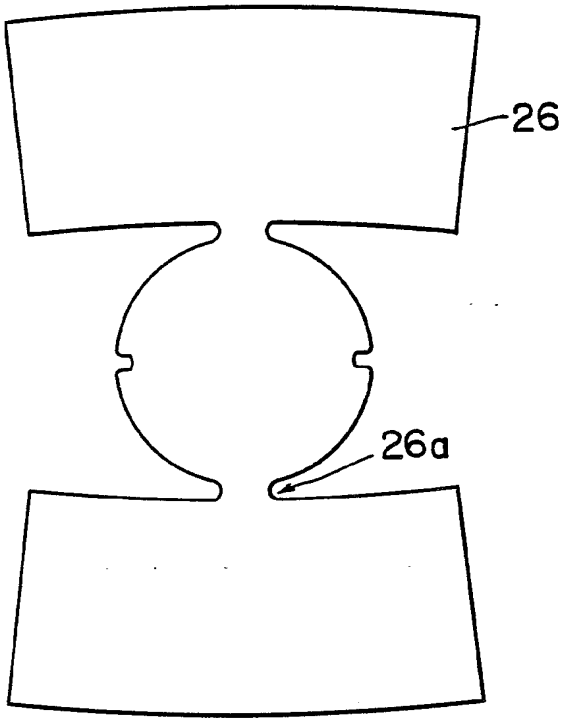


FIG. 10

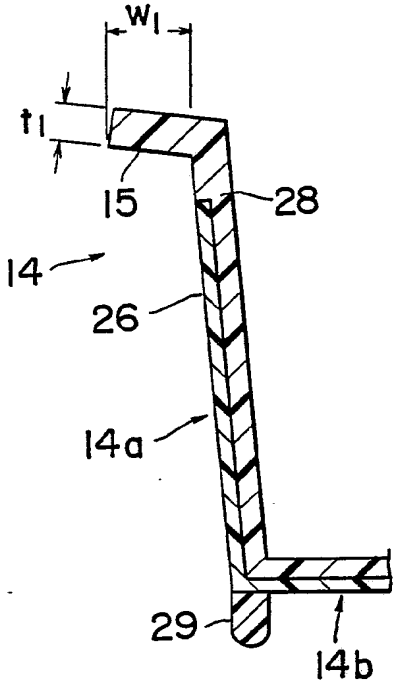


FIG. 11

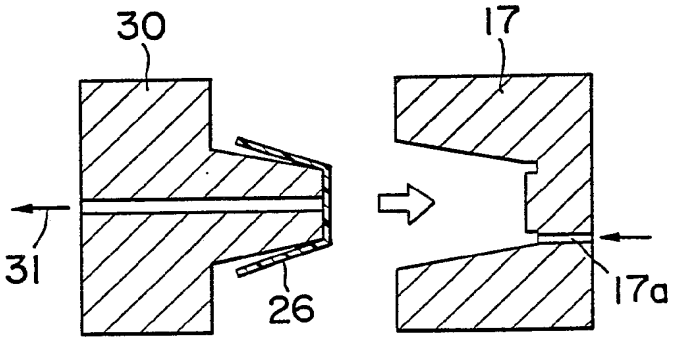


FIG. 12

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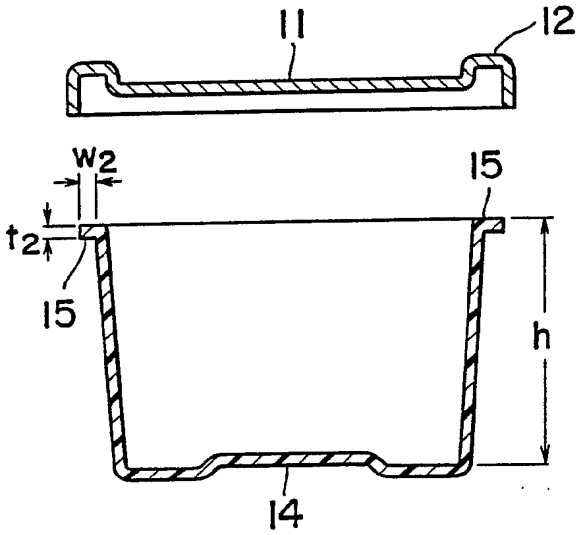


FIG. 13

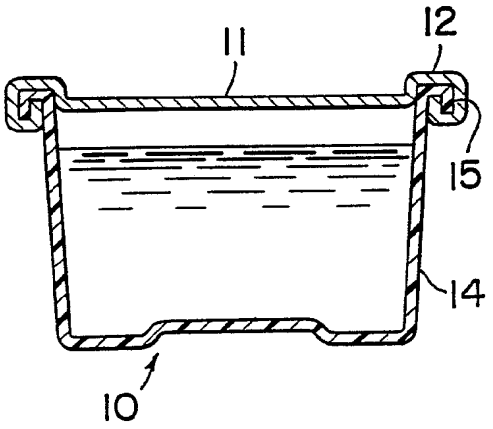


FIG. 14

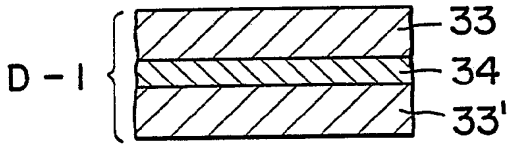


FIG. 15

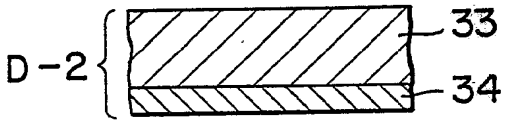


FIG. 16

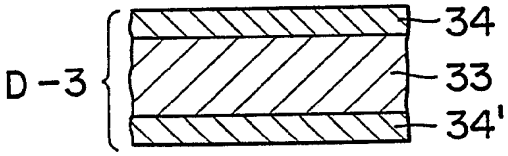


FIG. 17

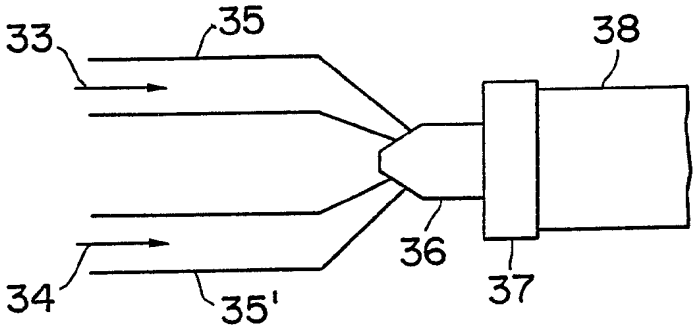


FIG. 18

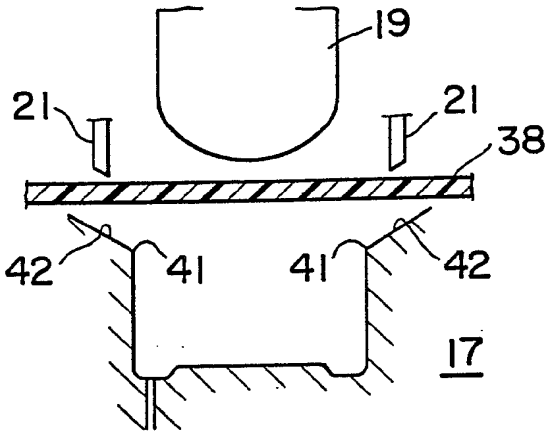


FIG. 19 (a)

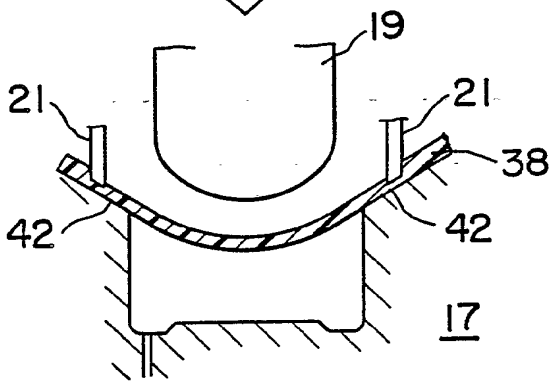


FIG. 19 (b)

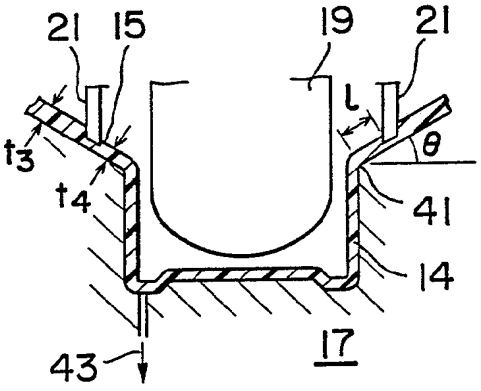


FIG. 19 (c)

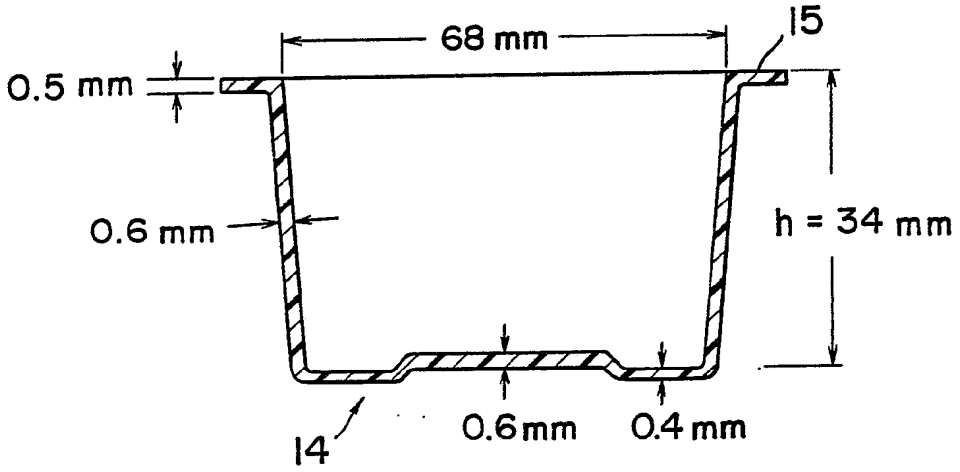


FIG. 20

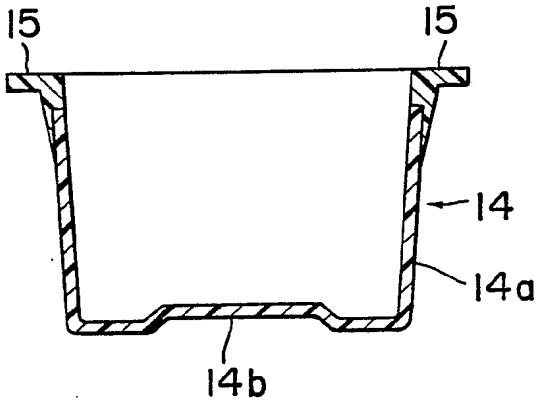


FIG. 21

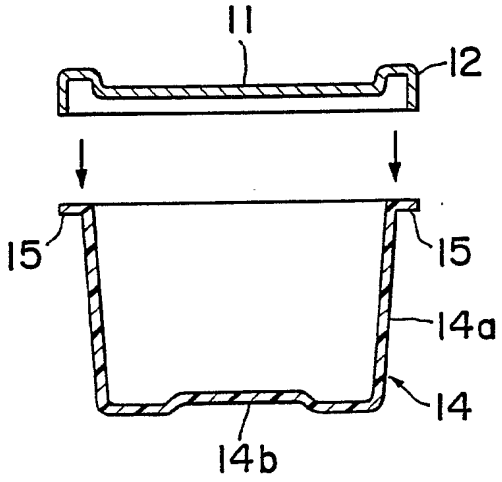


FIG. 22 (a)

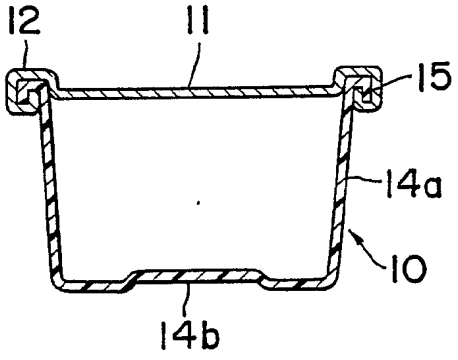


FIG. 22 (b)

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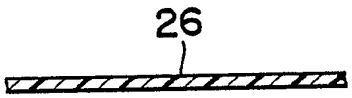


FIG. 23 (a)

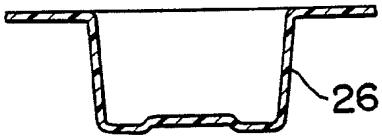


FIG. 23 (b)

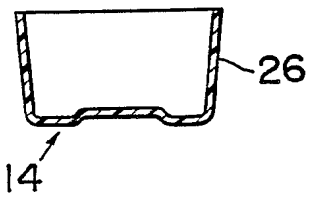


FIG. 23 (c)

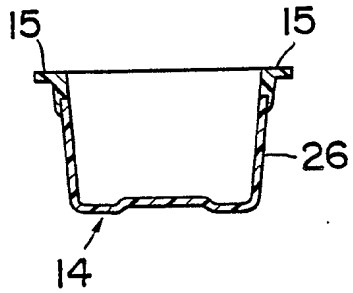


FIG. 23 (d)

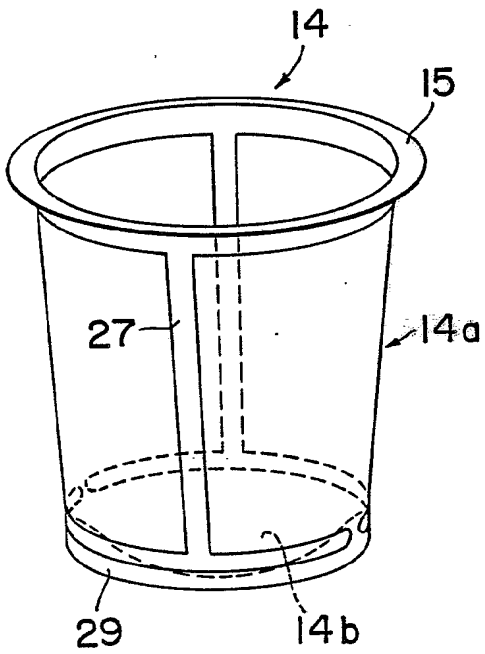


FIG. 24

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

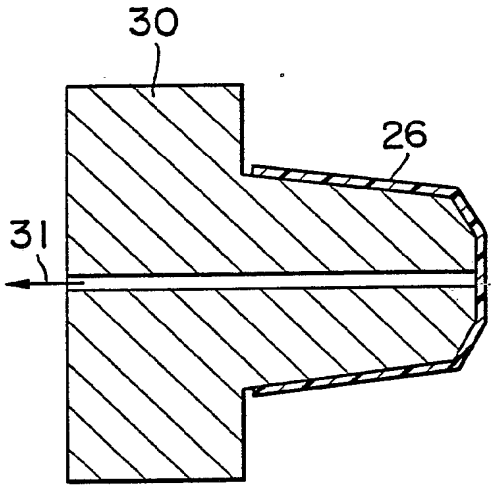


FIG. 25

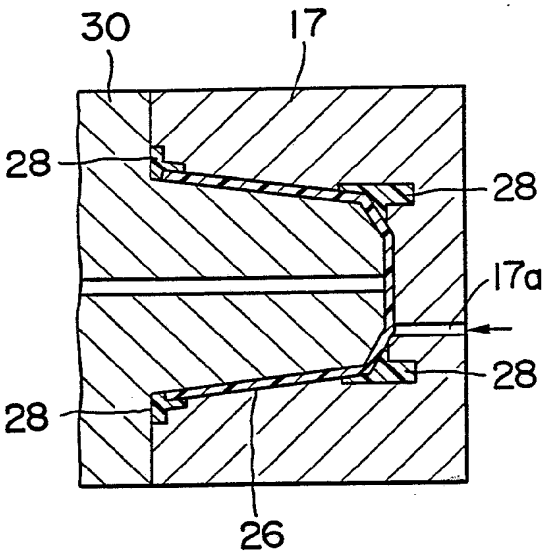


FIG. 26

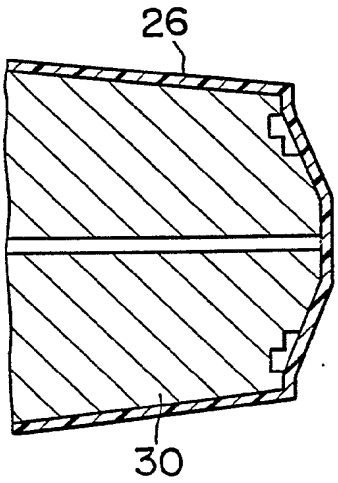


FIG. 27

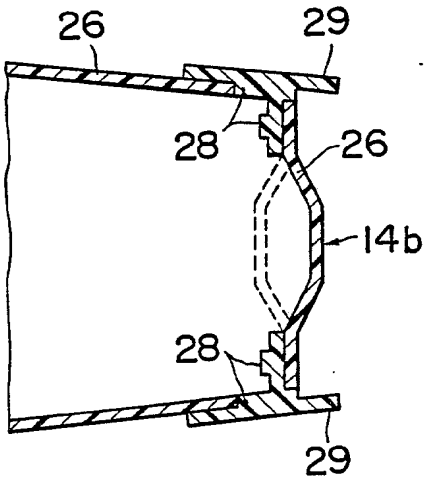


FIG. 28

K-FEE SYSTEM GMBH, EX2009, page 2337
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

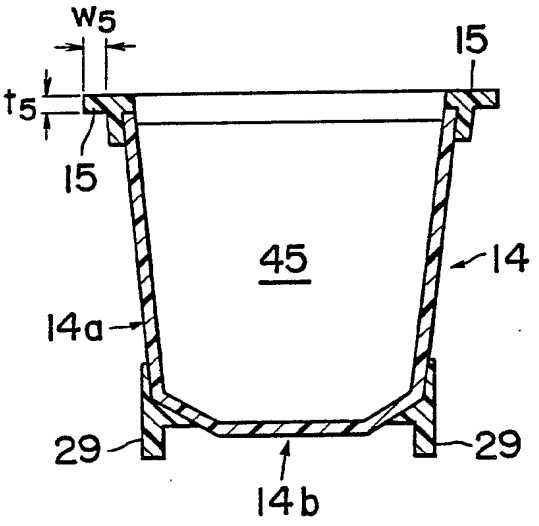


FIG. 29 (a)

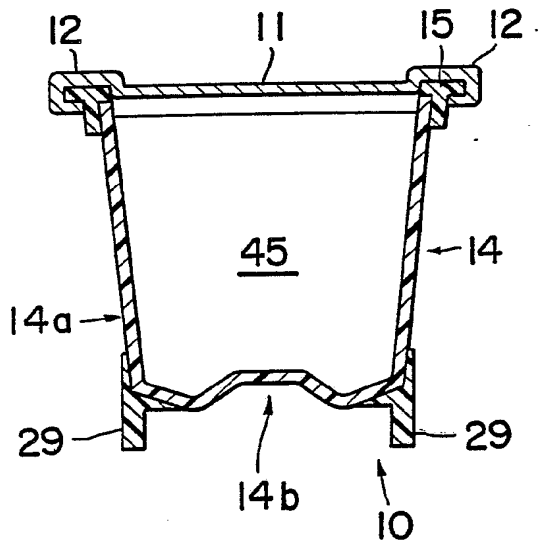


FIG. 29 (b)

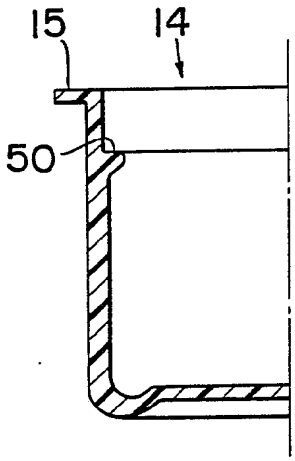


FIG. 30

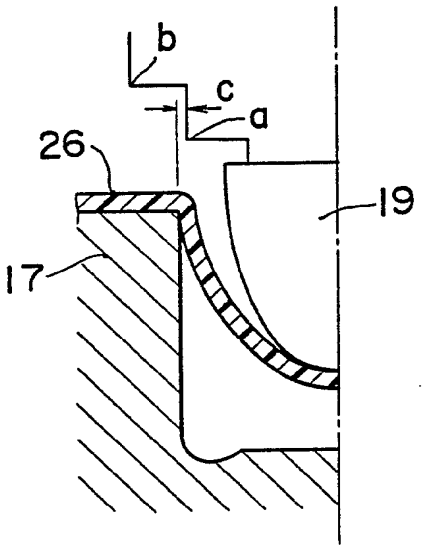


FIG. 31

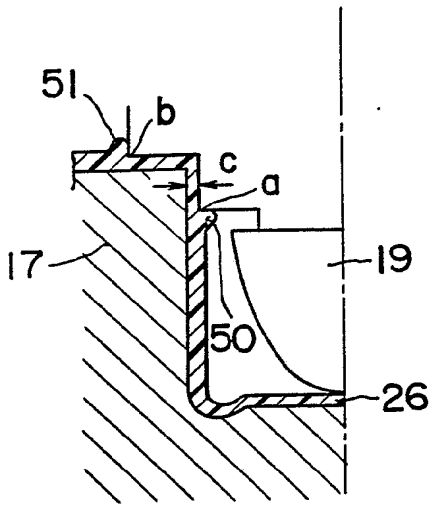


FIG. 33

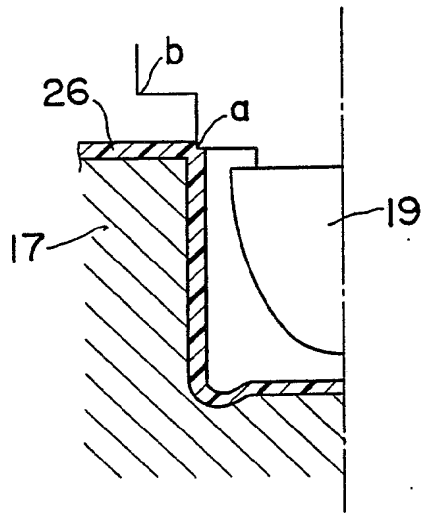


FIG. 32

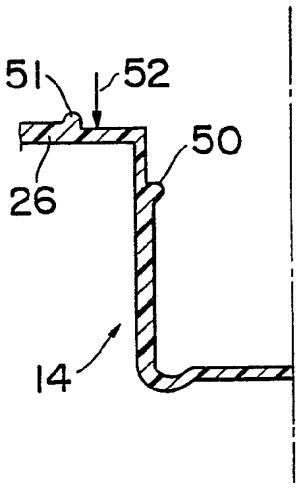


FIG. 34

K-FEE SYSTEM GMBH, EX2009, page 2339
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

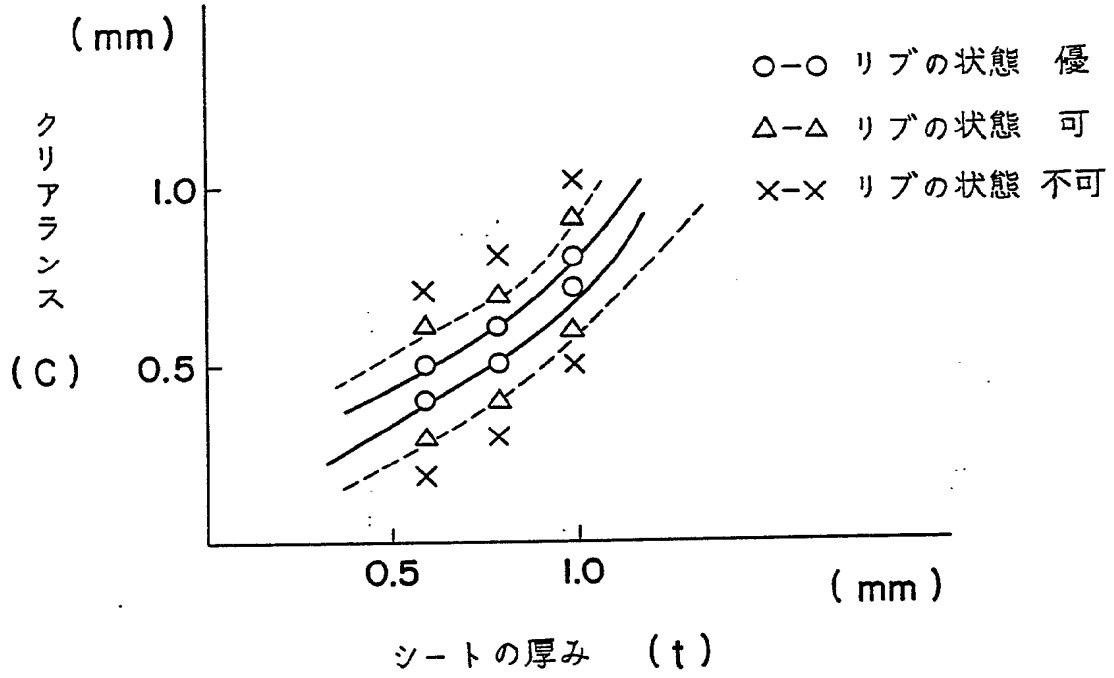


FIG. 35

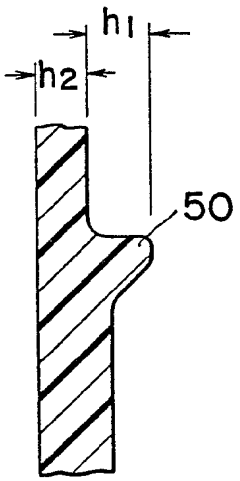


FIG. 36

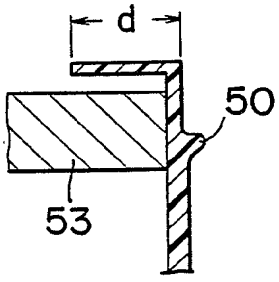


FIG. 37

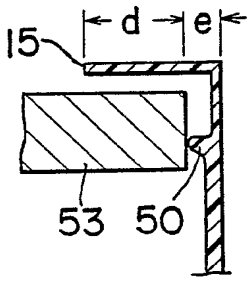


FIG. 38

K-FEE SYSTEM GMBH, EX2009, page 2340
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

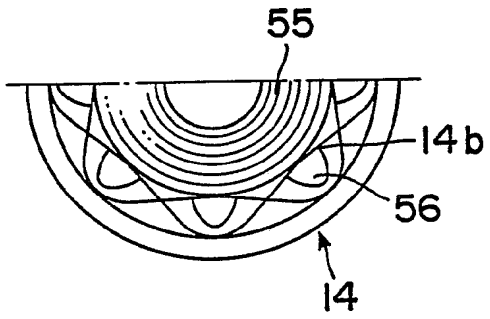


FIG. 39

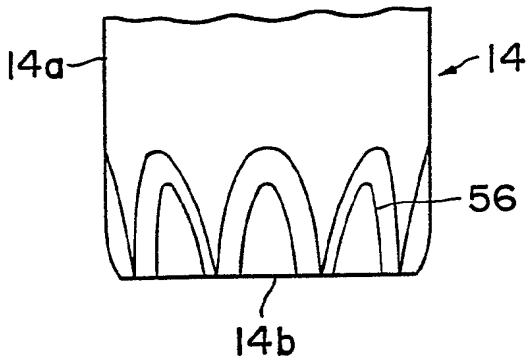


FIG. 40

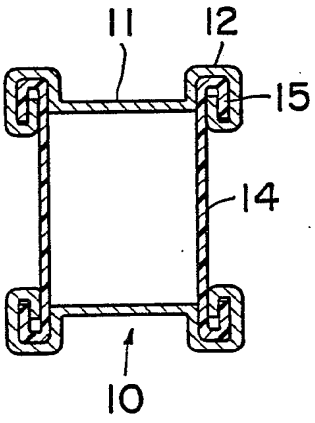


FIG. 41

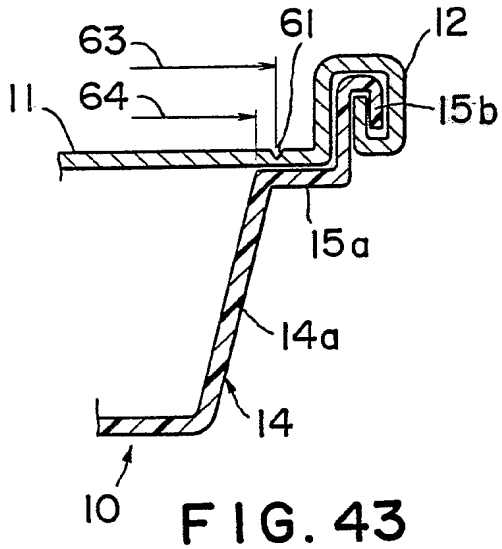


FIG. 43

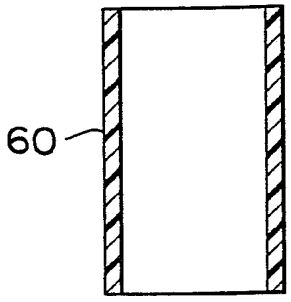


FIG. 42 (a)

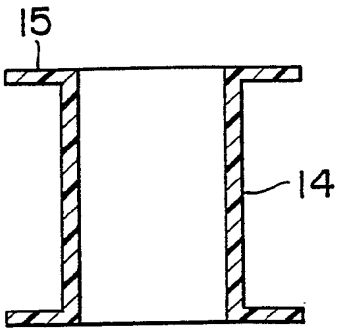


FIG. 42 (b)

K-FEE SYSTEM GMBH, EX2009, page 2341
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

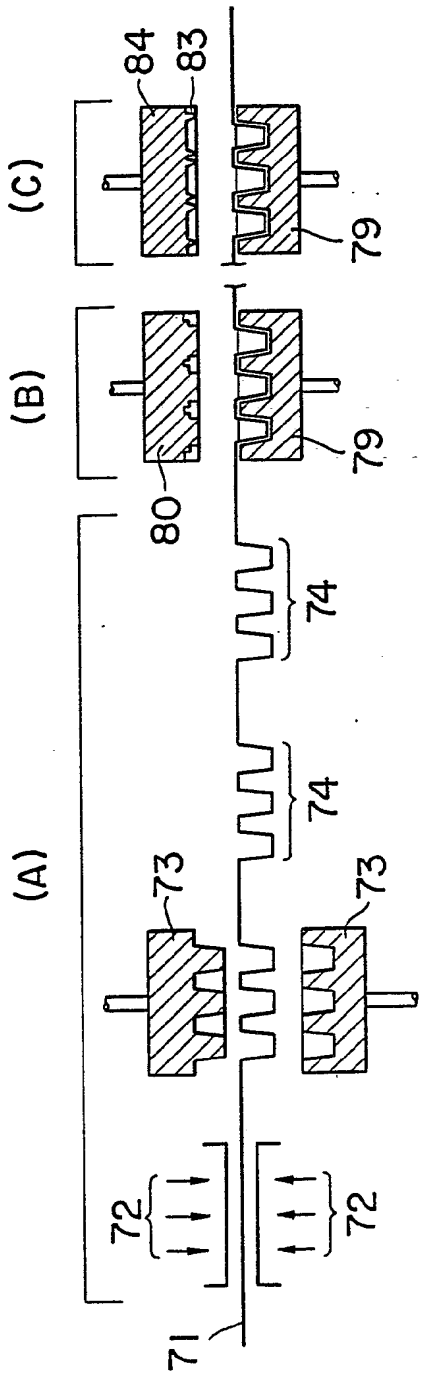


FIG. 44

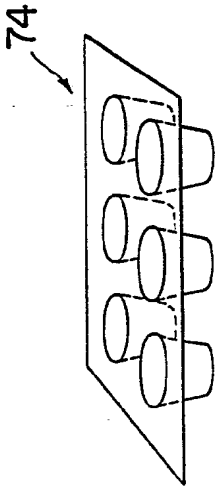


FIG. 45

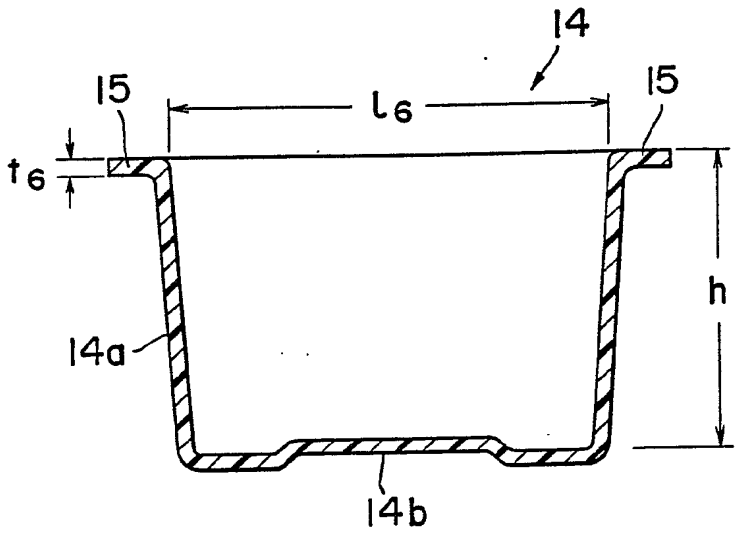


FIG. 46

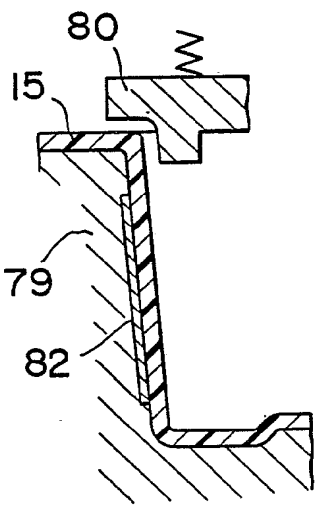


FIG. 47 (a)

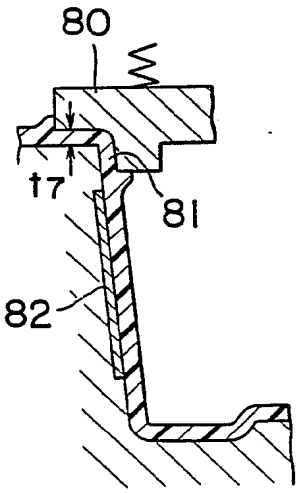


FIG. 47 (b)

K-FEE SYSTEM GMBH, EX2009, page 2343
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

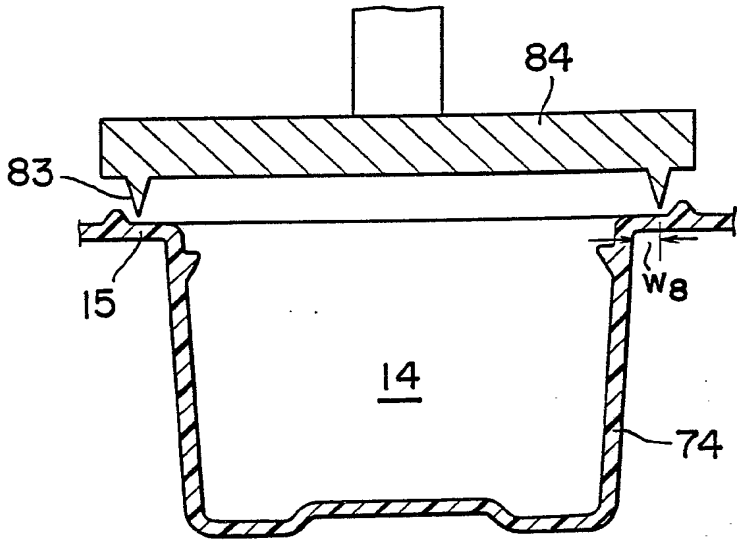


FIG. 48

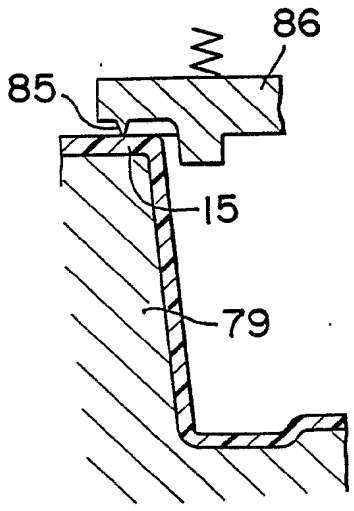


FIG. 49

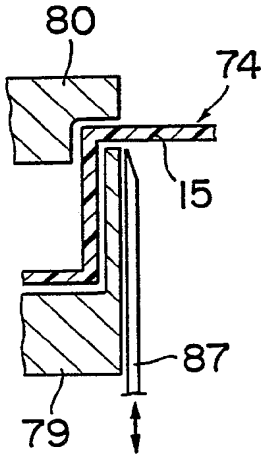


FIG. 50

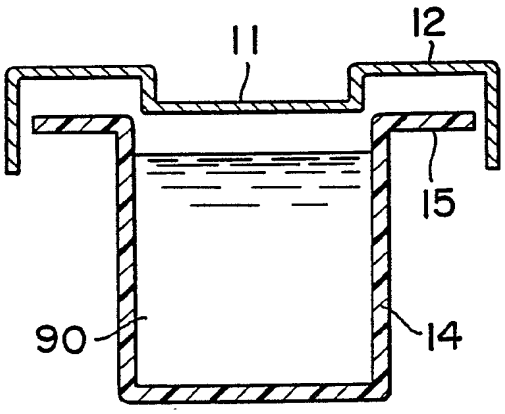


FIG. 51 (a)

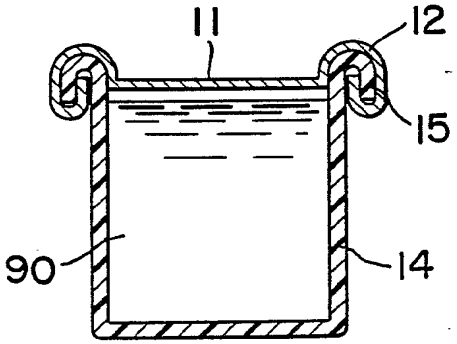


FIG. 51 (b)

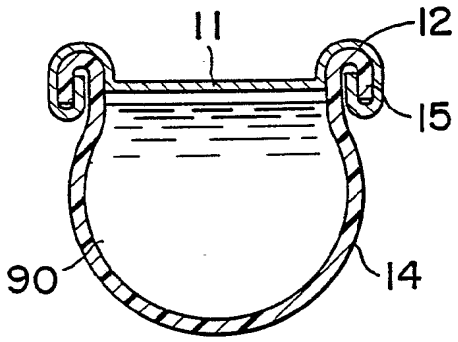


FIG. 51 (c)

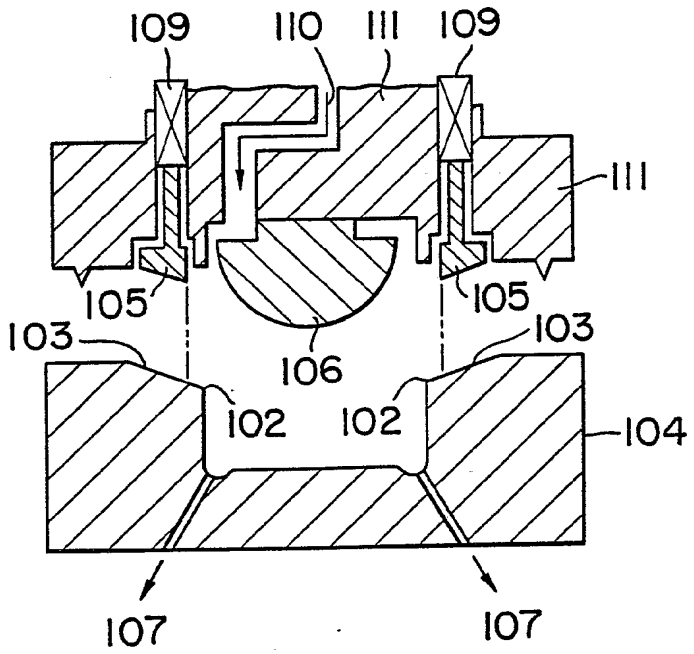


FIG. 52

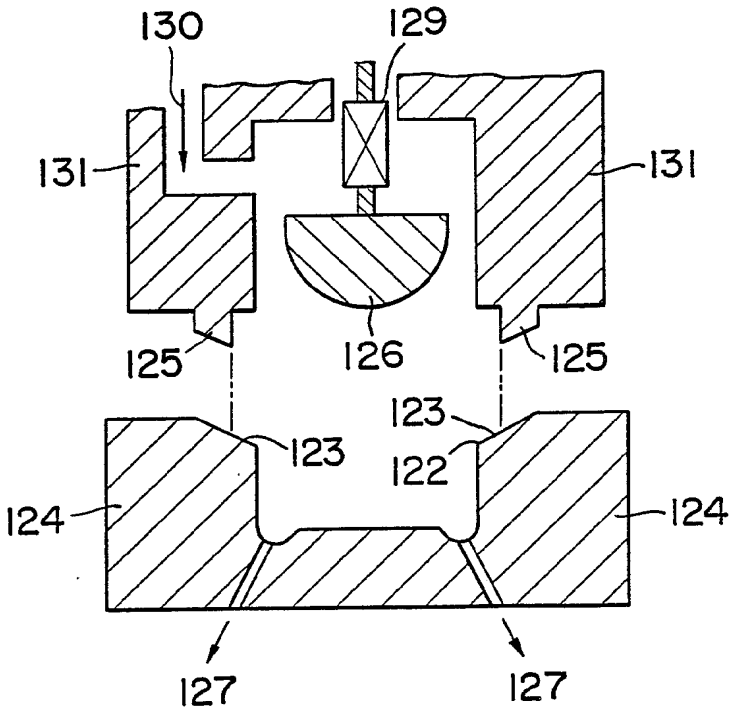


FIG. 53

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

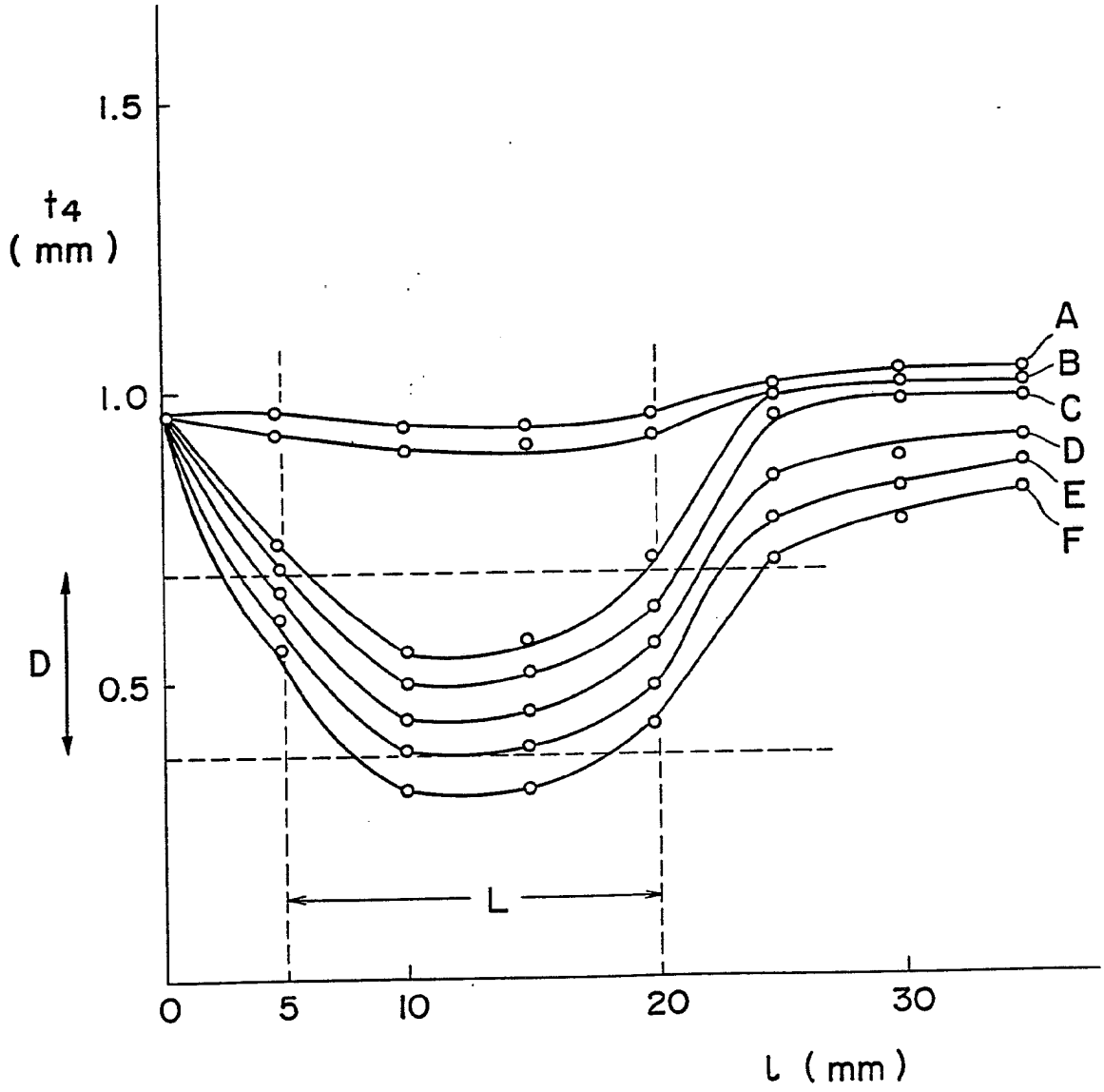


FIG. 54

K-FEE SYSTEM GMBH, EX2009, page 2347
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

