



UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, 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, KM, ML, MR, NE, SN, TD, TG).

- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*
- *of inventorship (Rule 4.17(iv))*

Published:

- *with international search report (Art. 21(3))*

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

BEVERAGE PRODUCTION SYSTEM

Field of the invention

The present invention relates to beverage dispensers configured for providing hot and cold
5 beverages by mixing a soluble beverage ingredient and a diluent in a drinking cup.

Background of the invention

It is known to prepare beverages by mixing a beverage concentrate such as a dry powder
or a liquid concentrate with a diluent such as cold or hot water. One way to implement the
10 mixing of the concentrate and the diluent is the so-called in-cup mixing where a dose of the
beverage concentrate is introduced into a drinking cup and then at least a stream or jet of
diluent is introduced to the cup in order to enable an interaction of the beverage concentrate and
the diluent.. Accordingly, the beverage concentrate is dissolved and eventually frothed by the
diluent in order to prepare the beverage. Usually the dose of concentrate that is introduced in
15 the empty drinking cup is dosed and dispensed from a storage tank.

The dispenser can comprise several storage tanks holding different types of concentrates -
e.g. coffee powder, milk powder, cocoa powder, tea powder - for preparing different types of
beverages from each powder or by mixtures of said powders. The dispenser is configured for
introducing the jet of diluent in the cup according to specific parameters depending on the nature
20 of the ingredient to be dissolved. These parameters can relate to the volume of diluent
introduced in the cup, the velocity of the diluent jet, the movement of the diluent jet during
dispensing and influence the effective dissolution of the concentrate and also the texture of the
concentrate. For example a high jet velocity enables the incorporation of air in the beverage
during its preparation and the creation of foam on the top of the beverage; such a foam is
25 desired for a milky or chocolate beverage but not for a tea. In that last case the diluent shall be
introduced with a low velocity in order to create fewer bubbles as possible on the surface of the
final beverage. Usually the controller of the dispenser stores information about the process of
dissolution in relation to each concentrate and each selected beverage.

It is also known to prepare beverages in the simplest way by introducing hot water in
30 particular drinking cups comprising a pre-packed quantity of a beverage concentrate. Such cups
are known as opercule cups. Generally the pre-packed quantity of beverage concentrate is
disposed in a compartment closed by removable sealing means so that the concentrate is
protected from air and moisture before the cup is used. This kind of opercule cups are described
in WO2008003570. To prepare the beverage the consumer can introduce hot water from a

kettle directly inside the cup. As there can be no control of the process of introduction of the diluent in said cup, the quality of the beverage can only be controlled through the properties of the concentrate packed in the cup ; for example, the foamy aspect of cappuccino can only be obtained by the introduction of a foaming agent in the composition of the beverage concentrate.

5 It has been proposed to use a beverage dispenser to fill such opercule cups with a diluent for the preparation of beverages. Yet the dispenser introduces the diluent in the opercule cup without information about the nature of the concentrate packed in the cup and cannot produce a stream of diluent in the cup fully optimised with the nature of the concentrate to be dissolved.

The object of the present invention is to propose a solution to the above problem related to
10 the filling of opercule cups with a beverage dispenser.

Summary of the invention

According to a first aspect the invention relates to a beverage production system of a drinking cup, said drinking cup comprising a pre-packed quantity of beverage concentrate
15 ingredient, and a beverage dispenser configured for preparing a beverage by introducing a diluent inside said drinking cup, wherein the dispenser comprises :

- diluent supply means,
- at least one nozzle for introducing the diluent in the drinking cup,
- a sensing device adapted to obtain information about said drinking cup by receiving or reading
20 information from the cup and/or by measuring at least one of the following characteristic of the cup : spectral property, colour, electrical property, resistivity, capacitance, electromagnetic property, magnetic induced field, mechanical property, geometry, weight, identifier, code bar, emitted or reflected signal.

said sensing device being interconnected with the controller of the dispenser so that in function
25 of the information obtained about the drinking cup the controller adapts the process for introducing a diluent in the drinking cup so that said diluent mixes with the beverage concentrate ingredient and produces a beverage.

Preferably the sensing device is adapted to detect the presence of the drinking cup in a detection area which generally corresponds to the dispensing area of the dispenser.

30 According to the preferred embodiment the sensing device is a reading device adapted for reading an identifier, said identifier encoding information and being carried by the drinking cup. This identifier is preferably chosen in the group of an RFID tag, a bar code, an optical code.

According to a first preferred embodiment the beverage dispenser of the system can comprise at least one nozzle delivering a jet of diluent at high pressure and at least one nozzle

delivering of diluent at low pressure, and in function of the information obtained about the drinking cup the controller can adapt the following conditions for introducing the diluent in the drinking cup :

- dispensing time through each nozzle,
- 5 - flow rate through each nozzle,
- sequence of use of each nozzle.

According to said first preferred embodiment in function of the information obtained about the drinking cup the controller can adapt the sequence of use of each nozzle in particular :

- number of subsequences about the dispensing of diluent through each nozzle,
- 10 - the time length of each subsequences,
- delay between the subsequences.

According to a second preferred embodiment the beverage dispenser of the system can comprise :

- several nozzles dispensing jets of diluent at high pressure, and
 - 15 - means for rotating these nozzles or the drinking cup during diluent dispensing,
- and in function of the information obtained about the drinking cup the controller can adapt the rotation speed of the rotating means.

According to the invention the beverage dispenser of the system can comprise :

- support means for supporting the drinking cup,
 - 20 - means for relatively moving the support means of the drinking cup to the at least one nozzle,
- and wherein in function of the information obtained about the drinking cup the controller can adapt the relative position of the support to the nozzle during the preparation of the beverage.

According to a second aspect the present invention concerns a system comprising a
25 beverage dispenser such as described hereabove and a drinking cup comprising a pre-packed quantity of beverage concentrate ingredient wherein said cup carries an identifier, said identifier encoding information related to the process for introducing a diluent in the drinking cup so that said diluent mixes with the beverage concentrate ingredient and produces a beverage.

Encoded information can directly relates to the process parameters for introducing a
30 diluent in the drinking cup so that said diluent mixes with the beverage concentrate ingredient and produces a beverage. Encoded information can also indirectly relates to the process parameters ; in particular the encoded information carried by the drinking cup can comprise information related to the nature of the beverage concentrate ingredient pre-packed in the drinking cup. Based on said piece of information, the dispenser controller can be configured to

adapt the process for introducing the diluent in the drinking cup.

The encoded information carried by the drinking cup can also comprise information related to :

- the authenticity of the beverage ingredient pre-packed in the drinking cup,
- 5 - a date of expiration of the beverage ingredient pre-packed in the drinking cup,
- information to be displayed on a user interface of the dispenser (product information, loyalty program).
- the temperature of the diluent to introduce in the drinking cup,
- the volume of diluent to introduce in the drinking cup.

10 The information obtained from the drinking cup by the sensing device can be simple data which can be used in order to trigger actions in the program run on the dispenser itself.

According to another embodiment the information obtained from the drinking cup by the sensing device can be signed information used to perform actions in the program sequence of the dispenser and/or an external data processing system to which the dispenser is connected
15 and which can be connected via a data network to trigger (for example internet).

According to another embodiment the information obtained from the drinking cup by the sensing device can be encrypted information which can be decrypted by the program sequence of the dispenser and/or an external data processing system to which the dispenser is connected and that causes actions in the program sequence of the dispenser or in the external data
20 processing system.

The drinking cup of the invention is usually disposable. By disposable it is meant that the drinking cup is a single use cup. It can be thrown away after use that is after the beverage has been prepared and drunk. It is generally a cup made out of paper, cardboard material or similar. It comprises a pre-packed quantity of beverage concentrate ingredient. This beverage
25 concentrate ingredient can be a powder or a liquid concentrate. This concentrate is preferably a water soluble concentrate able to be dissolved by a diluent, preferably water, when put into contact and preferably mixed with said diluent. Preferably the beverage concentrate ingredient is selected in the list of instant coffee powder, milk powder, instant tea powder, cocoa powder, soup powder or mixture of said powders. The beverage concentrate can also be a liquid
30 selected in the list of a coffee concentrate, a milk concentrate, a syrup.

The beverage concentrate ingredient is usually disposed in a compartment closed by removable sealing means. Then the concentrate is protected from air and moisture before the cup is used.