INTERNATIONAL SEARCH REPORT

International Application No PCT/JP87/00936

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl[4] B65D8/22, B29C51/08, B65D65/02, B65D65/72

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC	B65D8/00-8/22, B65D17/00-17/52, B29C51/00-51/46, B29C65/00-65/82

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

Jitsuyo Shinan Koho 1926-1987
Kokai Jitsuyo Shinan Koho 1971-1987

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
Y	JP, A, 58-124611 (Toyo Seikan Kaisha, Ltd.) 25 July 1983 (25. 07. 83) (Family: none)	1-31
Y	JP, A, 56-137917 (Plastona Ltd.) 28 October 1981 (28. 10. 81) (Family: none)	1, 6, 22-27
Y	JP, B2, 51-35916 (Star Stabiliménto Alimentare S.p.A.) 5 October 1976 (05. 10. 76) (Family: none)	1, 3-5
Y	JP, Y1, 39-36464 (Daiwa Can Co., Ltd.) 7 December 1964 (07. 12. 64) (Family: none)	3
X	JP, U, 51-98265 (Mitsui Toatsu Chemicals, Inc.) 6 August 1976 (06. 08. 76) (Family: none)	1
X	JP, U, 60-52219 (Dainippon Printing Co., Ltd.) 12 April 1985 (12. 04. 85) (Family: none)	2

* Special categories of cited documents: [16]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [2]
February 29, 1988 (29. 02. 88)	March 22, 1988 (22. 03. 88)
International Searching Authority [1]	**Signature of Authorized Officer [20]**
Japanese Patent Office	

Form PCT/ISA/210 (second sheet) (October 1977)

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IPR2023-00502, U.S. PATENT 10,994,923

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

X	JP, A, 56-24110 (Kishimoto Akira) 7 March 1981 (07. 03. 81) (Family: none)	7-14
X	JP, A, 57-98315 (The Goodyear Tire & Rubber Company) 18 June 1982 (18. 06. 82) (Family: none)	17
X	JP, A, 57-178816 (Sumitomo Bakelite Co., Ltd.) 4, November 1982 (04. 11. 82) (Family: none)	7-13

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE[10]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers_____, because they relate to subject matter[12] not required to be searched by this Authority, namely:

2. ☐ Claim numbers_____, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out[13], specifically:

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING[11]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:
3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:
4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

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

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

A	JP, A, 52-128952 (Yoshino Kogyosho Co., Ltd.) 28 October 1977 (28. 10. 77) (Family: none)	28

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [10]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers_____, because they relate to subject matter [12] not required to be searched by this Authority, namely:

2. ☐ Claim numbers_____, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out [13], specifically:

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [11]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:
3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:
4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

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

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

X	JP, A, 59-199435 (Kishimoto Akira) 12 November 1984 (12. 11. 84) (Family: none)	23
X	JP, Y2, 55-56093 (Mitsubishi Monsanto Co.) 26 December 1980 (26. 12. 80) (Family: none)	18-20, 12, 26
X	JP, Y2, 57-47157 (Dainippon Printing Co., Ltd.) 16 October 1982 (16. 10. 82) (Family: none)	14-16, 18-19
A	JP, A, 56-75819 (Matsushita Electric Ind. Co., Ltd.) 23 June 1981 (23. 06. 81) (Family: none)	28

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE[10]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers_____, because they relate to subject matter[12] not required to be searched by this Authority, namely:

2. ☐ Claim numbers_____, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out[13], specifically:

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING[11]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:
3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:
4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

See notes on accompanying sheet

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IPR2023-00502, U.S. PATENT 10,994,923

国　際　調　査　報　告

国際出願番号PCT/JP87/00936

Ⅰ．発明の属する分野の分類

国際特許分類（IPC）　Int. Cl⁴
B65D8/22, B29C51/08, B29C65/02,
B29C65/72

Ⅱ．国際調査を行った分野

調査を行った最小限資料

分類体系	分類記号
IPC	B65D8/00−8/22, B65D17/00−17/52, B29C51/00−51/46, B29C65/00−65/82

最小限資料以外の資料で調査を行ったもの

日本国実用新案公報　1926−1987年
日本国公開実用新案公報　1971−1987年

Ⅲ．関連する技術に関する文献

引用文献のカテゴリー※	引用文献名　及び一部の箇所が関連するときは、その関連する箇所の表示	請求の範囲の番号
Y	JP, A, 58−124611（東洋製罐株式会社） 25. 7月. 1983（25. 07. 83）（ファミリーなし）	1−31
Y	JP, A, 56−137917（プラストナ・リミテッド） 28. 10月. 1981（28. 10. 81）（ファミリーなし）	1, 6, 22−27
Y	JP, B2, 51−35916（スター・スタビリメント・アリメンタレ・ソチエタ・ペル・アジオニ） 5. 10月. 1976（05. 10. 76）（ファミリーなし）	1, 3−5
Y	JP, Y1, 39−36464（大和製罐株式会社） 7. 12月. 1964（07. 12. 64）（ファミリーなし）	3
X	JP, U, 51−98265（三井東圧化学株式会社） 6. 8月. 1976（06. 08. 76）（ファミリーなし）	1
X	JP, U, 60−52219（大日本印刷株式会社）	2

※引用文献のカテゴリー
「A」特に関連のある文献ではなく、一般的技術水準を示すもの
「E」先行文献ではあるが、国際出願日以後に公表されたもの
「L」優先権主張に疑義を提起する文献又は他の文献の発行日若しくは他の特別な理由を確立するために引用する文献（理由を付す）
「O」口頭による開示、使用、展示等に言及する文献
「P」国際出願日前で、かつ優先権の主張の基礎となる出願の日の後に公表された文献
「T」国際出願日又は優先日の後に公表された文献であって出願と矛盾するものではなく、発明の原理又は理論の理解のために引用するもの
「X」特に関連のある文献であって、当該文献のみで発明の新規性又は進歩性がないと考えられるもの
「Y」特に関連のある文献であって、当該文献と他の1以上の文献との、当業者にとって自明である組合せによって進歩性がないと考えられるもの
「&」同一パテントファミリーの文献

Ⅳ．認　　証

国際調査を完了した日	国際調査報告の発送日
29. 02. 88	22.03.88
国際調査機関	権限のある職員
日本国特許庁（ISA/JP）	特許庁審査官　村迫俊一　3E 6694

様式PCT／ISA／210（第2ページ）（1981年10月）

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第２ページから続く情報

	（Ⅰ欄の続き） １２．４月．１９８５（１２．０４．８５）（ファミリーなし）	
X	ＪＰ．Ａ．５６－２４１１０（岸本　昭） ７．３月．１９８１（０７．０３．８１）（ファミリーなし）	７－１４
X	ＪＰ．Ａ．５７－９８３１５（ザ・グッドイヤー・タイヤ・アンド・ラバー・カンパニー） １８．６月．１９８２（１８．０６．８２）（ファミリーなし）	１７
X	ＪＰ．Ａ．５７－１７８８１６（住友ベークライト株式会社） ４．１１月．１９８２（０４．１１．８２）（ファミリーなし）	７－１３

Ⅴ．☐ 一部の請求の範囲について国際調査を行わないときの意見

次の請求の範囲については特許協力条約に基づく国際出願等に関する法律第８条第３項の規定によりこの国際調査報告を作成しない。その理由は、次のとおりである。

１．☐ 請求の範囲＿＿＿＿＿は、国際調査をすることを要しない事項を内容とするものである。

２．☐ 請求の範囲＿＿＿＿＿は、有効な国際調査をすることができる程度にまで所定の要件を満たしていない国際出願の部分に係るものである。

３．☐ 請求の範囲＿＿＿＿＿は、従属請求の範囲でありかつPCT規則6.4(a)第２文の規定に従って起草されていない。

Ⅵ．☐ 発明の単一性の要件を満たしていないときの意見

次に述べるようにこの国際出願には二以上の発明が含まれている。

１．☐ 追加して納付すべき手数料が指定した期間内に納付されたので、この国際調査報告は、国際出願のすべての調査可能な請求の範囲について作成した。

２．☐ 追加して納付すべき手数料が指定した期間内に一部分しか納付されなかったので、この国際調査報告は、手数料の納付があった発明に係る次の請求の範囲について作成した。
請求の範囲＿＿＿＿＿

３．☐ 追加して納付すべき手数料が指定した期間内に納付されなかったので、この国際調査報告は、請求の範囲に最初に記載された発明に係る次の請求の範囲について作成した。
請求の範囲＿＿＿＿＿

４．☐ 追加して納付すべき手数料を要求するまでもなく、すべての調査可能な請求の範囲について調査することができたので、追加して納付すべき手数料の納付を命じなかった。

追加手数料異議の申立てに関する注意

☐ 追加して納付すべき手数料の納付と同時に、追加手数料異議の申立てがされた。

☐ 追加して納付すべき手数料の納付に際し、追加手数料異議の申立てがされなかった。

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Ⅲ. 関連する技術に関する文献（第2ページからの続き）

引用文献のカテゴリー※	引用文献名及び一部の箇所が関連するときは、その関連する箇所の表示	請求の範囲の番号
X	JP, A, 59-199435（岸本 昭） 12. 11月. 1984（12. 11. 84）（ファミリーなし）	23
X	JP, Y2, 55-56093（三菱モンサント株式会社） 26. 12月. 1980（26. 12. 80）（ファミリーなし）	18-20, 12, 26
X	JP, Y2, 57-47157（大日本印刷株式会社） 16. 10月. 1982（16. 10. 82）（ファミリーなし）	14-16, 18-19
A	JP, A, 56-75819（松下電器産業株式会社） 23. 6月. 1981（23. 06. 81）（ファミリーなし）	28
A	JP, A, 52-128952（株式会社 吉野工業所） 28. 10月. 1977（28. 10. 77）（ファミリーなし）	28

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(19) Octrooiraad Nederland

(11) Publikatienummer: **9302219**

(12) A **TERINZAGELEGGING**

(21) Aanvraagnummer: **9302219**

(22) Indieningsdatum: **20.12.93**

(51) Int.Cl.[6]:
B65C 3/06, G06K 9/18, G06K 19/00, B65C 3/26

(43) Ter inzage gelegd:
17.07.95 I.E. 95/14

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(54) **Houder met identificatie-inrichting**

(57) Een houder voor vloeibare of pasteuze, gekleurde massa vertoont de algemene vorm van een beker met een eventueel afsluitbare mondopening en is gekenmerkt door een met de houder verbonden identificatie-inrichting voor het ondubbelzinnig identificeren van de houder. Een eenvoudige uitvoering is die, waarin de identificatie-inrichting van het optisch leesbare type is. Een dergelijke identificatie-inrichting kan bij voorbeeld gebaseerd zijn op een streepjescode, een puntencode, alfanumerieke symbolen, of dergelijke.

NL A 9302219

De aan dit blad gehechte afdruk van de beschrijving met conclusie(s) en eventuele tekening(en) bevat afwijkingen ten opzichte van de oorspronkelijk ingediende stukken; deze laatste kunnen bij de Octrooiraad op verzoek worden ingezien.

HOUDER MET IDENTIFICATIE-INRICHTING

De uitvinding heeft betrekking op een houder voor vloeibare of pasteuze, gekleurde massa, welke houder de algemene vorm van een beker met een eventueel afsluitbare mondopening vertoont.

Een houder van dit type is in diverse uitvoeringen bekend en wordt gebruikt voor het transport van vloeibare of pasteuze, gekleurde massa's, in het bijzonder verven, lakken, inkten, en dergelijke.

Voor het op de juiste wijze roteren van houders met een bepaalde inhoud, in het bijzonder bij gebruik van een geautomatiseerde menginrichting, waarmee automatisch ingestelde hoeveelheden gekleurde massa's van een gewenste kleur kunnen worden vervaardigd, is het van belang, dat elke houder ondubbelzinnig identificeerbaar is. Als een houder niet identificeerbaar is, moet voor eventueel gewenst hergebruik van de inhoud de samenstelling van deze inhoud door een spectro-fotometrische bepaling worden vastgesteld. Een dergelijke bepaling is relatief onnauwkeurig. Het is daarom gewenst, de belangrijke informatie, die bij het vullen van de betreffende houder beschikbaar was, en betrekking had op de verhouding tussen de samenstellende kleurcomponenten, niet verloren te doen gaan. Deze informatie kan voor elke specifieke houder in een eventueel centraal geheugen worden opgeslagen. Voorwaarde voor het gebruik van de correcte informatie is natuurlijk, dat de betreffende houder identificeerbaar is. Met het oog op het bovenstaande verschaft de uitvinding een houder van het genoemde type, die is gekenmerkt door een met de houder verbonden identificatie-inrichting voor het ondubbelzinnig identificeren van de houder.

Een eenvoudige uitvoering is die, waarin de identificatie-inrichting van het optisch leesbare type is. Een dergelijke identificatie-inrichting kan bijvoorbeeld

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gebaseerd zijn op een streepjescode, een puntencode, alfanumerieke symbolen, of dergelijke.

Een andere uitvoering is die, waarin de identificatie-inrichting een transponder omvat. Een transponder kan in zijn eenvoudigste vorm één of meer bijvoorbeeld betrekkelijk vlak uitgevoerde afgestemde kringen, bestaande uit een vlakke spoel en een condensator omvatten. Bij gebruik van een aantal houders kan aan elke houder aldus een eigen resonantiefrequentie worden verleend. Bij het op zichzelf bekende gebruik van transponders met meerdere resonantiefrequenties kan op basis hiervan een binaire code worden ingebouwd, die de betreffende houder identificeert. Ook andere vormen van transponders zijn bekend en in het kader van de uitvinding toepasbaar.

Een specifieke uitvoering is die, waarin de identificatie-inrichting van het wisbare en schrijfbare type is.

De genoemde identificatie-inrichtingen kunnen bijvoorbeeld aan de buitenzijde van de houder zijn aangebracht door middel van geschikte bevestigingsmiddelen, zoals nagels, lijm, of dergelijke.

Een voordelige uitvoering vertoont het kenmerk dat de houder van kunststof is vervaardigd en dat de identificatie-inrichting daarin is ingebed. Bijvoorbeeld kan de identificatie-inrichting in de vorm van een inzetstuk in een spuitgietmatrijs vooraf zijn ingebracht en aldus tijdens het spuitgieten in de wand van de houder zijn ingebed.

De uitvinding zal nu worden toegelicht aan de hand van bijgaande tekeningen. Hierin tonen:

figuur 1 een perspectivisch aanzicht van een houder volgens de uitvinding;

figuur 2 een perspectivisch aanzicht van een variant;

figuur 3 een perspectivisch aanzicht van een deel van weer een andere uitvoering; en

figuur 4 gedeeltelijk in perspectivisch aanzicht en gedeeltelijk in dwarsdoorsnede een detail van een derde variant.

Figuur 1 toont een houder 1 voor vloeibare of pasteuze, gekleurde massa's. De houder 1 vertoont de algemene vorm van

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een beker met een door middel van een deksel met aangepaste vorm desgewenst afsluitbare mondopening 2. Op het buitenoppervlak 3 van de houder 1 is een identificatie-inrichting 4 geplakt. Dit is een van een lijmlaag voorziene film, waarop een puntencode 5 aanwezig is. De puntencode bestaat uit een aantal zwarte punten, die in een unieke samenstelling geplaatst zijn op een denkbeeldig matrix-raster. De code kan worden beschouwd als een binair getal, en stelt bijvoorbeeld een gewenste combinatie van letters en cijfers voor.

Door een te identificeren houder 1 langs een optische leesinrichting te voeren kan de puntencode 5 worden uitgelezen, waardoor aan de hand van de in een centraal geheugen aanwezige informatie kan worden vastgesteld, welke gekleurde massa bijvoorbeeld voor hergebruik beschikbaar is.

Figuur 2 toont een houder 6 van een andere vorm. Ook deze draagt aan zijn buitenoppervlak 7 de identificatie-inrichting 4 met de puntencode 5.

Figuur 3 toont een deel van een houder 8, aan het buitenoppervlak 9 van de ringvormige voet 10 waarvan door middel van popnagels 11 een identificatie-inrichting 12 is bevestigd. In deze uitvoering omvat de identificatie-inrichting 12 een transponder, waarin voldoende informatie is dan wel kan worden opgenomen om de houder 8 door middel van een geschikte uitlees-inrichting ondubbelzinnig te identificeren.

Figuur 4 tenslotte toont een houder 12 van thermoplastische kunststof, die door spuitgieten is vervaardigd. Voorafgaand aan het spuitgiet-procédé is in de vormholte van de spuitgietmatrijs een als transponder uitgevoerde identificatie-inrichting 13 ingebracht, die tijdens de spuitgietcyclus is ingebed in de houder 12. Het zal duidelijk zijn, dat de transponder 13 in voldoende mate warmtebestendig moet zijn om dit vervaardigingsprocédé te doorstaan.

De aandacht wordt erop gevestigd, dat een houder ook meerdere identificatie-inrichtingen met dezelfde informatie-inhoud kan dragen. Hierdoor is de leesbaarheid van de informatie verbeterd. Zelfs kan men gebruik maken van een

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zich geheel over de omtrek van een houder uitstrekkende code, zodanig dat deze code van alle kanten van de houder gelijkelijk zichtbaar is. Zo kan bijvoorbeeld een strook kleefband rond het buitenoppervlak van een houder worden geplakt. De strook kleefband draagt over zijn breedte bijvoorbeeld een streepjescode, die in dit geval bestaat uit een aantal in hoofdzaak coaxiale ringen die in de langsrichting van de houder op afstand van elkaar zijn gelegen.

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X Sch/sm/GB-3

CONCLUSIES

1. Houder voor vloeibare of pasteuze, gekleurde massa, welke houder de algemene vorm van een beker met een eventueel afsluitbare mondopening vertoont,

gekenmerkt door

een met de houder verbonden identificatie-inrichting voor het ondubbelzinnig identificeren van de houder.

2. Houder volgens conclusie 1, **met het kenmerk**, dat de identificatie-inrichting van het optisch leesbare type is.

3. Houder volgens conclusie 1, **met het kenmerk**, dat de identificatie-inrichting een transponder omvat.

4. Houder volgens conclusie 1, **met het kenmerk**, dat de identificatie-inrichting van het wisbare en schrijfbare type is.

5. Houder volgens conclusie 1, **met het kenmerk**, dat de houder van kunststof is vervaardigd en dat de identificatie-inrichting daarin is ingebed.

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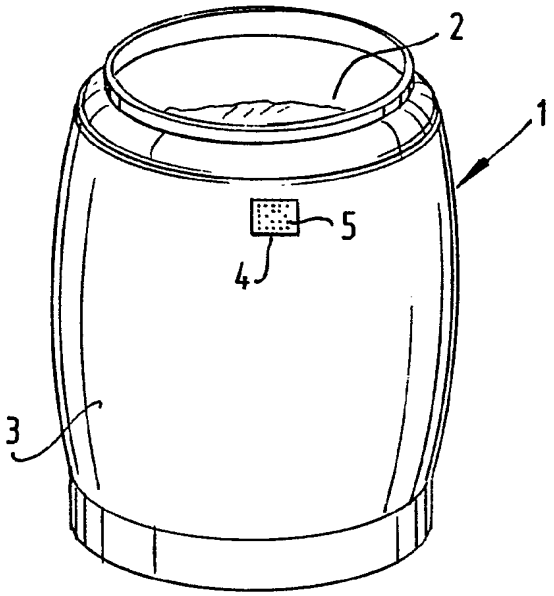


FIG.1

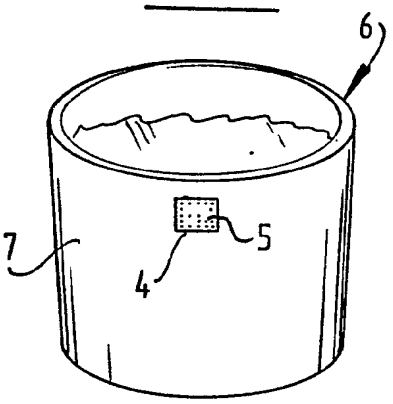


FIG.2

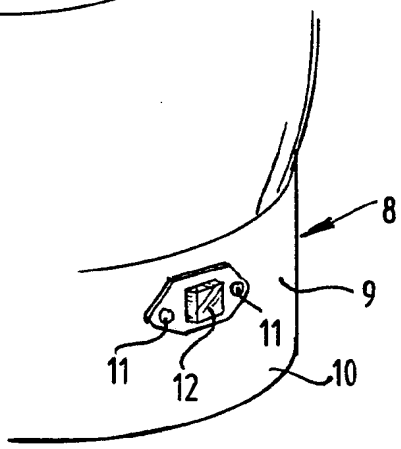


FIG.3

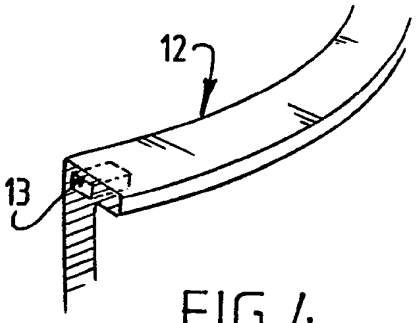


FIG.4

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

(11) Publication number: **0 339 807 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **89303244.1**

(51) Int. Cl.[4]: **B65D 81/34 , H05B 6/64**

(22) Date of filing: **03.04.89**

(30) Priority: **11.04.88 GB 8808458**

(43) Date of publication of application:
02.11.89 Bulletin 89/44

(84) Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

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(54) Food containers.

(57) A tray-type food container for food which is to be heated or re-heated in the container comprises both a flat outer lid (14) heat-sealed to a horizontal flange (12) on the tray (11) and a perforated inner lid (16) of substantially rigid and preferably transparent material which is supported on a step (18) in the wall (13) of the tray and is shaped so as to extend above the level of the step and to provide finger holes (21) whereby it may be grasped and removed after the outer lid has been removed. The inner lid (16) may support the outer lid (14) flush with the flange (12). The flange (12) may have a peripheral groove (23) to form a guide for a knife (24) for removal of the outer lid (14). The flange (12) may also carry heating instructions in a machine readable code. A vending machine comprising a microwave oven (31) may be provided with means for selecting a container from a number of stacks (34) and with means (51,52,53) for reading the coded heating instructions and regulating the energy supply to the microwave oven (31) accordingly.

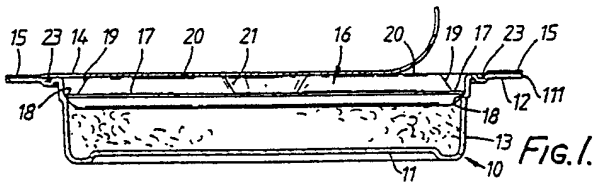


FIG. 1.

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FOOD CONTAINERS

This invention relates to food containers and more particularly to containers for foods which are to be heated or re-heated in the container. In one particular form, it is especially concerned with food containers for use in conjunction with a vending machine incorporating a microwave heating oven for dispensing selected hot foods in the container.

Food containers are known comprising a tray with a horizontal flange extending outwardly from an upwardly extending wall around its periphery, and a flat outer lid heat-sealed to the horizontal flange all around its periphery. The outer lid is normally removed before heating the contents to allow escape of steam or expansion of gases. With such a container, once the outer lid has been removed the contents are fully exposed to the atmosphere and, if hot, will cool rapidly as well as being liable to be spilt or splashed out of the tray when the latter is being handled prior to consumption of the contents.

According to the present invention, in a food container comprising a tray with a horizontal flange extending outwardly from an upwardly extending wall around its periphery, and an outer lid heat-sealed to the horizontal flange all around its periphery, a perforated inner lid is supported within the container so as to permit venting when the outer lid has been removed and the food is heated in the container. Preferably the perforated inner lid is of substantially rigid material, is supported on a step in the wall and is shaped so as to extend above the level of the step and to provide finger holds whereby it may be grasped and removed after the outer lid has been removed. The inner lid can be left in position during heating of the contents of the container, because the perforations allow for escape of steam or expansion of gases. It helps to prevent spilling or splashing of the food out of the container and delays cooling of the hot food, but it can readily be removed to allow consumption of the food, e.g. by use of the finger holds mentioned above.

Preferably the inner lid extends above the level of the step to such an extent as to support the outer lid flush with the horizontal flange. For example, the inner lid may have a peripheral flange for seating on the step in the wall, an inclined portion extending upwardly from the peripheral flange and a flat top portion supporting the outer lid. Indented formations may be provided in the inclined portion on opposite sides of the inner lid to form the finger holds.

Preferably the inner lid is transparent, so that the contents of the container can be seen when the outer lid has been removed.

The horizontal flange may advantageously be extended at two opposite locations to form a pair of handles for carrying the container.

The horizontal flange is preferably formed with a groove extending around its upper surface to form a guide for a knife for removal of the portion of the outer lid which lies within the area bounded by the groove.

The tray is preferably formed of a laminate of a metal and a polymer, or of a laminate of different polymers chosen to provide the laminate with a high barrier to oxygen permeation.

Specific embodiments of the invention will now be described in more detail by way of example and with reference to the accompanying drawings in which:-

Figure 1 is a vertical cross-section through a food container in accordance with the invention,

Figure 2 is a plan view of the food container of Figure 1,

Figure 3 is a plan view of the inner lid,

Figure 4 is a perspective view from above of the container of Figures 1 and 2, showing removal of the outer lid,

Figure 5 is an exploded perspective view of the container,

Figure 6 is a diagrammatic elevation of a vending machine for use with containers in accordance with the invention,

Figure 7 is a diagrammatic plan view of the machine of Figure 6, and

Figure 8 is a diagrammatic sectional view of the loading station of the machine of Figures 6 and 7.

As illustrated in Figures 1 to 5, a food container 10 intended for containing food which is to be heated or re-heated in the container, e.g. in a vending machine incorporating a microwave oven, comprises a substantially rectangular tray 11 with a horizontal flange 12 extending outwardly from an upwardly extending wall 13 around its periphery and a flat outer lid 14 heat-sealed to the horizontal flange 12 in a marginal zone 15, all around the periphery of the flange. At the ends 111 of the rectangular tray 11, the flange 12 is extended so as to be wider than it is along the sides of the tray, in order to provide a convenient pair of handles for carrying the tray. The tray 11 is preferably made of a laminate of a metal and polymer, e.g. as described in our co-pending British Patent Application No. 8724237.

The container 10 further comprises an inner lid 16 (shown in plan view in Figure 3) of substantially rigid material, e.g. of a transparent polymeric ma-

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terial. The inner lid 16 has a peripheral flange 17 which is seated on an inward step 18 in the wall 13 of the tray. The inner lid 16 also has an inclined portion 19 extending upwardly from the peripheral flange 17 and a flat top portion 20 which supports the outer lid 14 flush with the horizontal flange 12 of the tray. The inclined portion 19 is formed with indented formations 21 on opposite sides of the inner lid to form finger holds whereby the inner lid 16 may be grasped and removed after the outer lid 14 has been removed. The flat top portion 20 of the inner lid is formed with perforations 22 to allow escape of steam or expanding gases during heating of the contents of the container.

The horizontal flange 12 is formed with a groove 23 extending around its upper surface to form a guide for a knife (shown at 24 in Figure 4) for removal of that portion of the outer lid 14 which lies inside the marginal zone 15 and the groove 23.

When the food container 10 is intended for microwave heating or re-heating of its contents, especially in a vending machine incorporating a microwave oven, heating instructions in a machine readable code are provided on the outer lid 14 or on the tray 11, located so that they can be read by a reading head such as that shown at 52 in Figure 8, arranged to supply an appropriate control signal to the microwave oven. The instructions may, for example, comprise apertures in the flange 12, as indicated diagrammatically at 25, for use with an optical reading head comprising a light source and a plurality of photo cells arranged to receive light from the source through the apertures. In that case, the outer lid will be transparent or will be formed with apertures corresponding to those in the flange 12.

Alternatively, the heating instructions may comprise blind recesses or depressions in the flange 12, for cooperating with an electromechanical reading head (not shown) comprising an array of resiliently mounted pins coupled to micro-switches.

A vending machine suitable for using containers as described above is diagrammatically illustrated in Figures 6 to 8. It comprises an oven enclosure 30 enclosing a microwave oven 31 energised by a magnetron 32 and mounted on top of a magazine 33 containing a number of stacks 34 of containers 10 as described above, all being of a standard size and shape and having inner lids 16 and outer lids 14. As shown in Figure 7, the magazine 33 may be in the form of a rotary carousel containing, for example, five stacks 34 of containers 10 containing five different varieties of food. Five selector buttons 35 are accordingly provided on the oven enclosure 30 and connected to a drive mechanism such that on pressing one of the buttons 35 the corresponding stack 34 is brought to a position for introducing the topmost tray into the oven 31 (position A as shown in Figure 7).

The microwave oven 31 is so dimensioned that its horizontal dimensions exceed those of the tray 11 by substantially 10mm, so as to allow a gap of 5mm between the flange 12 and the oven walls to prevent arcing while the vertical dimension is chosen to ensure that a true resonant cavity is produced for microwave radiation of the wavelength used. The radiation is introduced through a waveguide 321 into the top of the tray 11 in the oven 31. It is found that this dimensioning and arrangement of the microwave oven results in particularly rapid and efficient heating of the food.

Figure 8 illustrates diagrammatically an arrangement for introducing the tray 11 of the uppermost container 10 into the microwave oven 31 (position B in Figure 7). In this arrangement, the microwave oven 31 has vertically movable entry and exit doors 36,37 whose movement is controlled by a lift cam 38 mounted on a rotary shaft 39. The stack 34 of containers 10 is constantly urged upwardly, e.g. by a pair of weights 40 attached to a cradle 41 by wires 42 passing over pulleys 43. A horizontally movable pusher element 44 normally lies over the top of the uppermost container 10, but when a button 35 has been pressed the pusher 44 is withdrawn by rotation of a desmodromic cam 45 to the position shown in Figure 8 which allows the uppermost container 10 to rise into contact with a cutting mechanism 46 for removal of the outer lid 14. The cutting mechanism 46 may consist of, for example, a series of vertical knives 47 (only one of which is seen in Figure 8) which are driven around a rectangular course by a motor 48 to sever the outer lid 14 on a line coinciding with the peripheral groove 23 in the flange 12. When the outer lid 14 has been severed, the pusher 44 is urged by the cam 45 to the left as seen in Figure 8. At the same time, through a mechanical connection diagrammatically indicated as a shaft 49, the lift cam 38 lifts the entry and exit doors 36 and 37 so that the tray 11 can be pushed into the oven 31. As the tray 11 reaches the appropriate heating position in the oven 31, an optical reading head comes into operation as follows: A beam of light 50 from a lamp 51 impinges on the flange 12 and a sensor 52 picks up the heating instructions from the coded information 25 and passes them to a microprocessor 53 which then determines the appropriate supply of energy to the microwave oven 31, and closes the doors 36,37.

On completion of the appropriate degree of heating, as determined by the microprocessor 53, the entry and exit doors 36,37 are again raised. The customer can then reach into the oven and remove the container 10, or a separate removal mechanism may be provided.

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Claims

1. A food container comprising a tray with a horizontal flange extending outwardly from an upwardly extending wall around its periphery, and outer lid heat-sealed to the horizontal flange all around its periphery, characterised by a perforated inner lid is supported within the container so as to permit venting when the outer lid has been removed and the food is heated in the container.

2. A food container according to claim 1 wherein the perforated inner lid is of substantially rigid material, is supported on a step in the wall, and is shaped so as to extend above the level of the step and to provide finger holds whereby it may be grasped and removed after the outer lid has been removed.

3. A food container according to claim 2 wherein the inner lid extends above the level of the step to such an extent as to support the outer lid flush with the horizontal flange.

4. A food container according to claim 2 or 3 wherein the inner lid has a peripheral flange for seating on the step in the wall, an inclined portion extending upwardly from the peripheral flange and a flat top portion supporting the outer lid.

5. A food container according to claim 4 wherein indented formations are provided in the inclined portion on opposite sides of the inner lid to form the finger holds.

6. A food container according to any one of the preceding claims wherein the inner lid is transparent.

7. A food container according to any one of the preceding claims wherein the horizontal flange is extended at two opposite locations to form a pair of handles for carrying the container.

8. A food container according to any one of the preceding claims wherein the horizontal flange on the tray is formed with a groove extending around its upper surface to form a guide for a knife for removal of the portion of the outer lid which lies inside the area bounded by the groove.

9. A food container according to any one of the preceding claims wherein the tray is formed of a laminate of a metal and a polymer.

10. A food container according to any one of the preceding claims 1 to 8 wherein the tray is formed of a laminate of different polymers chosen to provide the laminate with a high barrier to oxygen permeation.

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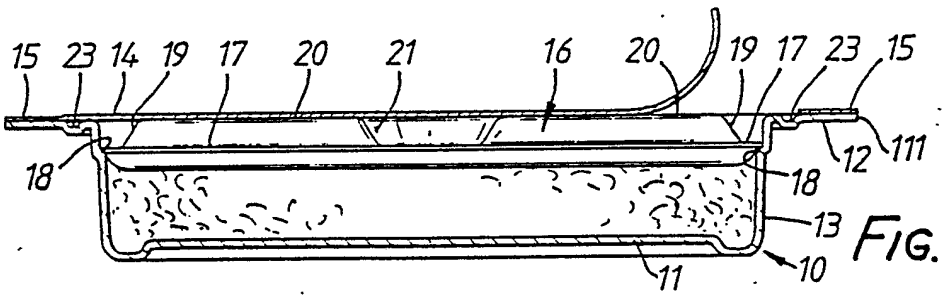


FIG. 1.

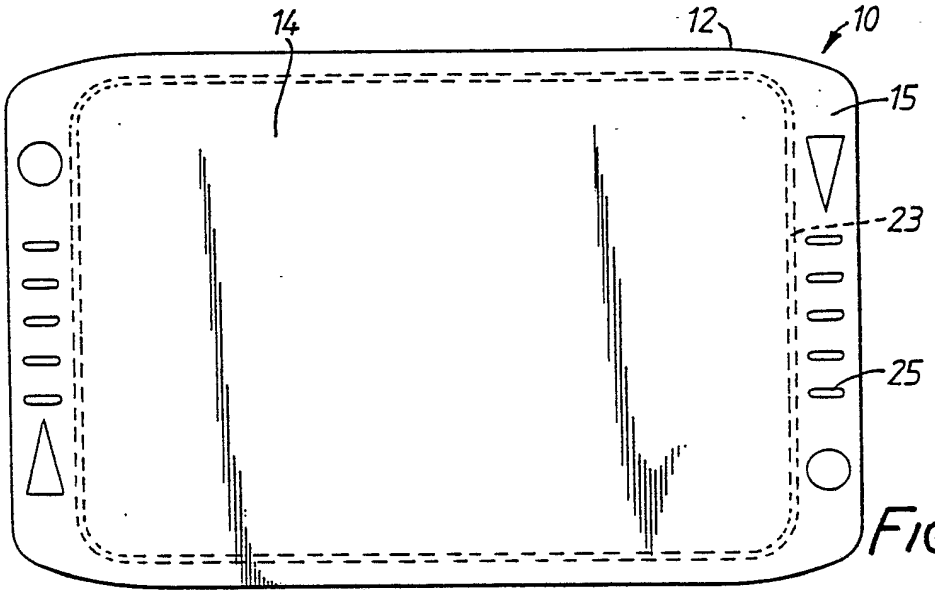


FIG. 2.

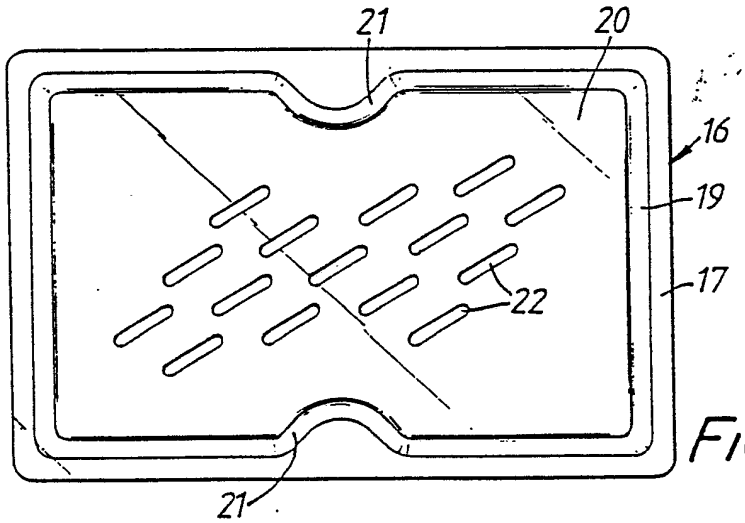


FIG. 3.

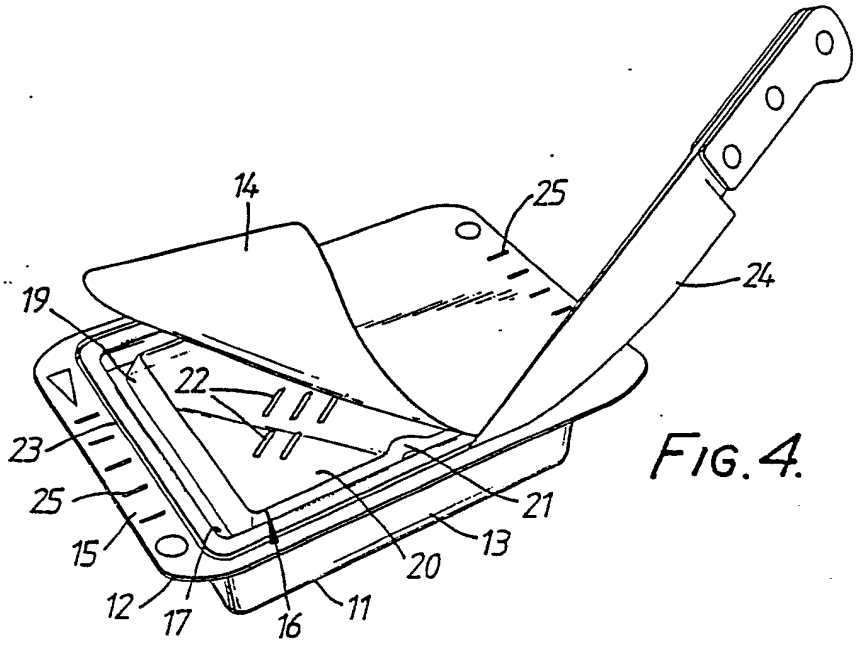

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FIG. 4.

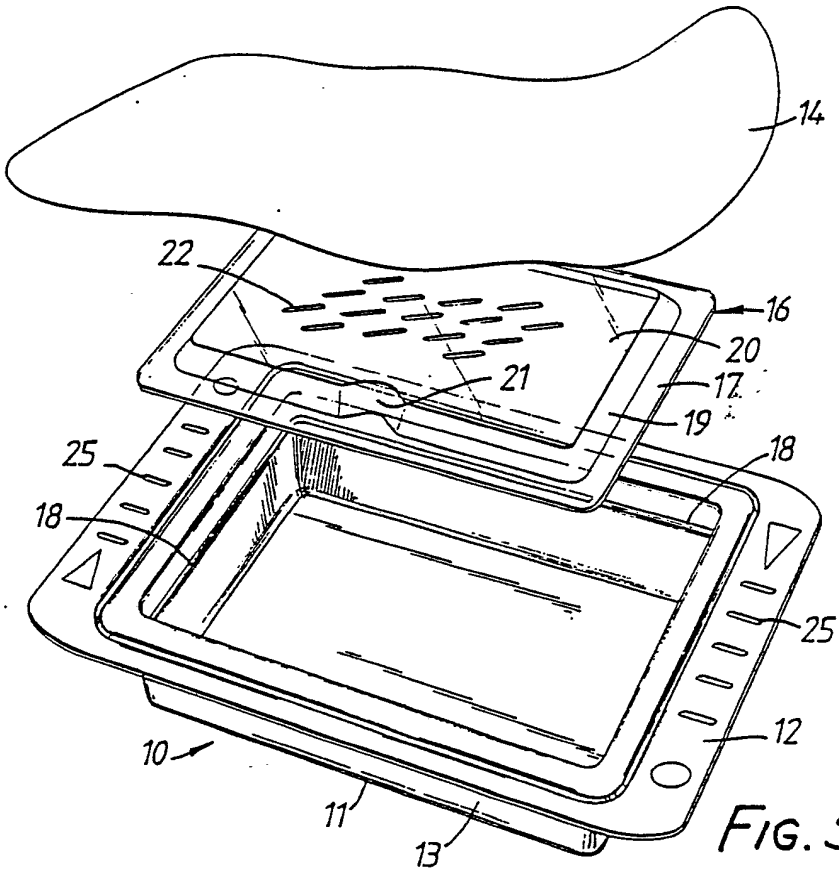

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FIG. 5.

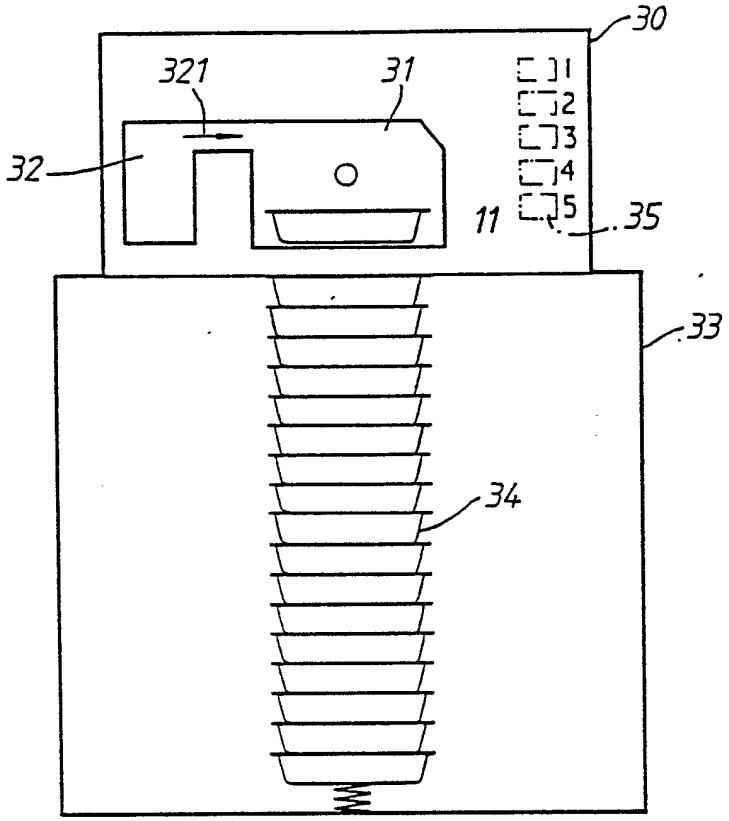


FIG. 6.