According to a particular mode the beverage concentrate ingredient can be pre-packed in

an insert having the shape of second cup, said second cup being smaller than the drinking cup so that this insert can be slid in the drinking cup and positioned at its bottom with its opening turned upwards the opening of the cup. This insert can present any shape or size. Usually its volume does not exceed one third of the internal volume of the drinking cup. The insert can be made of any material. Preferably it is made out of an injection molded thermoplastic material like polystyrene or polyethylene. The insert can be closed by a peelable removable foil made for instance of aluminium. For practical reasons the foil usually presents a tab, said tab being accessible from the top edges of the drinking cup.

According to the invention the cup carries an identifier. Preferably the identifier is chosen in the group of an RFID tag, a bar code, an optical code. The identifier encodes information related to the process for introducing a diluent in the drinking cup so that said diluent mixes with the beverage concentrate ingredient pre-packed in the cup and produces a beverage.

The identifier is generally positioned on the external surface of the drinking cup preferably under the bottom wall.

According to a third aspect the invention concerns the use of a drinking cup comprising a pre-packed quantity of beverage concentrate ingredient in a beverage dispenser according to the first aspect of the invention.

According to a fourth aspect the invention concerns a method of dispensing a beverage with a dispenser according to the first aspect of the invention which method comprises :

- placing a drinking cup comprising a pre-packed quantity of beverage concentrate ingredient in or close to the sensing device of the beverage dispenser,
- obtaining information about said drinking cup,
- preparing the beverage according to the read information.

According to the preferred method the container is a drinking cup enclosing a single serving portion of beverage or food ingredient, said beverage or food ingredient portion being disposed in a compartment closed by removable sealing means, wherein the method comprises the step of removing said sealing means before placing the container in or close to the food or beverage dispenser.

Brief description of the drawings

The characteristics and advantages of the invention will be better understood in relation to the following figures :

- Figure 1 illustrates a beverage dispenser according to an embodiment of the present invention.
- 5 - Figure 2 illustrates a drinking cup comprising a pre-packed quantity of beverage concentrate ingredient.
- Figure 3 illustrates the bottom face of a drinking cup according to an embodiment of the present invention.
- Figure 4 illustrates a beverage dispenser according to another embodiment of the present
10 invention.
- Figure 5 illustrates a drinking cup according to another embodiment of the present invention.
- Figure 6 illustrates an assembly of sub-nozzles that can be implemented in a dispenser according to the invention.
- Figure 7 illustrates one example of sequence used for describing a recipe.

Detailed description of the drawings

The dispenser of the present invention is configured for introducing a diluent in a drinking cup, said cup already comprising a beverage concentrate ingredient, preferably a soluble beverage concentrate ingredient. The cup is used for mixing the diluent and the beverage
20 concentrate ingredient and for holding the final beverage. Consequently the dispenser essentially comprises a dispensing area in which the drinking cup can be placed, at least one nozzle for introducing the diluent in the cup placed in the dispensing area and means for providing the at least one nozzle with the diluent. These diluent supply means generally comprise means for pumping and adjusting the temperature of the diluent before it is introduced
25 in the at least one nozzle.

Figure 1 illustrates a beverage dispenser according to an embodiment of the present invention wherein a particular embodiment of the nozzles is implemented and the sensing device is placed under the dispensing area so that it can read or receive information from the cup bottom or measure characteristic on the cup bottom.

30 Figure 4 illustrates a beverage dispenser according to another embodiment of the present invention wherein another particular embodiment of the nozzles is implemented and the sensing device is placed on the lateral side of the dispensing area so that it can read or receive information from the cup lateral side.

Figure 7 illustrates a sequence defining a specific beverage preparation.

Figures 1 and 4 are particularly detailed to explain the operations of the means for introducing the diluent in the cup, of the sensing device and of the dispenser control unit. But the present invention is not limited to these both particular embodiments of Figure 1 and 4. Any combination of nozzles configuration could be used with any position of the sensing device in the dispensing area.

In **Figure 1** the dispenser comprises a dispensing area 7 configured for receiving a drinking cup 1. The dispenser comprises several nozzles for introducing a diluent in the drinking cup 1. Figure 1 illustrates a dispenser with two different types of nozzles 31 and 32. A first nozzle 31 enables the introduction of a free flow of diluent. This kind of nozzle enables the rapid and gently filling of a drinking cup ; it is useful for producing beverage for which no bubble or foam is desired on the top surface like tea or for completing the filling of a beverage which has been previously foamed. Such a nozzle can present an outlet diameter comprised between 4 and 15 mm, preferably between 8 and 10 mm. The second nozzle 32 is an assembly of several sub-nozzles enabling the introduction of several jets of diluent of high velocity in the cup. **Figure 6** illustrates such an assembly of sub-nozzles and the way these nozzles introduce the diluent in a cup. The assembly comprises four sub-nozzles 32a, 32b, 32c and 32d. Each nozzle is oriented so that it produces a jet of diluent according to a specific orientation and so that the diluent hits the drinking cup at a specific place. For example as illustrated in Figure 6, two of the sub-nozzles 32a, 32b direct a diluent jet A3, A4 to an inner side wall 1a of the cup and are arranged at different angles (α) with respect to the vertical, and at least two of the sub-nozzles 32c, 32d are designed to direct a diluent jet A1, A2 to the bottom of the cup 1b and are arranged at different angles (β) with respect to the vertical. This figure illustrates the importance of using always the same shape of cup when a nozzle configuration is set. The jets of diluent are defined to provide specific mixing to get the full dissolution for the beverage ingredient placed in the cup and to provide specific agitation to introduce air in the beverage and get the requested foam. If the cup shape (surface of the bottom, angles of the lateral walls, height) changes then the diluent jets do not produce the optimal dissolution and agitation and finally a beverage of quality.

Preferably nozzles providing high pressure diluent jets present an outlet diameter comprised between 0,5 and 2,5 mm, preferably between 0,6 and 1,5 mm.

In the embodiment of Figure 1 the second nozzle 32 can be moved, in particularly rotated, during the dispensing of diluent in the cup. The movement is produced by a motor 321 to which the second nozzle 32 is connected. The motor 321 can also be used to change the relative distance between the drinking cup placed in the dispensing area and the nozzle 32.

The nozzles 31, 32 are supplied with the diluent usually water. The supply of water

comprises a source 8 which can be a tank or tap water. A pump 9 drives the water from the source 8. The dispenser comprises a heater 10 to heat the water for the preparation of hot beverages. Alternatively for the production of beverages at ambient temperature the dispenser comprises a by-pass line 15 from the pump outlet to the nozzles. Valves 11, 12 enable the selection of the temperature of the beverage. Two others valves 13, 14 respectively enable the supply of the first nozzle 31 or the second nozzle 32.

The dispensing area enables the positioning of a drinking cup under the at least one nozzle 31, 32 by the consumer. The drinking cup 1 used with the dispenser of Figure 1 comprises a pre-packed quantity of beverage concentrate ingredient 10.

Figure 2 illustrates a type of drinking cup containing a pre-packed quantity of beverage ingredient that can be used with the dispenser of Figure 1. The beverage ingredient is stored at the bottom of the drinking cup and protected from air and humidity by a membrane 12. A part of the edge of the membrane can extend up to the top of the cup and forms a tab 13. The consumer can pull the tab to withdraw the membrane from the cup and then use the cup to prepare a beverage. The cup also carries an identifier 11 that is located under its bottom surface.

Figure 3 illustrates the case where the bottom of the cup carries a bar code.

The dispenser comprises a sensing device 2 adapted to read the code bar 11 of the cup 1. The bar code reader 2 is connected to the control unit (or controller) 4 of the dispenser so that in function of the read barcode the control unit 4 adapts the process for introducing water in the drinking cup and for mixing the beverage concentrate ingredient and water. In particular the following devices of the dispenser can be adapted :

- the activation of the water pump 9,
- the activation of heater 10,
- the activation of the hot water valve 11 or the ambient water valve 12,
- the activation of the first nozzle valve 14,
- the activation of the second nozzle valve 13,
- the activation of the second nozzle motor 321.

The activation relates at least to the following aspects :

- switching on or off the corresponding device,
- the time at which the corresponding device is activated,
- the time during which the corresponding device is activated,
- the speed of the motors of the pump and of the nozzle rotating device,

Depending on the activation or not of these different devices according to specific time

sequences, different type of dilution processes can be implemented by the dispenser. The identifier 11 on the drinking cup provides the dispenser with information for implementing the optimal water introduction in the cup to get the optimal beverage from the beverage concentrate ingredient present in the cup and based on the shape of the cup.