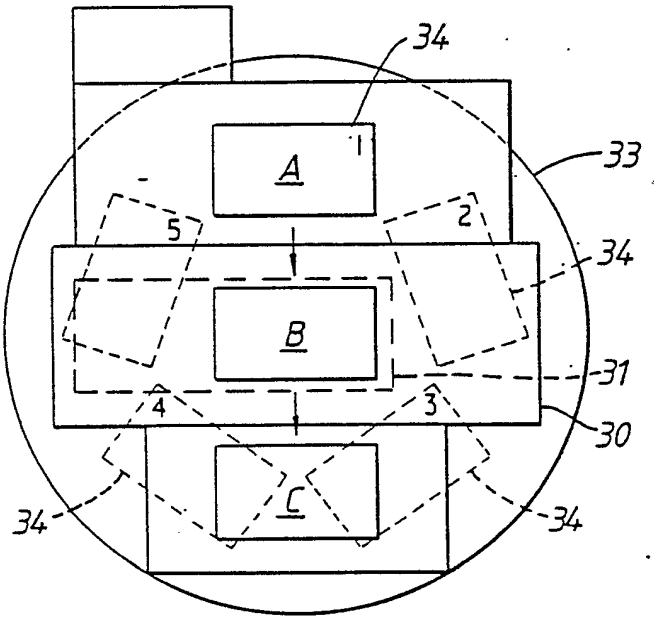


FIG. 7.

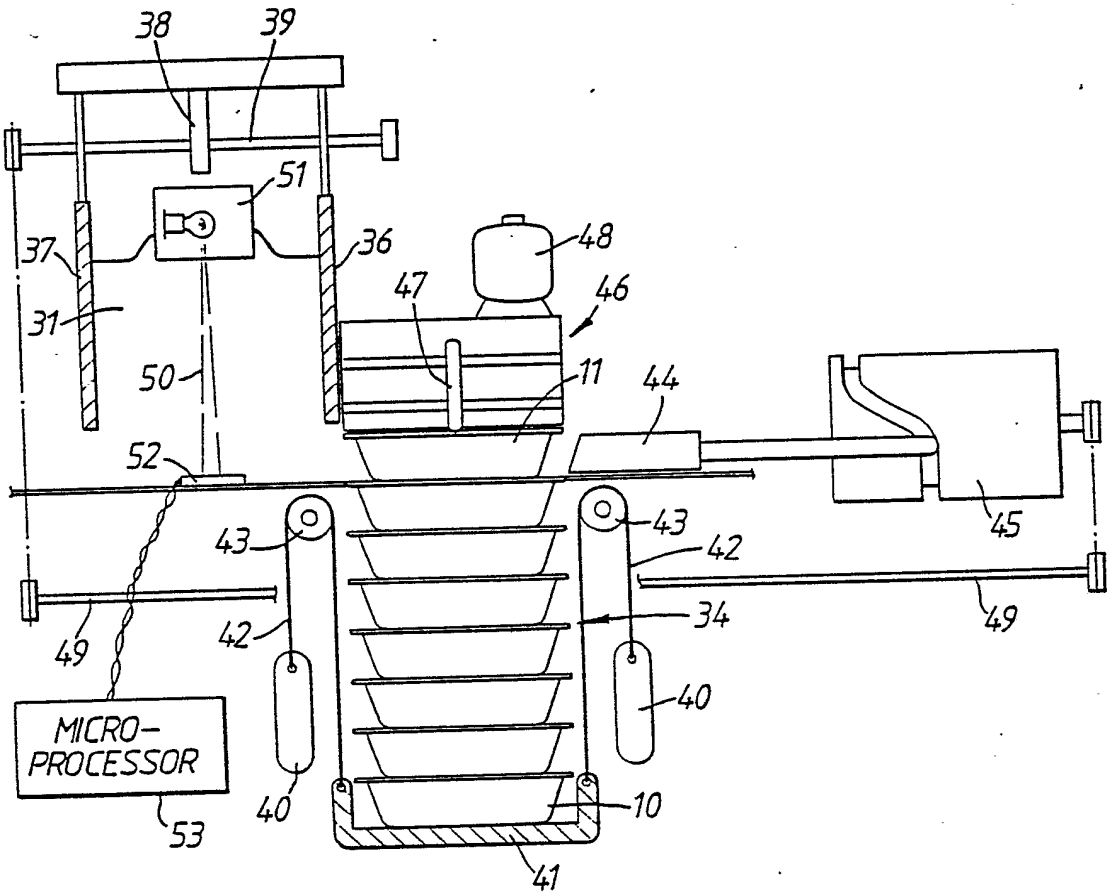

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MICRO-
PROCESSOR
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FIG. 8.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 30 3244

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.4)
A	US-A-4 574 174 (McGONIGLE) * Abstract; figures 1-6; claims 1-2 * ---	1-10	B 65 D 81/34 H 05 B 6/64
A	FR-A-1 528 638 (TANGUY et al.) * Whole document * -----	1-6	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

G 07 F
B 65 D
H 05 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24-07-1989	GUIVOL,O.

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 (P0401)

(19)日本国特許庁（ＪＰ）　(12)特　許　公　報（Ｂ２）　(11)特許出願公告番号

特公平8－18680

(24)(44)公告日　平成８年(1996)２月28日

(51)Int.Cl.[6]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｂ６５Ｇ　51/04		Ｚ		
	１０１	Ｚ		
51/42				
Ｃ１２Ｍ　1/00		Ｚ		

請求項の数７(全　９　頁)

(21)出願番号　特願平2－100883

(22)出願日　平成２年(1990)４月17日

(65)公開番号　特開平3－297728

(43)公開日　平成３年(1991)12月27日

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(54)【発明の名称】　サンプル輸送装置

【特許請求の範囲】

【請求項１】分析すべきサンプルを小径円筒状カプセルに封入するためのサンプリング手段と、上記カプセルに封入されたサンプルを分析するための分析手段と、上記サンプリング手段が出力したカプセルを上記分析手段に移送するための管状の輸送手段とを備えた、サンプル輸送装置であって、

上記サンプリング手段の出力側には、採取したサンプルに関する情報を記録したバーコードをカプセルに自動的に貼付するためのバーコード自動ラベリング装置と、

上記分析手段の入力側には、カプセルに貼付されたバーコードを自動的に読み取るためのバーコードリーダとを備え、

カプセルとともにサンプルに関する所望の情報を上記サンプリング手段から上記分析手段に自動的に輸送することによって、上記サンプリング手段と上記分析手段とにおいて、互いに独立して且つ自動的にサンプルに関する情報管理をすることができる、

ことを特徴とするサンプル輸送装置。

【請求項２】上記バーコード自動ラベリング装置は、上記輸送手段内のカプセルを所定の位置に停止させて保持するための停止保持手段と、貼付すべきバーコード紙を吸着保持するための吸着保持手段と、一対の互いに離間したローラを一端に備えたスライド手段とを備え、

上記一対のローラと上記吸着保持手段に保持されたバーコード紙の一端とを、上記停止保持されたカプセルの側面に当接させ、上記バーコード紙をカプセルの側面に押圧しながら上記吸着保持手段を移動させることによってカプセルを軸線を中心として回転させ、バーコードのバーがカプセルの軸線方向と平行になるようにカプセルの

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側面にバーコード紙を巻き付けて貼付する、
ことを特徴とする請求項（１）に記載の装置。
【請求項３】上記停止保持手段は、上記輸送手段を横断し且つ選択的にカプセルを通過させる貫通孔を有するターンテーブルであり、
上記吸着保持手段は、その端面に複数の吸引孔を備え、バーコードプリンタが出力したロール紙から剥離したバーコード紙を端面に吸着することのできるラベラーヘッドであり、
上記スライド手段はローラを介して偏心カムに当接するように付勢されており、上記偏心カムの作用により、上記一対のローラがカプセルの側面に当接する位置と側面から後退した位置との間で往復運動するようになり、
上記ラベラーヘッドは、ロール紙から剥離したバーコード紙を端面に吸着する位置と、カプセルの側面にバーコード紙を貼付する位置との間で回動することができ、上記スライド手段の運動方向と平行に往復運動することができ、且つカプセルの側面に当接してカプセルを回動させる方向に往復運動することができる、
ことを特徴とする請求項（２）に記載の装置。
【請求項４】上記ラベラーヘッドを回動させる手段は、正逆回転するモータの回転シャフトであり、
上記ラベラーヘッドをスライド手段の運動方向と平行に往復運動させる手段は、上記ラベラーヘッドに連結されたリニアソレノイドであり、
上記ラベラーヘッドをカプセルが回動する方向に往復運動させる手段は、正逆回転するモータの螺刻された回転シャフトと螺合するねじ機構であり、
上記ロール紙からバーコード紙を剥離させる手段は、鋭角的なエッジを有する部材である、
ことを特徴とする請求項（３）に記載の装置。
【請求項５】上記バーコードリーダは、上記輸送手段内のカプセルを所定の位置に停止させて保持するための第２の停止保持手段と、上記カプセルを回転させるための回動手段と、回転するカプセルに貼付されたバーコードを読み取るためのバーコードリーダヘッドとを備えている、
ことを特徴とする請求項（１）乃至（４）のうちいずれか１項に記載の装置。
【請求項６】上記第２の停止保持手段は、上記輸送手段を横断し且つ選択的にカプセルを通過させる貫通孔を有するターンテーブルであり、
上記回動手段は、一対の互いに離間したローラを一端に備えた第１のスライドテーブルと、モータによって回転駆動される１つの駆動ローラを一端に備えた第２のスライドテーブルとからなり、
上記一対のローラと駆動ローラとをカプセルの側面に当接させ、駆動ローラを回転駆動することによってカプセルを回転させる、
ことを特徴とする請求項（１）乃至（５）のうちいずれか１項に記載の装置。
【請求項７】上記第１のスライドテーブルは、ローラを介して偏心カムに当接するように付勢されており、上記偏心カムの作用により、上記一対のローラがカプセルの側面に当接する位置と側面から後退した位置との間で往復運動するようになり、
上記第２のスライドテーブルは、上記第１のスライドテーブルの運動方向と反対の向きに同じ距離だけ移動するようにワイヤ連結されている、
ことを特徴とする請求項（１）乃至（６）のうちいずれか１項に記載の装置。
【発明の詳細な説明】
産業上の利用分野
本発明は液体、気体等のサンプルを輸送するサンプル輸送装置に関し、更に詳細には、サンプルを封入したカプセルとともにバーコードを利用して各サンプルの情報も輸送することのできる、サンプル輸送装置に関する。
従来の技術
本発明者らは、微生物培養槽から培養液を採取して、採取したサンプルの生産物濃度、pH、成分等の分析を目的として、採取地から遠隔地点にある分析装置までサンプルを自動的に輸送するサンプル輸送装置を特開昭60－232323号明細書に開示している。
第４図は、培養槽から分析器までの遠隔距離をサンプル輸送装置で連結した従来のシステムの概略図である。上記サンプル輸送システムは、財団法人バイオインダストリー協会が昭和62年９月１日に発行した「バイオインダストリの装置と機器」の第175頁乃至第179頁に本発明者らの論文として本出願人の名前で掲載されている。
上記システムでは、培養液は、培養条件の異なる複数の培養槽１（同図では１つの培養槽しか示していない）から、これに対応するサンプリング容器、即ちフローセル２にペリスタルポンプ３によって汲み上げられ、各フローセル２で一時トラップされた後、培養槽に還流するようになっている。各フローセル２内の培養液はシリンジ４によってサンプリングされる。培養液をサンプリングしたシリンジ４は回転テーブル５上のカプセル６の位置に移動して、カプセル６内に培養液を注入する。注入を終えたシリンジ４は洗浄水容器７の位置に移動して洗浄される。
カプセル内への培養液の注入は、カプセル蓋部のゴムパッキンをシリンジ先端が穿孔してなされる。注入後のカプセルは、気密が保持される。上記回転テーブル５には、カプセルフィーダ８から順次カプセルが送られ、次の工程に備えられる。上記フローセル２、シリンジ４、回転テーブル５、洗浄水容器７及びカプセルフィーダ８は、殺菌槽９及びエアフィルタ10を備えたクリーンボックス11内に配設されている。
培養液が注入されたカプセル６は、弁14を介して導入される加圧空気の作用により輸送管12を介して第１の回

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転分配器13の入力側に輸送される。輸送管12は、各クリーンボックス11と第１の回転分配器13の入力側とを連結しており、その本数はクリーンボックスの数に相当している。第１の回転分配器13の出力側から出たカプセル６は主輸送管16を介して、第２の回転分配器18の入力側に輸送される。第２の回転分配器18を介して目的に応じた分析経路が選択され、カプセル６は輸送管12を介して所望の分析器に連結されたクリーンボックス19の中へ移送される。

上記第１の回転分配器13を介在させることにより、培養条件の異なる複数の培養槽から多種のサンプリングが可能になり、第２の回転分配器18を介在させることにより、液体クロマトグラフィー、アミノ酸分析器等の各種分析器のうち所望の分析器を随時使用することが可能になる。

所望の分析器に連結されたクリーンボックス19に輸送されたカプセル６は、回転テーブル20上に位置決めされ、回転テーブル20の回転によりシリンジ21の下方で停止する。次いで、シリンジ21は、カプセル６内から培養液を抽出して分析器用の試料容器22の上方に移動し、培養液を試料容器22に投入して分析が開始される。使用したシリンジ21は、洗浄水容器23の位置に移動して洗浄され、次の工程に備えられる。使用済のカプセル６は落下して回収される。

発明が解決しようとする課題

上述したような微生物培養における培養液の分析は、微生物生産物の高収率を維持する上で重要な情報を与える。従って、最適な培養条件、刻々と変化する培養槽内の状況を把握するためには、多数のサンプルを取り出して、できるだけ多くの情報を得る必要がある。しかしながら、上述の従来のサンプル輸送システムでは、採取されたサンプルの日時、温度、種類等の情報や所望の分析内容等の情報をサンプルとともに自動的に伝達する手段が講じられていなかった。

一般に、培養液採取室と分析室とが互いに数十メートルも離れており、更に採取工程と分析工程は必ずしも時間的に合致しないので、培養液採取室と分析室とで全く独立してサンプルの情報管理をすることが望ましいことは明らかである。しかしながら、従来のシステムでは人的手間をかけなければ、培養液採取室と分析室とで全く独立した情報管理をすることができず、従ってシステムの全自動化を達成することができないという問題があった。

また、情報伝達手段としてバーコードが公知でり、既に商品の製造年月日、場所、番号等をバーコードに記録し、記録されたバーコードを読み出して生産や販売に利用している。バーコードは商品に直接印刷したり、シールに印刷したものを商品に貼り付けて用いられている。しかしながら、特別の手段を講じない場合、培養液のカプセルのように直径13㎜程度の小径円筒形状物品では、バーコード紙をしわがよることなく確実に貼り付けること、及び貼り付けられたバーコードの焦点ボケを起こすことなく正確に読み出すことができないという問題があった。

そこで、本発明は、サンプルを封入したカプセルとともにバーコードを利用して各サンプルの情報も輸送することのできる、サンプル輸送装置を提供することを目的とする。

更に、本発明は、サンプルを封入したカプセルにバーコード紙をしわがよることなく確実に貼り付けることができ、且つカプセルに貼付されたバーコードを焦点ボケを起こすことなく正確に読み出すことのできる、サンプル輸送装置を提供することを目的とする。

課題を解決するための手段

本発明によれば、分析すべきサンプルをカプセルに封入するためのサンプリング手段と、上記カプセルに封入されたサンプルを分析するための分析手段と、上記サンプリング手段が出力したカプセルを上記分析手段に移送するための輸送手段とを備えた、サンプル輸送装置であって、上記サンプリング手段の出力側には、採取したサンプルに関する情報を記録したバーコードをカプセルに自動的に貼付するためのバーコード自動ラベリング装置と、上記分析手段の入力側には、カプセルに貼付されたバーコードを自動的に読み取るためのバーコードリーダとを備え、カプセルとともにサンプルに関する所望の情報を上記サンプリング手段から上記分析手段に自動的に輸送することによって、上記サンプリング手段と上記分析手段とにおいて、互いに独立して且つ自動的にサンプルに関する情報管理をすることができる、ことを特徴とするサンプル輸送装置を提供する。

実施例

以下、添付図面を参照して本発明のサンプル輸送装置の実施例を説明する。

第１図は、本発明によるサンプル輸送装置の一実施例を説明する概略図である。図示のサンプル輸送装置の構成は第４図に示した従来のサンプル輸送装置と類似しているが、サンプルを収容したカプセル６にバーコードを自動的に貼り付けるためのバーコード自動ラベリング装置15が第１の回転分配器13の後段に付設され、カプセルに貼り付けられたバーコードを自動的に読み出すためのバーコードリーダ17が第２の回転分配器18の前段に付設されている点が、基本的に相違している。

本発明によれば、バーコード自動ラベリング装置15を第１の回転分配器13の前段に付設してもよいし、バーコードリーダ17を第２の回転分配器18の後段に付設してもよく、目的に応じて適宜組み合わせることができる。また、第１の回転分配器13及び第２の回転分配器18を取り除いて、輸送管12をバーコード自動ラベリング装置15又はバーコードリーダ17に直接連結することもできる。

第２図は、本発明のサンプル輸送装置に適したバーコ

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ード自動ラベリング装置の一実施例の構成を示す概略図である。

図示のラベリング装置は、バーコードプリンタ30を備えている。バーコードプリンタ30は、所定の情報をバーコードにプリントしたロール紙31を出力する。ロール紙31は、鋭角的なエッジを有しバーコード紙をロール紙31から剥離させるためのエッジ部材32と、一対のピンチローラ33とを介して、巻取りローラ34によって巻き取られるようになっている。上記一対のピンチローラ33及び巻取りローラ34は、モータ35によって回転駆動される。

ラベリング装置はまた、端面に複数の吸引孔36が形成されたラベラーヘッド37を備えている。ラベラーヘッド37は、リニアソレイド38の作用により矢印Ａ方向に往復運動するようになっている。ラベラーヘッド37及びリニアソレイド38は、モータ39の回転シャフト40の回転方向に固定されており、モータ39の正逆回転運動により、ほぼ水平位置とエッジ部材32と対面する位置との間で、矢印Ｂの方向に正逆回転運動をすることができる。ラベラーヘッド37及びリニアソレイド38はまた、シャフト40を介して、別のモータ41の螺刻された回転シャフト42と螺合するねじ機構43に連結されている。従って、モータ41の正逆回転運動により、ねじ機構43は矢印Ｄの方向に、従ってラベラーヘッド37は矢印Ｃの方向に往復運動をすることができる。ラベラーヘッド37には、一対の吸引管44が連結されており、この吸引管44を介して吸引することにより、ロール紙31から剥離したバーコード紙をラベラーヘッド37の端面に吸着させることができるようになっている。

図示のラベリング装置はさらに、主輸送管16を介して移送されたカプセル６の通過を停止させるためのターンテーブル45を備えている。停止したカプセル６の上下のキャップ部分は環状ガイド46に対面し、カプセル６の中間部分は外部に開放される。ターンテーブル45は、モータ47により回転駆動される。モータ47はまた、偏心カム48を回転駆動する。偏心カム48には、スライドテーブル49がその一端に設けられたローラ50を介して当接している。スライドテーブル49は、図示を省略したばねによって偏心カム48の方向に付勢されており、偏心カム48の作用により矢印Ａと平行な矢印Ｅの方向の往復運動するようになっている。スライドテーブル49の他端には、一対のローラ51が設けられている。

ターンテーブル45には、カプセル６の最大直径よりわずかに大きい直径を有する１つの孔52が形成されている。ターンテーブル45の下方では、主輸送管16が不連続になっておりこの環状不連続部分に、ロータリソレノイド53の作用を受けたシャッタ54が介入して主輸送管16の断面を完全に覆うようになっている。シャッタ54は、マグネット55の作用により下方輸送管56の端面を密封する。下方輸送管56には、圧縮空気を導入するための入口57が形成されている。

操作において、バーコードプリンタ30から出力されたバーコード紙はエッジ部材32の位置で停止する。停止したバーコード紙に対面する位置には、ラベラーヘッド37が初期的に位置決めされており、バーコード紙がエッジ部材32の位置に停止するとリニアソレノイド38の作用によりラベラーヘッド37の端面とバーコード紙が当接する。巻取ローラ34の作用によりロール紙31が更に送られると、エッジ部材32に形成された鋭角的なエッジの作用により、ロール紙31からバーコード紙が剥離する。ロール紙31の移動とともにラベラーヘッド37も回動し、剥離したバーコード紙をラベラーヘッド37の端面に吸着する。端面にバーコード紙を吸着させながら、ラベラーヘッド37は矢印Ｂ方向に回動して水平位置に停止する。

一方、モータ47は例えば120度ずつ間歇的に回転するようになっており、カプセル６がターンテーブル45の上に停止すると、ターンテーブル45及び偏心カム48は120度回転して図示の位置に停止する。この位置ではスライドテーブル49が最もカプセル６に近接し、第2A図に示すように、一対のローラ51がカプセル６に当接する。一対のローラ51がカプセル６に当接すると同時に、正対するラベラーヘッド27もリニアソレノイド38の作用によりカプセル６に当接する。但し、カプセル６とラベラーヘッド37の初期的な当接点は、ラベラーヘッド37の一端の近傍である。次いで、ラベラーヘッド37は、ねじ機構43の作用により矢印Ｆの方向に移動する。この移動により、カプセル６及び一対のローラ51は図示のように回転する。こうして、バーコードのバーがカプセルの軸線方向と平行になるように、カプセルの筒状の中間部分に、しわがよることなく確実に、バーコード紙を貼り付けることができる。カプセルは、培養液に対する抵抗特性を考慮してテフロン等の付着性の低い材料で製造されることが多いので、バーコード紙を全周に亘って貼り付け、好ましくは一部重複させるのがよい。

カプセル６にバーコード紙が貼り付けられると、ラベラーヘッド37はエッジ部材に対面する初期位置に戻って次の工程に備える。一方、偏心カム48及びターンテーブル45は、更に120度回転して停止する。同時にスライドテーブル49はカプセルから最も離れた位置まで後退する。この状態で、ターンテーブル45の孔52はカプセル６の位置に移動してカプセル６は落下する。カプセル６が落下してターンテーブル45を通過すると、偏心カム48及びターンテーブル45は更に120度回転して初期位置に戻り、停止して次の工程に備える。

次いで、シャッタ54は、ロータリソレノイド53の作用により下方輸送管56を完全に横断する位置に移動し、マグネット55に引き付けられて下方輸送管56の端面を密封する。入口57から圧縮空気を導入して、カプセル６をバーコードリーダ17に移送する。

第３図は、本発明のサンプル輸送装置に適したバーコードリーダの一実施例の構成を示す概略図である。

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図示のバーコードリーダは、第２図に示すバーコード自動ラベリング装置15の一部のうち、図中において輸送管16より左側にある機構と類似している。大きく相違するのは、図示のバーコードリーダが、バーコードリーダヘッド58と、スライドテーブル49に正対するもう１つのスライドテーブル59とを備えている点である。

バーコードリーダヘッド58は、ターンテーブル45の上で停止するカプセル６の中間部分の表面に合焦しており、カプセルに貼付されたバーコードを読み取ることができるように位置決めされている。スライドテーブル59のカプセル側の端部には駆動ローラ60が設けられ、２つのスライドテーブル49、59はワイヤ61によって図示のように連結されている。従って、２つのスライドテーブル49、59は、矢印Ｅの方向で反対向きに同じ距離だけ往復運動するようになっている。スライドテーブル59に連結されたローラ60は、モータ62により回転駆動される。

操作において、モータ47は例えば120度ずつ間歇的に回転するようになっており、バーコード紙の貼付されたカプセル６が主輸送管16を介して移送されてターンテーブル45の上に停止すると、ターンテーブル45及び偏心カム48は120度回転して図示の位置に停止する。この位置では２つのスライドテーブル49及び59が最もカプセル６に近接し、第3A図に示すように、一対のローラ51及び駆動ローラ60がカプセル６に当接してカプセル６を固定保持する。次いで、モータ62の駆動により駆動ローラ60が回転し、この回転により駆動ローラ60に当接するカプセル６及び一対のローラ51が図示のように回転する。こうして、カプセル６の回転の間、貼付されたバーコードがバーコードリーダヘッド58によって確実に且つ正確に読み取られる。

カプセル６に貼付されたバーコードが読み取られると、偏心カム48及びターンテーブル45は更に120度回転して停止する。同時に２つのスライドテーブル49及び59はカプセル６から最も離れた位置まで後退する。この状態で、ターンテーブル45の孔52はカプセル６の位置に移動してカプセル６は落下する。カプセル６が落下してターンテーブル45を通過すると、偏心カム48及びターンテーブル45は更に120度回転して初期位置に戻り停止して次の工程に備える。

次いで、シャッタ54は、ロータリソレノイド53の作用により下方輸送管56を完全に横断する位置に移動し、マグネット55に引き付けられて下方輸送管56の端面を密封する。入口57から圧縮空気を導入し、第２の回転分配器18を介して分析器に連結したクリーンボックス19にカプセル６を移送する。

発明の効果

以上のように、本発明のサンプル輸送装置では、サンプルの採取情報及び所望の分析に関する指示情報をバーコードに記録し、記録したバーコード紙をサンプルを封入したカプセルに貼付して輸送するので、換言すれば、サンプルとともにサンプルに関する情報を一体的に輸送するので、サンプル採取側とサンプル分析側で互いに独立して且つ自動的に情報管理をすることができる。その結果、サンプル採取側とサンプル分析側が相当距離離れていても、情報の伝達が確実になり、本装置の信頼性が著しく向上するとともに、本装置を組み込んだサンプル分析システムの全自動化が可能になる。

また、請求項（２）乃至（４）の態様によれば、小径円筒状のカプセルの側面に、しわがよることなく確実にバーコード紙を貼付することができる。

更に、請求項（５）乃至（７）の態様によれば、小径円筒状のカプセルの側面に貼付されたバーコードを確実に且つ正確に読み取ることができる。

【図面の簡単な説明】

第１図は、本発明によるサンプル輸送装置の全体構成を概略的に示す図であり、

第２図は、本発明によるサンプル輸送装置に適したバーコード自動ラベリング装置の一実施例の構成を概略的に示す図であり、

第2A図は、カプセルにバーコード紙を貼付する工程を説明する図であり、

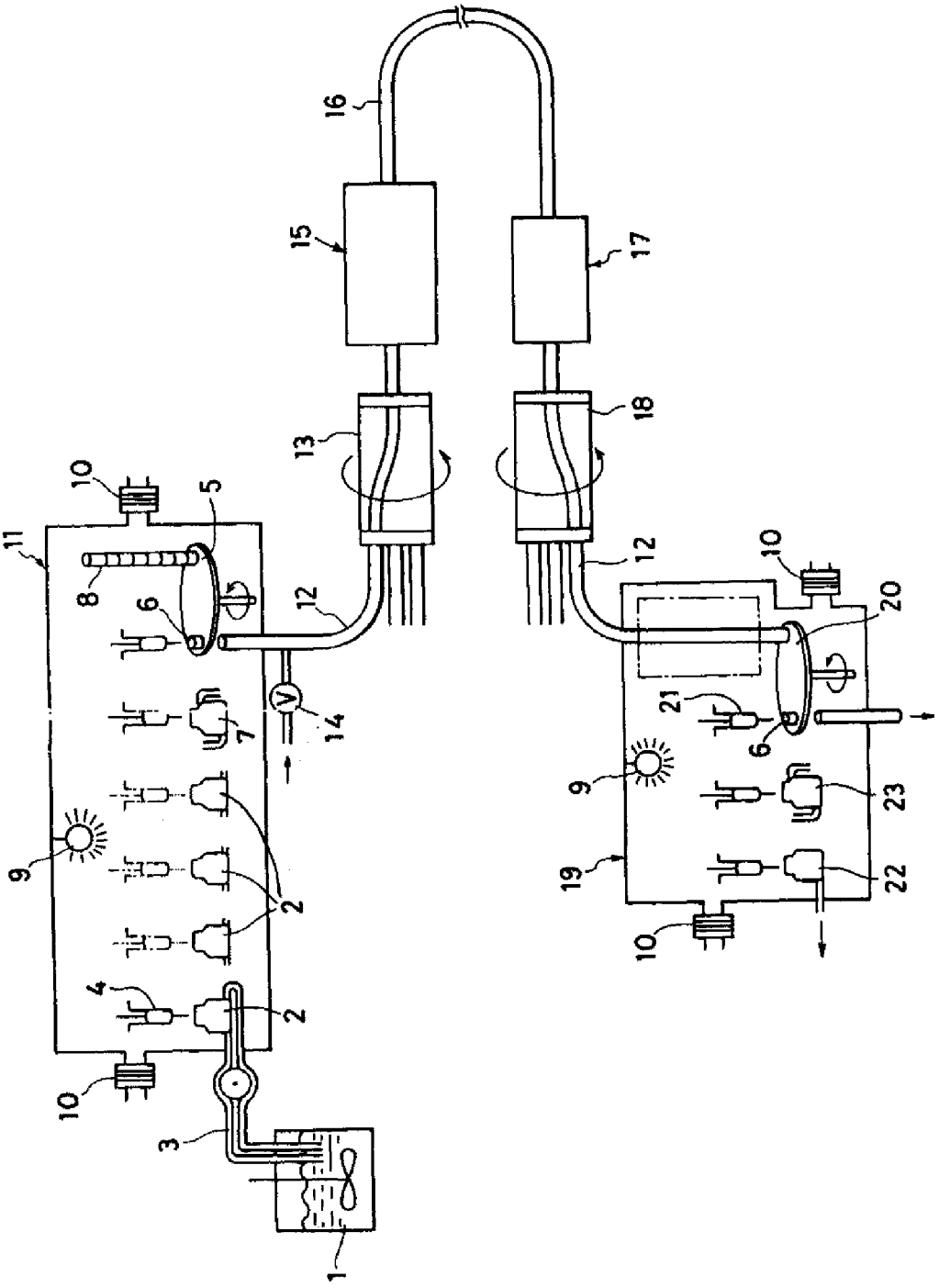
第３図は、本発明のサンプル輸送装置に適したバーコードリーダの一実施例の構成を概略的に示す図であり、

第3A図は、カプセルに貼付したバーコードを読み取る工程を説明する図であり、

第４図は、従来のサンプル輸送装置の構成を概略的に示す図である。

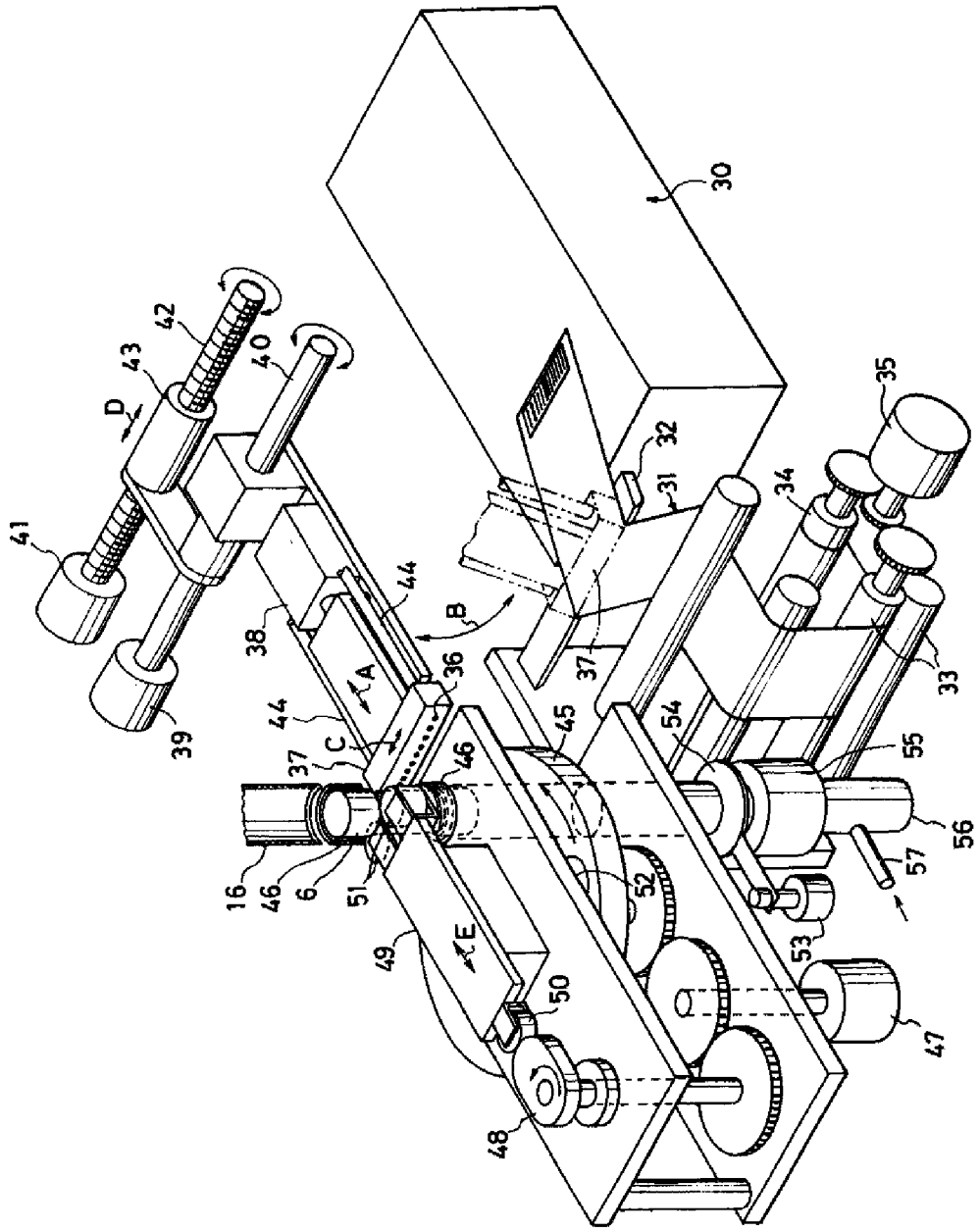
１……培養槽、
４……シリンジ、
６……カプセル、
12……輸送管、
13……第１の回転分配器、
15……バーコード自動ラベリング装置、
16……主輸送管、
17……バーコードリーダ、
18……第２の回転分配器、
30……バーコードプリンタ、
36……吸引孔、
37……ラベラーヘッド、
45……ターンテーブル、
48……偏心カム、
49……スライドテーブル、
58……バーコードリーダヘッド

【第１図】

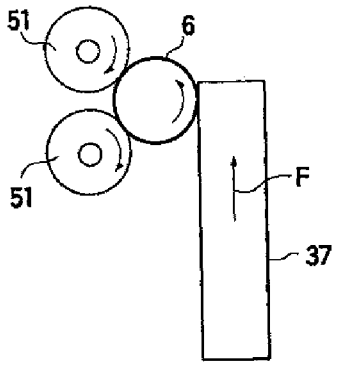


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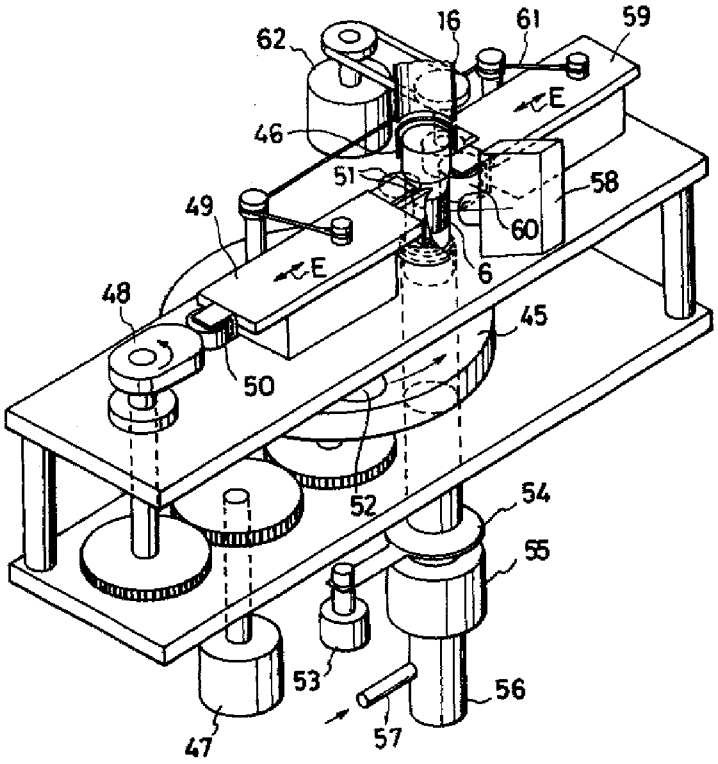
【第２図】


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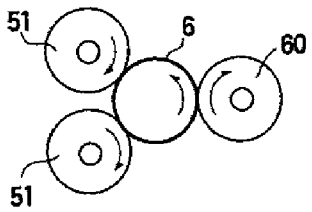
【第２Ａ図】



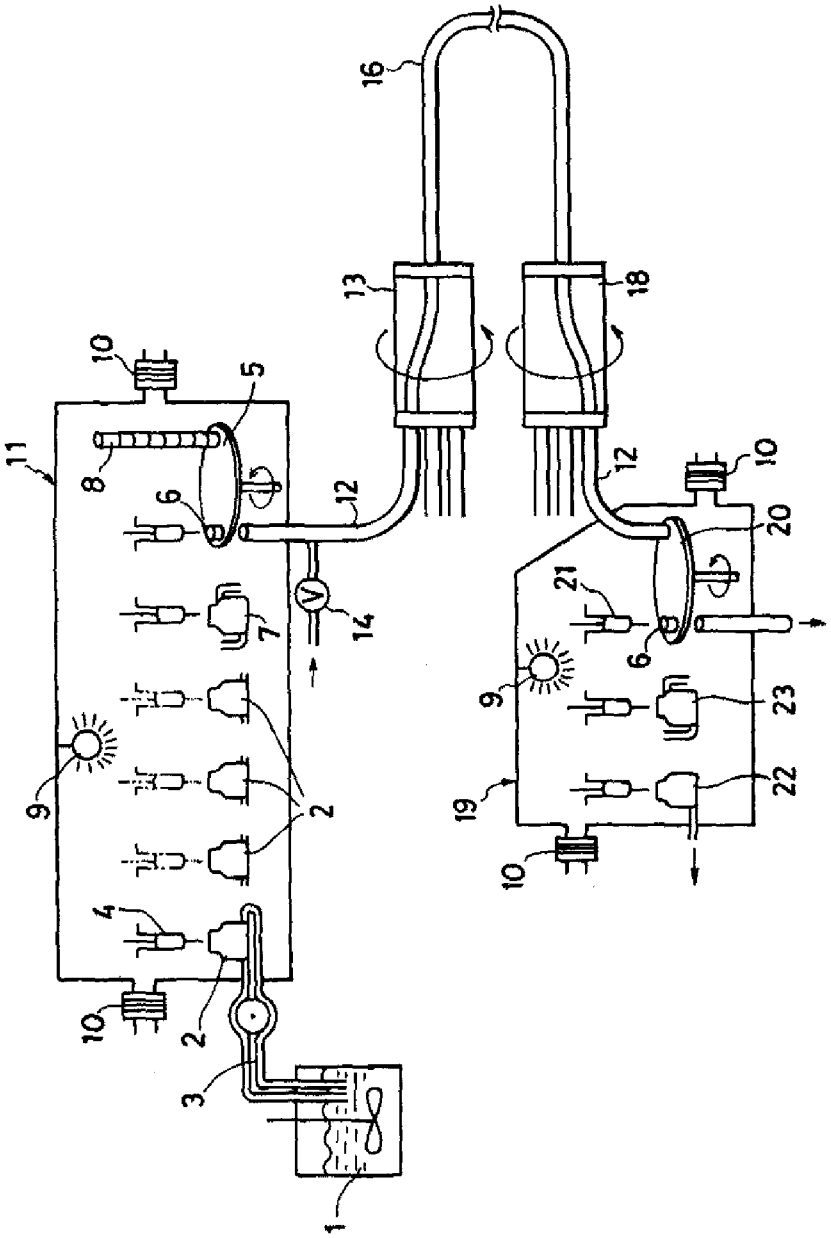
【第３図】



【第３Ａ図】



【第４図】



[19] 中华人民共和国国家知识产权局

[51] Int. Cl.
G01N 33/48 (2006.01)
G01N 35/00 (2006.01)
G01N 21/03 (2006.01)

[12] 实用新型专利说明书

专利号 ZL 200620115295.8

[45] 授权公告日 2007 年 8 月 22 日

[11] 授权公告号 CN 2938096Y

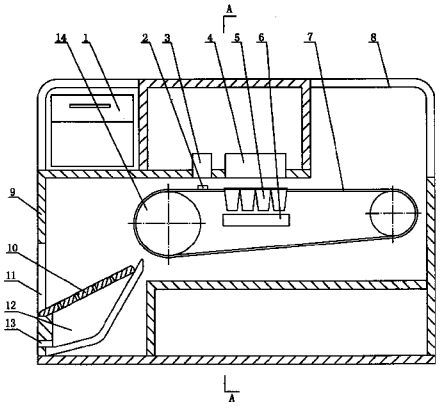
[22] 申请日 2006.5.15
[21] 申请号 200620115295.8
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代理人 何文彬
权利要求书 1 页 说明书 3 页 附图 3 页

[54] 实用新型名称

批量诊断仪及专用比色杯

[57] 摘要

本实用新型公开了一种批量诊断仪，属于批量检测血液和尿液的仪器。它包括外壳，外壳前方面板上安装有显示屏和操作面板，其特征在于外壳内腔中设置有一对带轮，其中一个带轮由电动机带动转动，两个带轮之间通过传送带相连，上侧传送带中部位置的上方和下方分别设置有光发射器和光接收器，光上侧传送带上方设置有扫描仪；传送带上设有比色杯孔；外壳上部一侧开有加样口。利用光发射器和光接收器可以对血液进行生化酶免分析，利用扫描仪可以对尿样进行分析；检测完毕后的废料从传送带下落到筛子上，其中固体废料从外壳侧壁上的废料口排出，液体废料从筛孔落入筛子下方的集液腔，然后从排液口排掉。这样不用手工取废料，避免了操作人员被感染的可能性。



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1、批量诊断仪，包括外壳，外壳前方面板上安装有显示屏和操作面板，其特征在于：外壳内腔中设置有一对带轮，其中一个带轮由电动机带动转动，两个带轮之间通过传送带相连，传送带上设有比色杯孔；外壳上部一侧开有加样口。

2、根据权利要求 1 所述的批量诊断仪，其特征在于：所述上侧传送带中部位置的上访和下方分别设置有光发射器和光接收器。

3、根据权利要求 1 或 2 所述的批量诊断仪，其特征在于：所述上侧传送带上方设置有扫描仪。

4、根据权利要求 3 所述的批量诊断仪，其特征在于：所述的扫描仪采用 CIS、CCD、COMS 感光器中的一种。

5、根据权利要求 1 所述的批量诊断仪，其特征在于：所述的离外壳的加样口较远的带轮的下方设有倾斜放置的筛子，筛子较矮的一端设在外壳的侧壁上，侧壁上开有废料出口；筛子下方设有集液腔，集液腔的侧壁上设置有排液口。

6、根据权利要求 1 所述的批量诊断仪，其特征在于：所述的带轮与传送带的接触面上设有环形凹槽。

7、根据权利要求 1 所述的批量诊断仪，其特征在于：所述的外壳的上部相对加样口的另一侧设有打印机。

8、用于权利要求 1 所述批量诊断仪的专用比色杯，包括杯体和杯沿，其特征在于：所述杯体的底部为透明。

9、根据权利要求 8 所述的专用比色杯，其特征在于：所述杯沿上套有一层保护膜，保护膜上印制有条形码。

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批量诊断仪及专用比色杯

技术领域

本实用新型涉及一种通过分析尿液或血液为诊断疾病提供参数的仪器，具体地说是可以批量对尿液或血液进行分析的批量诊断仪。本实用新型还涉及用于上述批量诊断仪的专用比色杯。

背景技术

在现代医疗技术中，对血液测试分析是常用的诊断方法，它可以非常准确的检测各种疾病。尿液化验也同样是现代医学工程和临床医学中的常规项目，是三大常规检验之一，它不仅是诊断泌尿系统疾病以及观察疗效的重要手段，也是其它疾病如内分泌系统障碍疾病的化验检查方法。目前所使用的尿液分析和血液分析的仪器是分别独立的，无法在一台机器上既进行尿液分析又进行血液分析，并且在分析时一般也只能一份一份的测，无法进行批量诊断。测完后的废料也需要由手工取出扔掉，存在感染的可能性。

发明内容

本实用新型要解决的技术问题是提供一种方便易用，清洁卫生，可以批量对血样和尿样进行分析的批量诊断仪。

本实用新型的批量诊断仪包括外壳，外壳前方面板上安装有显示屏和操作面板，外壳内腔中设置有一对带轮，其中一个带轮由电动机带动转动，两个带轮之间通过传送带相连，传送带上设有比色杯孔；外壳上部一侧开有加样口。

所述上侧传送带中部位置的上方和下方分别设置有光发射器和光接收器。

所述上侧传送带上方设置有扫描仪；

所述的扫描仪采用 CIS、CCD、COMS 感光器中的一种。

所述的离外壳的加样口较远的带轮的下方设有倾斜放置的筛子，筛子较矮的一端设在外壳的侧壁上，侧壁上开有废料出口；筛子下方设有集液腔，集液腔的侧壁上设置有排液口。

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所述的外壳的上部相对加样口的另一侧设有打印机。

本实用新型的批量诊断仪的专用比色杯，包括杯体和杯沿，杯体的底部为透明。

所述杯沿上套有一层保护膜，保护膜上印制有条形码。

将盛有血样比色杯放入传送带上的比色杯孔中，利用光发射器和光接收器可以对血液进行生化酶免分析，分析完后经过扫描仪时，由扫描仪扫描杯沿上的识别码，将血样的信息记录下了，以便将分析结与相应患者的编号对应起来；将淋有尿液的试剂条放置到传送带到上，利用扫描仪可以对尿样进行分析。检测完毕后的废料从传送带下落到筛子上，其中固体废料从外壳侧壁上的废料口排出，液体废料从筛孔落入筛子下方的集液腔，然后从排液口排掉。这样不用手工取废料，避免了操作人员被感染的可能性。

附图说明

下面结合附图和实施例对本实用新型进一步说明。

图 1 为本实用新型的批量诊断仪的结构示意图；

图 2 为图 1 所示批量诊断仪的 A－A 剖视图；

图 3 为批量诊断仪的带轮的结构示意图；

图 4 为本实用新型的用于批量诊断仪的专用比色杯的结构示意图；

图 5 为图 4 所示专用比色杯的侧剖视图；

图 6 为图 4 所示专用比色杯的俯视图。

图中：1.打印机，2.试剂条，3.扫描仪，4.光接收器，5.比色杯，6.光发射器，7.传送带，8.加样口，9.外壳，10.筛子，11.废料出口，12.集液腔，13.排液口，14.带轮；15.电动机，16.显示屏，17.凹槽，18.杯体，19.保护模，20.杯沿，21.条形码。

具体实施方式

本实用新型的批量诊断仪的一种具体实施方式如图 1 和图 2 所示，外壳 9 前方面板上安装有显示屏 16 和操作面板，外壳 9 内腔中设置有一对带轮，其中一个带轮 14 由电动机带动转动，两个带轮之间通过传送带 7 相连，传送带 7 上设有比色杯孔，为了使比色杯 5 能随传送带 7 运动，带轮 14 与传送带 7 的接触面上设有环形凹槽 17，如图 3 所示。上侧的传送带 7 中部位置的下侧设置

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有光发射器 6，上侧设置有光接收器 4，光接收器 4 的一侧设置有扫描仪 3。扫描仪与光检测器可以一同设置在诊断仪上，也可以只设其中一个。外壳 9 上部一侧开有加样口 8。在离外壳 9 上的加样口 8 较远的带轮 14 的下方设有倾斜放置的筛子 10，筛子 10 较矮的一端设在外壳 9 的侧壁上，侧壁上开有废料出口 11；筛子 10 下方设有集液腔 12，集液腔 12 的侧壁上设置有排液口 13；外壳 9 的上部相对加样口 8 的另一侧设有打印机 1。扫描仪 3 可以采用 CIS 感光器，也可以采用 CCD 感光器或 COMS 感光器。

为了应用上述批量诊断仪，提供图 4、图 5 和图 6 所示的专用比色杯，比色杯的杯体 18 底部为透明材料制成。杯体 18 的上部设置有杯沿 20。杯子口的外侧设置有保护膜 19，以防止比色杯 5 内的试剂受到污染，保护膜 19 上印制有由条形码 21。用热的或冷的开口器将保护膜 19 刺破，保护膜 19 被刺破后收缩，使比色杯口露出，将尿样或血样加入到比色杯内。将比色杯 5 放到传送带 7 上，当比色杯 5 经过扫描仪 3 下方时，扫描仪 3 可以扫描条形码，得到该比色杯的信息，包括测试项目和该杯子对应患者的信息。

如果要对血样测试分析，将待测血液或血清加入盛有试剂的比色杯 5，充分反应后，将比色杯 5 从加样口 8 放置到传送带 7 上的比色杯孔内，启动机器，电动机 15 带动带轮 14 和传送带 7 转动，当比色杯 5 运动到光发射器 6 与光接收器 4 之间时停止，光发射器 6 发出检测光，检测光穿过比色杯 5 后被光接收器 4 接收，根据特定波长的光被吸收的程度可以得出血样中相应物质的含量，从而得出诊断结果。由于传送带 7 上一次可以放置多个比色杯 5，因此可以实现对血样的批量诊断。检测完毕后，电动机 15 启动，当比色杯 5 运动到传送带 7 一端时在重力作用下脱落，比色杯 5 中的液体通过筛子 10 的孔落到集液腔 12 中，然后通过排液孔 13 排掉；比色杯 5 沿筛子 10 的斜面下落，经废料出口 11 排掉。

如果要对尿样测试分析，将待测尿液加到试剂条 2 上，然后将试剂条 2 放到传送带 7 上，传送带 7 将试剂条 2 运送到扫描仪 3 下方，扫描仪 3 将试剂条 2 的颜色扫描下来，根据试剂条 2 的颜色可以得出诊断结果。检测完毕后，转送 7 带将试剂条 2 送到筛子 10 上，从废料出口 11 排掉。

根据需要可以将检测结果从显示屏 16 上显示出来，也可以将检测结果用打印机 1 打印出来，以供患者和医生参考。

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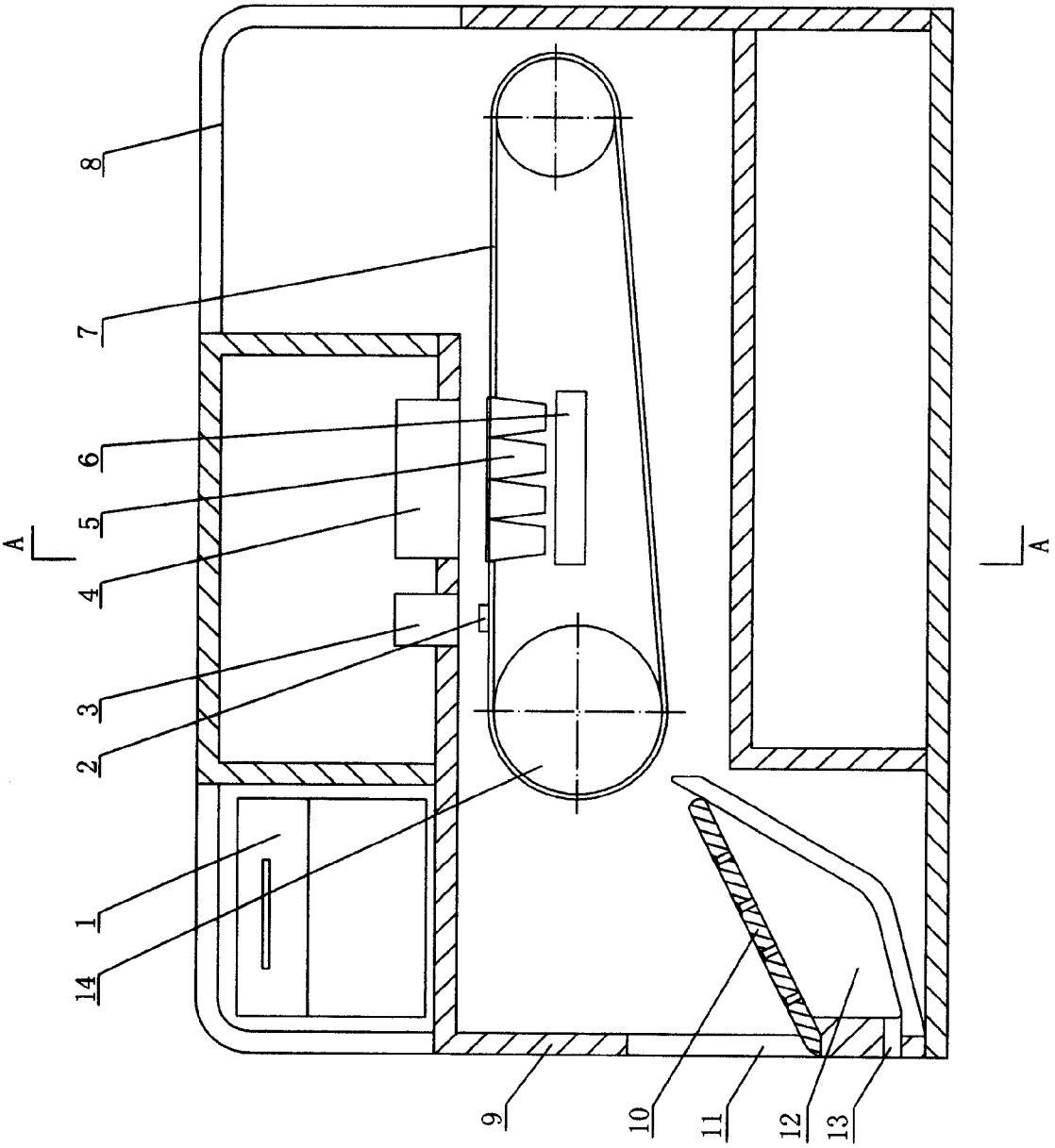


图1

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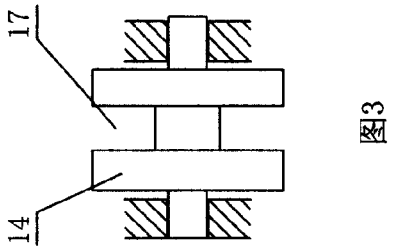


图3

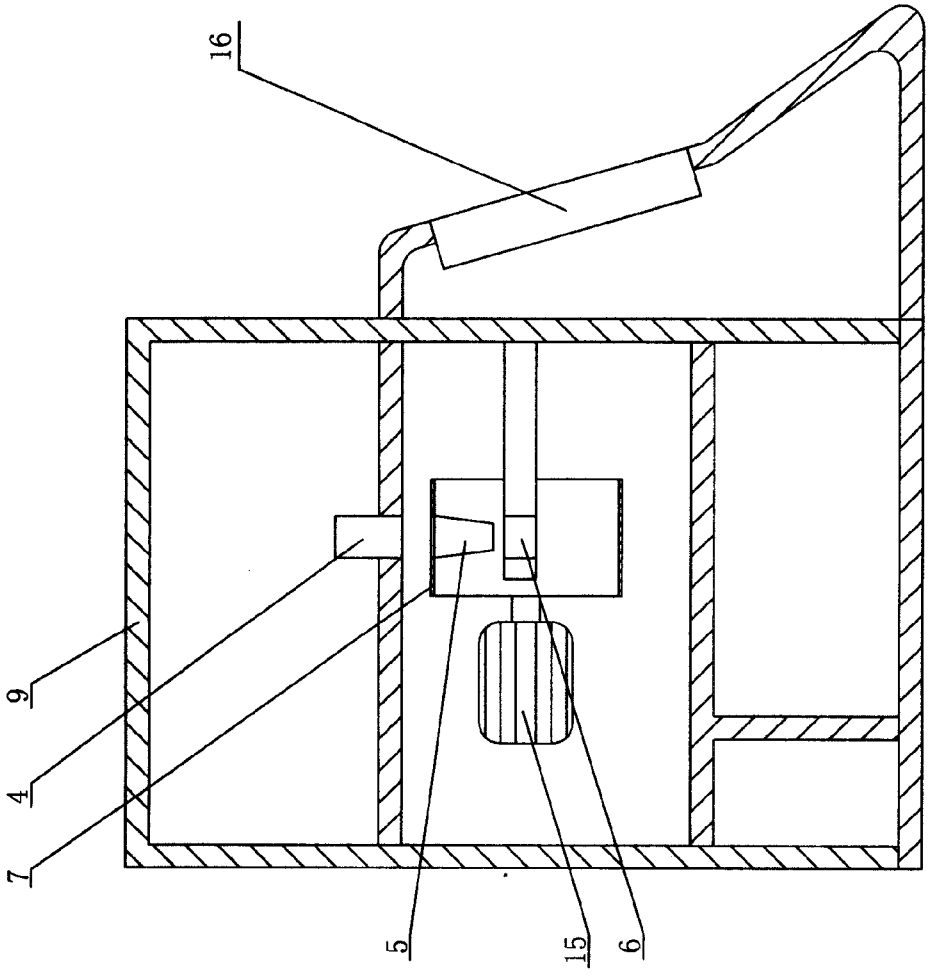


图2

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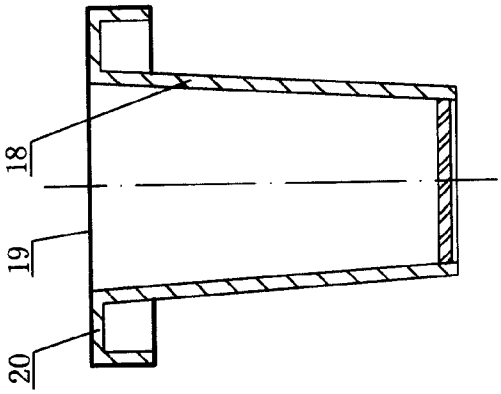


图5

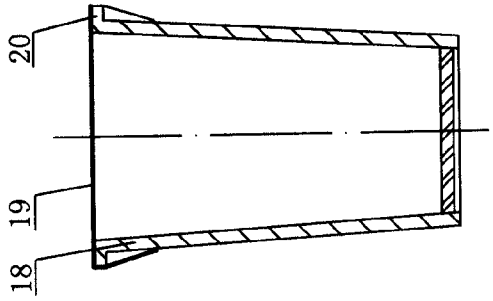


图4

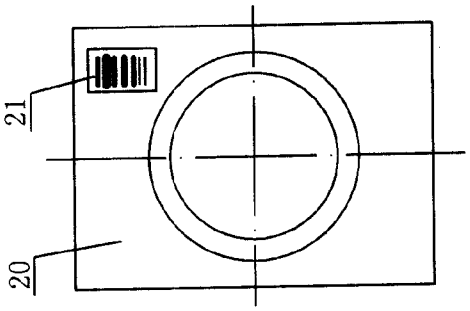


图6

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Patents CN2938096Y

Batch diagnosis instrument and special colorimetric cup

Abstract

The utility model relates to a batch diagnosis instrument, belonging to the instruments for blood and urine batch testing. The utility model comprises a crust whose front has a panel which is provided with a display screen and an operation panel. The utility model is characterized in that a couple of belt wheels are arranged in the cavity of the crust, with, one driven by an electrical motor and two being connected by a conveyer belt; a light emitter and a light receiver are respectively arranged above and under the central section of the upper conveyer belt; a scanner is arranged above the upper light conveyer belt which is provided cuvette holes; a sample feeding mouth is opened on one side of the crust top. The light emitter and the light receiver can be use to carry out biochemical ELISA analysis to blood and the scanner can be used to carry out analysis to urine. After testing, the scrap on the conveyer belt drops to a sieve, wherein the solid scrap is discharged from the scrap orifice on the side wall of the crust while the liquid scrap drops through the sieve pore to the liquid collection cavity below and then be discharged from the fluid discharge port, leaving out the handwork of scrap discharge, thus limiting the possibility of the operator being infected.

CN2938096Y

China

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Other languages: Chinese

Inventor: 李建德, 滕浩然

Worldwide applications

2006 CN

Application CN 200620115295 events

2006-05-15 Application filed by 滕浩然

2006-05-15 Priority to CN 200620115295

2007-08-22 Application granted

2007-08-22 Publication of CN2938096Y

Info: Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, Discuss

Claims (9)

Hide Dependent
translated from Chinese

1. Batch diagnostic apparatus, including a housing mounted on the front panel display and an operation panel, wherein: the housing is provided with a lumen of a pair of pulleys, wherein a pulley rotatably driven by the motor, between the two pulleys it is connected by a conveyor belt provided with holes than the cuvette belt; the upper side of the housing is opened loading opening.

The diagnostic apparatus according to claim 1 batch, wherein: said petition upper and lower sides of the central position of the conveyor belt are provided with a light emitter and a light receiver.

Diagnostic batch according to claim 1 or claim 2, characterized in that: said conveyor is provided with an upper side of the scanner.

Batch according to claim diagnostic apparatus of claim 3, wherein: said scanner uses CIS, CCD, CCMS photoreceptor of one.

Diagnostic batch according to claim 1, wherein: the screen is provided below the tilted away from the loading port housing farther pulley, one end of the screen provided on the shorter side of the housing wall, side walls are open to a waste outlet; provided with liquid collecting chamber below the screen, with a liquid discharge port provided on a side wall of the liquid collection chamber.

Diagnostic batch according to claim 1, wherein: said groove is provided with an annular contact surface of the pulley and the conveyor belt.

Diagnostic batch according to claim 1, wherein: the other side of the upper housing relative to said loading port provided with the printer.

8. A specific batch of claim 1 diagnostic cuvette, comprising a cup body and the rim, wherein: the bottom of the cup body is transparent.

According to claim 8, said specific cuvette, characterized in that: the rim of the sleeve with a layer of protective film, the protective film printed with a bar code.

Description

translated from Chinese

Batch diagnostic equipment and special cuvette

FIELD

The present invention relates to a method of providing instrument parameters by analyzing a blood or urine for the diagnosis of disease, in particular bulk batches diagnostic blood or urine analysis. The present invention further relates to the lot-specific diagnostic cuvette.

Background technique

In modern medical technology, a blood test analysis is commonly used diagnostic method, it can be very accurate detection of various diseases. Urine tests are equally modern medical engineering and clinical medicine in regular projects, it is one of the three routine tests, it is not only an important means of diagnosis of urinary tract diseases and efficacy, as well as other diseases such as laboratory tests of endocrine system disorders disease method. Urine analysis and blood analysis instruments

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currently used are independent and can not be carried out on a urine analysis and blood analysis machines only, and generally can only be measured in a copy of the analysis can not be batch diagnosis. After measuring the need to remove the waste thrown away by hand, the possibility of infection exists.

SUMMARY

The present invention to solve the technical problem is to provide an easy to use, clean, you can bulk of blood and urine samples were analyzed batch diagnostic equipment.

The present invention includes a diagnostic batch a housing mounted on the front panel display and an operation panel, the housing interior is provided with a pair of pulleys, wherein a pulley rotatably driven by the motor, is connected by a conveyor belt between the two pulleys , a conveyor belt provided with holes cuvette; open upper side of the housing has a loading port.

Above and below the middle position of the upper belt are provided with a light emitter and a light receiver.

The upper side above the conveyor is provided with a scanner, the scanner uses CIS, CCD, COMS photoreceptor of one.

Below the loading opening of the housing remote from the pulley is provided with tilted sieve, sieve shorter end is provided on the side wall of the housing, with a waste outlet opening on the side wall; provided below the screen header it is provided with a liquid discharge port on the sidewall of the cavity, the liquid collection chamber.

The other side of the upper housing relative to said loading port provided with the printer.

The present invention batch-specific diagnostic cuvette, and the rim comprises a bottom cup, the cup is transparent.

On the rim of the sleeve has a protective film, the protective film printed with a bar code.

The cuvette filled with holes placed on a conveyor belt in a blood sample cuvette, using a light emitter and a light receiver may ELISA blood biochemical analysis, after the elapsed time of the scanner, the scanner scans the rim of identification code, the information recorded the blood sample to the analytical results with the respective patient number association; the eluent urine reagent strip is placed on the conveyor belt, the scanner can be analyzed by using urine samples. After testing has been completed to the waste falls from the screen belt, wherein the solid waste is discharged from the waste port on the sidewall of the housing, the liquid waste liquid collection chamber falls below the mesh sieve, and then drained from the discharge port. So do not take the waste by hand, to avoid the possibility of the operator being infected.

BRIEF DESCRIPTION

DRAWINGS The present invention is further described and embodiments of the embodiment.

FIG 1 is schematic view of the new batch of the present diagnostic utility; FIG. 2 AA cross-sectional view shown in FIG. 1 for diagnostic quantities; FIG. 3 is a schematic view of a pulley diagnostic batch; FIG. 4 for the present invention bulk specific diagnostic schematic configuration than the cuvette; FIG. 5 side than the special cross-sectional view of the cuvette 4; FIG. 6 is a specific plan view shown in FIG. 4 to the cuvette.

FIG..... A printer, reagent strip, 3 scanners, 4 optical receiver 5 cuvette, 6 light emitter 7 conveyor 8 loading port 9 of the housing, 10 ..... sieve, waste outlet 11, a liquid collection chamber 12, the discharge port 13, a pulley 14;..... the motor 15, the display 16, the recess 17, the cup 18, protection module 19, 20 . rim of the glass, 21 bar code.

Detailed ways

The present invention a batch diagnostic DETAILED DESCRIPTION As shown in FIG. 1, the housing 9 is mounted on the front panel 2 and the operation panel 16 with a display screen, the lumen of the housing 9 is provided with a pair of pulleys, a belt, and wherein wheel 14 is rotated by a motor driven by a belt connected between two pulleys 7, conveyor belts provided with holes than 7 cuvette, the cuvette in order to make the conveyor belt 5 can follow movement 7, contact surface of the pulley 14 and the belt 7 It provided with an annular groove 17, as shown in FIG. The lower side middle portion of the conveyor belt 7 is provided on the side of the light transmitter 6, on the light receiving side 4, a side of the light receiver 4 is provided with a scanner 3. The scanner and light detector may be provided together on a diagnostic may be provided only one. 9 the upper side of the housing is opened loading opening 8. Away from the loading port 8 below the far pulley housing 914 is provided with the inclined position of the sieve 10, the sieve 10 is provided at the shorter end of the housing 9 on the side wall, waste outlet 11 is opened on the side wall, collection chamber is provided below the sieve was 10 12, the liquid discharge port 13 is provided on the side wall of the liquid collection chamber 12; the other side of the upper portion of the housing 9 opposite the loading port 8 is provided with a printer. 3 may be employed CIS scanner photoreceptor, the photoreceptor may be a CCD or COMS photoreceptor.

For diagnostic applications of the lot, are provided in Figure 4, dedicated FIG. 5 and the cuvette 6, made of a transparent material than the bottom of the cup body 18 of the cuvette. The upper cup 18 is provided with the rim 20. Outer lip of the cup is provided with a protective film 19, to prevent contamination of the reagent in the cuvette than 5, the protective film 19 by the bar code 21 is printed. Hot or cold opening 19 will pierce the protective film, the protective film 19 is punctured after contraction, the cuvette opening is exposed, the urine or blood sample was added to the cuvette. The cuvette 5 into the conveyor 7, when the cuvette 5 3 passes under the scanner, the scanner may scan the bar code 3, to obtain the information of the cuvette, and the cup including test items corresponding to information of the patient.

To test if blood analysis, blood or serum to be tested is added to the cuvette filled with reagent 5, sufficient reaction cuvette 5 is placed from a loading port 8 to the conveyor belt on the cuvette bore 7, starting machine, the motor 15 drives the pulley 14 and the belt 7 is rotated, the cuvette 5 is stopped when the movement of the light emitter and the light receiver 6 is between 4 and 6 the light emitter emits the detection light, the detection light passes through the cuvette 5 after 4 receives the light receiver, the content of the blood sample can be drawn according to the degree appropriate substance specific wavelengths of light absorbed, to arrive at a diagnosis. Since the conveyor 7 may be placed a plurality of cuvette 5, it is possible to realize batch diagnosis of the blood sample. After testing is completed, the motor 15 starts, when the cuvette 5 is moved to the end of the conveyor 7 fall under gravity, 5 cuvette the liquid falls through the drip chamber 12 sieve holes 10 and then through the drain holes 13 drain; than 5 cuvette along bevel sieve 10 fall, through waste outlet 11 to drain.

To test for the analysis of urine, urine is added to the reagent test strip 2, and the reagent strip 2 onto conveyor 7, the conveyor 7 conveying the reagent strip is 2 to 3 below the scanner, the scanner will reagent strip 3 2 color scanning down, the diagnosis result can be derived according to the color of the reagent strip 2. After testing is completed, the transfer belt 7 to the screen 2 on the reagent strip 10, 11 away from the waste discharge outlet.

The detection result may be displayed on the display screen 16 from the need to come out, but also the test results can be printed out with a printer, a reference for patients and doctors.

Similar Documents

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Publication	Publication Date	Title
AU732627B2	2001-04-26	Immunoassays in capillary tubes
AU636568B2	1993-05-06	Reaction cartridge and carousel for biological sample analyzer
AU615094B2	1991-09-19	Apparatus and method for providing assay calibaration data
JP4321738B2	2009-08-26	Liquid sample testing system
US6186956B1	2001-02-13	Breath test analyzer
JP4922931B2	2012-04-25	In vivo diagnostic comprehensive automatic analyzer
AU759239B2	2003-04-10	Device and apparatus for conducting an assay
CN1155814C	2004-06-30	Nephelometer and turbidimeter combination
US5733507A	1998-03-31	Biological cell sample holder for use in infrared and/or Raman spectroscopy analysis holder
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US20040237674A1	2004-12-02	Fluid collection and application device and methods of use of same
EP0967954B1	2006-07-05	APPARATUS FOR determining the concentration of INTERFERENTS IN PLASMA
KR100710122B1	2007-04-20	Assay System
CN1187598C	2005-02-02	Detecting method and device for analyzing component of many kinds of urine at same time
US20100248277A1	2010-09-30	Detection and quantification of analytes in bodily fluids
CA2599747C	2011-05-24	A method, device and system for enumeration of white blood cells
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JP2731613B2	1998-03-25	Enzyme immunoassay for Katoritsuji, measuring method and apparatus using the same
US5051238A	1991-09-24	Automatic analyzing system
AU712523B2	1999-11-11	Analyte concentration measurement using a hollow frustum
JP4745245B2	2011-08-10	Sample collection cup with an integrated operable sample analysis system
KR100544038B1	2006-06-08	Remote-dose expression analyte concentration meter

Priority And Related Applications

Priority Applications (1)

Application	Priority date	Filing date	Title
CN 200620115295	2006-05-15	2006-05-15	Batch diagnosis instrument and special colorimetric cup

Applications Claiming Priority (1)

Application	Filing date	Title
CN 200620115295	2006-05-15	Batch diagnosis instrument and special colorimetric cup

Legal Events

Date	Code	Title	Description
2007-08-22	C14	Granted	
2009-07-08	C19	Lapse of patent right due to non-payment of the annual fee	

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⑲日本国特許庁（JP）　⑪特許出願公開

⑫公開特許公報（A）　昭64－23936

⑤Int.Cl.⁴	識別記号	庁内整理番号	㊸公開　昭和64年(1989)1月26日
B 65 D 1/26		Z－6902－3E	
B 29 C 51/02		6660－4F	

審査請求　未請求　発明の数 1　（全3頁）

㊹発明の名称　ポスシステム付シート成形容器の製造方法

㉑特　願　昭62－174848

㉒出　願　昭62(1987)7月15日

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㉔代　理　人　弁理士　野崎　錬也

明　細　書

1．発明の名称

ポスシステム付シート成形容器の製造方法

2．特許請求の範囲

1　合成樹脂シートにバーコードを印刷した後、シート成形機に成形された容器の蓋体又は本体のフランジ部にバーコードがくるように該シートを装着して、成形することを特徴とするポスシステム付シート成形容器の製造方法。

3．発明の詳細な説明

〔産業上の利用分野〕

本発明はポスシステム付シート成形容器の製造方法に関する。

〔従来の技術とその問題点〕

ポス（POS）システムはコンピューターを駆使して売上、仕入、在庫等を迅速に把握するシステムであって、大小の小売店をはじめとする種々の企業の販売及び経営管理に盛んに利用されているものである。

このポスシステムにおいては、商品価格、種類等の情報を表示したバーコードが極めて重要な役割を担っている。

従来、このバーコードは予めラベル等に印刷していたものを商品に貼着して用いるのが一般であった。

しかし、この方法は大量生産、販売タイプの商品の場合、貼り付ける手間及び時間が馬鹿にならず、そのような大ロットの商品には対応できないという問題点があった。

そこで、包装済みの容器に直接バーコードを印刷する方法も試みられているが、肝心のバーコードが不鮮明になったり印刷不良箇所が出たりするという問題が多発している。一方、成形前のシートに予め印刷しておき、容器を製造するという方法もあるが、従来のものは成形時のシートの伸び縮みによりバーコードが不正確、不鮮明になるという問題点を克服できずに終わっていた。

〔発明が解決しようとする問題点〕

本発明は上記した従来技術の持つ諸問題を解決し、大ロットの商品にも対応でき、且つ正確、鮮

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明なバーコード表示を持ったシート成形容器の製造方法を開発することを目的とするものである。

〔問題点を解決するための手段〕

すなわち本発明は、合成樹脂シートにバーコードを印刷した後、シート成形機に成形された容器の蓋体又は本体のフランジ部にバーコードがくるように該シートを装着して、成形することを特徴とするポスシステム付シート成形容器の製造方法を提供するものである。

本発明に用いる合成樹脂シートは一般にシート成形に用いられているポリスチレン系シート、ポリオレフィン系シート、塩ビ系シート、各種ラミネートシート等の合成樹脂シートならいずれも用いることができるが、ポリスチレン系シートが好ましく、特に２軸延伸されたポリスチレンシートが好ましい。

又、シートの厚みは0.13～0.21㎜のものが好ましい。

これら合成樹脂シートにバーコードをグラビヤ印刷法等で印刷する。

印刷する場所は該シートが容器となったとき、その本体又は蓋のフランジ部に相当するところである。

本発明においては、目的の容器をシート成形で製造する、すなわち、印刷済みの合成樹脂シートをバーコードを印刷した場所が本体又は蓋体のフランジ部となるように金型にセットしクランプする。次いで加熱し、該シートを軟化せしめた後、真空もしくは圧空により外力を加え、目的とする容器を成形する。　なお、この場合圧空成形が特に好ましい。

本発明においては目的に応じていかなる形状のもの容器も製造できるが、少なくともフランジ又はそれに相当する部分があり、該部に予めバーコードが印刷されていることが必須である。

又、実施態様の１つとしてフランジ部はミシン目又はノッチを入れて、切断可能にしておくこともできる。

さらに別の実施態様として、フランジ部にヒンジを設けておき、包装体をダンボールケースに詰めた際、ＰＯＳ部（＝フランジ部）を上又は下に折り曲げて省スペースを図る態様も取ることができる。

具体例としては、第１図及び第２図に示すような、スーパー等で食品販売に用いられている透明プラスチックシート製の蓋と本体が一体となったシート成形包装容器をあげることができる。

〔実 施 例〕

以下実施例で本発明を説明する。

実施例

厚さ0.15㎜の二軸延伸ポリスチレンシート（旭化成工業㈱製，スタイロシート®）の所定位置にグラビヤ印刷にてバーコードを印刷する。この印刷済みシートを浅野研究所製の圧空成形機ＣＬ－４１１にバーコード表示部が容器の蓋のフランジ部にくるように装着せしめ、第１図及び第２図に示す蓋と本体が一体になった食品用透明容器を１サイクル20個取りで圧空成形した。得られた容器は全て蓋のフランジ部にバーコードが正確に表示されていた。

〔発明の効果〕

本発明の製法によればシート成形により目的とする容器の大量生産が可能であり大ロットにも充分対応できる、しかもバーコードが事前に印刷されているので、誤ったバーコードの付与が防止でき、且つ確実に読み取ることも可能になるという効果が発揮される。加えて、バーコード部分はフランジ部にあるので、シート成形時にも伸び縮みせず、従来のようにバーコードを後で読み取る際、誤読又は読み取り不能という問題が防止できる。

又、従来のように蓋の中央にバーコードが入っているものに比べ意匠的にも優れた包装容器とすることができるという効果も本発明は有している。

４．図面の簡単な説明

第１図は本発明によって得られたポスシステム付きシート成形容器の１例を示す斜視図であり、第２図はその平面図である。

１…バーコード，２…フランジ部，３…蓋，

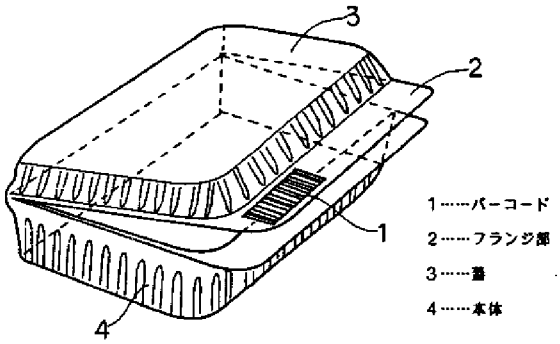
４…本体

出願人　旭化成工業株式会社

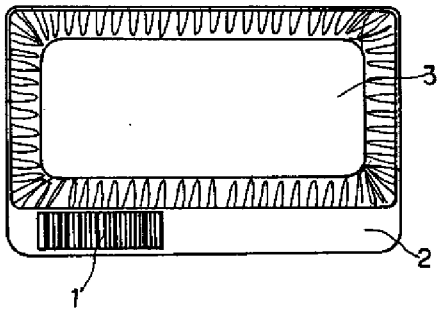
代理人　弁理士　野崎銑也

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第１図



第２図



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(19) 대한민국특허청(KR)
(12) 공개특허공보(A)

(11) 공개번호 특1998-040090
(43) 공개일자 1998년08월17일

(51) 국제분류코드
B32B 5/18 (2006.01)

(21) 출원번호 특1996-059216

(22) 출원일자 1996년11월29일

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없음

전체 청구항 수 : 총 16 항

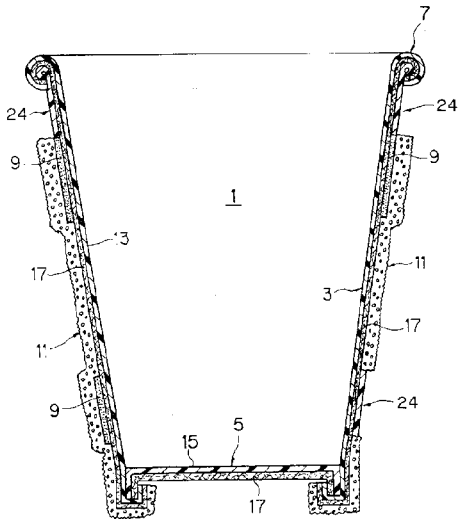
(54) 단열성 지제 용기 및 그 제조방법

(57) 요 약

원하는 개소에 발포억제부가 존재하는 발포단열층을 갖는 지제용기를 제공하는 것을 과제로 한다.

이 해결수단으로, 용기 몸통 부재 및 바닥판 부재로 이루어지는 지제용기에 있어서, 상기 용기 몸통부재의 외벽면의 적어도 일부에는 합성수지성분을 5wt%~40wt% 함유하는 도료가 도포되어 있고, 상기 용기 몸통 부재의 외벽면의 상기 수지성분함유 도료 도포부분에 열가소성 합성수지 필름의 발포억제부가 존재하고, 상기 용기 몸통 부재의 외벽면의 그 외 부분에 열가소성 합성수지 필름으로 이루어지는 발포단열층이 존재하는 것을 특징으로 하는 단열성 지제용기이다.

대 표 도 - 도 1



This Facsimile Page has been artificially created from KIPO data.

청구의 범위

청구항 1

용기 몸통 부재(3) 및 바닥판 부재(5)로 이루어지는 지제용기(1)에 있어서, 상기 용기 몸통 부재(3)의 외벽면의 적어도 일부에는 합성수지 성분을 5wt%~40wt% 함유하는 도료가 도포되어 있고, 상기 용기 몸통 부재(3)의 외벽면의 상기 수지성분함유 도료 도포부분에 열가소성 합성수지 필름의 발포억제부(24)가 존재하고, 상기 용기 몸통 부재(3)의 외벽면의 그 외 부분에 열가소성 합성수지 필름으로 이루어지는 발포단열층(11)이 존재하는 것을 특징으로 하는 단열성 지제용기.

청구항 2

제 1항에 있어서, 합성수지 성분은 알키드와 니트로 셀룰로우스의 공중합체, 니트로 셀룰로우스, 우레탄, 염화비닐과 초산비닐의 공중합체, 수성아크릴, 폴리아미드 주체계, 염소화 폴리올레핀, 염소화 폴리올레핀과 로진과의 공중합체, 용제계 아크릴 주체계의 수지류로 이루어지는 군에서 선택되어, 이 성분을 10~30wt% 함유하는 도료를 사용하는 것을 특징으로 하는 단열성 지제용기.

청구항 3

제 2항에 있어서, 합성수지성분은 염화비닐과 초산비닐의 공중합체인 것을 특징으로 하는 단열성 지제용기.

청구항 4

제 1항에 있어서, 상기 발포억제부(24)는 적어도 용기 입구 가장자리부(7) 하부에 소정의 폭으로 연속적인 띠형상으로 존재하는 것을 특징으로 하는 단열성 지제용기.

청구항 5

제 1항에 있어서, 상기 발포억제부(24)는 용기 몸통 부재(3)의 바코드 인쇄 개소에 해당하는 부분에 상기 바코드를 씌우는 데 충분한 면적으로 존재하는 것을 특징으로 하는 단열성 지제용기.

청구항 6

제 1항에 있어서 상기 도료는 합성수지 성분을 5wt% ~ 40wt% 함유하고, 다시 안료 및 착색염료를 적정량 함유하고, 이 도료로 인쇄된 문자, 기호, 도형, 및 모양부분이 상기 발포억제부(24)로 이루어지는 것을 특징으로 하는 단열성 지제용기.

청구항 7

제 1항에 있어서, 용기 몸통 부재(3)의 외벽면의 발포단열층(11)의 두께가 대체로 일정한 것을 특징으로 하는 단열성 지제용기.

청구항 8

제 1항에 있어서 용기 몸통 부재(3)의 외벽면의 발포단열층(11)은 두께가 비교적 두꺼운 발포단열층(11)과 두께가 비교적 얇은 발포단열층(11)으로 이루어지는 것을 특징으로 하는 단열성 지제용기.

청구항 9

제 8항에 있어서, 상기 비교적 두꺼운 발포단열층(11)을 용기 몸통 부재(3)의 상반부에서 입구 가장자리부 근처에 가지는 것을 특징으로 하는 단열성 지제용기.

청구항 10

제 1항에 있어서, 적어도 용기 몸통 부재(3)의 내벽면은 용기 몸통 부재(3)의 외벽면에 라미네이트되는 열가소성 합성수지 필름보다도 연화점이 높은 열가소성 합성수지 필름 또는 알루미늄박으로 라미네이트 되어 있는 것을 특징으로 하는 단열성 지제용기.

청구항 11

원지의 한쪽면에 열가소성 합성수지 필름을 라미네이트하고, 이 라미네이트 필름의 소정 개소에 합성수지성분을 5wt%~40wt% 함유하는 도료를 도포하고, 이 원지에서 용지 몸통부 용 블랭크를 뚫고, 다른 원지에서 용기 바닥판용 블랭크를 뚫어내어, 얻어진 양 블랭크에서 용기를 성형하고, 그후 이 용기를 가열하는 것에 의해 이 열가소성 합성수지 필름을 발포시켜, 상기 용기 몸통부의 외벽면에 발포단열층(11)을 형성시켜, 그리고 상기 합성수지성분함유 도료를 도포한 개소에 대응하는 용기 몸통부의 외벽면에 발포억제부(24)를 형성시키는 것을 특징으로 하는 단열성 지제용기의 제조방법.

청구항 12

제 11항에 있어서, 합성수지성분은 알키드와 니트로 셀룰로이스의 공중합체, 니트로 셀룰로이스, 우레탄, 염화비닐과 초산비닐의 공중합체, 수성아크릴, 폴리아미드 주체계, 염소화 폴리올레핀, 염소화 폴리올레핀과 로진과의 공중합체, 용제계 아크릴 주체계의 수지류로 이루어지는 군에서 선택되어 이 성분을 10~30wt% 함유하는 도료를 사용하는 것을 특징으로 하는 단열성 지제용기의 제조방법.

청구항 13

제 12항에 있어서, 합성수지성분은 염화비닐과 초산비닐의 공중합체인 것을 특징으로 하는 단열성 지제용기의 제조방법.

청구항 14

제 11항에 있어서, 상기 발포억제부(24)는 적어도 용기 입구 가장자리부(7)의 하부에 소정의 폭으로 연속적인 띠형상으로 형성시키는 것을 특징으로 하는 단열성 지제용기의 제조방법.

청구항 15

제 11항에 있어서, 상기 발포억제부(24)는 용기 몸통 부재(3)의 바코드 인쇄 개소에 해당하는 부분에 상기 바코드를 씌우는 데 충분한 면적으로 형성시키는 것을 특징으로 하는 단열성 지제용기의 제조방법.

청구항 16

제 11항에 있어서, 상기 도료는 합성수지성분을 5wt%~40wt% 함유하고, 다시 안료 및 착색염료를 적량 함유하고, 이 도료를 사용하여 문자, 기호, 도형 및 모양을 인쇄하는 것에 의해 상기 발포억제부(24)를 형성시키는 것을 특징으로 하는 단열성 지제용기의 제조방법.

명세서

[발명의 명칭]

단열성 지제(紙製)용기 및 그 제조방법

[도면의 간단한 설명]

제 1도는 본 발명의 발포억제부를 갖는 단열성 지제용기의 일예의 개요 단면도.

제 2도는 제 1도에 도시된 용기의 발포억제부 부근의 모식적 부분 확대 단면도.

제 3도는 발포억제 도료안의 각 합성수지와 그 농도가 필름의 발포에 미치는 영향을 도시하는 특성도.

제 4도는 일본국 특원평 5-346302호 명세서에 개시된 다른 두께의 발포 단열층을 갖는 지제 단열용기의 일예의 모식적 단면도.

제 5도는 제 4도에 도시된 용기의 몸통부에 비발포부를 형성시키는 방법의 일예를 도시하는 모식적 단면도.

제 6도는 제 4도에 도시된 용기의 몸통부에 비발포부를 형성시키는 방법의 다른 예를 도시하는 모식적 단면도.

제 7도는 수지성분 함유율과 발포단열층의 두께와의 관계를 도시하는 특성도.

제 8도는 수지성분 함유율과 발포율과의 관계를 도시하는 특성도이다.