5 **Figure 7** illustrates one example of sequence used for describing a recipe that can be implemented in the dispenser of Figure 1. The sequence provides information related to the time of activation of the pump, the time of activation of the rotating jet, the delay between the activation of the different devices. Other information relate to the temperature of the water, the flow of water delivered by the pump, the rotation speed of the second nozzle. In the sequence
10 illustrated in Figure 7, the recipe comprises 3 sub-sequences :

- during the first sub-sequence, diluent is delivered through the second nozzle which is made to rotate, so as to enhance dissolution,
- during the second sub-sequence, diluent is delivered through the first nozzle, so as to fill the cup,
- 15 - during the third sub-sequence, diluent is delivered through the second nozzle which is made to rotate, so as to froth the beverage.

In one mode this recipe can be directly encoded in the identifier of the cup. In a second mode this recipe can be indirectly deduced from the information encoded in the identifier of the cup ; for example, the encoded information can simply provide the nature of the ingredient
20 (instant coffee, milk powder) in the cup or the nature of the beverage to be prepared in the cup (espresso, American coffee). The dispenser can store the recipe related to this ingredient or beverage in a storage memory of the dispenser (not illustrated) and so can apply it.

The dispenser generally comprises a user interface 5 to activate the preparation of a beverage. The user interface 5 can comprise a screen on which information related to the
25 beverage under preparation can be presented to the consumer ; these information can again be obtained from the information sensed by the sensing device 2 through the identifier 11.

According to a specific embodiment the control unit 4 of the dispenser can be in communication with an external server 41 and at least one database 42 that can store information about the dispenser or about the drinking cup 1 of which information is sensed by
30 the sensing device 2. Based on the information the control unit 4 can be induced to download information from the external system 41, 42. For example the following information can be downloaded :

- information about the beverage concentrate enclosed in the cup, like compositions of the beverage ingredients, origins of the ingredients, nutritional information about the dispensed

beverages.

- information about the recipes for preparing a beverage from the cup with the particular dispenser of Figure 1, in particular the process for introducing water in the drinking cup and for mixing the beverage concentrate ingredient and water such as defined in a sequence as illustrated in Figure 7.

The connection of the dispenser to an external data processing system that causes actions in the dispenser control unit is particularly interesting since the dispenser does not have to be regularly updated with new softwares e.g. each time a new beverage concentrate is developed or a new dilution recipe is implemented.

Based on the information encoded in the conductive or dielectric pattern the control unit 4 can also be induced to upload information in the external system 41, 42. Such information can be used to establish consumption patterns.

Figure 4 illustrates a dispenser that differs from the dispenser of Figure 1 by its second nozzle 32, the position of the sensing device 2 to obtain information about the drinking cup 1 and the presence of a movable drinking cup support 6. All the other elements of the dispenser are identical to those of the dispenser of Figure 1 having the same reference number.

The second nozzle 32 of the dispenser is a single tube presenting a shape configured for producing a high velocity water jet, preferably a tube having a diameter outlet comprised between 0,5 and 2,5 mm, preferably between 0,6 and 1,5 mm, and preferably a nozzle having an internal bore tapering to said outlet diameter. This nozzle is oriented so that the water jet emerging therefrom hits the lateral internal side of the drinking cup.

The dispensing area 7 comprises a cup support 6 which can be made moved by a motor 61. The movement can be a rotation of the cup on itself and/or a vertical movement to adapt the distance of the cup 1 to the nozzles 31, 32.

The dispenser is configured for forming a system with a drinking cup 1 comprising a pre-packed quantity of beverage ingredient 10 and carrying an identifier 11 on its lateral external side such as illustrated in **Figure 5**. The sensing device 2 of the dispenser is positioned so as to be able to read information on said side of the cup when the cup is placed in the dispenser.

The present invention also covers dispenser in which the sensing device 2 is not positioned to read information on the cup when the cup is placed in the dispenser. The sensing device can be positioned in another area of the dispenser and the consumer can be incited to place his/her cup near from or in contact with said device to obtain information therefrom before the cup is placed in the dispensing area under the nozzle(s) outlet (s).

In the embodiment of Figures 4 and 5, the identifier on the cup is a text "cocoa" that can be recognised by a sensing device comprising a camera : the picture made by the camera can be analysed with a software by comparing said picture with a database of pictures so as to recognise the type of cup placed in the dispenser and applies the corresponding process for introducing water in the cup.

The present invention presents the advantage of enabling the encoding of a disposable drinking cup in a very rapid and low cost manner in order to enable the optimised preparation of the beverage ingredient present in the cup. In particular it is possible to code the shape of the drinking cup so that diluent can be optimally introduced in the cup taking into account that shape.