* 도면의 주요 부분에 대한 부호의 설명

1 : 본 발명의 단열성 지제용기, 3 : 용기 몸통 부재, 5 : 바닥판 부재, 7 : 용기 입구 가장자리부, 9 : 인쇄층, 10 : 용기 외벽면측 라미네이트 필름, 11 : 발포단열층, 13 : 용기 내벽면측 라미네이트 필름, 17 : 원지, 20 : 슬릿, 22 : 비발포부, 24 : 발포억제부, 26 : 합성수지함유 발포억제 도포막

[발명의 상세한 설명]

본 발명은 용기 몸통 부재의 외벽면상에 열가소성 합성수지 필름의 발포 단열층을 갖는 지제용기에 관한 것이다. 다시 상세하게는 본 발명은 부분적으로 발포가 억제된 개소가 존재하는 발포단열층을 갖는 지제용기에 관한 것이다.

종래부터 고온액체의 충전용 단열성 용기는 몇종류가 실용으로 공급되어 왔다. 예를들면 이와같은 목적때문에 발포 폴리스티롤성의 단열성 용기가 사용되어 왔다. 이것은 폴리스티롤에 발포제를 첨가하는 공정을 거친 후, 이 재료를 몰드내에 주형하고 그 후 열과 압력을 가해 원료를 발포시키고, 성형용기를 틀에서 꺼내는 것에 의해 제조된다. 이렇게 하여 얻어진 단열성 용기는 단열성 면에서는 매우 뛰어나다. 그러나 석유 자원의 절약 또는 폐기물의 소각처리면에서는 재검토가 필요한 용기이다. 또한 발포 스티롤제 단열성 용기의 바깥표면에 인쇄할 경우 컵성형후에 따로따로 인쇄하지 않으면 안되므로, 곡면인쇄기나 스탬프인쇄기 등으로 인쇄하는 것 이외에는 안되었다. 따라서, 인쇄가 잘 되지 않는다도 결점도 있었다.

또, 예를들면 미리 성형된 종이 용기의 몸통부 외주면의 전둘레에 파형 형상을 한 지제의 허리띠를 접합시킨 것으로 이루어지는 단열성 용기가 있다. 이 용기를 제조할 경우, 파형 형상 지제 허리띠 부재의

제조공정과, 이 허리띠 부재를 용기본체의 몸통부 외주면에 접속시키는 공정이 다시 필요하게 된다. 이런 종류의 단열성 용기는 그외에도 여러가지 결점을 갖는다. 제 1의 결점은 문자, 도형, 기호등이 파형 형상 지제 허리띠 부재의 외주면에 인쇄되므로, 이들의 문자나 도형등이 비뚤게 보여, 소비자에게 좋은 인상을 주지 못하는 것이다. 제 2의 결점은, 허리띠가 파형의 골짜기 부분만으로 용기 몸통 부재와 접촉하고 있으므로, 접합력이 약하고, 몸통부 외주면에서 떨어질 염려가 있는 것이다. 제 3의 결점은 파형 형상 허리띠를 갖는 용기는 여러 겹으로 쌓을 수가 없으므로 많은 보관장소를 필요로 한다.

또한 다른 종류의 단열성 용기는 몸통부의 테이퍼가 다른 내측컵과 외측컵의 2겹구조를 갖는다. 따라서 내측컵과 외측컵과의 사이에 공기단열층이 형성된다. 내측컵과 외측컵은 각각의 몸통 부재의 위 테두리를 동시에 커얼링처리하여 테두리를 형성하는 것에 의해 일체화된다. 이 용기의 경우, 외측컵의 외주면이 평활하므로 인쇄하기에는 아주 좋지만, 내측컵과 외측컵이 분리되기 쉬운 경향이 있었다. 또, 용기는 본질적으로 2겹이므로 제조원가는 일반적으로 높다.

일본국 특개소 57-110439호 공보에는 용기 몸통 부재 및 바닥판 부재로 이루어지는 지제용기에 있어서, 적어도 용기 몸통 부재의 한쪽 벽면은 열가소성 합성수지 필름의 발포단열층이 코팅 또는 라미네이트되어 있고, 용기 몸통 부재의 다른 벽면은 열가소성 합성수지 필름, 이 열가소성 합성수지 필름의 발포단열층 또는 알루미늄박의 어느것이 코팅 또는 라미네이트 되어 있는 단열성 지제용기가 개시되어 있다. 일본국 특개소 57-110439호 공보에 교시되어 있는 바와 같이, 종이에 포함되는 수분이 가열되어 증발할 때에 표면의 열가소성 합성수지 필름을 발포시킨다. 이 용기는 비교적 양호한 단열성을 갖고, 저렴한 가격으로 용이하게 제조할 수 있는 등의 이점을 갖는다.

그러나 이 방법에서는 열가소성 합성수지 필름의 발포가 종이의 수분 함유율에만 좌우되어, 종이의 관리상태가 나쁘고 수분함유율이 낮은 경우에는 충분히 발포하지 않거나, 또는 수분함유율이 높은 경우에는 필름의 발포에는 좋은 상태이지만, 용기의 기계강도가 저하할 염려가 있다. 또, 발포해도 전체적으로 균일하게 발포할 뿐이고, 발포층의 두께에 변화를 일으킬 수는 없다.

이 때문에, 본 발명자들은 먼저 제 4도에 도시된 바와 같은 장소에 의해 두께가 다른 발포단열층을 갖는 단열성 지제용기(1)를 발명하고, 일본국 특원평 5-346302호로서 특허출원했다. 제 4도에 도시된 바와 같이, 이 단열성 지제용기(1)는 기본적으로 용기 몸통 부재(3)와 바닥판 부재(5)로 구성되고 있다. 용기 몸통 부재(3)의 외주면의 입구 가장자리부(7) 및 바닥판 부재(5)근처에 유기용제 함유 잉크에 의한 인쇄층(9)이 존재한다. 또한 이 인쇄층(9)도 포함하여 용기 몸통 부재(3)의 외주면 전체를 피복하는 발포단열층(11)이 존재한다. 도시되고 있는 바와 같이, 인쇄층(9)에 상당하는 개소의 발포단열층(11)의 두께는 무인쇄 부분에 상당하는 개소의 발포단열층(11)보다도 두껍다. 발포단열층(11)은 예를들면, 폴리에틸렌등과 같은 열가소성 합성수지로 형성되어 있다.

그러나 이 단열성 지제용기(1)는 용기 몸통 부재의 바깥표면 전면이 발포하여 단열층을 형성하므로, 용기 몸통 부재의 바깥표면 전체가 요철상태가 된다. 이 때문에, 사용시(즉, 마실때)에 이용자의 입술이 접촉하는 부분(즉, 용기의 입구 가장자리부 바로 아래)에서는 아래입술이 까칠까칠한 느낌을 받는 경우가 있다. 또, 라미네이트된 열가소성 합성수지필름의 바깥표면에 POS용의 바코드가 인쇄되어 있는 경우, 필름의 발포에 의해 바코드가 변형 또는 비뚤어짐이 생기고, 바코드 판독기에 의한 판독동작에 악영향을 미치는 경우가 있다. 또, 용기 몸통 부재의 지면에 바코드가 인쇄되어 있는 경우, 필름의 발포에 의해 바코드가 선명치 않게 되고, 읽기 에라의 원인이 된다. 이 문제점을 해결하기 위해서 본 발명자들은 일본국 특원평 6-284125호에 있어서, 용기 몸통부 바깥표면의 원하는 개소에 비발포부를 마련하기로 했다.

제 5도는 이 비발포부 형성방법의 하나의 방법을 도시한 것으로, 발포시킬 측의 필름면에서 비발포부를 마련할 만한 원하는 개소의 표면에 연속 또는 불연속인 슬릿(20)을 적어도 하나 마련하는 것으로 이루어진다. 이 슬릿(20)은 필름(10)을 관통하고 종이(17)에 달하는 깊이를 갖는 것이 바람직하다. 이로인해, 가열에 의해 종이속의 수분이 증발할 때, 슬릿(20)을 통하여 대기중으로 흩어지고, 슬릿 배설부분의 필름의 발포가 저지되어, 결과적으로 비발포부(22)가 형성된다.

제 6도는 비발포부 형성방법의 다른 방법을 도시한 것으로, 예를들면 용기 입구 가장자리부 아랫부에 소정의 폭으로 휘발방지 도포층(70)을 마련한다. 이 휘발방지 도포층(70)은 종이에 포함되는 수분 및 잉크안에 포함되는 용제성분을 지면에서 휘발시키지 않도록 하기 위한 것으로, 예를들면 구와바 화학공업회사의 크레하론텍스 DO-818 및 헤키스트합성의 크레아 코트 LA723-B1등의 피막성이 좋은 수증기 투과 방해성질을 갖는 수계 코팅재료를 이용하여 형성된다. 도시되고 있는 바와 같이, 원지면(17)에 도포된 휘발 방지 도포층(70)의 부분의 라미네이트 필름(10)은 전혀 발포되지 않고, 원래의 필름두께 그대로이다. 이것에 대하여 휘발방지 도포층(70)의 존재하지 않는 개소의 필름은 지면안의 수분에 의해 발포되고, 특히 인쇄층(9)의 존재하는 개소의 필름은 인쇄층안의 용제에 의해 강하게 발포되며, 두꺼운 발포단열층(11)을 형성한다.

그러나 제 5도에 도시되는 바와 같은 슬릿 형성방법을 실시하는 데는, 슬릿가공을 하기 위한 특별한 장치 및 공정이 필요하고, 용기의 제조원가를 증대시키는 원인이 된다.

한편, 제 6도에 도시되는 바와 같은 휘발방지 도포층(70)을 마련하는 방법은, 디자인과 같은 개소에 도료를 도포하기 때문에, 인쇄공정중(즉, 덧칠중)에 전에 도포된 잉크가 도료안의 용제성분때문에 재용해하고, 색깔이 빠지거나 하는 경우가 있다. 또, 발포억제하는 것이 우선적인 수지성분이므로 표층의 필름과 접착성이 불충분하게 되기 쉽고, 오히려 도료 표면부분으로 기포가 들어가버리는 결점이 발견되었다. 또, 도료가 인쇄시에 동일 개소로 도포하기 때문에 그 부분만이 극단으로 두껍게 되고, 롤로 감는 경우에 부분적인 압력이 걸리고, 브로킹되기 쉽다는 결점도 발견되었다.

따라서 본 발명의 목적은 발포단열층을 갖는 지제용기에 있어서, 발포억제부가 한층 확실하고 간단한 방법으로 형성된 지제용기를 제공하는 데에 있다.

상기 목적을 달성하기 위해 본 발명은 용기 몸통 부재 및 바닥판 부재로 이루어지는 지제용기에 있어서, 상기 용기 몸통 부재의 외벽면의 일부에는 합성수지 성분을 5wt% ~ 40wt%함유하는 도료가 도포되어 있고, 상기 용기 몸통 부재의 외벽면의 상기 수지성분함유 도료 도포부분에 열가소성 합성수지 필름의 발포억제부가 존재하고, 상기 용기 몸통 부재의 외벽면의 그외부분에 열가소성 합성수지 필름으로 이루어지는 발포단열층이 존재하는 것을 특징으로 하는 단열성 지제용기를 제공한다.

상기와 같이, 본 발명의 단열성 지제용기는 합성수지성분을 5wt%~40wt%함유하는 도료가 도포된 부분에 발포억제부를 갖고, 이 도료가 도포되지 않은 부분에 발포단열층을 갖는다. 즉, 합성수지성분을 5wt%~40wt%함유하는 도료는 용기 몸통 부재의 외벽면에 라미네이트된 합성수지 필름의 발포성을 제어하는 기능을 갖는다. 따라서, 용기 입구 가장자리부 바로아래 또는 바코드 인쇄부와 같이, 필름을 발포시키지 않는 편이 바람직한 개소에 미리 이 도료를 도포해두는 것에 의해 효과적으로 발포억제부를 형성시킬 수가 있다.

제 1도는 본 발명에 의한 단열성 용기의 일예의 단면도이다. 본 발명의 단열성 지제용기(1)는 기본적으로 용기 몸통 부재(3)와 바닥판 부재(5)로 구성되어 있다. 용기 몸통 부재(3)의 외주면의 입구 가장자리부(7) 및 바닥판 부재(5) 근처에 합성수지함유 도료가 도포된 발포억제부(24)가 존재한다. 또, 이 도포부분 이외의 용기 몸통 부재(3)의 외주면 전체를 피복하는 장소에 의해 두께가 다른 발포단열층(11)이 존재한다. 도시되고 있는 바와 같이, 합성수지함유 도료가 도포된 발포억제부(24)의 두께는 발포 단열층(11)보다도 매우 얇다.

이 명세서에서 사용되는 발포억제라는 용어는 용기 몸통 부재의 외벽면에 라미네이트된 열가소성 합성수지필름이 전혀 발포되고 있지 않은 상태외에, 입술이 접촉했을 때에 위화감을 느끼지 않을 정도의 발포량 또는 바코드 판독의 에라를 일으키지 않을 정도의 발포량을 포함하는 의미로 사용되고 있다. 이와같은 발포량은 일반적으로는 완전발포량의 약 40%미만 이하이지만, 에라없는 바코드 판독을 위해서는 30%이하인 것이 바람직하다.

또, 용기 몸통 부재(3)의 내벽면측은 폴리에틸렌등과 같은 열가소성 합성수지 필름, 또는 알루미늄박(13)등으로 피복되어 있다. 용기 몸통 부재(3)의 내벽면측에도 피복층을 마련하는 이유는 충전액체가 종이안으로 침투하는 것을 방지하는 것 외에, 조립용기를 가열했을 때에, 종이안의 수분이 종이면에서 직접 대기중으로 증발해 버리지 않도록 하기 위해서이다. 종이안의 함유수분이 완전히 없어지면 용기 몸통 부재(3)의 열가소성 합성수지필름을 발포시킬 수 없게 될 가능성이 있다. 바닥판 부재(5)의 용기 내벽면측에는 열가소성 합성수지 필름(15)이 라미네이트되어 있다. 이것은 상기와 같이 종이안으로의 액체의 침투방지를 위해서이다. 부호(17)는 원지이다.

제 2도는 제 1도에 도시된 용기의 발포억제부분(24)의 부분 확대 단면도이다. 용기 몸통 부재(3)의 외벽면에 라미네이트된 열가소성 합성수지 필름(10)의 소정 개소에 합성수지함유 도료를 도포하는 것에 의해 형성된 도포막(26)이 존재한다. 이 도포막(26)에 의해, 하부의 열가소성 합성수지 필름(10)의 발포가 억제되어, 그 결과 발포억제부(24)가 형성된다. 합성수지함유 도포막(26)에 의해 열가소성 합성수지필름(10)의 발포가 억제되는 메카니즘은 다음과 같이 추측된다. 열가소성 합성수지 필름의 표면에 합성수지함유 도포막(26)을 형성할 경우, 가열공정시에, 도포막(26)안의 합성수지성분이 필름(10)보다도 내열성이 있으면, 도포막(26)이 치수가 팽창을 하지 않는다. 이 때문에, 도포막(26)은 필름(10)의 팽창에 추종하지 않기 때문에 필름(10)에 균열이 생기거나, 갈라져 버려 공기 방울이 발생하지 않고, 필름(10)은 발포하지 않는다. 이 때, 도료안의 합성수지 성분농도에도 크게 관계한다. 합성수지 성분농도가 높아짐에 따라 수지의 피막강도도 높아지고, 이 수지의 피막강도가 필름(10)의 팽창에 추종하지 않을 만큼, 강한 경우에도 마찬가지로 발포하지 않는다.

본 발명에 있어서, 용기 몸통 부재 외벽면에 라미네이트된 열가소성 합성수지 필름의 발포를 억제하기 위해 사용되는 도료에 배합할 수 있는 합성수지는 예를들면, 알키드와 니트로 셀룰로우스의 혼합물, 니트로 셀룰로우스, 우레탄, 염화비닐과 초산비닐의 혼합물, 수성아크릴, 폴리아미드 주체계, 염소화 폴리올레핀, 염소화 폴리올레핀과 로진과의 혼합물, 용제계 아크릴 주체계의 수지류이다. 이것들을 단독으로 또는 2종류 이상을 혼합하여 사용할 수가 있다.

이들 수지성분의 배합량은 도료 전체의 중량을 기준으로 하여, 5wt%~40wt%의 범위내이다. 바람직하게는 10wt%~30wt%의 범위내이다. 수지성분의 배합량이 5wt%미만일 경우, 너무 엷어서 도료로서 도포하는 것이 매우 곤란할 뿐만아니라, 원하는 발포억제 효과를 얻을 수 없다. 한편, 수지성분의 배합량이 40wt%를 초과할 경우, 도료의 점도가 매우 높아지고, 도포가공시, 특히 그라비아 코타, 리버스 롤 코타등의 롤을 사용하는 방법으로 도포할 경우, 도료의 전사(轉寫)가 순조롭게 되지 않는다. 또, 닥터 블레이드의 걷어올림 불량이나, 스프레이의 막힘등의 지장이 생겨, 적절한 도포가공을 할 수 없게 된다.

본 발명에 있어서, 열가소성 합성수지 필름의 발포억제에 사용되는 도료는 상기 수지성분의 분산성을 촉진시키고, 유동성을 콘트롤하는 데 사용된다. 또, 그라비아식으로 도료를 도포할 경우, 도료의 전사를 쉽게하고, 도포표면의 젖는 성질을 좋게 할 수 있다. 용제의 배합량은 수지성분의 배합량 및 그 외의 첨가성분(예를들면 안료 또는 여러가지 조제류)(사용할 경우)을 전량으로 100wt%로 하는 양일 수가 있다. 예를들면, 안료 또는 여러가지 조제류를 전혀 사용하지 않고, 수지성분과 용제만 사용할 경우, 수지성분의 배합량이 5~40wt%라면 용제의 배합량은 95~60wt%이다. 이 용제는 수계, 유기 용제계 또는 이것들의 혼합계의 어느것이어도 좋다. 이와같은 용제류는 예를들면, 물, 아세톤, 초산메틸, 메틸에틸케톤, 초산이 소프로필, 에틸알코올, 초산 2부틸, 초산 n부틸, 이소 부틸 알코올, 톨루엔, 크시렌 등이다. 이것들의 용제중 2종류 이상을 혼합하여 사용할 경우, 수지와의 융합이 쉽다는 점에서 용해 파라미터(SP 값)를 고려한 후, 용해성과 젖는 성질의 바란스를 잘 맞추는 것이 필요하다. 또, 실제로는 도포후의 건조성도 생각하지 않으면 안되므로, 용제의 비등점과, 증발속도와의 비교도 중요하게 고려해야 할 요소이다. 이것들의 요소를 검토한 후에, 2종류 이상의 용제를 적절히 선택하고, 짜 맞추어 사용하면 좋다.

합성수지함유 도료의 도포량은 특별히 한정되지는 않지만, 일반적으로 1.0g/㎡~10g/㎡(건조중량)의 범위내, 바람직하게는 2~7g/㎡이다. 이 범위내의 도포량이라면, 건조후에 1㎛~10㎛의 범위내의 막

두께를 갖는 발포억제 도포막(26)을 얻을 수 있다. 형성 도포막(26)의 막두께가 1㎛미만일 경우, 원하는 발포억제효과를 얻을 수 없다. 한편, 막두께가 10㎛초과에서는 발포억제효과가 포화하고, 경제적이지 못하게 된다. 합성수지함유 도포막(26)의 두께는 도료안의 합성수지 함량에 의존하여 변화한다. 예를들면 합성수지 함량이 높을 경우, 도포막의 막두께를 얇게 할 수 가 있다.

합성수지함유 도료의 도포방법은 특별시 한정되지 않는다. 도포방법으로서는 에를들면, 나이프 코타, 스프레이 코타, 키스 롤 코타, 스퀴즈 롤코타, 그라비아 코타, 리버스 롤 코타, 바 코타, 커튼 코타, 에어나이프 코타등이 있다. 도료의 건조방법도 특별히 한정되지 않는다. 바람건조, 온풍건조등 널리 알고 있는 관용의 방법으로 건조시킬 수가 있다.

본 발명의 단열성 용기는 상용의 컵 제조장치에 의해 조립될 수가 있다. 우선, 롤종이에서 용기 몸통 부재용 원지를 계속 꺼내어, 소정 개소에 필요한 인쇄를 실시한다. 이 단계에서 바코드등을 인쇄할 수도 있다. 인쇄 부분의 위치결정등은 상용의 수단 또는 순서에 의해 할 수가 있다. 다음으로 이 인쇄를 실시된 원지에 폴리에틸렌등의 열가소성 합성수지필름을 압출라미네이트한다. 원지의 반대면에도 열가소성 합성수지 필름 또는 알루미늄박등을 라미네이트한다. 바닥판용 원지는 한쪽면에만 열가소성 합성수지 필름을 라미네이트한다. 그 후, 이 원지의 열가소성 합성수지필름 라미네이트면에서 용기 몸통 부재의 외벽면이 될 만한 면의 소정 개소에 다음에 상세하게 설명하는 바와 같은 합성수지함유 도료를 도포한다. 다른 방법으로서, 합성수지함유 도료는 용기조립후에 용기 몸통 부재 외벽면의 소정 개소에 도포할 수 있는 이점도 갖고 있다. 이어서, 용기 몸통 부재용 원지에서 용기 몸통 부재용 블랭크를 뚫고, 바닥판 부재용 원지에서 바닥판 부재용 블랭크를 뚫는다. 이것들의 블랭크를 이용하여 상용의 컵성형기에서, 용기 몸통 부재용 블랭크는 합성수지함유 도료 도포부분이 용기 외측을 향하도록, 또 바닥판 부재는 필름 라미네이트면이 용기내측으로 향하도록 하여, 용기에 조립한다. 용기조립후에 가열처리를 행한다. 이것에 의해 제 1도에 도시된 바와 같은 두께가 다른 발포단열층과 원하는 개소에 발포억제부를 갖는 단열성 지제용기(1)를 얻을 수 있다.

두께가 다른 발포단열층을 형성시키는 방법은 상기의 일본국 특원평 5-346302호 명세서에 개시되어 있지만, 더 확실히 하기 위해 그 기재의 일부를 여기에 인용한다. 상기와 같이, 두꺼운 발포단열층을 형성시킬 경우, 미리 원지면(17)에 유기용제 함유 잉크로 인쇄를 해 두지 않으면 안된다. 이 인쇄에 사용되는 잉크는 특별히 한정되지 않지만, 필름의 발포를 촉지시키기 위해서, 인쇄후에 인쇄면(특히 상세히 설명하면, 종이안)에 미량의 용제성분이 잔유하는 타입이 바람직하다. 일반적으로 잉크로서 사용되는 용제로서는 아세톤, 초산에틸, 메타놀, 이소프로필 알코올, 에타놀, 톨루엔, 크시렌, 메틸에틸케톤, 메틸이소부틸케톤, 부타놀, 프로필렌글리콜, 모노 메틸에테르 아세테이트, 에틸셀로솔브등 많은 것중에서, 적당히 선택하여 혼합되어 사용되고 있다. 이 중, 발포성을 향상시키기 위해서는 양면 폴리 라미네이트 가공된 시점에서도 미량으로 잔류하는 편이 좋기 때문에, 인쇄기에서의 건조시 또는 폴리 라미네이트 공정에서, 비교적 증발하기 어렵고, 톨루엔, 메틸에틸케톤, 메틸이소부틸케톤등이 많이 포함되는 잉크가 바람직하다. 비교적 이것들의 용제가 적어도 10%이상, 바람직하게는 20%~50% 함유되어 있는 것이 바람직하다. 그러나 이것들의 잉크의 사용목적에서 인쇄적성을 무시한 용제 바란스가 되어서는 안된다.

본 발명에서 사용할 수 있는 열가소성 합성수지필름은 폴리에틸렌, 폴리프로필렌, 폴리염화비닐, 폴리스틸렌, 폴리에스텔, 나이론등이다. 용기 몸통 부재(3)의 외측면측에 라미네이트되는 필름은 내벽면측에 라미네이트 되는 필림보다도 연화점이 낮은 것이어야 한다. 따라서, 예를들면 용기 몸통 부재(3)의 내외 양벽면에 폴리에틸렌 필름을 사용할 경우, 용기 몸통 부재(3)의 외주면측은 저밀도 폴리에틸렌으로 라미네이트하고, 내벽면측은 중밀도 또는 고밀도 폴리에틸렌으로 라미네이트하지 않으면 안된다.

라미네이트되는 필름의 두께는 특별히 한정되지 않으면, 용기 몸통 부재(3)의 외주면측에 라미네이트되는 필름을 발포시켰을 때에, 원하는 두께의 발포단열층(11)을 형성시키는 데 필요충분한 두께를 갖는 것이 바람직하다. 일례로서, 저밀도 폴리에틸렌 필름이 용기 몸통 부재(3)의 외주면측에 라미네이트 되어 있는 경우, 이 필름의 두께는 25~60㎛일 수가 있다. 이것보다도 두꺼운 필름을 사용할 수도 있지만, 밑의 인쇄모양이 보기어렵게 된다. 용기 몸통 부재(3)의 내벽면측에 라미네이트되는 필름의

두께는 특별히 한정되지 않는다. 내액체 침투성을 확보하는 데 필요충분한 두께라면 좋다. 이와같은 두께는 사용되는 필름에 의해 다르다. 이와같은 두께는 선택되는 필름에 따라 당업자가 적절이 용이하게 결정할 수가 있다.

본 발명의 단열성 용기를 제조하는데 사용되는 원지는 100g/㎡ ~ 400g/㎡의 범위내의 양의 것이 바람직하다. 또, 이 원지는 약 3~10%의 범위내의 함수율을 갖는 것이 바람직하다.

가열온도 및 가열시간은 사용하는 원지 및 열가소성 합성수지필름에 따라서 변화하지만, 일반적으로는 가열온도는 약 110℃ ~ 약 200℃이고, 가열시간은 약 20초간~약 4분간이다. 사용하는 필름에 대한 최적한 가열온도와 가열시간의 짜 맞춤은 당업자가 적당히 결정할 수가 있다.

가열수단은 열풍, 전열, 전자선등 임의의 수단을 사용할 수 있다. 콘베이어에 의한 반송수단을 갖춘 터널내에서 열풍 또는 전열등에 의해 가열하면, 싼 가격으로 대량생산 할 수가 있다.

말할 것도 없이, 발포억제부는 단일의 두께의 발포단열층을 갖는 지제용기에도 형성할 수가 있다. 단일의 두께의 발포단열층을 갖는 지제용기는 본원 출원인에 의한 일본국 특개소 57-110439호 명세서에 개시되어 있다. 특히, 합성수지함유 도료에 착색함량을 배합하면, 이 도료는 인쇄잉크로서도 사용할 수도 있다. 따라서, 이 잉크로 문자, 기호, 모양등을 라미네이트 필름 표면에 인쇄하면, 필름의 발포후, 이것들의 인쇄부분은 발포가 억제되고, 문자, 기호, 모양등을 발포전의 인쇄시와 거의 같은 상태로 유지할 수가 있다. 그 결과, 인쇄된 문자, 기호, 모양등에 변형, 비뚤어짐, 탈색, 핀홀이 발생하지 않고 명료한 시각성을 얻을 수 있다.

다음 도면을 참조하면서 본 발명을 다시 상세하게 설명한다.

[실시예 1]

230g/㎡ (함수율 7.9%)의 원지의 한쪽면에 저밀도 폴리에틸렌을 두께 60㎛로 압출 라미네이트했다. 원지의 반대면에는 고밀도 폴리에틸렌을 두께 20㎛로 압출 라미네이트했다. 이 저밀도 폴리에틸렌 라미네이트 필름면에 여러가지 합성수지성분을 5wt%~40wt%의 범위내의 농도로 함유하는 도료를 도포했다. 용제로서는 이소프로필 알코올(10%)/ 초산에틸(40%)/ 톨루엔(30%)/ 메틸에틸케톤(20%)으로 이루어지는 혼합용제를 사용했다. 이 양면 라미네이트 원지의 전체 두께는 0.340㎜였다. 이 양면 라미네이트 원지에서 샘플편을 뚫어, 이 샘플편을 콤베이어 오븐에 넣어, 120℃에서 120초간 가열했다. 샘플편의 저밀도 폴리에틸렌 라미네이트 필름의 외주면상에만 발포단열층을 갖는 샘플편을 얻을 수 있었다. 발포단열층을 갖는 샘플편 전체두께는 0.826㎜였다. 사용한 합성수지성분 및 그 사용농도와 발포단열층과의 관계를 제 3도에 도시한다. 도시되고 있는 바와 같이, 염화비닐-초산 비닐계 합성수지는 20~30wt%의 범위내의 농도에서 뛰어난 발포억제효과를 나타낼 수 있는 것을 알 수 있다. 또, 다른 합성수지류도 10~40wt%의 범위내의 농도에서 원하는 발포억제효과를 나타낼 수 있다는 것도 알 수 있다.

[실시예 2]

용기 몸통 부재에 인쇄된 바코드 부분에 본 발명의 합성수지함유 발포억제도료를 도포하여 발포시킨 경우, 이 바코드의 판독확율에 대한 발포억제 효과를 조사했다. 평량 230g/㎡ 의 원지(함수율 8.0%)에 바코드를 인쇄했다. 바코드는 대(1.5배), 중(1.2배), 소(1.0배)의 3사이즈의 것을 인쇄했다. 이 원지의 한쪽면에 저밀도 폴리에틸렌을 두께 60㎛로 압출 라미네이트했다. 원지의 반대면에는 고밀도 폴리에틸렌을 두께 20㎛로 압출 라미네이트했다. 합성수지함유 발포억제 도료로서는 합성수지에 염화비닐-초산비닐 공중합체를 사용하고 용제에는 이소프로필 알코올(10%)/ 초산에틸(40%)/ 톨루엔(30%)/ 메틸에텔케톤(20%)으로 이루어지는 혼합용제를 사용했다. 샘플 원지의 바코드의 인쇄되어 있는 부위의 라미네이트 필름상에서 합성수지함유 발포억제 도료를, 합성수지 성분농도를, 30.0, 22.5, 15.0, 7.5, 3.8 및 1.9wt%로 바꾸어 도포했다. 각각 1 샘플에 대해, 10장 블랭크를 준비하고, 120℃, 120

초간의 가열처리후에 각각 바코드 판독기로, 1장에 대해 10회 판독테스트를 행하고, 그 확율을 구했다. 바코드 판독기에서의 판독은 바코드면에 대하여 눈어림으로 수직으로 맞추어 주사(走査)를 행하고, 1번으로 읽혀지는지를 평가했다. 바코드 판독기로서는, (주) 동연제품의 TBR-4000을 사용했다. 바코드의 크기와 도료안의 합성수지 성분농도의 관계에 의한 바코드 판독기에서의 판독 테스트결과를 다음의 표 1에 나타낸다. 표 1에 있어서, 가로란은 도료안의 합성수지 성분농도를 나타내고, 세로란은 바코드의 크기를 나타낸다. 표안의 숫자는 바코드 판독기에서 샘플 하나에 대해 총 100회 주사했을 때의 바르게 읽혀진 회수를 나타낸다.

[표 1]

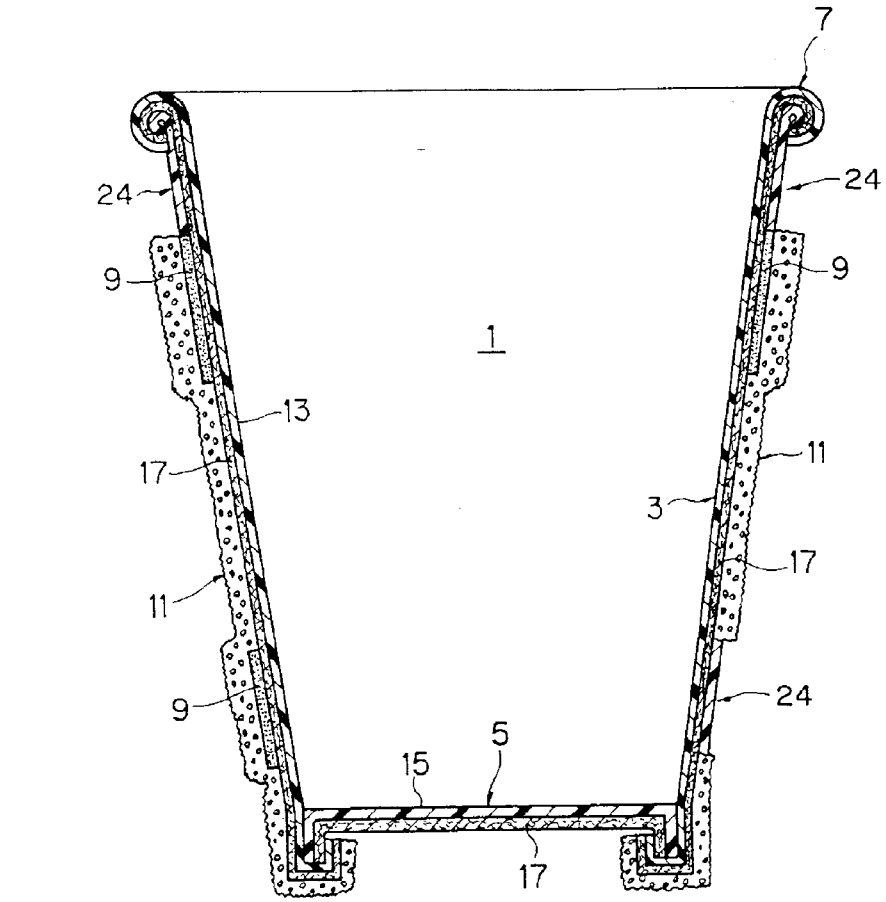
	30.0%	22.5%	15.0%	7.5%	3.8%	1.9%	무도포
대 1.5배	100	100	100	100	100	99	61
중 1.2배	100	100	100	100	100	90	18
소 1.0배	100	100	100	100	91	39	2

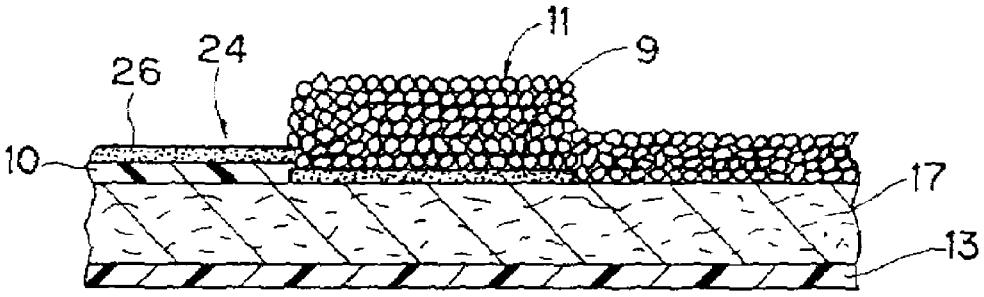
본 발명의 합성수지함유 발포억제도료를 아무것도 도포하지 않고 발포시켰을 때, 바코드 판독기에서의 판독테스트에서는, 대(1.5배)에서도 61%로 낮고, 중(1.2배)에서 18%, 소(1.0배)에서 2%로 전혀 판독되지 않는 것과 비슷한 상태였다. 이것은 모두 발포단열층의 존재에 의한 것으로 생각된다. 이것에 대하여 본 발명의 합성수지함유 발포억제 도료를 도포하면, 합성수지 성분농도 30.0wt%~7.5wt%까지, 바코드의 사이즈(배율)에 관계없이, 100%완전히 판독하는 것이 가능하다.

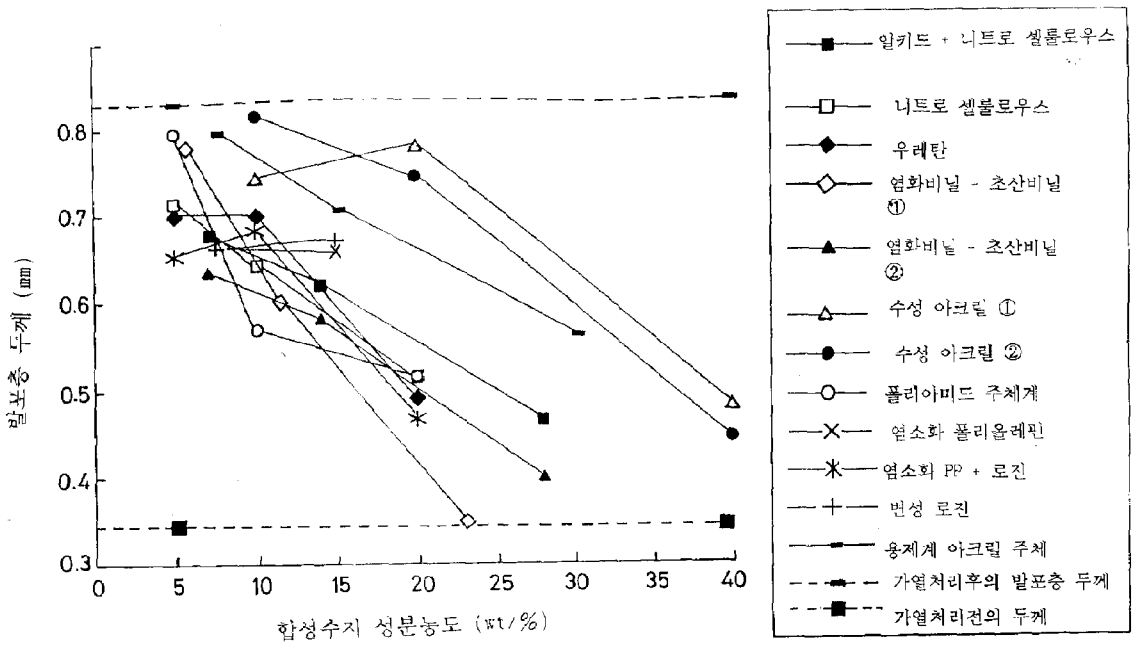
제 7도는 상기의 조건에서 작성된 샘플에 있어서, 발포억제 도료안의 수지성분 함유율에 대한 발포층의 두께의 관계를 도시하는 특성도이다. 발포억제 도료를 도포하지 않은 경우의, 발포단열층을 갖는 샘플의 전체 두께는 0.786㎜였다. 또한, 발포전의 샘플의 두께는 0.458㎜였다. 도시되는 바와 같이, 수지성분의 함유율이 증대함에 따라서, 발포단열층의 두께는 감소해간다. 즉, 수지성분의 함유율이 증대함에 따라서 라미네이트 필름의 발포억제효과가 증대한다.

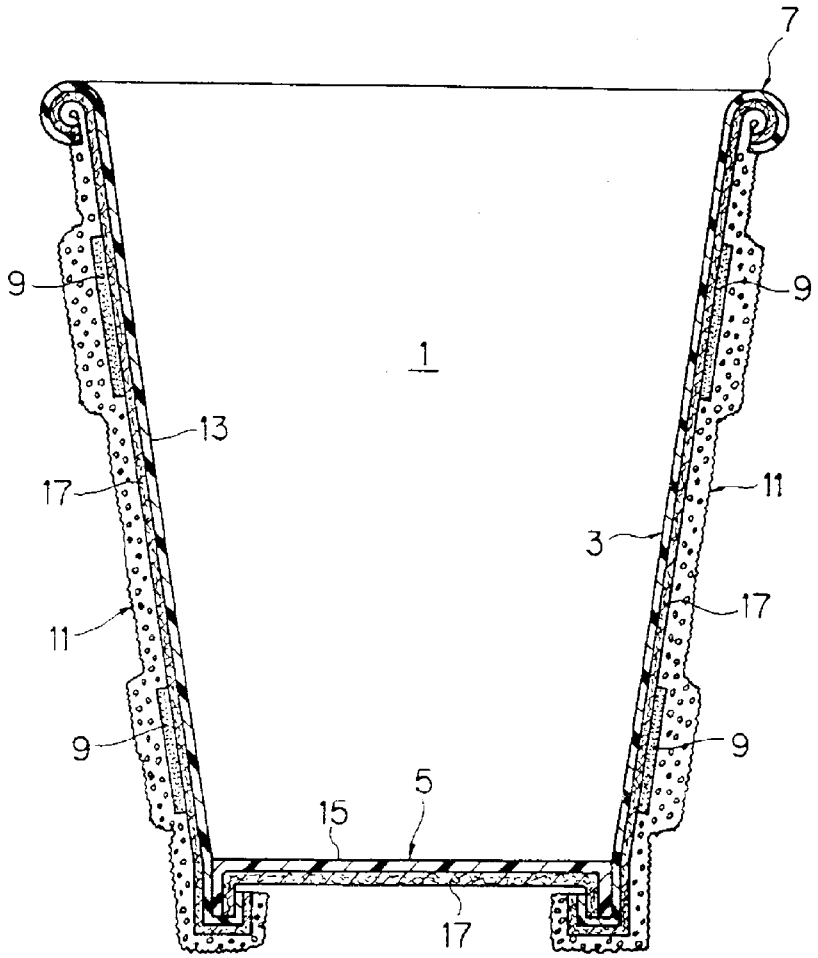
제 7도에 도시된 발포억제 도료를 도포하지 않는 경우의 발포단열층을 갖는 샘플의 전체 두께의 0.786㎜를 발포율 100%로하고, 각 수지성분 함유율에 있어서 샘플의 전체 두께의 값을 이 0.786㎜의 값에 대비시키는 것에 의해 상대적 발포율을 구했다. 이 수지성분 함유율에 대한 발포율의 관계를 제 8도에 도시한다. 표 1에 나타낸 결과에서는 수지함유율이 7.5wt%일때에 바코드의 사이즈에 관계없이, 판독 에러가 0%가 되므로, 제 8도에서, 그 대응하는 발포율은 29%인 것을 알 수 있다. 따라서 에라없는 바코드 판독에 관해서는 라미네이트 필름의 발포량은 완전 발포량의 30%이하로 억제하지 않으면 안된다는 결론이 나온다.

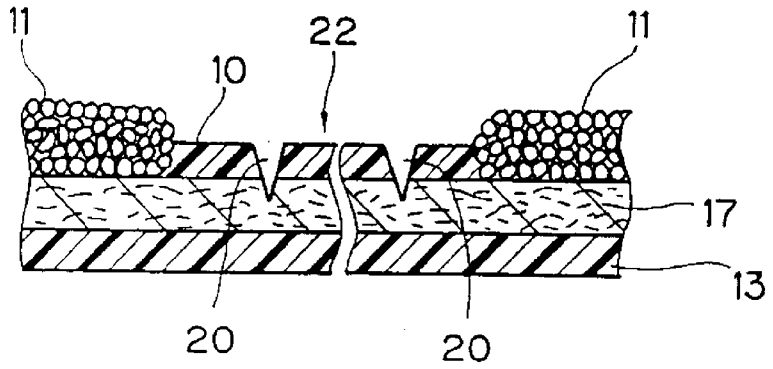
이상 설명한 바와같이, 본 발명에 의하면 용기 몸통 부재의 소정 개소에 합성수지함유 발포억제 도료를 도포해 두는 것에 의해 이 용기를 가열시켜 몸통 부재 바깥표면에 라미네이트된 열가소성 합성수지 필름을 발포시켜도, 발포억제도료의 도포된 부분의 하부의 열가소성 합성수지 필름의 발포를 효과적으로 억제할 수가 있다. 그 결과, 이 발포억제도료의 도포된 해당 개소의 하부에 인쇄된 바코드등을 판독할 때에 에라를 일으키는 일이 없게 된다. 게다가 이 도료를 용기 입구 가장자리부 하부에 둘레에 돌린 형상으로 도포해 두는 것에 의해 입구 가장자리부 하부의 필름의 발포가 억제되고, 이 부분에 입술이 닿아도 거칠거칠한 느낌을 받지 않고, 평활한 필름과 같은 감촉을 받을 수가 있다.

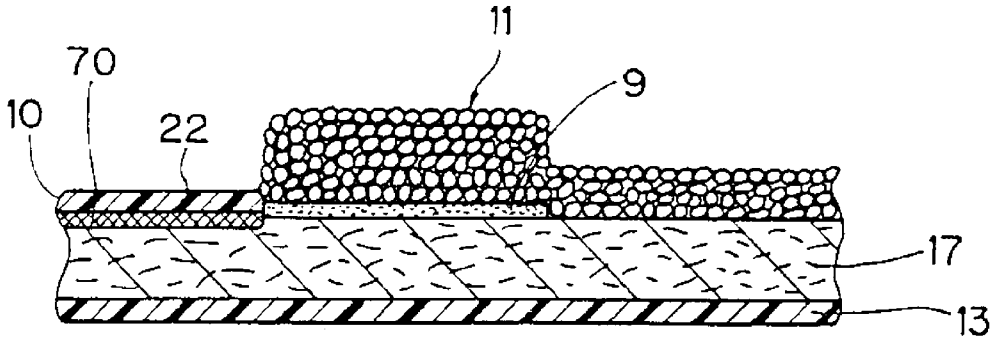

7
24
24
9
9
1
13
17
11
3
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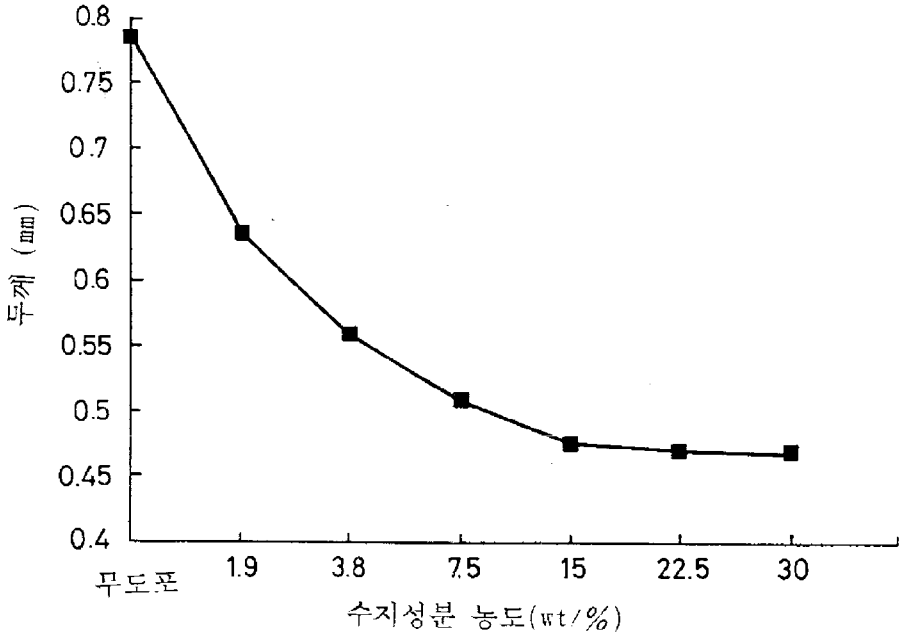

11
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26
24
10
17
13

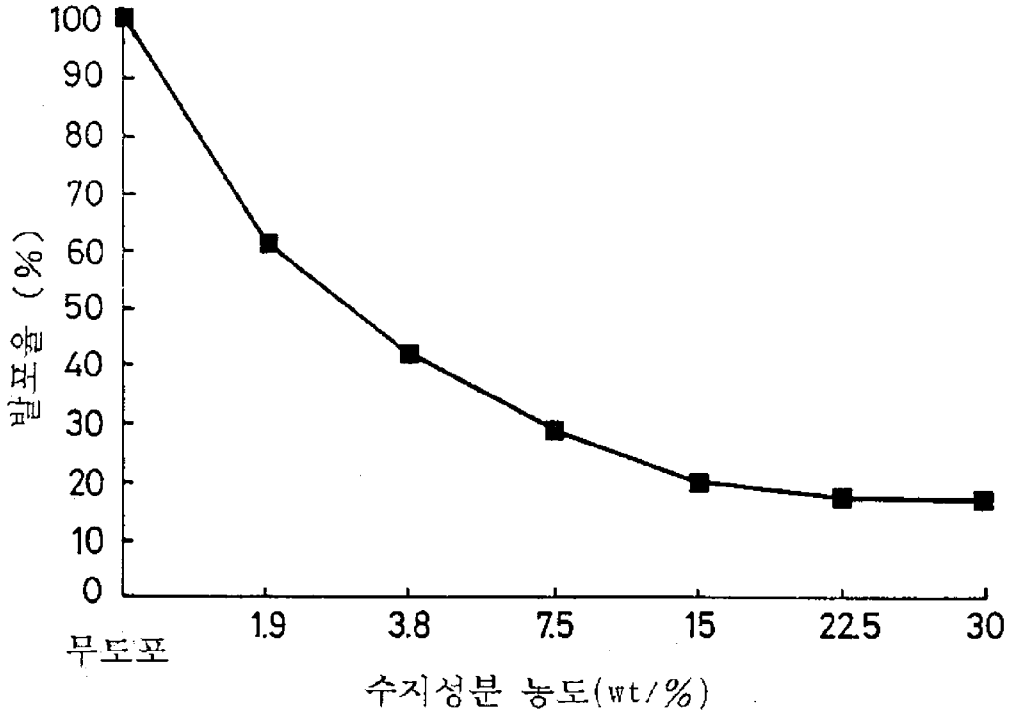

발포층 두께 (mm)
0.8
0.7
0.6
0.5
0.4
0.3
0
5
10
15
20
25
30
35
40
합성수지 성분농도 (wt/%)
일키드 + 니트로 셀룰로우스
니트로 셀룰로우스
우레탄
염화비닐 - 초산비닐 ①
염화비닐 - 초산비닐 ②
수성 아크릴 ①
수성 아크릴 ②
폴리아미드 주체계
염소화 폴리올레핀
염소화 PP + 로진
변성 로진
용제계 아크릴 주체
가열처리후의 발포층 두께
가열처리전의 두께


7
9
9
1
13
17
11
3
17
11
9
9
5
15
17


11
22
11
10
17
13
20
20


11
70
9
10
22
17
13


0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
두께 (mm)
무도포
1.9
3.8
7.5
15
22.5
30
수지성분 농도(wt/%)


100
90
80
70
60
50
40
30
20
10
0
발포율 (%)
무토포
1.9
3.8
7.5
15
22.5
30
수지성분 농도(wt/%)

(12) DEMANDE INTERNATIONALE PUBLIÉE EN VERTU DU TRAITÉ DE COOPÉRATION EN MATIÈRE DE BREVETS (PCT)

(19) Organisation Mondiale de la Propriété Intellectuelle
Bureau international

(43) Date de la publication internationale
1 novembre 2007 (01.11.2007)

PCT

(10) Numéro de publication internationale
WO 2007/122144 A1

(51) **Classification internationale des brevets :**
B65D 85/804 (2006.01) ***A47J 31/40*** (2006.01)

(21) **Numéro de la demande internationale** :
PCT/EP2007/053738

(22) **Date de dépôt international** : 17 avril 2007 (17.04.2007)

(25) **Langue de dépôt** : français

(26) **Langue de publication** : français

(30) **Données relatives à la priorité** :
0651475 26 avril 2006 (26.04.2006) FR

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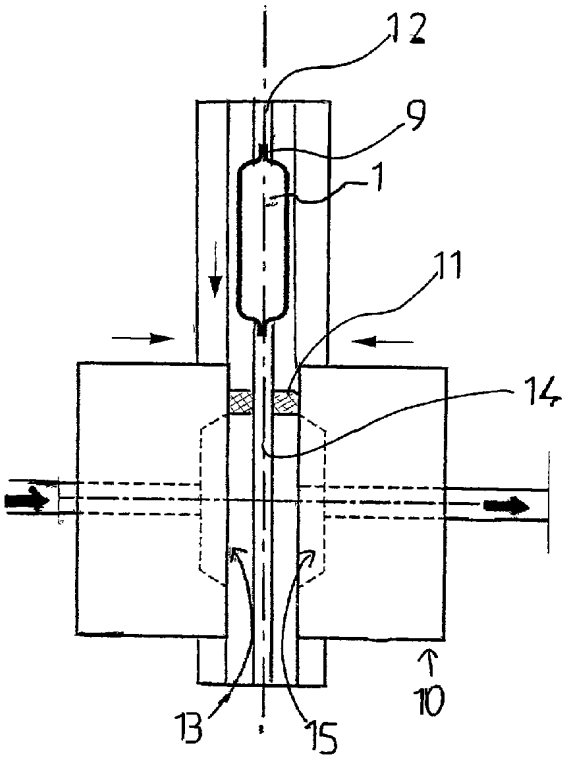
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(81) **États désignés** *(sauf indication contraire, pour tout titre de protection nationale disponible)* : AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FT, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY,MA, MD, MG, MK, MN, MW, MX, MY, MZ,

[Suite sur la page suivante]

(54) Title: PACKAGING FOR THE INFUSION OF AN INFUSIBLE SUBSTANCE WITH TWO SPECIHC DIRECTIONS OF USE

(54) Titre : CONDITIONNEMENT POUR LTNFUSION DTJNE MATIERE A INFUSER AVEC DEUX SENS SPECIFIQUES D'UTILISATION



(57) Abstract: The présent invention relates to packaging (1) for the infusion of an infusible substance that comprises two filtering layers (3, 4) so as to define a volume (2) receiving the infusible substance (2) and able to engage with a water injection head through one or other of its surfaces characterised in that said filtering layers hâve différent filtering properties. To advantage, the packaging comprises a mark (7) intended to identify the two filtering layers. Device (10) for using this packaging comprising mark reading means (11). Application for the packaging of ground coffee or tea for use with machines using shots of pre-packed ground coffee or tea.

(57) **Abrégé** : La présente invention concerne le conditionnement (1) pour l'infusion de matière à infuser comportant deux couches filtrantes (3,4) de sorte à délimiter un (2) volume de réception de Ia matière à infuser (2) et apte à coopérer avec une tête d'injection d'eau par l'une ou l'autre de ses faces caractérisé par le faite que lesdites couches filtrantes possèdent des propriétés de filtration différentes. Avantageusement, le conditionnement comporte un marquage (7) destine à identifier les deux couches filtrantes. Dispositif (10) pour l'utilisation de ce conditionnement comportant des moyens de lecture (11) du marquage. Application pour le conditionnement de café moulu ou de thé utilisable avec des machines utilisant des doses de café moulu ou de thé pré-emballées.

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

NA, NG, **NI,** NO, NZ, **OM, PG, PH, PL, PT, RO, 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) États désignés *(sauf indication contraire, pour tout titre de protection régionale disponible)* : **ARIPO (BW, GH, GM,** KE, **LS, MW,** MZ, NA, **SD, SL,** SZ, TZ, UG, ZM, ZW), eurasien (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), européen (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, 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).

Publiée :

— *avec rapport de recherche internationale*

— *avant l'expiration du délai prévu pour la modification des revendications, sera republiée si des modifications sont reçues*

En ce qui concerne les codes à deux lettres et autres abréviations, se référer aux "Notes explicatives relatives aux codes et abréviations" figurant au début de chaque numéro ordinaire de la Gazette du PCT.

K-FEE SYSTEM GMBH, EX2009, page 2411
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

"Conditionnement pour l'infusion d'une matière à infuser avec deux sens spécifiques d'utilisation »"

La présente invention concerne un conditionnement pour l'infusion d'une matière à infuser et un dispositif pour son utilisation.

Elle trouvera, en particulier, son application pour le conditionnement de café moulu ou de thé utilisable avec des machines utilisant des doses de café moulu ou de thé pré -emballées.

Le document FR A 2 709 737, au nom du déposant, décrit un conditionnement pour du café moulu, se présentant sous la forme de pastille formée de papier filtre qui renferme le café moulu. Le pourtour de la pastille est constitué d'un matériau suffisamment rigide pour faire office d'armature, de sorte que ladite pastille a une bonne tenue mécanique.

Quel que soit le sens d'utilisation, la même qualité de boisson est obtenue.

On connaît aussi le document FR 2 874 210 au nom du déposant décrivant un conditionnement pour du café moulu tel que précédemment décrit

comportant un marquage pour identifier le type de conditionnement, par exemple le type de café moulu.

Le document EP-A-1 273 528 décrit une capsule souple fermée pour la préparation d'une boisson. La capsule possède deux faces ne laissant pas passer l'eau à la même pression. Seule une face de la capsule est apte à coopérer avec une tête d'injection d'eau. Cette capsule n'est pas réversible et donc pas utilisable dans les deux sens d'utilisation.

Aucun des documents ne décrit la possibilité d'obtenir deux qualités de boisson avec un seul et même conditionnement.

A cet effet, la présente invention propose un conditionnement pour l'infusion de matière à infuser comportant deux couches filtrantes de sorte à délimiter un volume de réception de la matière à infuser et apte à coopérer avec une tête d'injection d'eau par l'une ou l'autre de ses faces caractérisé par le fait que lesdites couches filtrantes possèdent des propriétés de filtration différentes et qu'il comporte un marquage spécifique sur une face dudit conditionnement pour différencier les deux faces.

Par propriétés de filtration, il faut entendre : porosité, épaisseur, relief, type de matériau utilisé et toutes autres caractéristiques pouvant modifier les qualités de filtration d'une couche filtrante.

Les qualités de filtration d'une couche filtrante sont classiquement, définies par un temps de passage de l'eau.

Pour déterminer ce temps de passage, on utilise une pompe continue, une mouture précise, un poids défini de matière à infuser et seule une caractéristique comme la porosité de la couche filtrante varie.

Par exemple en utilisant une pompe de 16 bar, une mouture de café de finesse moyenne, un poids de 7g et en faisant varier la porosité de la couche filtrante, le rapport du temps de passage entre deux couches filtrantes peut varier de 1 à 4.

L'avantage de la présente invention est la possibilité d'obtenir une qualité de boisson différente selon le sens d'utilisation dudit conditionnement.

Le sens d'utilisation est choisi en fonction de la qualité de la boisson désirée par l'utilisateur ou un sens d'utilisation est préféré pour obtenir une boisson d'une certaine qualité.

Dans l'objectif de distinguer les deux couches filtrantes, le conditionnement comporte avantageusement un marquage qui permet leur différenciation.

L'invention a aussi pour objet un dispositif de production de boissons par infusion d'une matière à infuser comportant une tête d'injection d'eau et destiné à coopérer avec ledit conditionnement caractérisé par le fait qu'il comporte un repère visuel indiquant le sens d'utilisation du conditionnement relativement à la tête d'injection d'eau.

Avantageusement, le repère visuel est semblable au marquage spécifique porté par une face dudit conditionnement.

Dans un autre mode de réalisation, le dispositif peut comporter des moyens de lecture pour l'identification dudit marquage.

La tête d'injection d'eau peut comporter une tête de perforation si le conditionnement nécessite de tels moyens.

D'autres buts et avantages apparaîtront au cours de la description qui suit d'un mode préféré de réalisation de l'invention qui n'en est cependant pas limitatif.

La présente invention concerne un conditionnement pour l'infusion d'une matière à infuser comportant deux couches filtrantes de sorte à délimiter un volume de réception de la matière à infuser et apte à coopérer avec une tête d'injection d'eau par l'une ou l'autre de ses faces, caractérisé par le fait que lesdites couches filtrantes possèdent des propriétés de filtration différentes et qu'il comporte un marquage spécifique sur une face dudit conditionnement pour différencier les deux faces.

Suivant des variantes préférées de l'invention, ce conditionnement est tel :

- que les faces sont de forme sensiblement identique apte à coopérer avec une tête d'injection d'eau
- que le rapport du temps de passage des deux couches filtrantes est compris entre 1 et 2, et avantageusement égal à 2,
- que le rapport du temps de passage des deux couches filtrantes est compris entre 2 et 4, et avantageusement égal à 3,

- qu'il comporte un marquage spécifique sur une face dudit conditionnement pour différencier les deux faces,
- qu'il comporte un marquage complémentaire sur l'autre face dudit conditionnement,
- que ledit marquage est une couleur,
- que les couches filtrantes sont formées à base de papier filtre,
- que les deux couches filtrantes sont à base de papier filtre et sont solidaires chacune à une face d'un renfort périphérique portant ledit marquage.

Un autre objet de l'invention est un dispositif de production de boissons par infusion d'une matière à infuser comportant une tête d'injection d'eau et destiné à coopérer avec un conditionnement comme décrit précédemment caractérisé par le fait qu'il comporte un repère visuel indiquant le sens d'utilisation dudit conditionnement relativement à la tête d'injection d'eau.

Avantageusement, le repère visuel est une couleur semblable au marquage spécifique porté par une face dudit conditionnement.

L'invention concerne aussi un dispositif de production de boissons par infusion d'une matière à infuser comportant une tête d'injection d'eau et destiné à coopérer avec un conditionnement comme décrit précédemment caractérisé par le fait qu'il comporte des moyens de lecture pour l'identification dudit marquage.

Avantageusement, les moyens de lecture se situent dans une glissière apte à coopérer avec ledit renfort périphérique et destiné à guider ledit conditionnement.

Préférentiellement, le dispositif comporte des moyens de commande destinés à adapter le fonctionnement dudit dispositif selon l'identification dudit marquage.

Les dessins ci-joints sont donnés à titre d'exemples et ne sont pas limitatifs de l'invention. Ils représentent seulement un mode de réalisation de l'invention et permettront de la comprendre aisément.

La figure 1 illustre partiellement de côté et partiellement en coupe, un conditionnement selon l'invention.

La figure 2 en donne une vue en perspective.

La figure 3 est une vue schématique du dispositif de l'invention en vue de côté.

La figure 4 est un exemple de configuration des moyens de lecture utilisables.

Le conditionnement 1 selon l'invention est constitué d'une couche inférieure 3 dont les propriétés de filtration sont différentes de celle de la couche supérieure 4. Les deux couches 3 et 4 délimitent un volume intérieur rempli d'une matière à infuser 2.

Les faces 5 et 6 dudit conditionnement 1 sont de forme sensiblement identique de manière à pouvoir coopérer dans les deux sens avec une tête d'injection d'eau 13.

A titre d'exemple, la matière à infuser 4 est de la mouture de café et les couches filtrantes 3 et 4 du conditionnement 1 sont à base de papier filtre.

Les deux couches préférentiellement à base de papier filtre 3 et 4 sont solidaires chacune à une face d'un renfort périphérique 9 destiné à donner une bonne tenue mécanique au conditionnement.

Les différences de filtration entre les deux couches 3 et 4 peuvent être distinguées par la mise en œuvre de moyens de marquage pour identifier les deux faces 5 et 6 dudit conditionnement 1.

La face 6 comporte un marquage spécifique 7 et la face 5 peut ou non porter un marquage complémentaire 8.

Dans un mode de réalisation, le marquage spécifique 7 et le marquage complémentaire 8 sont constitués par une couleur prédéterminée. On entend par couleur, une nuance de couleur apte à être individualisée par l'utilisateur et/ou par des moyens de lecture 11.

Selon un mode de réalisation particulier, dans chaque série de conditionnement 1, le marquage spécifique 7 sera une couleur prédéterminée correspondant à une qualité de boisson particulière et le marquage complémentaire 8 sera identique pour toute la série. A titre d'exemple, le marquage spécifique 7 pourrait être bleu, rouge ou jaune et le marquage complémentaire 8 serait blanc quel que soit la couleur du marquage spécifique 7.

Avantageusement, le marquage spécifique 7 et le marquage complémentaire 8 sont portés par le renfort périphérique 9.

Le conditionnement 1 peut être utilisé dans un dispositif 10 de production de boissons par infusion d'une matière à infuser 2 comportant une tête d'injection d'eau 13 apte à coopérer avec les deux faces 5 et 6 dudit conditionnement 1.

Ledit conditionnement 1 est placé verticalement dans une glissière 12 verticale apte à coopérer avec le renfort périphérique 9 dudit conditionnement 1, la glissière 12 permet de guider ledit conditionnement 1 jusqu'à la chambre d'infusion 14. Celle-ci est constituée de deux pièces symétriques qui se rapprochent une fois le conditionnement présent dans la chambre d'infusion.

Une des deux pièces est la tête d'injection d'eau 13, par laquelle l'eau chaude arrive jusqu'au conditionnement 1. La tête d'injection d'eau a une forme concave permettant l'encastrement dudit conditionnement et peut être constituée d'une grille plus ou moins fine permettant le passage de l'eau chaude sur toute la surface dudit conditionnement 1. Elle peut aussi comporter une tête de perforation si le conditionnement nécessite de tels moyens.

L'autre pièce 15 de la chambre d'infusion a une forme concave identique à celle de la tête d'injection d'eau 13 pour pouvoir recevoir ledit conditionnement 1 dans ses deux sens d'utilisation. Cette pièce 15 permet l'écoulement de la boisson vers l'extérieur dudit dispositif 10.

Une fois l'utilisation du dispositif 10 finie, les deux pièces formant la chambre d'infusion 14, s'écartent et laissent tomber le conditionnement 1 vers un réceptacle récupérateur.

Les moyens de lecture 11 se situent de part et d'autres de la glissière 12, à un emplacement défini pour permettre la lecture des marquages 7 et 8 lorsque ledit conditionnement 1 est positionné dans la chambre d'infusion 14.

Dans un mode de réalisation particulier, les moyens de lecture 11 sont des moyens de reconnaissance d'au moins une couleur.

A titre d'exemple, les moyens de lecture comportent :

- une diode apte à émettre une lumière avec un spectre fréquentiel prédéfini vers une zone cible du conditionnement 1,

- un composant de détection apte à capter la lumière transmise ou réfléchie par le conditionnement et à l'interpréter pour identifier le marquage du conditionnement.

Les moyens de lecture 11 peuvent fonctionner de façon réfléchie c'est-à-dire en utilisant la surface cible du conditionnement 1 comme surface de réflexion pour la mesure de la lumière réfléchie ou de façon transmitive c'est-à-dire apte à détecter la lumière transmise au travers de son épaisseur. Dans ce dernier cas la diode et le composant de détection sont positionnés en vis-à-vis relativement à la glissière 12.

Une lecture par réflexion est plus adaptée si un marquage spécifique 7 et un marquage complémentaire 8 sont réalisés.

Les moyens de lecture étant formés dans la glissière 12 apte à coopérer avec ledit renfort périphérique 9 portant lesdits marquages 7 et 8 ledit conditionnement 1 peut être placé dans la glissière 12 dans les deux sens d'utilisation.

Selon un autre mode de réalisation, le conditionnement 1 pourrait être de forme cylindrique ou même cubique constitué de plastique ou de carton et dont deux faces sont filtrantes et de même structure extérieure de manière à permettre la production de boisson par infusion dans deux sens d'utilisation.

1er Exemple d'utilisation du dispositif

L'utilisateur prend le conditionnement 1 puis repère le marquage spécifique 7 porté par la face 6 du renfort périphérique 9. Le marquage complémentaire 8 est alors identique pour toutes les séries de conditionnement. Les marquages 7 et 8 étant avantageusement des couleurs, le marquage complémentaire 8 peut être la couleur blanche. L'utilisateur remarque ensuite le repère visuel présent sur le dispositif 10 et correspondant sensiblement à la couleur du marquage spécifique 7. Il peut alors introduire le conditionnement 1 dans le dispositif 10 de manière à avoir le marquage spécifique 7 du même côté que le repère visuel du dispositif 10.

De façon additionnelle, des moyens de lecture 11 dudit dispositif 10 peuvent détecter et identifier le marquage spécifique 7. Le dispositif 10 peut alors informer l'utilisateur par divers moyens d'avertissement, si le sens d'introduction du conditionnement 1 n'est pas le bon. Si le sens d'introduction

est correct, le dispositif 10 adapte son fonctionnement en fonction du marquage spécifique 7 identifié.

2ème Exemple d'utilisation du dispositif

L'utilisateur prend le conditionnement 1 puis repère le marquage spécifique 7 porté par la face 6 du renfort périphérique 9 ainsi que le marquage complémentaire 8 porté par la face 5 du renfort périphérique 9.

Les marquages 7 et 8 étant avantageusement des couleurs, le marquage spécifique 7 est de couleur distincte du marquage complémentaire 8. L'utilisateur identifie la différence entre les deux marquages et choisi le type de boisson désirée. Si il veut la boisson correspondant au marquage spécifique 7 alors il introduit le conditionnement 1 dans le dispositif 10 de manière à avoir le marquage spécifique 7 face à lui.

Si l'utilisateur souhaite obtenir la boisson correspondant au marquage complémentaire 8 alors il introduit le conditionnement 1 dans le dispositif 10 de manière à avoir le marquage complémentaire 8 face à lui.

Les moyens de lecture 11 dudit dispositif 10 détectent alors soit le marquage spécifique 7, soit le marquage complémentaire 8, en informe l'utilisateur et adapte son fonctionnement en fonction du marquage identifié.

REFERENCES

1. Conditionnement
2. Matière à infuser
3. Couche inférieure filtrante
4. Couche supérieure filtrante
5. Face inférieure du conditionnement
6. Face supérieure du conditionnement
7. Marquage spécifique
8. Marquage complémentaire
9. Renfort périphérique
10. Dispositif
11. Moyens de lecture
12. Glissière
13. Tête d'injection
14. Chambre d'infusion
15. Pièce d'écoulement

REVENDICATIONS

1. Conditionnement (1) pour l'infusion de matière à infuser (2) comportant deux couches filtrantes (3) (4) de sorte à délimiter un volume de réception de la matière à infuser (2) et apte à coopérer avec une tête d'injection d'eau (13) par l'une ou l'autre de ses faces (5) (6) caractérisé par le fait

que lesdites couches filtrantes (3) (4) possèdent des propriétés de filtration différentes et qu'il comporte un marquage spécifique (7) sur une face (6) dudit conditionnement pour différencier les deux faces.

2. Conditionnement (1) selon la revendication 1 dans lequel les faces (5) (6) sont de forme sensiblement identique apte à coopérer avec une tête d'injection d'eau (13).

3. Conditionnement selon la revendication 1 ou 2 caractérisé par le fait

que le rapport du temps de passage des deux couches filtrantes est compris entre 1 et 2, et avantageusement égal à 2.

4. Conditionnement selon la revendication 1 ou 2 caractérisé par le fait

que le rapport du temps de passage des deux couches filtrantes est compris entre 2 et 4, et avantageusement égal à 3.

5. Conditionnement selon une quelconque des revendications 1 à 4 comportant un marquage complémentaire (8) sur l'autre face (5) dudit conditionnement (1).

6. Conditionnement selon une quelconque des revendications précédentes caractérisé par le fait

que ledit marquage (7) (8) est une couleur.

7. Conditionnement selon la revendication 1 caractérisé par le fait que les couches filtrantes (3) (4) sont formées à base de papier filtre.

8. Conditionnement selon les revendications 1 à 7 caractérisé par le fait

que les deux couches filtrantes sont à base de papier filtre (3) (4) et sont solidaires chacune à une face d'un renfort périphérique (9) portant ledit marquage (7) (8).

9. Dispositif (10) de production de boissons par infusion d'une matière à infuser (2) comportant une tête d'injection d'eau (13) et apte à coopérer avec un conditionnement selon l'une des revendications 1 à 8 caractérisé par le fait

qu'il comporte un repère visuel indiquant le sens d'utilisation du conditionnement relativement à la tête d'injection d'eau (13).

10. Dispositif (10) selon la revendication 9 dans lequel le repère visuel est une couleur semblable au marquage spécifique (7) porté par une face du conditionnement (1).

11. Dispositif (10) selon la revendication 9 ou 10 caractérisé par le fait qu'il comporte des moyens de lecture (11) pour l'identification dudit marquage (7) (8).

12. Dispositif (10) selon la revendication 11 caractérisé par le fait que les moyens de lecture (11) se situent dans une glissière (12) apte à coopérer avec ledit renfort périphérique (9) et destiné à guider ledit conditionnement (1).

13. Dispositif (10) selon la revendication 12 comportant des moyens de commande destinés à adapter le fonctionnement dudit dispositif (10) selon l'identification dudit marquage (7) (8).

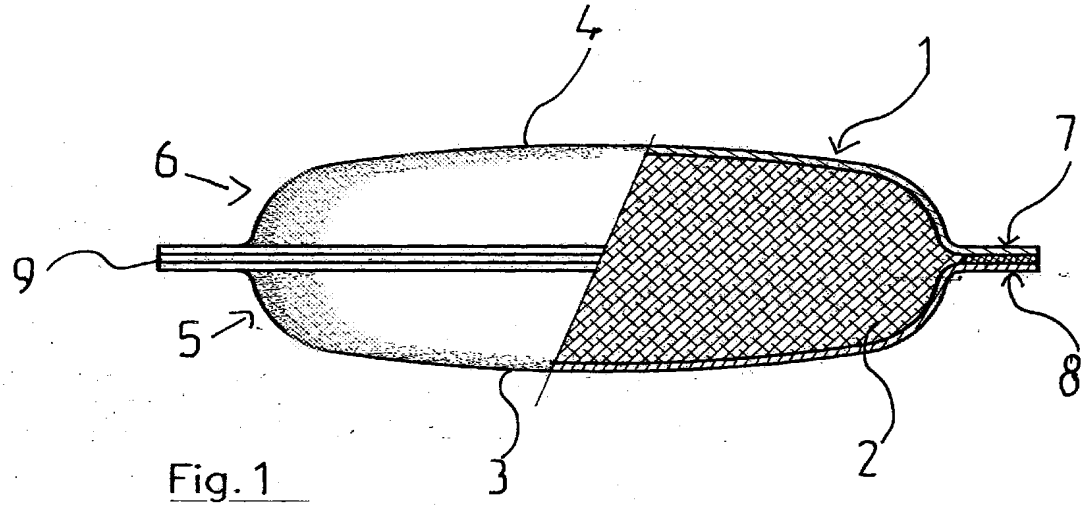


Fig. 1

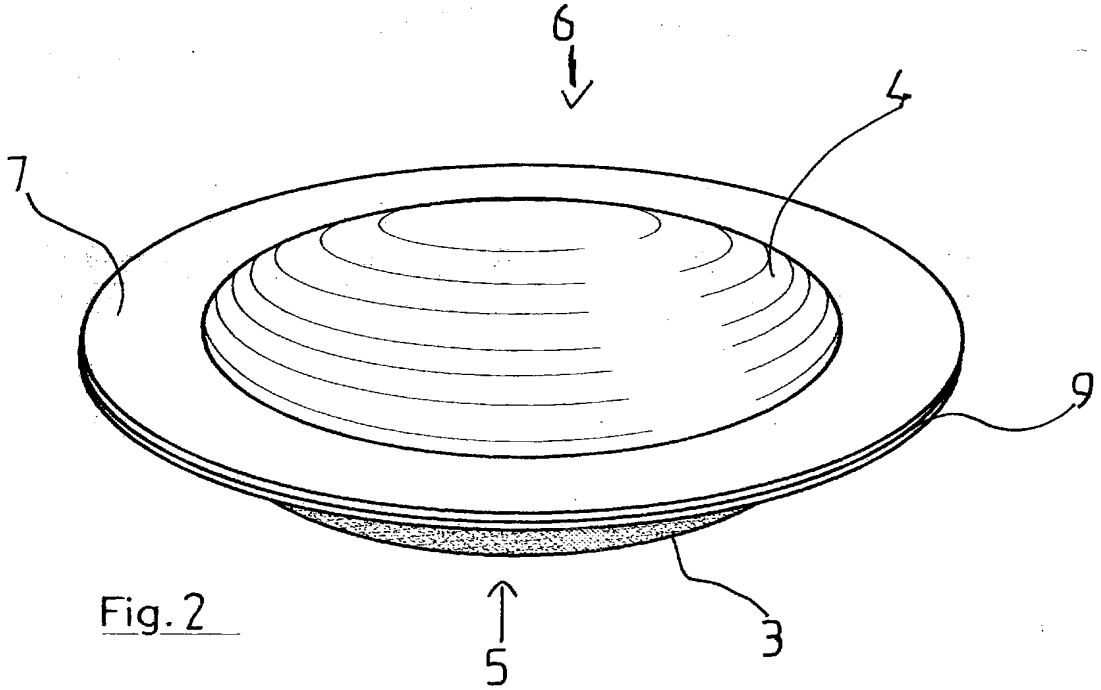


Fig. 2

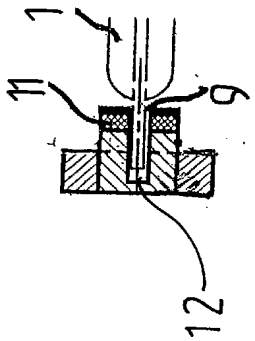


Fig.4

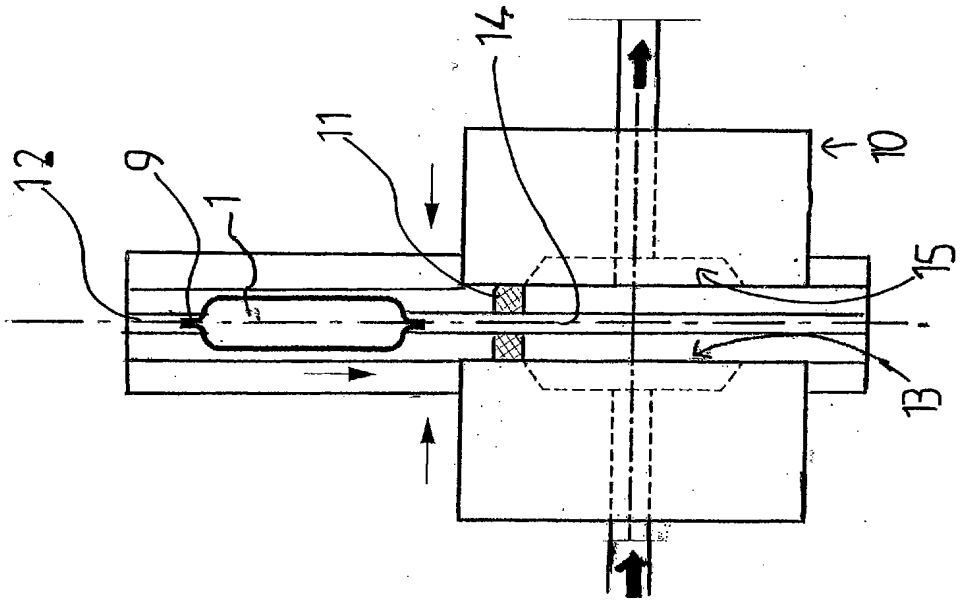


Fig.3

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2007/053738

A. CLASSIFICATION OF SUBJECT IMATTER
INV. B65D85/804 A47J31/40

According to Inlernalional Patent Classification (IPC) orlo both national classiticatio π and IPC

B FIELDS SEARCHED

Minimum documentation searched (classification System tollowe α Dy classification symbols)
B65D A47J

Documentation searched other than minimum documentation to the exte πt that such documents are mcluded in the fields searched

Electronic data base consulter! dunng the international search (name of data base and where practical search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document with indication where appropriate of the relevant passages	Relevant to daim No
Y	FR 2 874 210 A1 (CIE MEDITERRANEENNE DES CAFES [FR]) 17 February 2006 (2006-02-17) page 2, Unes 3-29 page 3, Iine 9 - page 4, Iine 30; figures 1,2	1-8
Y	EP 1 273 528 A1 (NESTLE SA [CH]) 8 January 2003 (2003-01-08) paragraphs [0020], [0021]; claim 1; figures 1,2	1-8
X	FR 2 874 164 A1 (CIE MEDITERRANEENNE DES CAFES [FR]) 17 February 2006 (2006-02-17) page 4, line 31 - page 8, une 31; figures 1-4	9-13

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

[X] See patent family annex

* Spécial catégories of cited documents

"A" document defInIng the gênerai state of Ihe art whIch Is not considerad to be of particular relevance

[1]E[1] earlier document but published on or after Ihe international filiπg date

[1]L" document which may throw doubts on pπority claim(s) or which is cited to establish the publication date of another citation or other spécial reason (as εpeclfied)

'O' document referrIng to an oral disclosure, use, exhibition or other means

'P' document published pnor to the international filing date but later Ihan the pπonty date claimed

[1]T[1] later document published after the international fiting date or pπority date and not In contlict wIth the application but αtcd to understand the pπncφ le or theory undorl/ng the invention

'X' document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document Is taken alone

[1]Y' document of particular relevance, Ihe claimed invention cannot be considered to involve an inventive step when the document Is combined with onβ or more other such docu¬ments, such combmatio π being obvious to a perso π skIlled in the art

'&' document member of the same patent family

Date of the actual completIon orthe international search	Date of mailing of trie international search report
3 July 2007	30/08/2007
Name and mailing address of the \SA/ European Patent Office, P B 581 B Patentlaan 2 NL - 2280 HV Rijswijk Tel (+31-70) 340-2040, Tx 31 651 epo nl, Fax (+31-70) 340-3016	Authoπzed officer Grondin, David

Form PCT/ISA/210 (second sheet) (Apnl 2005)

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IPR2023-00502, U.S. PATENT 10,994,923

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2007/053738

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

CatBgory*	Citation of document with indication, where appropriate, of the relevant passages	Relevant to daim No
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Form PCT/ISA/210 (continuation of second sheet) (April 2005)

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Information on patent lamily mèmbere

International application No
PCT/EP2007/053738

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RAPPORT DE RECHERCHE INTERNATIONALE

Demande internationale π°
PCT/EP2007/053738

A CLASSEMENT DE L'OBJET DE LA DEMANDE
INV. B65D85/804 A47J31/40

Selon la classification internationale des brevets (CIB) ou à la fois selon la classification nationale et la CIB

B DOMAINES SUR LESQUELS LA RECHERCHE A PORTE

Documentation minimale consultée (système de classification SUIVI des symboles de classement)
B65D A47J

Documentation consultée autre que la documentation minimale dans la mesure ou ces documents relèvent des domaines sur lesquels a porte la recherche

Base de données électronique consultée au cours de la recherche internationale (nom de la base de données et si cela estrealisable termes de recherche utilisés)
EPO-Internal

C DOCUMENTS CONSIDERES COMME PERTINENTS

Catégorie'	Identification des documents cités avec le cas échéant l'indication des passages pertinents	no des revendications visées
Y	**FR 2 874 210 A1 (CIE MEDITERRANEENNE DES CAFES [FR]) 17 février 2006 (2006-02-17)** **page 2, ligne 3-29** **page 3, ligne 9 - page 4, ligne 30;** **figures 1,2**	**1-8**
Y	**EP 1 273 528 A1 (NESTLE SA [CH])** **8 janvier 2003 (2003-01-08)** **alinéas [0020], [0021]; revendication 1;** **figures 1,2**	**1-8**
X	**FR 2 874 164 A1 (CIE MEDITERRANEENNE DES CAFES [FR]) 17 février 2006 (2006-02-17)** **page 4, ligne 31 - page 8, ligne 31;** **figures 1-4**	**9-13**

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[X] Voir la suite du cadre C pour la Im de la liste des documents

[X] Les documents de familles de brevets sont indiqués en annexe

* Catégories spéciales de documents cites

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3 jui I let 2007	30/08/2007

Nom et adresse postale de l'administration chargée de la recherche internationale	Fonctionnaire autorisé
Office Européen des Brevets, P B 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tal (+31-70) 340-2040 Tx 31 651 epo ni Fax (+31-70) 340-3016	Grondin, **David**

Formulaire PCT/ISA/210 (deuxèmβ Iθuιιιθ) (avril 2005)

RAPPOFIT DE RECHERCHE INTERNATIONALE

Demande Internationale π°
PCT/EP2007/053738

C(suite). DOCUMENTS CONSIDERES COMME PERTINENTS

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PCT/EP2007/053738

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(19)日本国特許庁(JP)　(12)公表特許公報(A)　(11)特許出願公表番号
特表2010-516364
(P2010-516364A)
(43)公表日　平成22年5月20日(2010.5.20)

(51)Int.Cl.		F I			テーマコード（参考）
A47J 31/44	(2006.01)	A47J	31/44	Z	3E067
B65D 77/02	(2006.01)	B65D	77/02	B	3E084
B65D 51/24	(2006.01)	B65D	51/24	D	4B104

審査請求 未請求　予備審査請求 未請求　（全 15 頁）

(21)出願番号　特願2009-546732 (P2009-546732)
(86)(22)出願日　平成20年1月21日 (2008.1.21)
(85)翻訳文提出日　平成21年9月16日 (2009.9.16)
(86)国際出願番号　PCT/EP2008/050634
(87)国際公開番号　WO2008/090122
(87)国際公開日　平成20年7月31日 (2008.7.31)
(31)優先権主張番号　07101087.0
(32)優先日　平成19年1月24日 (2007.1.24)
(33)優先権主張国　欧州特許庁 (EP)

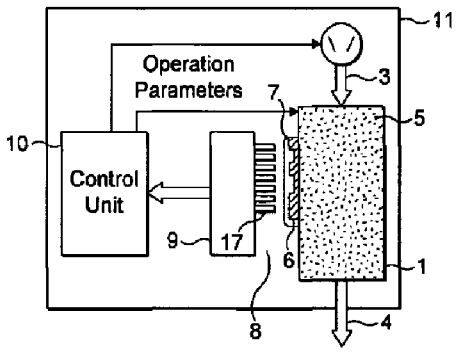
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(54)【発明の名称】飲料原料収容カプセルの識別

(57)【要約】
飲料原料カプセル（１）には、関連する飲料製造機の動作パラメータを制御するために外側から物理的に接触されるようになっている識別部材（６）が設けられる。
【選択図】　図１

Fig.1



K-FEE SYSTEM GMBH, EX2009, page 2431
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】
外側から物理的に接触されるよう構成された識別部材（６）が設けられている飲料原料カプセル（１）において、前記識別部材（６）が、変形可能な、変位可能な、取り外し可能な、および／または、穿刺可能なカバー（７）によって覆われることを特徴とする、飲料原料カプセル。
【請求項２】
外側から接触されるよう構成された識別部材（６）が設けられている飲料原料カプセル（１）において、前記識別部材（６）がカバー（７）によって覆われ、前記カバーおよび／または前記識別部材をカバー状態から識別情報読み取り状態へと移行させることができることを特徴とする、飲料原料カプセル。
【請求項３】
前記識別部材（６）が、外側からの機械的な接触時に情報を表わすように構成されている、請求項１または２に記載の飲料原料カプセル。
【請求項４】
前記識別部材（６）が、物理的に接触される前に外部に露出されない、請求項１～３のいずれか一項に記載の飲料原料カプセル。
【請求項５】
前記カバー（７）が、関連する飲料製造機（１１）からのプローブ手段（８）によって貫通され或いは変形されるように構成されている、請求項４に記載の飲料原料カプセル。
【請求項６】
前記カバーが、前記識別部材の表面構造に適合するように穿孔され或いは変形されるべきアルミニウムおよび／またはプラスチック膜または箔から形成される、請求項５に記載の飲料原料カプセル。
【請求項７】
前記識別部材（６）が複数の所定の局部接触受け部（１２）を備え、前記局部接触受け部のそれぞれが、外部プローブ部材との接触が確立されるか否かに基づく所定の２進コード化状態（０または１）に対応する２つの異なる表面レベル間で選択を成す、請求項１～６のいずれか一項に記載の飲料原料カプセル。
【請求項８】
第１の接触受け部が同じ深さの穴または凹部であり、第２の接触受け部がより浅い深さの穴または凹部であり、または、穴埋めされ或いは僅かに起伏された状態にある、請求項７に記載の飲料原料カプセル。
【請求項９】
第１の接触受け部が同じ高さの突出要素であり、第２の接触受け部が更に高さのある突出要素である、請求項７に記載の飲料原料カプセル。
【請求項１０】
前記識別部材（６）が、飲料形成原料を収容するキャビティを画定するためにカプセルのカップ形状体に関連付けられるカプセルの蓋の前面に形成される、請求項７～９のいずれか一項に記載の飲料原料カプセル。
【請求項１１】
前記識別部材（６）が前記蓋の一体部品として形成される、請求項１０に記載の飲料原料カプセル。
【請求項１２】
前記蓋が成形プラスチックから一体形成される、請求項１１に記載の飲料原料カプセル。
【請求項１３】
前記複数の所定の局部接触受け部が非直線的パターンで前記蓋の前面に配置される、請求項７～１２のいずれか一項に記載の飲料原料カプセル。
【請求項１４】