The present invention also presents the advantage of enabling the production of new food or beverage ingredient presenting new tastes and compositions and being always able to teach the dispenser how to optimally prepared the beverage with the new ingredient.

CLAIMS

1. A beverage dispenser configured for preparing a beverage by introducing a diluent inside a drinking cup (1), said drinking cup comprising a pre-packed quantity of beverage concentrate ingredient (10), wherein the dispenser comprises:
- 5 - diluent supply means,
- at least one nozzle (31, 32) for introducing the diluent in the drinking cup,
- a sensing device (2) adapted to obtain information about said drinking cup by receiving or reading information from the cup and/or by measuring at least one of the following characteristic
- 10 of the cup : spectral property, colour, electrical property, resistivity, capacitance, electromagnetic property, magnetic induced field, mechanical property, geometry, weight, identifier, code bar, emitted or reflected signal,
- said sensing device being interconnected with the controller (4) of the dispenser so that in function of the information obtained about the drinking cup the controller adapts the process for
- 15 introducing the diluent in the drinking cup (1) so that the diluent mixes with the beverage concentrate ingredient (10) and produces a beverage.
2. A beverage dispenser according to Claim 1 wherein it comprises at least one nozzle delivering a jet of diluent at high pressure and at least one nozzle (31) delivering diluent at low
- 20 pressure, and
- in function of the information obtained about the drinking cup the controller (4) adapts the following conditions for introducing the diluent in the drinking cup :
- dispensing time through each nozzle,
- flow rate through each nozzle,
- 25 - sequence of use of each nozzle.
3. A beverage dispenser according to Claim 2 wherein in function of the information obtained about the drinking cup the controller adapts the sequence of use of each nozzle in particular :
- number of subsequences about the dispensing of diluent through each nozzle,
- 30 - the time length of each subsequences,
- delay between the subsequences.
4. A beverage dispenser according to any one of Claims 1 to 3 wherein the beverage dispenser comprises :

- several nozzles (32) dispensing jets of diluent at high pressure, and
- a motor (321) for rotating these nozzles or the drinking cup during diluent dispensing, and in function of the information obtained about the drinking cup the controller adapts the rotation speed of the rotating means.

5

5. A beverage dispenser according to any one of Claims 1 to 4 wherein the beverage dispenser comprises :

- a device (6) for supporting the drinking cup,
- a motor (61) for relatively moving the device supporting the drinking cup to the at least one

10

nozzle,
and wherein in function of the information obtained about the drinking cup the controller adapts the relative position of the support to the nozzle during the preparation of the beverage.

6. A beverage production system comprising a beverage dispenser according to any one of Claims 1 to 5 and a drinking cup comprising a pre-packed quantity of beverage concentrate ingredient (10) wherein said cup carries an identifier (11), said identifier encoding information related to the process for introducing a diluent in the drinking cup so that said diluent mixes with the beverage concentrate ingredient and produces a beverage.

15

20

7. A beverage production system according to the precedent claim wherein the encoded information carried by the drinking cup comprises information related to the nature of the beverage concentrate ingredient pre-packed in the drinking cup.

25

8. Use of a drinking cup comprising a pre-packed quantity of beverage concentrate ingredient in a beverage dispenser according to any one of Claims 1 to 5.

9. A method of dispensing a beverage with a beverage dispenser according to any of Claims 1 to 5, which method comprises :

- placing a drinking cup comprising a pre-packed quantity of beverage concentrate ingredient in or close to the sensing device of the beverage dispenser,
- obtaining information about said drinking cup,
- preparing the beverage according to information obtained about the drinking cup.

30

10. A method according to Claim 9 wherein the container is a drinking cup (1) enclosing a single

serving portion of beverage or food ingredient (10), said beverage or food ingredient portion being disposed in a compartment closed by removable sealing means (12), wherein the method comprises the step of removing said sealing means (12) before placing the container (1) in or close to the food or beverage dispenser.