識別部材（６）を備える飲料原料収容カプセル（１）と、前記カプセルを収容するための飲料製造機とを備え、前記飲料製造機が、
カプセル（１）と物理的に接触して前記カプセルの情報を読み取るための手段（８）と、
前記接触手段（８）に対して機能的に接続されるとともに、読み取られた情報に応じて前記飲料製造機（１１）の動作を制御するように構成されている制御手段（１０）と、
を備える飲料製造システムにおいて、
前記接触手段（８）が、前記カプセル（１）と機械的に接触する少なくとも１つの変位可能なプローブを備え、前記制御手段（１０）が、当初は、少なくとも１つの前記プローブを用いて、前記カプセル（１）との前記プローブの接触に応じた前記プローブの変位度合いに関する識別情報を検出するようになっていることを特徴とする、飲料製造システム。
【請求項１５】
前記少なくとも１つの変位可能なプローブが、前記制御手段の回路から距離を隔てて弾性的に位置されるとともに、前記カプセルとの接触に応じて前記回路と接触する状態へと選択的に移動され、前記プローブと前記回路との接触が所定の２進コード化状態（０または１）を成し、前記プローブと前記回路との非接触が他の２進コード化状態を成す、請求項１４に記載の飲料製造システム。
【請求項１６】
前記識別部材がプリント回路に関連付けられる、請求項１４または１５に記載の飲料製造システム。
【請求項１７】
前記少なくとも１つのプローブが、弾性支持部材（１４）に結合され或いはその一部であり、回路に関連付けられる、請求項１４～１６のいずれか一項に記載の飲料製造システム。
【請求項１８】
前記弾性支持部材がエラストマー、好ましくはシリコーン部材である、請求項１７に記載の飲料製造システム。
【請求項１９】
前記プローブが、前記支持部材の座部に埋め込まれ或いは挿入されるベースを有するピンから形成される、請求項１８に記載の飲料製造システム。
【請求項２０】
前記接触手段が、前記カプセルの複数の所定の局部接触受け部（１２）と接触するための複数の同一の変位可能なピンを備える、請求項１４～１９のいずれか一項に記載の飲料製造システム。
【請求項２１】
前記カプセルの前記識別部材（６）が変形可能なおよび／または穿刺可能なカバー（７）によって覆われる、請求項１５～２０のいずれか一項に記載の飲料製造システム。
【請求項２２】
前記識別部材（１６）が複数の所定の局部接触受け部（１２）を備え、前記局部接触受け部のそれぞれが、前記飲料製造機の前記プローブとの十分な接触が確立されるか否かに基づく所定の２進コード化状態（０または１）に対応する２つの異なる表面レベル間で選択を成す、請求項１５～２１のいずれか一項に記載の飲料製造システム。
【請求項２３】
前記複数の所定の局部接触受け部が、前記カプセルの壁の非直線的パターンに沿って配置される、請求項２２に記載の飲料製造システム。
【請求項２４】
前記制御手段（１０）が、読み取られた情報に応じて飲料製造温度および／または浸出休止時間を制御するようになっている、請求項１４～２３のいずれか一項に記載の飲料製造機。

【請求項２５】
前記制御手段が、異なる特性および／または起源を有するリーフティー原料を収容するカプセルにしたがった異なる浸出茶飲料の浸出において、水温パラメータ、流量、および／または、浸出休止時間を変えるように構成されている、請求項１４または２４のいずれか一項に記載の飲料製造機。
【発明の詳細な説明】
【技術分野】
【０００１】
本発明は、一般に、カプセル内に収容された原料から液体食料品または飲料を製造する分野に関する。
【背景技術】
【０００２】
近年、飲料原料収容カプセルは、例えば茶またはコーヒーおよび他の液体食料品などの様々なタイプの飲料を製造するために広範囲の用途を見出してきている。これらのカプセルは、カプセル内に収容された原料と液体が相互作用するように液体をカプセルの内部へ供給するための手段が設けられる専用の飲料製造機と関連して用いられるようになっており、相互作用の結果により、飲料または他の液体食料品が製造される。
【０００３】
既知の飲料製造機の一部には、飲料製造プロセスのための全ての種類の動作パラータを設定する精巧な制御システムが設けられている。これらのパラメータは、（網羅的ではないリストとして）例えば、カプセルの内部へ供給される液体の温度および量、並びに、カプセルに収容される原料と液体との相互作用の持続時間を含むことができる。
【０００４】
飲料製造機にはユーザが自分の好みにしたがって動作パラメータを設定できるようにユーザインタフェースが設けられることも知られている。これらのパラメータが手動で設定されると、飲料製造機は、以降の全ての飲料製造プロセスのための所定の一連のパラメータを使用する。
【０００５】
従来技術において、カプセルは、飲料製造機の検出手段によって選択的に検出される幾つかの機械的な接点の形態を成す識別要素を伴って見出され得る。一般に、接点は、視認できるようにされ且つカプセルの表面で起伏状態にされており、飲料製造機の固定された検出手段によって直接に検出される。そのようなシステムは幾つかの欠点を有している。外部の機械的な接点が露出され、これらの接点が誤ってまたは故意に破損され或いは変造される可能性がある。接点の変更は、システムの深刻な障害をもたらす可能性があり、および／または、誤った飲料パラメータを設定する可能性がある。
【０００６】
例えば、欧州特許第０６３８４８６号明細書は、飲料の生成のためのカートリッジであって、カートリッジの一側縁に沿って成形された複数の歯を備えるカートリッジに関する。歯には、それらの間に凹部が形成されている。歯は、カムの係合によって飲料生成機を介してカートリッジを押し進めることができるようにするべく意図されている。カートリッジの縁部の反対側には、歯とカムとの係合によってパッケージが機械内へと押し進められるように、複数のペグが形成されており、直立するペグの存在または不存在が検出アームによって検出され、それにより、カートリッジの異なるタイプが識別される。検出アームはスイッチを動作させ、それにより、パッケージ上におけるペグの存在または不存在に関する情報が飲料分配機のための制御機構へ伝えられる。つまり、カートリッジ上のペグの配置がコントローラに対してカートリッジのタイプを識別し、その結果、コントローラが適切な飲料生成条件を選択する。
【０００７】
また、従来技術においては、飲料製造機がバーコードによって表わされる情報を読み取ることにより関連するカプセルを識別できるように、外面にバーコードが設けられるカプ

セルも見出され得る。バーコードを設けると、幾つかの欠点がある。即ち、まず第１に、バーコードをカプセルの外面で視認できなければならないため、これが自動的にカプセルの美的外観に悪影響を与える。一方、飲料製造プロセスの環境では、例えばバーコード上またはリーダーの光学素子上に堆積される水／蒸気によってバーコードの読みやすさが危険に晒されるという虞が常に存在する。

【０００８】

例えば、米国特許出願公開第２００２／００４８６２１号明細書は、エンコードされたコーヒーパケットおよび飲料製造装置に関し、飲料製造装置は、飲料パケットに記憶されたエンコードデータを検出するように構成されたセンサと、エンコードデータを解釈してエンコードデータにしたがって飲料の生成を命令するように構成されたプロセッサとを備える。エンコードデータは、バーコード、幾何学的形状、テキスト文字列、グリフ、デジタル透かし、切り欠き、溝、または、穴などの視覚コードであってもよい。

【０００９】

欧州特許出願公開第１６２９７５２　Ａ２号明細書は、飲料生成機によって分配される飲料カートリッジの順序に関する情報を記憶するメモリを有する飲料製造システムを開示している。

【発明の概要】

【発明が解決しようとする課題】

【００１０】

したがって、本発明の目的は、飲料原料収容カプセルの識別のための安価で信頼できる解決策を提案することである。特に、本発明の１つの目的は、識別システムの悪用または破損の危険を減らすことである。他の目的は、高温多湿の状態でうまく機能する解決策を提供することである。他の目的は、簡単な製造動作によりカプセルで実施され得る解決策を有することである。

【００１１】

本発明の他の目的は、機械の容量が限られた環境で検出動作を行なうことができる、よりコンパクトな解決策を提供することである。

【課題を解決するための手段】

【００１２】

本発明の一態様は、従来技術の視認できる識別表示が「隠された」或いは殆ど露出されない識別表示に取って代えられることである。

【００１３】

また、本発明の一態様は、従来技術の厄介な検出がカプセル側および機械側の両方でコンパクトな検出システムに取って代えられることである。

【００１４】

本発明の一態様によれば、カプセルの識別部材は、上記識別部材を保護し且つ識別システムの誤用または劣化の危険を減らすために、変形可能な、変位可能な、および／または、穿刺可能なカバーによって覆われる。

【００１５】

これに関連して、本発明によれば、飲料原料を収容するカプセルが提案される。カプセルには、外側から物理的に接触されるようになっている識別部材が設けられる。

【００１６】

識別部材は、外側からの機械的な接触時に情報を表わすようになっている。

【００１７】

つまり、識別部材は、構造的様式で情報をコード化する（従来技術の視覚的なバーコード表示とは異なる）。より正確には、識別部材は複数の所定の局部接触表面受け部を備えることができ、上記局部接触表面受け部のそれぞれは、外部プローブ部材との接触が確立されるか否かに基づく２進コード状態（０または１）に対応する２つの異なる表面レベル間で選択を成す。

【００１８】

表面レベルは、例えば、複数の局部的な凹部／穴または突出部材の異なる深さまたは高さに対応し得る。

【００１９】

一実施形態では、第１の接触受け部および第２の接触受け部が設けられる。第１の接触受け部は同じ深さの穴または凹部であってもよく、一方、第２の接触受け部は、より浅い深さの穴または凹部であり、或いは、穴埋めされ或いは僅かに起伏された状態にある。想定し得る変形例では、第１の接触受け部が同じ高さの突出要素であり、一方、第２の接触受け部がより高さのある突出要素である。

【００２０】

好ましくは、識別部材は、外側から見えず、また、飲料製造機の関連するプローブ手段によって物理的に接触される前に外部に露出されない。

【００２１】

これに関連して、識別部材をカバー手段によって外側に対して覆うことができる。この場合、カバー手段および／または識別部材は、関連する飲料製造機からのプローブ手段によって例えば貫通され、変形され、変位されることによりカバー状態から識別読み取り状態へと移行できるようになっている。

【００２２】

識別部材は、カプセルの面の表面構造を調節することにより、例えば、カプセルの識別面に穴または凹部を設けることによってコード化されることが好ましい。

【００２３】

カプセルの識別面は、プラスチック層、アルミニウム層、または、プラスチックーアルミニウムの積層体などの変位可能な、変形可能な、または、穿刺可能な膜によって覆われることができる。したがって、カバーは、外側から選択的に穿孔され或いは凹部または穴と重なり合う部分で変形されるようになっている。一方、カバーは、凹部または穴と重なり合わない部位で支持されることによって少なくとも特定の貫通または変形に抵抗することができる。

【００２４】

或いは、カバー部材が不変のままとどまることもできるが、識別部材は、カプセルを識別－カバー状態から識別－読み取り状態へと移行するように操作される（例えば変位される）。

【００２５】

好ましい実施形態では、飲料形成原料を収容するキャビティを画定するためにカプセルのカップ形状体に関連付けられるカプセルの蓋の前面に識別部材を形成することができる。

【００２６】

識別部材を蓋の一体部品として形成することができる。例えば、蓋を成形プラスチックから形成することができ、この蓋上に識別手段が成形される。

【００２７】

検出システムのために必要とされる空間を制限するため、複数の所定の局部接触受け部が非直線的パターンで蓋の前面に配置される。例えば、受け部は、略多角形パターンで、星形または湾曲パターンで、或いは、蓋の表面を覆う不規則なほぼ閉じられたパターンでグループ化することができる。

【００２８】

また、本発明は、原料収容カプセルから飲料を製造するようになっている飲料製造機と、先に規定されたカプセルとを備える飲料製造システムに関する。

【００２９】

本発明の更なる態様は、飲料原料収容カプセルと共に使用するようになっている飲料製造機に関する。飲料製造機には、カプセルと物理的に接触してカプセルの情報を読み取るための手段が設けられる。更に、飲料製造機には、上記手段と機能的に接続されるとともに、読み取られた情報に応じて飲料製造機の動作パラメータを制御するようになっている

制御手段が設けられる。接触手段は、カプセルと機械的に接触する少なくとも１つの変位可能なプローブを備えることが好ましく、この場合、制御手段は、当初は、少なくとも１つのプローブを用いて、カプセルとのプローブの接触に応じたプローブの変位度合いに関する識別情報を検出するようになっている。

【００３０】

特に、少なくとも１つの変位可能なプローブは、制御手段の回路から距離を隔てて弾性的に位置されるとともに、カプセルとの接触に応じて上記回路と接触する状態へと選択的に移動され、プローブと回路との接触が所定の２進コード化状態（０または１）を成し、プローブと回路との非接触が他の２進コード化状態を成す。

【００３１】

識別システムのサイズを大幅に減少させるため、識別部材をプリント回路に関連付けることができる。プリント回路は、たった数ミリメートルの幅を有することができ、カプセルのハウジングに隣接する機械の小空間内に挿入することができる。例えば、プリント回路の厚さは０．５～３ｍｍである。

【００３２】

プリント回路は、例えば、コード化された状態を与えるために複数のプローブによって選択的に閉じられ或いは開かれる複数のプリント回路を備える。

【００３３】

プローブに対して弾性を与えてプローブの非接触位置への戻りを可能にするとともに、カプセルによってもたらされる湿気から回路を分離するために、少なくとも１つのプローブは、弾性支持部材に結合され或いはその少なくとも一部であるとともに回路に関連付けられることが好ましい。

【００３４】

弾性支持部材は、例えば、エラストマー、好ましくはシリコーン部材であってもよい。

【００３５】

更に、プローブは、支持部材の座部に埋め込まれ或いは挿入されるベースを有するピンから形成することができる。

【００３６】

制御手段は、読み取られた情報に応じて、例えばカプセルの内部に供給される液体の温度などの飲料製造温度を制御するようになっていてもよい。

【００３７】

飲料製造機は、茶、コーヒー、および／または、他の飲料を製造するようになっていてもよい。

【００３８】

接触手段は、カプセルの所定の局部表面受け部と機械的に選択的に接触する所定のパターンを形成する複数の移動可能なピンを備えることができる。

【００３９】

制御手段は、カプセルに抗するピンの変位度合いによって識別情報を検出するようになっていてもよい。

【００４０】

ピンの変位は、ピンが制御手段の回路の関連する接点を選択的に開くように行なわれてもよい。

【００４１】

少なくとも１つのピンは、制御手段の回路から電気的に絶縁されることが好ましい。

【００４２】

本発明の更なる態様は、飲料原料収容カプセルから飲料を製造するようになっている飲料製造機の動作を制御するための方法に関する。

【００４３】

当該方法は、カプセルの専用の識別部材から識別情報を読み取るために飲料製造機のプローブ手段によってカプセルと物理的に接触するステップを備える。更なるステップでは

、読み取られた識別情報に応じて飲料製造機の動作パラメータが設定される。

【００４４】

ここで、同封された図面の図を参照して、本発明の更なる利点、特徴、および、目的について説明する。

【図面の簡単な説明】

【００４５】

【図１】飲料原料収容カプセルから識別情報を読み取るようになっている本発明によるシステムの概略図を示している。

【図２】本発明によるカプセルの正面図を示している。

【図３】飲料製造機のプローブ手段とカプセルの識別部材との間の相互作用部品の詳細図を示している。

【図４】プローブ手段とカプセルとの間の相互作用の要素、即ち、図３の図を示している。

【図５】プローブ手段と関連付けることができるプリント回路基板を示している。

【発明を実施するための形態】

【００４６】

一般に、本発明の態様は、飲料製造機１１が上記飲料製造機１１の専用の飲料製造位置に位置されるカプセル１から飲料を製造するようになっていることである。図１に示されるように、カプセルは、飲料原料５を収容するための専用の区画室を有する。

【００４７】

飲料製造機１１の制御ユニット１０によって制御される液体３は、カプセル内に収容される原料５と相互作用するためにカプセル１に流入させられる。その後、相互作用の結果物、即ち、製造された飲料または液体食料品を飲料製造機１１から得る（参照４）ことができる。

【００４８】

液体３と原料５との間の相互作用の性質における典型例は、浸出、混合、抽出、溶解などである。異なるタイプの原料が飲料区画室に存在することができ、また、異なるタイプの相互作用がカプセル内で起こることができる。

【００４９】

図１に示されるシステムには、カプセル１から識別データを検索して（「読み取って」）読み取られた識別データを制御ユニット１０へ転送するための手段が設けられており、それにより、制御ユニット１０は、読み取られた識別データの内容に応じて飲料製造機１１の以降の製造サイクルの動作を制御できる。

【００５０】

識別データとは、カプセルおよび／または原料のパラメータのことであってもよい。

【００５１】

本発明の１つの態様によれば、カプセル１から非光学的様式で識別情報を読み取ることができる。これは、例えばバーコードを使用する光学的な読み取りが、カプセルの外観の美的印象に悪影響を及ぼすという不都合、および、飲料製造プロセスの環境でバーコードの読みやすさに起因して損なわれ易いという不都合を有するからである。

【００５２】

本発明によるカプセル１には、コード化された様式で識別情報を保持する識別部材６が設けられている。情報はデジタル様式でコード化されるのが好ましい。

【００５３】

情報は、カプセル１の面の表面構造の調節によってコード化されることが好ましい。例えば、穴または凹部が１つの論理状態（例えば「０」）を表わすことができ、一方、他の表面状態（「凹部がない」または「穴がない」）が他の論理状態（例えば「１」）を表わすことができる。

【００５４】

バーコードを、その後に非光学的様式で（或いは、光学的様式であっても）検出され得

る表面調節と置き換えることによって、カプセルからの情報読み取りの信頼性が高まる。

【００５５】

識別部材６は、それが外部に晒されず且つ通常は外部から見えないようにカプセル１に配置されることが好ましい。これに関連して、識別部材６のためにカバー７を設けることができる。カバー７は、識別部材６に関しては、審美的目的および／または保護目的を果たす。

【００５６】

（なお、そのようなカバー７は、バーコードおよび情報の視覚的読み取りと組み合わせても有用である）

【００５７】

カバー７および識別部材６は、カプセルの一部であり、初めに識別部材が保護された状態であるように配置される。その後、飲料製造機のプローブ手段は、システムカバー手段／識別部材を操作して、システムカバー手段／識別部材が、カバー状態から、プローブ手段が識別部材中にエンコードされた情報を視覚的或いは機械的接触によって読み取ることができる識別読み取り状態へと移行されるようにすることができる。操作は、識別部材および／またはカバー手段に関して行なうことができる。

【００５８】

カバー７は、検出プロセスが行なわれていない限り、完全なカバーの機能を果たしているだけであることが好ましい。後述するように、検出プロセスと共に、カバー７を例えば少なくとも部分的に除去することができ、変位させることができ、変形させることができ、或いは、穿孔することができる。

【００５９】

或いは、カバー７は、情報読み取りプロセス中に、カバーの下側に配置される識別部材の表面輪郭にしたがうように撓ませられる。これに関連して、カバー７の下側に配置される識別部材６の表面構造を読み取るために外側から撓ませることができる柔軟なカバー７を予見することができる。

【００６０】

飲料製造機１１には、識別部材６の表面構造を調節させることによりコード化された情報を読み取るようになっているプローブ手段８が設けられる。

【００６１】

そのような検出は、物理的な機械接触によって或いは電気接触によって行なわれることが好ましいが、表面の調節を光学的に読み取ることもできる。

【００６２】

これに関連して、プローブ手段８は、好ましくは、情報読み取りプロセス中にカプセル１の識別部材６に抗して付勢される複数の変位可能なピン１７を有することができる。

【００６３】

したがって、ピン１７と識別部材６との間の接触領域における識別部材６の表面構造の特定の形状に応じて、ピン１７は、ほぼカプセル１の方へ突出することができる。識別部材６の表面構造によって情報がデジタル様式でコード化される場合には、それに対応して、ピン１７の変位位置のデジタルエンコーデングも存在する。即ち、ピン１７においては、より多く突出する位置と、より少なく突出する位置とが存在するだけである。

【００６４】

ピン１７のこの相対的な変位は、検出ユニット９によって電気信号へと変換される。このようにして生成された電気検出信号は、その後、制御ユニット１０によって処理することができる。

【００６５】

このように、検出ユニット９は、機械的に読み取られた情報を電気信号へと変換するようになっている。

【００６６】

その後、制御ユニット１０は、カプセルから読み取られた識別データに応じて、（網羅

的ではないリストとして）例えば、供給される液体３の流量および温度並びに相互作用時間などの飲料製造プロセスのパラメータを設定する。

【００６７】

図２はカプセル１の平面図を示している。図２に示される実施形態によれば、識別部材の表面構造は、複数の穴１２を選択的に設けることによって調節される。所定の位置に穴１２を有することは１つの論理状態を表わし、一方、同じ位置に穴を有さないことは、他のデジタルでコード化された状態をそれぞれ表わす。

【００６８】

図３は、カプセル１の識別部材のデジタルでコード化された情報の機械的読み取りの、電気信号への変換を示している。

【００６９】

図３から分かるように、ピン１７は、例えばシリコーンなどの弾力性のある電気絶縁材料層１４によって電子回路基板１５から絶縁されている。したがって、層１４は、ピン１７をカプセルの方へ僅かに押圧して最終的にカプセルの識別部材上に設けられる任意のカバーを穿孔し或いは変形させるために必要な付勢力を与える。

【００７０】

各ピン１７の後端は、層１４の突出部分２２中に埋め込まれる拡大部分２１を有する。各ピン１７には、層１４の突出部分２２の上面２４と同一平面上で重なり合うフランジ２３を設けることができる。

【００７１】

図３に示される状態では、描かれた２つのピン１７がそれぞれ、識別部材の穴１２内へ突出しており、カバー７を穿孔してしまっている。したがって、これらの２つのピン１７は、後方へ押圧されず、そのため、プリント回路基板１５の専用部分の電気的短絡を選択的に引き起こすようになっている電気マイクロスイッチ２５を作動させていない。ＰＣＢ１５の更なる詳細については図５を参照して説明する。

【００７２】

各ピン１７は、例えば圧入またはオーバーモールドによって弾性層１４の凹部内に挿入することができる。ピンは、支持層１４よりも硬質であることが好ましい。ピンは金属または硬質プラスチックから形成することができる。また、ピンおよび層１４は、異なる硬さのゴム弾性材料の共射出成形によって形成することもできる。

【００７３】

識別部材の表面構造に起因してピン１７が識別部材３の表面構造中へ更に突出できない場合には、それにより、ピンが後方へ（図３の左内側へ）僅かに押圧され、そのため、シリコーン材料が押圧されて、導電マイクロスイッチ２５がプリント回路基板１５の方へ作動される（即ち、導電状態に移行する）。この場合、プリント回路基板１５に対向するシリコーン材料の面を、プリント回路基板１５上で所定の短絡を選択的に生み出すことができる導電層でコーティングすることができる。ここで、所定の短絡は、スイッチを閉じることに対応する。

【００７４】

図５は、プリント回路基板１５の更なる詳細を示している。参照符号２０は、選択的に短絡され得る領域を示している。

【００７５】

したがって、ピン１７の変位は、電子回路１５上のスイッチを選択的に作動させる（閉じる或いは開く）ことができる。

【００７６】

図４には、例えばシリコーンなどの弾性材料から形成されるのが好ましい絶縁・付勢部材１４が更に示されている。

【００７７】

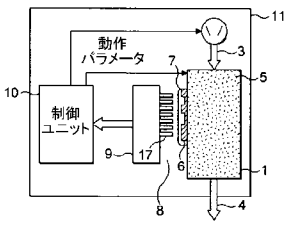
このように、本発明は、飲料または液体食料品が製造されるべきカプセルからの情報の読み取りに基づいて飲料製造サイクル毎に個別に動作パラメータを設定することができる

。

【００７８】

本発明の飲料製造システム、特に、変位可能なプローブは、視認できる（即ち、保護膜を伴わない）識別部材を有するカプセルを利用することもできる。

【図１】



【図２】

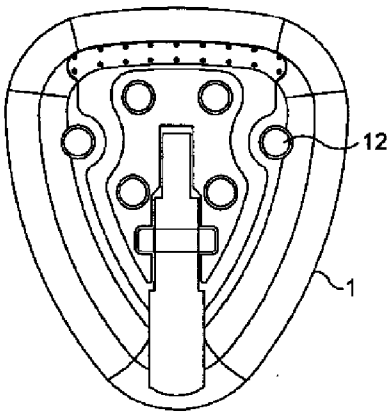


FIG. 2

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

【図３】

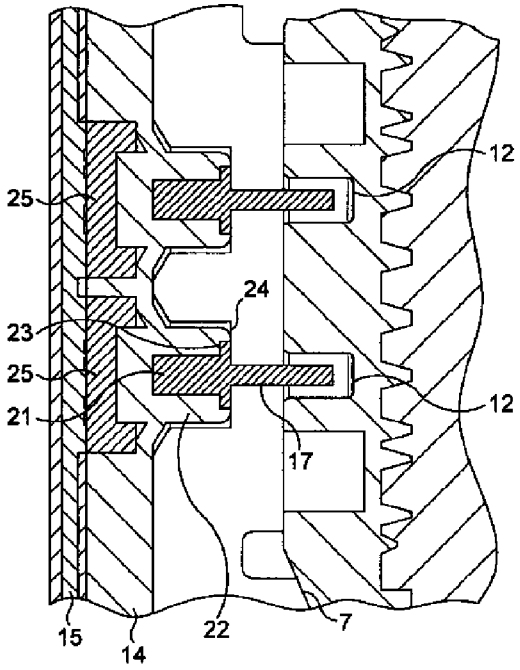


FIG. 3

【図４】

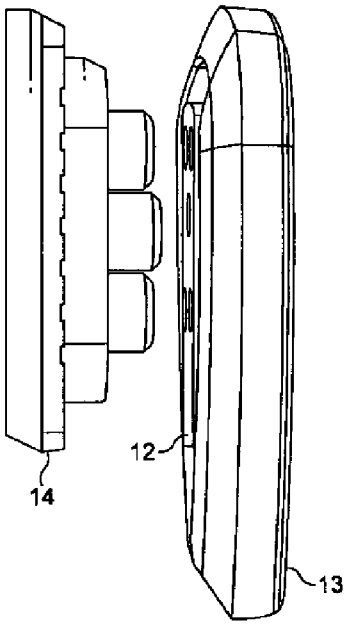


FIG. 4

【図５】

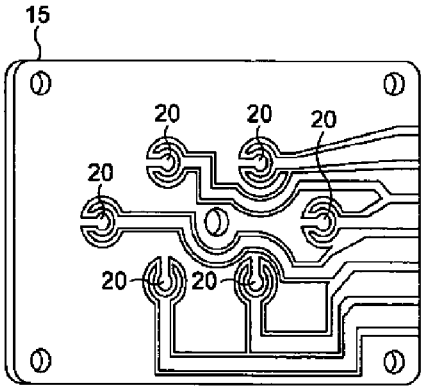


FIG. 5

【国際調査報告】

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2008/050634

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

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D A47J

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2005/122851 A (LEE DE NV SARA [NL]; KOELING HENDRIK CORNELIS [NL]; BROUWER GUSTAAF FR) 29 December 2005 (2005-12-29) the whole document	1,2,14
A	WO 02/28241 A (BOYD COFFEE CO [US]) 11 April 2002 (2002-04-11) the whole document	1,2,14

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 May 2008	09/07/2008

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Serrano Galarraga, J

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2008/050634

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2005122851 A	29-12-2005	EP 1781151 A1	09-05-2007
		NL 1026437 C2	20-12-2005
		US 2008105130 A1	08-05-2008
WO 0228241 A	11-04-2002	AU 1148902 A	15-04-2002

Form PCT/ISA/210 (patent family annex) (April 2005)

フロントページの続き

(81)指定国 AP(BW,GH,GM,KE,LS,MW,MZ,NA,SD,SL,SZ,TZ,UG,ZM,ZW),EA(AM,AZ,BY,KG,KZ,MD,RU,TJ,TM),EP(AT,BE,BG,CH,CY,CZ,DE,DK,EE,ES,FI,FR,GB,GR,HR,HU,IE,IS,IT,LT,LU,LV,MC,MT,NL,NO,PL,PT,RO,SE,SI,SK,TR),OA(BF,BJ,CF,CG,CI,CM,GA,GN,GQ,GW,ML,MR,NE,SN,TD,TG),AE,AG,AL,AM,AO,AT,AU,AZ,BA,BB,BG,BH,BR,BW,BY,BZ,CA,CH,CN,CO,CR,CU,CZ,DE,DK,DM,DO,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,LY,MA,MD,ME,MG,MK,MN,MW,MX,MY,MZ,NA,NG,NI,NO,NZ,OM,PG,PH,PL,PT,RO,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

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Ｆターム(参考) 3E067 AA05 AB24 AC01 BA07A BB14A BC03A EE03 FC01
3E084 AB07 BA01 JA19
4B104 BA02 DA23 DA29 DA39 DA57 EA06 EA22 EA28

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IPR2023-00502, U.S. PATENT 10,994,923

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/697,297	Filing Date 11/09/2012	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $62 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $250 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	07/19/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 23	Minus	** 20	= 3		x $100 =	300
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 3	= 1		x $460 =	460
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	760

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/EUGENIA V HARDY/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. 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 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. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, 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.

(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

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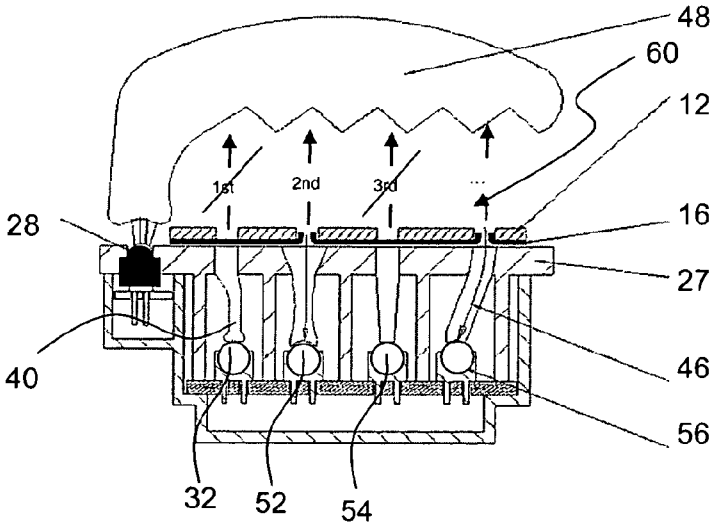
(74) Gemeinsamer Vertreter: **BRAUN GMBH**; Frankfurter Strasse 145, 61476 Kronberg (DE).

(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]

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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), europäisches (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, 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 Abkürzungen 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 Heißgetränke mit einer optischen Erkennungseinheit für auswechselbare Kartuschen (10), in denen eine pulverartige Getränkesubstanz (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 Pad 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 Brühergebnisse 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 Brühvorrichtung 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 Grifflasche 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.

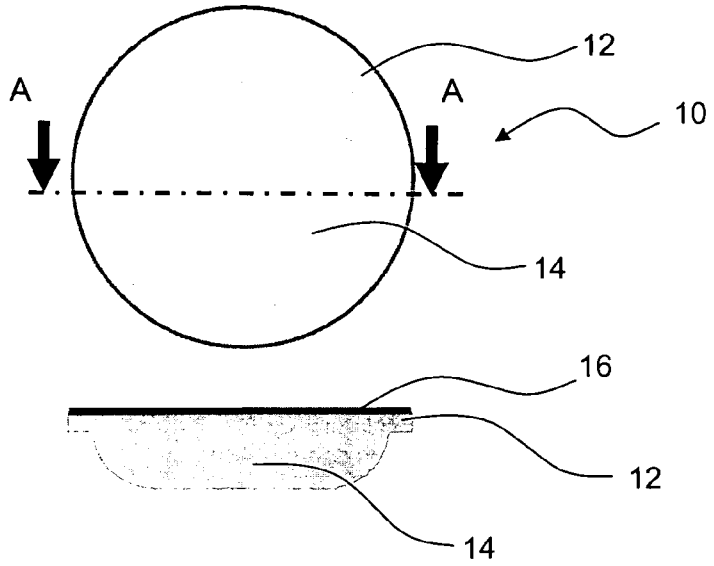


Fig. 1

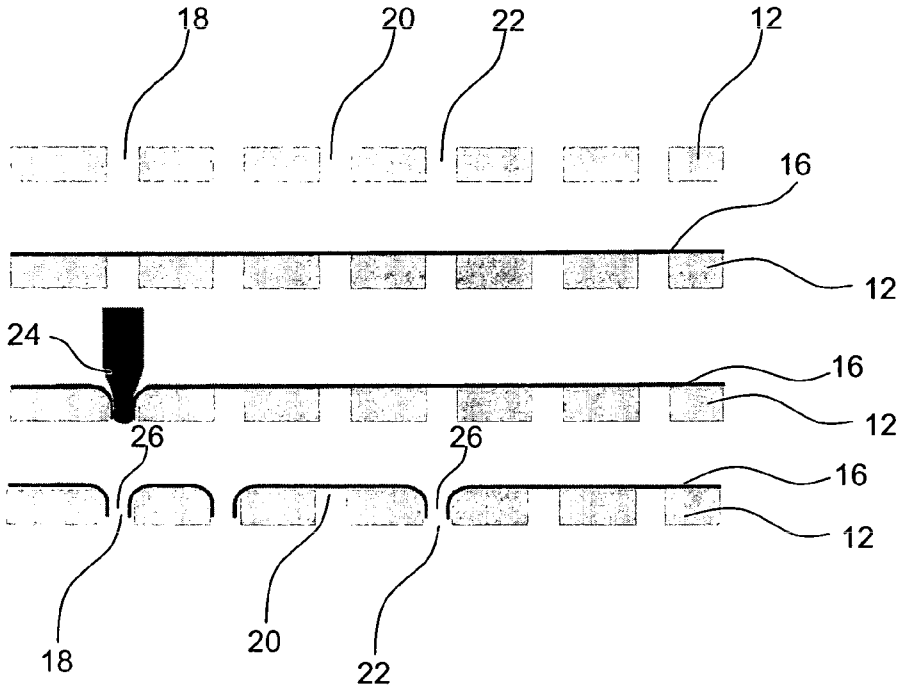


Fig. 2

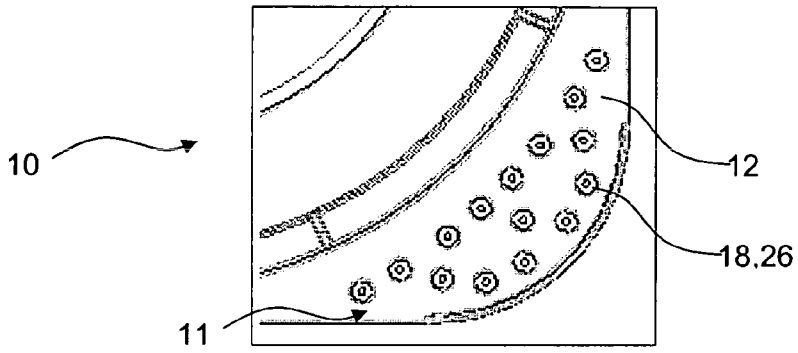


Fig. 3

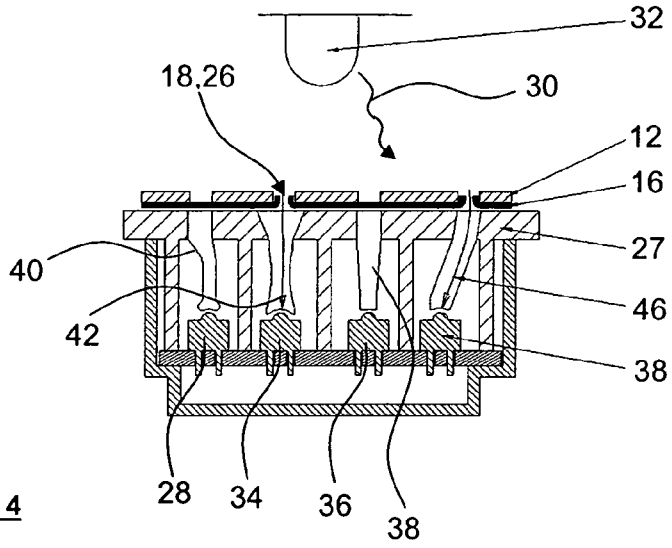

32
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38

Fig. 4

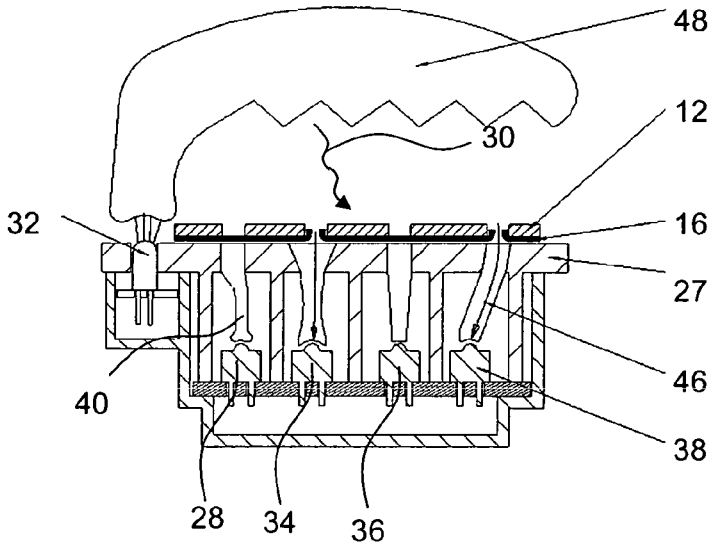

48
30
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28
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36

Fig. 5

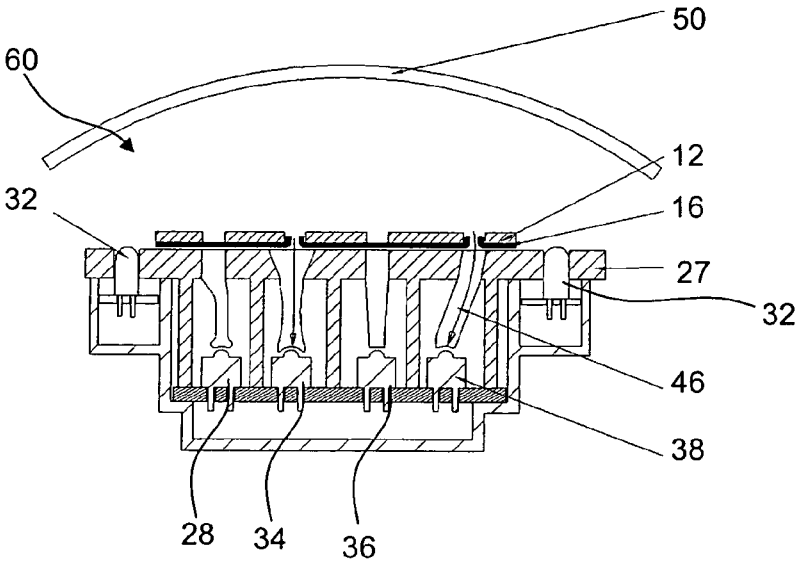

50
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Fig. 6

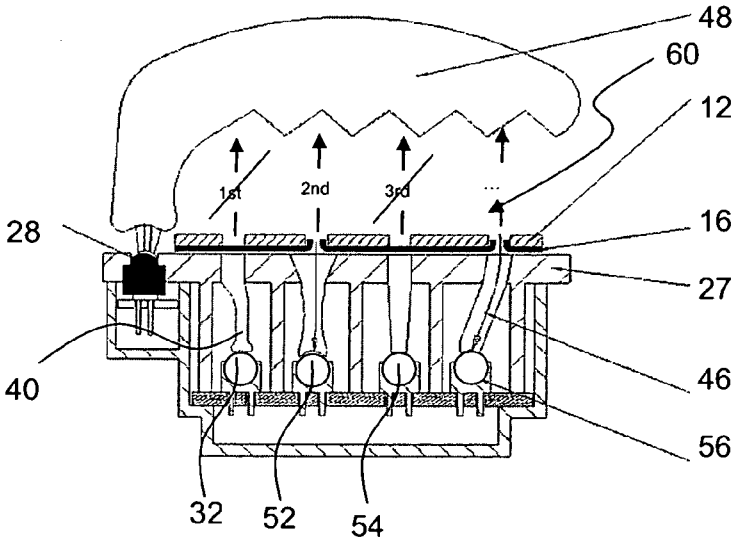

48
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1st
2nd
3rd
...
28
16
27
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32
52
54

Fig. 7

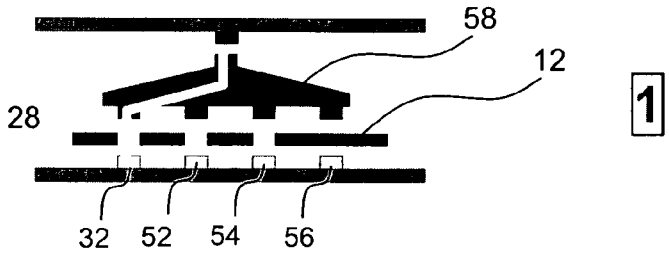


Fig. 8a

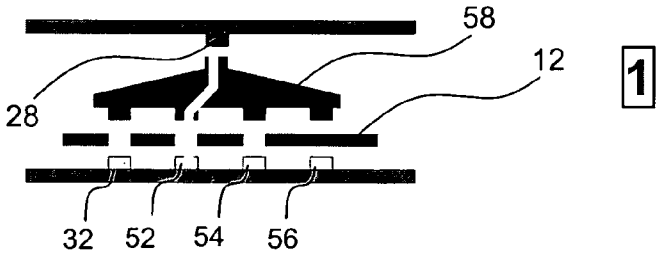


Fig. 8b

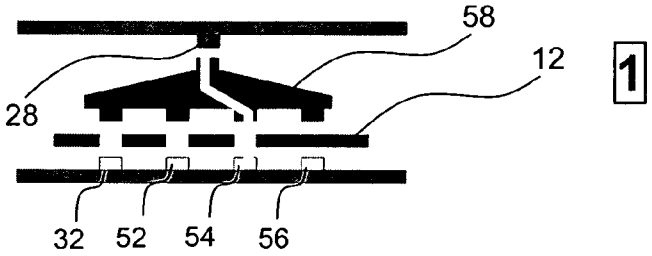


Fig. 8c

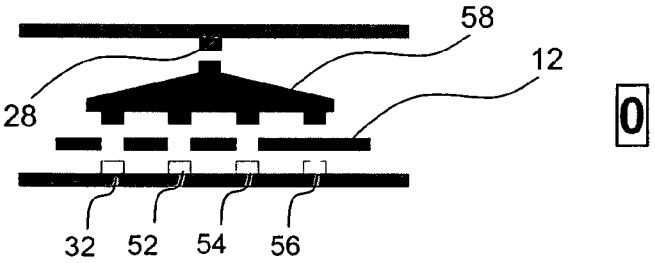


Fig. 8d

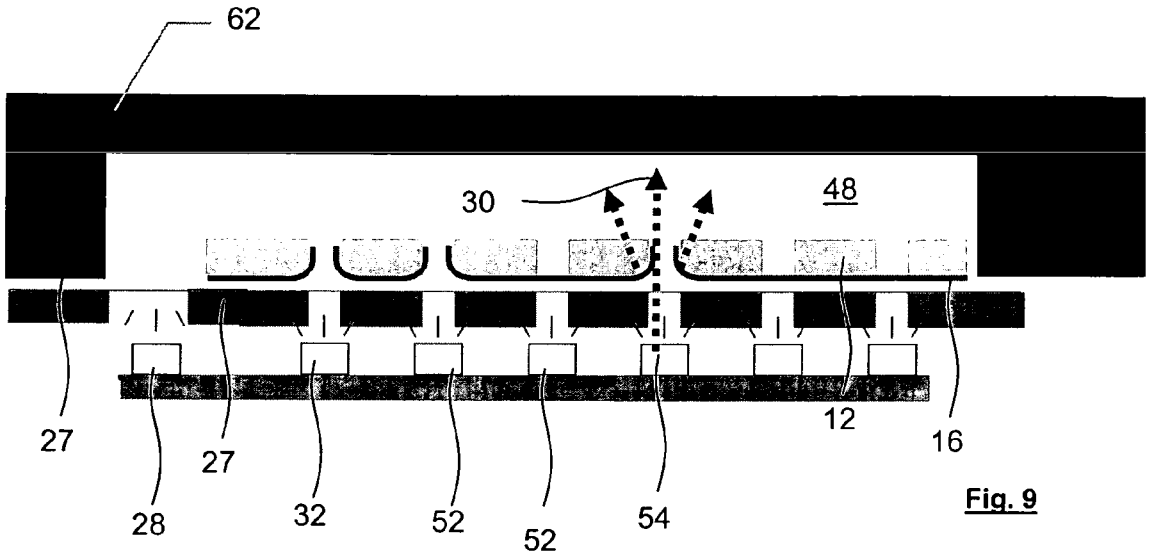


Fig. 9

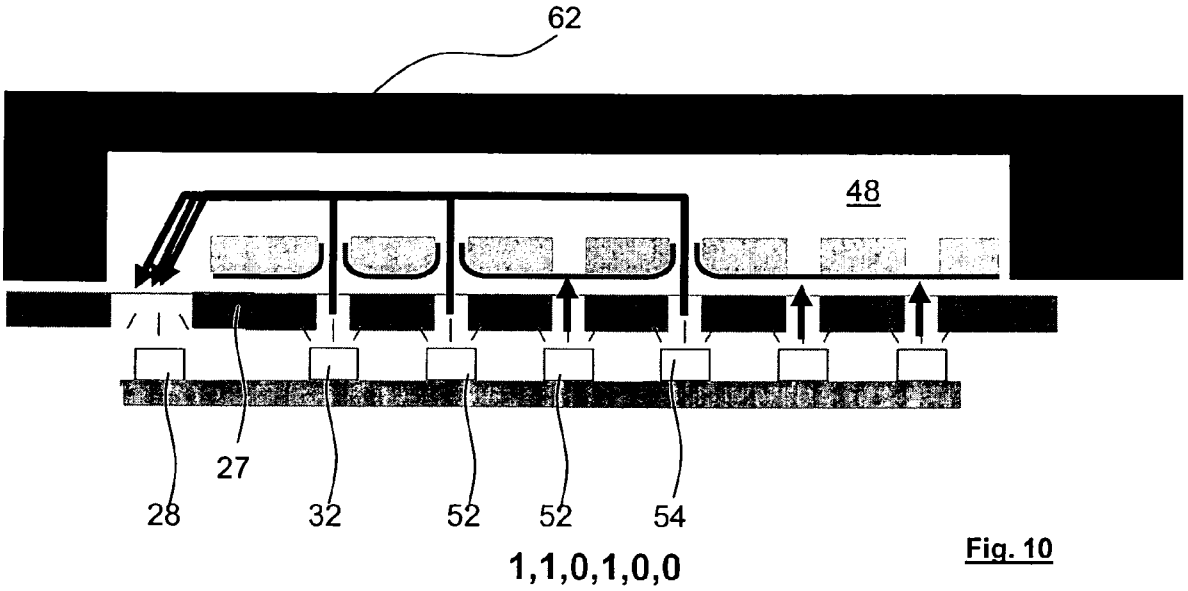


Fig. 10

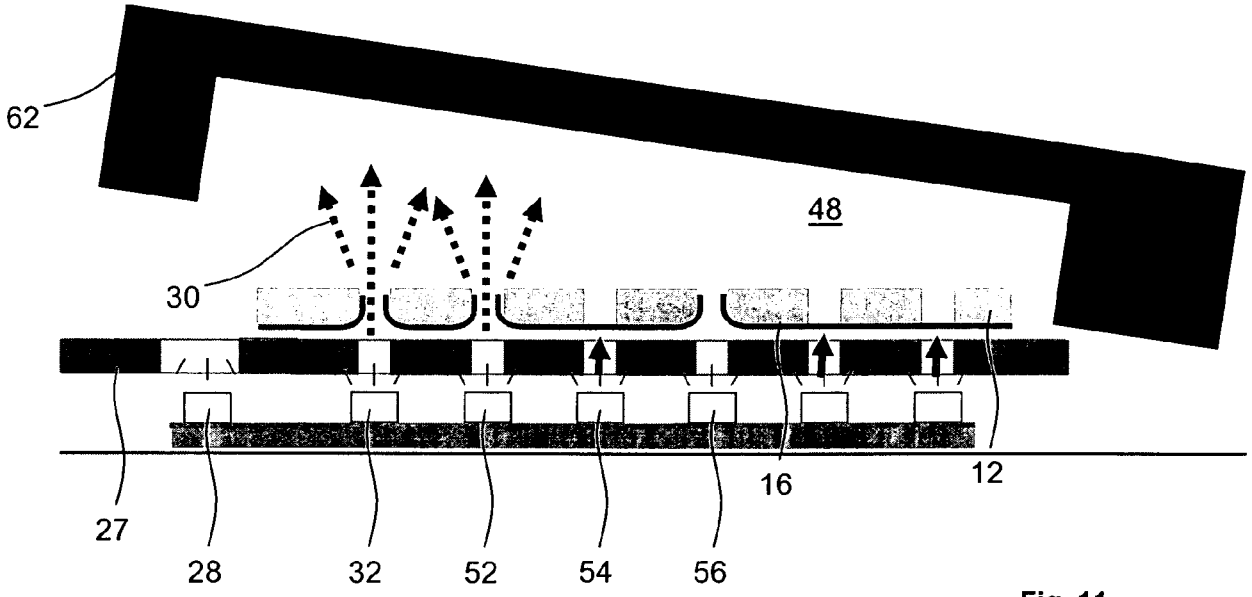


Fig. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2006/012529

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

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47J B65D

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X P,A	DE 20 2006 007056 U1 (KONINKL PHILIPS ELECTRONICS NV [NL]) 12 October 2006 (2006-10-12) paragraph [0039]; figures 7-9	1-3,5,6, 8,15, 20-22,26 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 A	WO 02/28241 A (BOYD COFFEE CO [US]) 11 April 2002 (2002-04-11) cited in the application page 7, lines 14-20 - page 7; figures 2h,3	20-23,26 1-3,15, 16

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

[X] See patent family annex.

* Special categories of cited documents :

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
3 April 2007	12/04/2007

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

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2006/012529

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 449 533 A (GEN FOODS KRAFT LTD [GB]) 2 October 1991 (1991-10-02) column 4, lines 3-9	20,21
A	column 5, lines 8,9,33-37	1,3,15, 16,23, 28,29

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

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 JP 4224715 A	01-10-1991 14-08-1992

Form PCT/ISA/210 (patent family annex) (April 2005)

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2006/012529

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

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

B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
A47J B65D

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

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C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
P,X P,A	DE 20 2006 007056 U1 (KONINKL PHILIPS ELECTRONICS NV [NL]) 12. Oktober 2006 (2006-10-12) Absatz [0039]; Abbildungen 7-9	1-3,5,6, 8,15, 20-22,26 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 A	WO 02/28241 A (BOYD COFFEE CO [US]) 11. April 2002 (2002-04-11) in der Anmeldung erwähnt Seite 7, Zeilen 14-20 - Seite 7; Abbildungen 2h,3	20-23,26 1-3,15, 16

-/--

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

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Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
3. April 2007	12/04/2007

Name und Postanschrift der Internationalen Recherchenbehörde	Bevollmächtigter Bediensteter
Europäisches 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	Novelli, Bruno

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INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2006/012529

C. (Fortsetzung) ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	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

Internationales Aktenzeichen
PCT/EP2006/012529

Im Recherchenbericht 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 JP 4224715 A	01-10-1991 14-08-1992

K-FEE SYSTEM GMBH, EX2009, page 2484
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 September 2005 (01.09.2005)

PCT

(10) International Publication Number
WO 2005/079638 A1

(51) International Patent Classification[7]: A47J 31/06, 31/40

(21) International Application Number: PCT/GB2005/000469

(22) International Filing Date: 11 February 2005 (11.02.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0403496.3 17 February 2004 (17.02.2004) GB

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(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **PANESAR, Satwinder, Singh** [GB/GB]; Kraft Foods UK Ltd, Ruscote Avenue, Banbury, Oxfordshire OX16 2QU (GB). **CARTER, Steve** [GB/GB]; Kraft Foods UK Ltd, Ruscote Avenue, Banbury, Oxfordshire OX16 2QU (GB).

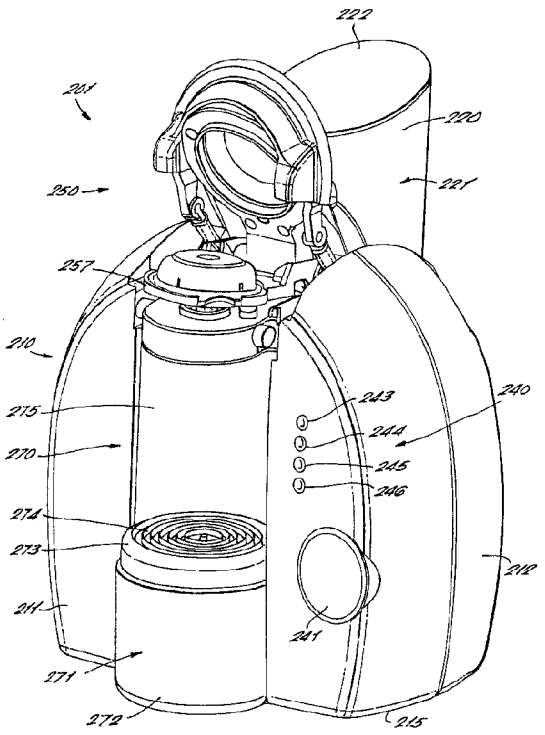
(74) Agents: **ALEXANDER, Thomas, Bruce** et al.; Boult Wade Tennant, Verulam Gardens, 70 Gray's Inn Road, London WC1X 8BT (GB).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: 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, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,

[Continued on next page]

(54) Title: AN INSERT, A MACHINE AND A SYSTEM FOR THE PREPARATION OF BEVERAGES



(57) Abstract: An insert (400) for use in a beverage preparation machine (201) of a type comprising a brew head (250) comprising an upwardly directed inlet (253) for supplying water to the brew head (250) and a downwardly directed outlet (250) for outflow of beverage produced by the machine (201). The insert (400) comprises, or is adapted to contain in use, a quantity of beverage ingredients in a brewing volume. A lower surface of the insert (400) comprises an inlet (405) and an outlet (404) arranged to communicate respectively with the inlet (253) and outlet (254) of the brew head (250) of the beverage preparation machine (201) when the insert (100) is inserted into the machine such that, in use, water from the inlet (253) of the brew head (250) passes upwardly through the inlet (405) of the insert (400) into the brewing volume and such that beverage produced from the water and the quantity of beverage ingredients passes downwardly through the outlet (404) of the insert (100) to flow out of the outlet (254) of the brew head (250). The lower surface of the insert (400) further comprises a RFID or barcode (320) which, in use, is readable by a RFID or barcode reader of the beverage preparation machine (201) for controlling operation of the beverage preparation machine (201), wherein the barcode (320) or RFID is located on the lower surface of the insert (400) such that a line joining the outlet (404) of the insert (400) to a centre of the barcode (320) or RFID and a line joining the outlet (404) of the insert (400) to the inlet (405) of the insert (400) separated by a minimum angular separation of greater than 70 degrees.

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K-FEE SYSTEM GMBH, EX2009, page 2485
NESPRESSO USA, INC. v. K-FEE SYSTEM GMBH
IPR2023-00502, U.S. PATENT 10,994,923

SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

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Published:

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AN INSERT, A MACHINE AND A SYSTEM FOR THE PREPARATION OF BEVERAGES

The present invention relates to an insert, a machine and a system for the preparation of beverages.

It is known to provide machines and systems for the preparation of beverages such as coffee, tea and chocolate. Typically, in such systems the beverage ingredients are used either in a loose form or contained in a container. It is known in some machines to use flexible containers, such as filter paper bags containing roast and ground coffee or leaf tea. It is also known in other machines to use containers in the form of cartridges which may be rigid, semi-rigid, or flexible and which are pierced during preparation of the beverage. In both cases, the machine for use with such containers is specially adapted to receive a particular design of container in a brew head and to pass water and/or steam through the container to prepare a beverage which is then dispensed. Such beverage preparation machine may be used in commercial or domestic markets. In the domestic market consumers may not wish to use separate machines when preparing beverages from different beverage ingredient containing containers or, indeed, loose beverage ingredients. It is therefore an object of the present invention to provide an insert, a beverage preparation machine and a beverage preparation system which allows consumers to use a variety of containers or loose ingredients in a single beverage preparation machine. In one aspect, it is an object of the present invention to provide an insert for a beverage preparation machine which is primarily designed for use with cartridges, whether rigid, semi-rigid or flexible, that allows the beverage preparation

machine to dispense beverage ingredients from flexible containers such as filter bags.

Accordingly, the present invention provides an insert for use in a beverage preparation machine of a type comprising a brew head comprising an upwardly directed inlet for supplying water to the brew head and a downwardly directed outlet for outflow of beverage produced by the machine, the insert comprising, or being adapted to contain in use, a quantity of beverage ingredients in a brewing volume, a lower surface of the insert comprising an inlet and an outlet arranged to communicate respectively with the inlet and outlet of the brew head of the beverage preparation machine when the insert is inserted into the machine such that, in use, water from the inlet of the brew head passes upwardly through the inlet of the insert into the brewing volume and such that beverage produced from the water and the quantity of beverage ingredients passes downwardly through the outlet of the insert to flow out of the outlet of the brew head, characterised in that the lower surface of the insert further comprises a barcode or RFID which, in use, is readable by a barcode or RFID reader of the beverage preparation machine for controlling operation of the beverage preparation machine, wherein the barcode or RFID is located on the lower surface of the insert such that a line joining the outlet of the insert to a centre of the barcode and a line joining the outlet of the insert to the inlet of the insert separated by a minimum angular separation of greater than 70 degrees.

Advantageously, it has been found that this minimum angular separation of the barcode or RFID from the inlet improves the accuracy of the reading of the barcode or RFID by the recognition means of the machine. Firstly, the

separation results in any distortion of the inlet area having a minimal affect on the region of the barcode or RFID. Secondly, it has been found that there may be a small degree of leakage of fluid from the inlet area during dispensation since dispensation occurs at pressure. This fluid may spread, in particular due to capillary effect between the insert and a brew head of the machine, leading to partial obfuscation of the barcode or RFID by the fluid resulting in a greater chance of the barcode or RFID being misread. With the barcode or RFID separated by an angle of greater than 70 degrees it has been found that this problem does not occur.

Preferably, the line joining the outlet of the insert to the centre of the barcode or RFID and the line joining the outlet of the insert to the inlet of the insert subtend an angle of greater than or equal to 85 degrees.

Preferably the outlet is located at a centre or near a centre of the lower surface of the insert. The barcode or RFID is preferably located at or near a periphery of the lower surface.

The insert may be disc-shaped.

The insert may be a cartridge. The cartridge may be rigid or semi-rigid. The lower surface may be a laminate. In this case, the inlet and outlet of the cartridge may be portions of the lower surface which are opened for transportation, in use, by piercing the lower surface. Alternatively, the insert may define a receptacle for receiving loose beverage ingredients. Alternatively, the insert may define a receptacle for receiving a container of beverage ingredients, wherein the container comprises filtering means. In one aspect, the container is formed at

least in part from filter paper or filtering membrane. For example, the container may be a filter bag.

The inlet and outlet of the insert may be open. Alternatively, the inlet and outlet of the insert may be closed prior to use by means of a frangible membrane. The frangible membrane may comprise a tear-off portion.

The insert may be reusable.

The inlet of the insert, outlet of the insert and barcode or RFID may be coplanar. Alternatively, the inlet of the insert, outlet of the insert and barcode or RFID may not be coplanar.

Preferably, the insert further comprises means for preventing rotation of the insert in the brew head after insertion of the insert and closing of the brew head. The means for preventing rotation may comprise an externally directed handle or tab portion.

The externally directed handle or tab portion may be located substantially diametrically opposite the inlet of the insert.

The present invention also provides a beverage preparation system comprising a beverage preparation machine and an insert for use in said machine, said insert being as described above.

The beverage preparation machine may comprise a brew head comprising an upwardly directed inlet for supplying water to the brew head, a downwardly directed outlet for outflow of beverage produced by the machine and a barcode or RFID reader having a window in the brew head through which signals may be transmitted, wherein a line joining the outlet of the machine to a centre of the window and a line joining the outlet of the machine to the inlet of the machine subtend an angle of greater than 70 degrees.

Preferably the line joining the outlet of the machine to the centre of the window and the line joining the outlet of the machine to the inlet of the machine subtends an angle of greater than or equal to 85 degrees.

Preferably the outlet of the beverage preparation machine is located at or near a centre of the brew head.

Preferably the barcode reader or RFID reader window is located at or near a periphery of the brew head.

The brew head may comprise a mount for receiving the insert so as to prevent relative rotation of the insert and the brew head once the brew head is closed.
The mount may comprise a recess or opening for receiving an externally directed handle or tab portion of the insert. The mount may comprise an opening through which the inlet of the brew head, outlet of the brew head and barcode reader or RFID reader window are accessible.

The brew head may comprise a cavity for receiving the insert wherein one of the insert and cavity comprises a key and the other of the insert and cavity comprises a recess, wherein interengagement of the key and recess prevents relative rotation of the insert and the brew head once the brew head is closed.

The insert of the present invention may contain or be loaded with one or more beverage ingredients suitable for the formation of a beverage product. The beverage product may be, for example, one of coffee, tea, chocolate or a dairy-based beverage including milk. The beverage ingredients may be powdered, ground, leaf-based or liquid. The beverage ingredients may be insoluble or soluble. Examples include roast and ground coffee, leaf tea, powdered chocolate and soup, liquid milk-based beverages, carbonated drinks and concentrated fruit juices.

In the following description the terms "upper" and "lower" and equivalents will be used to describe the relational positioning of features of the invention. The terms "upper" and "lower" and equivalents should be understood to refer to the insert (or other components) in its normal orientation for insertion into the beverage preparation machine and subsequent dispensing. In addition, the terms "inner" and "outer" and equivalents will be used to describe the relational positioning of features of the invention. The terms "inner" and "outer" and equivalents should be understood to refer to relative positions in the insert (or other components) being, respectively, nearer or further from a centre or major axis X of the insert (or other component).

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1a is a front perspective view of a beverage preparation machine of the present invention;

Figure 1b is a front perspective view of the machine of Figure 1a with a brew head in an open position;

Figure 2 is a rear perspective view of the machine of Figure 1a with some parts omitted for clarity;

Figure 3 is another rear perspective view of the machine of Figure 1a with some parts omitted for clarity;

Figure 4 is a perspective view of the brew head of the machine of Figure 1a with some parts omitted for clarity;

Figure 5 is another perspective view of the brew head of the machine of Figure 1a with some parts omitted for clarity;

Figure 6 is a cross-sectional view of the brew head in a closed position;

Figure 7 is a cross-sectional view of the brew head in an open position illustrated containing an insert in the form of a cartridge of the present invention;

Figure 8 is a schematic layout of the machine of Figure 1a;

Figure 9a and 9b are schematic layouts of first and second code recognition means for the machine of Figure 1a; and

Figure 10 is a plan view of a beverage cartridge of the present invention comprising a barcode;

Figure 11 is cross-sectional drawing of an outer member of a cartridge of the present invention which may be used in the beverage preparation machine of the present invention;

Figure 12 is a cross-sectional drawing of a detail of the outer member of Figure 11 showing an inwardly directed cylindrical extension;

Figure 13 is a cross-sectional drawing of a detail of the outer member of Figure 11 showing a slot;

Figure 14 is a perspective view from above of the outer member of Figure 11;

Figure 15 is a perspective view from above of the outer member of Figure 11 in an inverted orientation;

Figure 16 is a plan view from above of the outer member of Figure 11;

Figure 17 is a cross-sectional drawing of an inner member of the cartridge;

Figure 18 is a perspective view from above of the inner member of Figure 17;

Figure 19 is a perspective view from above of the inner member of Figure 17 in an inverted orientation;

Figure 20 is a plan view from above of the inner member of Figure 17;

Figure 21 is a cross-sectional drawing of the cartridge in an assembled condition;

Figure 22 is a perspective view from above of another embodiment of insert according to the present invention showing upper and lower parts thereof separated;

Figure 23 is a perspective view from below of the lower part of the insert of Figure 22;

Figure 24 is a perspective view from above of the insert of Figure 22 showing the upper and lower parts sealed together; and

Figure 25 is a cross-sectional view of the brew head of the beverage preparation machine in an open position illustrated accommodating the insert of Figure 22.

Beverage Preparation System

A beverage preparation machine 201 of the beverage preparation system of the present invention is shown in Figures 1a to 9b. The beverage preparation machine 201 generally comprises a housing 210 containing a water tank 220, a water heater 225, a water pump 230, an air compressor 235, a control processor, a user interface 240 and a brew head 250. The brew head 250 in turn generally comprises a holder 251, recognition means 252 and inlet and outlet piercers 253, 254.

The beverage preparation machine 201 is designed to be capable of dispensing beverage ingredients from inserts in the form of cartridges 1 such as that illustrated in Figures 10 to 21 and also from inserts 400 such as that shown in Figures 22 to 25 which are loaded in use with beverage ingredients in loose form or packaged in other types of

containers, such as flexible bags. To aid understanding of the comprehensive and flexible operation of the beverage preparation machine an example of an insert in the form of the cartridge 1 will first be described and its use in the beverage preparation machine 201 explained before the insert 400 and its use is described.

Cartridge for use in the system

As shown in Figure 10 to 21, the cartridge 1 generally comprises an outer member 2, an inner member 3 and a laminate 5. The outer member 2, inner member 3 and laminate 5 are assembled to form the cartridge 1 which has an interior 120 for containing one or more beverage ingredients, an inlet 121, an outlet 122 and a beverage flow path linking the inlet 121 to the outlet 122 and which passes through the interior 120. The inlet 121 and outlet 122 are initially sealed by the laminate 5 and are opened in use by piercing or cutting of the laminate 5. The beverage flow path is defined by spatial inter-relationships between the outer member 2, inner member 3 and laminate 5 as discussed below. Other components may optionally be included in the cartridge 1, such as a filter 4, as will be described further below.

The cartridge 1 is particularly designed for use in dispensing filtered products such as roast and ground coffee or leaf tea. However, the cartridge 1 may be used with other products such as chocolate, coffee, tea, sweeteners, cordials, flavourings, alcoholic beverages, flavoured milk, fruit juices, squashes, sauces and desserts.

As can be seen from Figure 15, the overall shape of the cartridge 1 is generally circular or disc-shaped with the diameter of the cartridge 1 being significantly greater than

its height. A major axis X passes through the centre of the outer member as shown in Figure 11. Typically the overall diameter of the outer member 2 is 74.5 mm ±6mm and the overall height is 16 mm ±3mm. Typically the volume of the cartridge 1 when assembled is 30.2 ml ±20%.

The outer member 2 generally comprises a bowl-shaped shell 10 having a curved annular wall 13, a closed top 11 and an open bottom 12. The diameter of the outer member 2 is smaller at the top 11 compared to the diameter at the bottom 12, resulting from a flaring of the annular wall 13 as one traverses from the closed top 11 to the open bottom 12. The annular wall 13 and closed bottom 11 together define a receptacle having an interior 34.

A hollow inwardly directed cylindrical extension 18 is provided in the closed top 11 centred on the major axis X. As more clearly shown in Figure 12, the cylindrical extension 18 comprises a stepped profile having first, second and third portions 19, 20 and 21. The first portion 19 is right circular cylindrical. The second portion 20 is frusto-conical in shape and is inwardly tapered. The third portion 21 is another right circular cylinder and is closed off by a lower face 31. The diameter of the first, second and third portion 19, 20 and 21 incrementally decreases such that the diameter of the cylindrical extension 18 decreases as one traverses from the top 11 to the closed lower face 31 of the cylindrical extension 18. A generally horizontal shoulder 32 is formed on the cylindrical extension 18 at the junction between the second and third portions 20 and 21.

An outwardly extending shoulder 33 is formed in the outer member 2 towards the bottom 12. The outwardly extending shoulder 33 forms a secondary wall 15 co-axial with the annular wall 13 so as to define an annular track

forming a manifold 16 between the secondary wall 15 and the annular wall 13. The manifold 16 passes around the circumference of the outer member 2. A series of slots 17 are provided in the annular wall 13 level with the manifold 16 to provide gas and liquid communication between the manifold 16 and the interior 34 of the outer member 2. As shown in Figure 13, the slots 17 comprise vertical slits in the annular wall 13. Between 20 and 40 slots are provided. In the embodiment shown thirty-seven slots 17 are provided generally equi-spaced around the circumference of the manifold 16. The slots 17 are preferably between 1.4 and 1.8 mm in length. Typically the length of each slot is 1.6 mm representing 10% of the overall height of the outer member 2. The width of each slot is between 0.25 and 0.35 mm. Typically, the width of each slot is 0.3 mm. The width of the slots 17 is sufficiently narrow to prevent the beverage ingredients passing therethrough into the manifold 16 either during storage or in use.

An inlet chamber 26 is formed in the outer member 2 at the periphery of the outer member 2. A cylindrical wall 27 is provided, as most clearly shown in Figure 15, which defines the inlet chamber 26 within, and partitions the inlet chamber 26 from, the interior 34 of the outer member 2. The cylindrical wall 27 has a closed upper face 28 which is formed on a plane perpendicular to the major axis X and an open lower end 29 co-planar with the bottom 12 of the outer member 2. The inlet chamber 26 communicates with the manifold 16 via two slots 30 as shown in Figure 11. Alternatively, between one and four slots may be used to communicate between the manifold 16 and the inlet chamber 26.

A lower end of the outwardly extending shoulder 33 is provided with an outwardly extending flange 35 which extends perpendicularly to the major axis X. Typically the flange 35 has a width of between 2 and 4 mm. A portion of the flange 35 is enlarged to form a handle 24 by which the outer member 2 may be held. The handle 24 is provided with an upturned rim 25 to improve grip.

The outer member 2 is formed as a single integral piece from high density polyethylene, polypropylene, polystyrene, polyester, or a laminate of two or more of these materials. A suitable polypropylene is the range of polymers available from DSM UK Limited (Redditch, United Kingdom). The outer member may be opaque, transparent or translucent. The manufacturing process may be injection moulding.

The inner member 3 as shown in Figures 17 to 20, comprises an annular frame 41 and a downwardly extending cylindrical funnel 40. A major axis X passes through the centre of the inner member 3 as shown in Figure 17.

As best shown in Figure 18, the annular frame 41 comprises an outer rim 51 and an inner hub 52 joined by ten equi-spaced radial spokes 53. The inner hub 52 is integral with and extends from the cylindrical funnel 40. Filtration apertures 55 are formed in the annular frame 41 between the radial spokes 53. A filter 4 is disposed on the annular frame 41 so as to cover the filtration apertures 55. The filter is preferably made from a material with a high wet strength, for example a non-woven fibre material of polyester. Other materials which may be used include a water-impermeable cellulosic material, such as a cellulosic material comprising woven paper fibres. The woven paper fibres may be admixed with fibres of polypropylene, polyvinyl chloride and/or polyethylene. The incorporation

of these plastic materials into the cellulosic material renders the cellulosic material heat-sealable. The filter 4 may also be treated or coated with a material which is activated by heat and/or pressure so that it can be sealed to the annular frame 41 in this way.

As shown in the cross-sectional profile of Figure 17, the inner hub 52 is located at a lower position than the outer rim 51, resulting in the annular frame 41 having a sloping lower profile.

The upper surface of each spoke 53 is provided with an upstanding web 54 which divides a void space above the annular frame 41 into a plurality of passages 57. Each passage 57 is bounded on either side by a web 54 and on a lower face by the filter 4. The passages 57 extend from the outer rim 51 downwardly towards, and open into, the cylindrical funnel 40 at openings 56 defined by the inner extremities of the webs 54.

The cylindrical funnel 40 comprises an outer tube 42 surrounding an inner discharge spout 43. The outer tube 42 forms the exterior of the cylindrical funnel 40. The discharge spout 43 is joined to the outer tube 42 at an upper end of the discharge spout 43 by means of an annular flange 47. The discharge spout 43 comprises an inlet 45 at an upper end which communicates with the openings 56 of the passages 57 and an outlet 44 at a lower end through which the prepared beverage is discharged into a cup or other receptacle. The discharge spout 43 comprises a frusto-conical portion 48 at an upper end and a cylindrical portion 58 at a lower end. The cylindrical portion 58 may have a slight taper such that it narrows towards the outlet 44. The frusto-conical portion 48 helps to channel beverage from the passages 57 down towards the outlet 44 without inducing

turbulence to the beverage. An upper surface of the frusto-conical portion 48 is provided with four support webs 49 equi-spaced around the circumference of the cylindrical funnel 40. The support webs 49 define channels 50 therebetween. The upper edges of the support webs 49 are level with one another and perpendicular to the major axis X.

The inner member 3 may be formed as a single integral piece from polypropylene or a similar material as described above and by injection moulding in the same manner as the outer member 2.

Alternatively, the inner member 3 and/or the outer member 2 may be made from a biodegradable polymer. Examples of suitable materials include degradable polyethylene (for example, SPITEK supplied by Symphony Environmental, Borehamwood, United Kingdom), biodegradable polyester amide (for example, BAK 1095 supplied by Symphony Environmental), poly lactic acids (PLA supplied by Cargil, Minnesota, USA), starch-based polymers, cellulose derivatives and polypeptides.

The laminate 5 is formed from two layers, a first layer of aluminium and a second layer of cast polypropylene. The aluminium layer is between 0.02 and 0.07 mm in thickness. The cast polypropylene layer is between 0.025 and 0.065 mm in thickness. In one embodiment the aluminium layer is 0.06 mm and the polypropylene layer is 0.025 mm thick. This laminate is particularly advantageous as it has a high resistance to curling during assembly. As a result the laminate 5 may be pre-cut to the correct size and shape and subsequently transferred to the assembly station on the production line without undergoing distortion. Consequently, the laminate 5 is particularly well suited to welding. Other

laminate materials may be used including PET/Aluminium/PP, PE/EVOH/PP, PET/metallised/PP and Aluminium/PP laminates. Roll laminate stock may be used instead of die cut stock.

The cartridge 1 may be closed by a rigid or semi-rigid lid instead of a flexible laminate.

Assembly of the cartridge 1 involves the following steps:

a) the inner member 3 is inserted into the outer member 2;

b) the filter 4 is cut to shape and placed onto the inner member 3 so to be received over the cylindrical funnel 40 and come to rest against the annular frame 41;

c) the inner member 3, outer member 2 and filter 4 are joined by ultrasonic welding;

d) the cartridge 1 is filled with one or more beverage ingredients;

e) the laminate 5 is affixed to the outer member 2.

These steps will be discussed in greater detail below.

The outer member 2 is orientated with the open bottom 12 directed upwards. The inner member 3 is then inserted into the outer member 2 with the outer rim 51 being received as a loose fit in an axial extension 14 at top 11 of the cartridge 1. The cylindrical extension 18 of the outer member 2 is at the same time received in the upper portion of the cylindrical funnel 40 of the inner member 3. The third portion 21 of the cylindrical extension 18 is seated inside the cylindrical funnel 40 with the closed lower face 31 of the cylindrical extension 18 bearing against the support webs 49 of the inner member 3. The filter 4 is then placed over the inner member 3 such that the filter material contacts the annular rim 51. An ultrasonic welding process

is then used to join the filter 4 to the inner member 3 and at the same time, and in the same process step, the inner member 3 to the outer member 2. The inner member 3 and filter 4 are welded around the outer rim 51. The inner member 3 and outer member 2 are joined by means of weld lines around the outer rim 51 and also the upper edges of the webs 54.

As shown most clearly in Figure 21, the outer member 2 and inner member 3 when joined together define a void space 130 in the interior 120 below the annular flange 41 and exterior the cylindrical funnel 40 which forms a filtration chamber. The filtration chamber 130 and passages 57 above the annular frame 41 are separated by the filter paper 4.

The filtration chamber 130 contains the one or more beverage ingredients 200. The one or more beverage ingredients are packed into the filtration chamber 130. For a filtered style beverage the ingredient is typically roast and ground coffee or leaf tea. The density of packing of the beverage ingredients in the filtration chamber 130 can be varied as desired. Typically, for a filtered coffee product the filtration chamber contains between 5.0 and 10.2 grams of roast and ground coffee in a filtration bed of thickness of typically 5 to 14 mm. Optionally, the interior 120 may contain one or more bodies, such as spheres, which are freely movable within the interior 120 to aid mixing by inducing turbulence and breaking down deposits of beverage ingredients during discharge of the beverage.

The laminate 5 is then affixed to the outer member 2 by forming a weld 126 around the periphery of the laminate 5 to join the laminate 5 to the lower surface of the outwardly extending flange 35. The weld 126 is extended to seal the laminate 5 against the lower edge of the cylindrical wall 27

of the inlet chamber 26. Further, a weld 125 is formed between the laminate 5 and the lower edge of the outer tube 42 of the cylindrical funnel 40. The laminate 5 forms the lower wall of the filtration chamber 130 and also seals the inlet chamber 26 and cylindrical funnel 40. However, a small gap 123 exists prior to dispensation between the laminate 5 and the lower edge of the discharge spout 43. A variety of welding methods may be used, such as heat and ultrasonic welding, depending on the material characteristics of the laminate 5.

Advantageously, the inner member 3 spans between the outer member 2 and the laminate 5. The inner member 3 is formed from a material of relative rigidity, such as polypropylene. As such, the inner member 3 forms a load-bearing member that acts to keep the laminate 5 and outer member 2 spaced apart when the cartridge 1 is compressed. It is preferred that the cartridge 1 is subjected to a compressive load of between 130 and 280N in use. The compressive force acts to prevent the cartridge failing under internal pressurisation and also serves to squeeze the inner member 3 and outer member 2 together. This ensures that the internal dimensions of passageways and apertures in the cartridge 1 are fixed and unable to change during pressurisation of the cartridge 1.

To use the cartridge 1 it is first inserted into the beverage preparation machine and the inlet 121 and outlet 122 are opened by piercing members of the beverage preparation machine which perforate and fold back the laminate 5. An aqueous medium, typically water, under pressure enters the cartridge 1 through the inlet 121 into the inlet chamber 26 at a pressure of between 0.1-2.0 bar. From there the water is directed to flow through the slots

30 and round the manifold 16 and into the filtration chamber 130 of the cartridge 1 through the plurality of slots 17. The water is forced radially inwardly through the filtration chamber 130 and mixes with the beverage ingredients 200 contained therein. The water is at the same time forced upwardly through the beverage ingredients. The beverage formed by passage of the water through the beverage ingredients passes through the filter 4 and filtration apertures 55 into the passages 57 lying above the annular frame 41. The sealing of the filter 4 onto the spokes 53 and the welding of the rim 51 with the outer member 2 ensures that there are no short-circuits and all the beverage has to pass through the filter 4.

The beverage then flows downwardly along the radial passages 57 formed between the webs 54 and through the openings 56 and into the cylindrical funnel 40. The beverage passes along the channels 50 between the support webs 47 and down the discharge spout 43 to the outlet 44 where the beverage is discharged into a receptacle such as a cup.

Preferably, the beverage preparation machine comprises an air purge facility, wherein compressed air is forced through the cartridge 1 at the end of the dispense cycle to flush out the remaining beverage into the receptacle.

In accordance with the present invention, the cartridge 1 is provided on the laminate with a barcode 320 as shown in Figure 10. The barcode 320 is formed from a plurality of bars of contrasting colour. Preferably the bars are black on a white background to maximise the contrast. The barcode 320 is not required to conform to a published standard but a standard format for barcodes, such as EAN-13, UPC-A, or Interleaf 2 of 5 may be used.

As shown in Figure 10, the barcode 320 is specifically located relative to the inlet 121 and the outlet 122 of the cartridge 1. As will be noted from the description of the cartridge 1 above, the inlet 121 and outlet 122 may simply comprise portions of the laminate 5 which in use will be perforated by the piercers of the machine as described below. There is no requirement for the inlet and outlet to be marked on the laminate and these are shown in Figure 10 for illustrative purposes. According to the present invention, the barcode 320 and inlet 121 of the cartridge 1 are separated by a minimum angular distance. A line 328 may be defined extending from the centre of the cartridge 1 through the centre of the barcode 320. In addition, a line 329 may be defined extending from the centre of the cartridge 1 through the centre of inlet 121. According to the present invention, the angle α subtended by these two lines is greater than 70 degrees. Preferably the angle α is greater than or equal to 85 degrees. Where the outlet 122 is at the centre of the cartridge 1 as in the illustrated embodiment the lines 328 and 329 extend from a centre of the outlet 122 to the barcode 320 and inlet 121 respectively. Advantageously, it has been found that this minimum angular separation of the barcode 320 from the inlet 121 improves the accuracy of the reading of the barcode 320 by the recognition means of the machine as described below. This is believed to be for two reasons. Firstly, the separation results in any distortion of the inlet area of the laminate on piercing of the laminate 5 having a minimal affect on the laminate in the region of the barcode 320. Secondly, it has been found that there may be a small degree of leakage of fluid from the inlet area of the cartridge 1 during dispensation since dispensation occurs at pressure. This

fluid may spread, in particular due to capillary effect between the laminate and the brew head 250, leading to partial obfuscation of the barcode 320 by the fluid resulting in a greater chance of the barcode 320 being misread. With the barcode 320 separated by an angle of greater than 70 degrees it has been found that this problem does not occur. In an alternative embodiment the barcode 320 is replaced by a RFID code, located in the same manner as described above.

Preferably, the barcode 320 is also located near a periphery of the laminate 5 so as to separate the barcode 320 from the outlet 122 so as to avoid distortion of the barcode 320 on piercing of the outlet 122.

The cartridge 1 described above is given as an example of one type of cartridge that may bear a barcode 320 in accordance with the present invention. Other cartridges of a similar type may be provided for dispensing other beverage types, for example foamed milk, espresso-style coffee, chocolate, each of which in accordance with the present invention is provided with a barcode or RFID 320 as described above.

Beverage Preparation Machine

As shown in Figure 1a the housing 210 contains and holds in position the other components of the machine 201. The housing 210 preferably made in whole or in part from a robust plastics material such as ABS. Alternatively, the housing 210 can be made in whole or in part from a metallic material such as stainless steel or aluminium. The housing 210 preferably comprises a clam-shell design having a front half 211 and a rear half 212 which allow access during assembly for fitting of the machine 201 components and can

afterwards be joined together to define an interior 213 of the housing 210. The rear half 212 provides a recess 214 for the attachment of the water tank 220. The housing 210 is formed with means, such as detents, abutments, bosses and threaded portions, for retaining the components of the machine 201 in position without the need for a separate chassis. This reduces the overall cost and weight of the machine 201. A base 215 of the housing 210 is preferably provided with feet for standing the machine thereon in a stable manner. Alternatively, the base 215 itself may have a shape forming a stable support.

The front half 211 of the housing 210 comprises a dispense station 270 where dispensation of the beverage takes place. The dispense station 270 comprises a receptacle stand 271 having a hollow interior forming a drip tray 272. An upper surface 273 of the receptacle stand is provided with a grill 274 on which the receptacle is positioned. The drip tray 272 is removable from the housing 210 to ease emptying of the collected water. A recess 275 is formed in the front half of the housing 210 above the receptacle stand 271 to accommodate the dimensions of the receptacle.

The brew head 250 is located towards the top of the housing 210 above the receptacle stand as shown in Figures 1a and 1b. Preferably, the height of the grill 274 relative to the brew head 250 can be adjusted to accommodate different sizes of receptacle. It is preferred that the receptacle is as close to the brew head 250 as possible, whilst still allowing the receptacle to be inserted and withdrawn from the dispense station 270, so as to minimise the height that the dispensed beverage has to descend before contacting the receptacle. This acts to minimise spraying

and splashing of the beverage and minimise loss of entrained air bubbles where these are present. Preferably receptacles of between 70mm and 110 mm in height can be inserted between the grill 274 and brew head 250.

The machine user interface 240 is located on the front of the housing 210 and comprises a start/stop button 241, and a plurality of status indicators 243-246.

The status indicators 243-246 preferably include a light emitting diode (LED) 243 to indicate readiness of the machine 201, a LED 244 to indicate if an error has occurred in the machine 201 operation, and one or more LEDs 245-256 to indicate whether the machine 201 is operating in manual or automatic modes. The LEDs 243-246 may be controlled to illuminate at a constant intensity, to flash intermittently, or both depending on the status of the machine 201. The LEDs 243-246 may have a variety of colours including green, red and yellow.

The start/stop button 241 controls commencement of the dispense cycle and is a manually operated push-button, switch or similar.

A volume adjustment control may be provided to allow a user of the machine 201 to manually adjust the volume of the delivered beverage without altering the other operating characteristics. Preferably the volume adjustment control allows an adjustment in volume of plus or minus 20%. The volume adjustment control may be a rotary knob, a linear slider, a digital readout with increment and decrement buttons, or similar. More typically, volume is controlled by a user operating the start/stop button 241.

A manual power switch (not shown) may be provided on the machine 201. Alternatively, power supply can be

controlled simply by insertion or removal or the power supply plug from the mains power supply.

The water tank 220 is located to the rear of the housing 210 and is connected to the rear half 212 of the housing 210. The water tank 220 comprises a generally cylindrical body 221 which may be right circular or a frustum as desired for aesthetic reasons. The tank comprises an inlet for filling the tank with water which is closed off in use by a manually removable lid 222. An outlet is provided towards a lower end of the tank which communicates with the water pump 230. The water tank 220 may be made from a transparent or translucent material to allow a consumer to view the quantity of water remaining in the tank. Alternatively, the water tank 220 may be made from an opaque material but have provided a viewing window therein. In addition, or in place of the above, the water tank 220 may be provided with a low level sensor which prevents operation of the water pump 230 and optionally triggers a warning indicator, such as an LED, when the water level in the tank descends to a preselected level. The water tank 220 preferably has an internal capacity of approximately 1.5 litres.

The water pump 230 is operatively connected between the water tank 220 and the water heater 225 as shown schematically in Figure 8 and is controlled by the control processor. The pump provides a maximum flow rate of 900 ml/min of water at a maximum pressure of 2.5 bar. Preferably, in normal use, the pressure will be limited to 2 bar. The flow rate of water through the machine 201 can be controlled by the control processor to be a percentage of the maximum flow rate of the pump by cycle chopping the electrical supply to the pump. Preferably the pump can be

driven at any of 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90% or 100% of the maximum rated flow rate. The accuracy of the volume of water pumped is preferably + or - 5% leading to a + or - 5% accuracy in the final volume of the dispensed beverage. A suitable pump is the Evolution (RTM) EP8 pump produced by Ulka S.r.l. (Pavia, Italy). A volumetric flow sensor (not shown) is preferably provided in the flow line either upstream or downstream of the water pump 230. Preferably, the volumetric flow sensor is a rotary sensor.

The water heater 225 is located in the interior of the housing 210. The heater 225 has a power rating of 1550 W and is able to heat water received from the water pump 230 from a starting temperature of approximately 20 °C to an operating temperature of around 85 °C in under 1 minute. Preferably the dwell time between the end of one dispense cycle and the heater 225 being able to commence a subsequent dispense cycle is less than 10 seconds. The heater maintains the selected temperature to within + or - 2 °C during the dispense cycle. The water for the dispense cycle may be delivered to the brew head 250 at 83 °C or 93 °C. The heater 225 is able to quickly adjust the delivery temperature to either 83 °C or 93 °C from a nominal water temperature of 85 °C. The heater 225 comprises an over-temperature cut-off which shuts off the heater if the temperature exceeds 98 °C. Water output from the heater 225 is fed to the brew head 250 by means of a three-way valve. If the pressure of the water flow is acceptable the water is passed to the cartridge 1. If the pressure is below or above predetermined limits then the water is diverted by means of the three-way valve into the drip tray recovery receptacle 270.