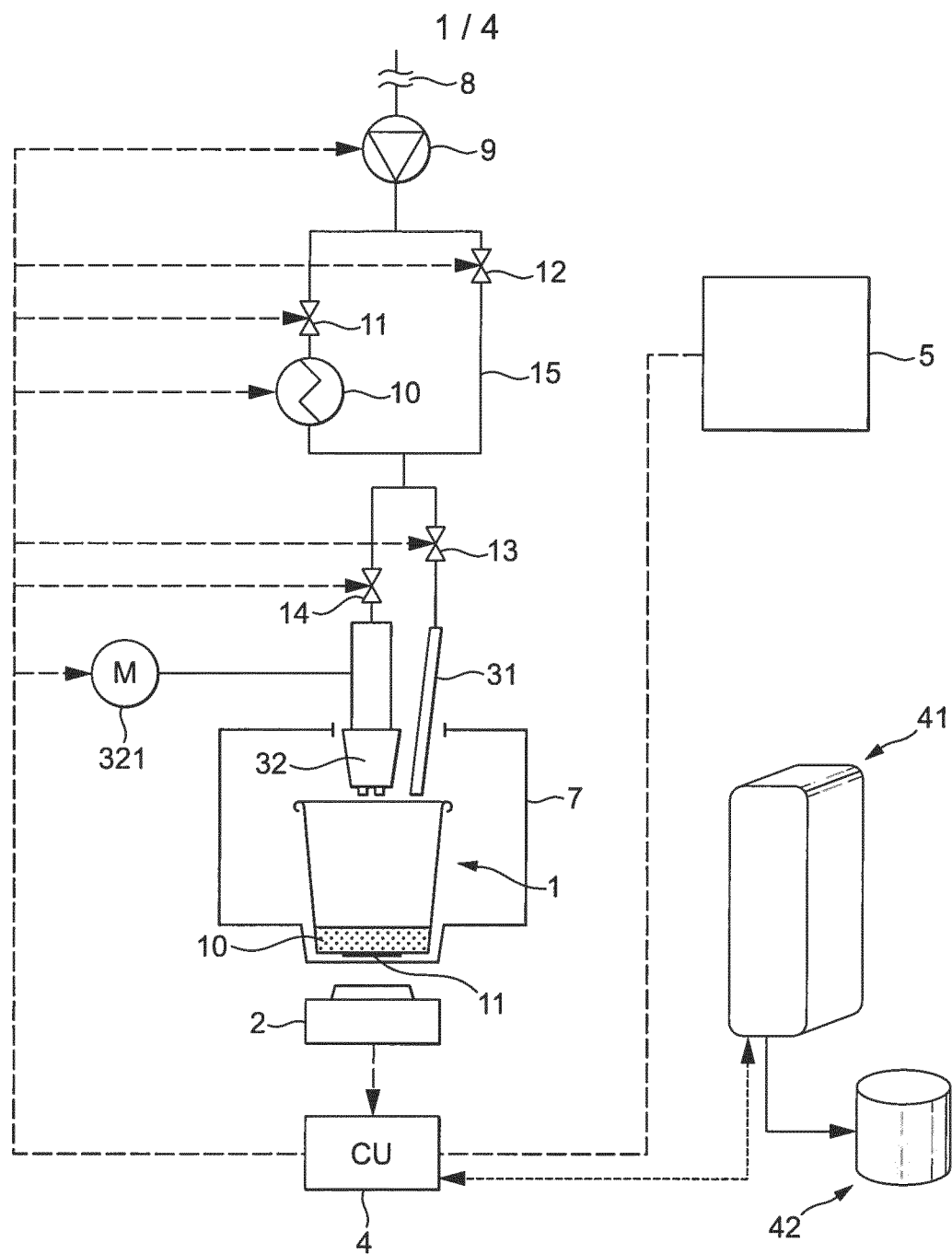


FIG. 1

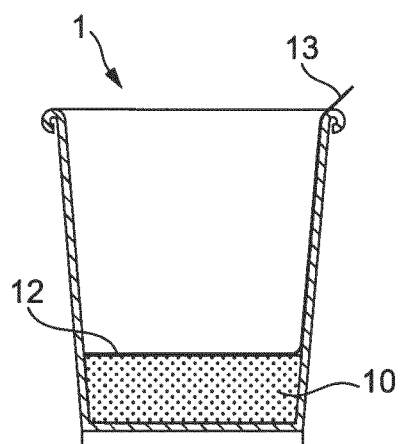


FIG. 2

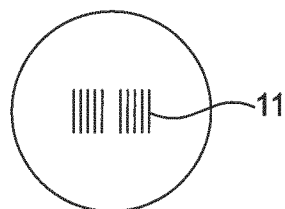


FIG. 3

2 / 4

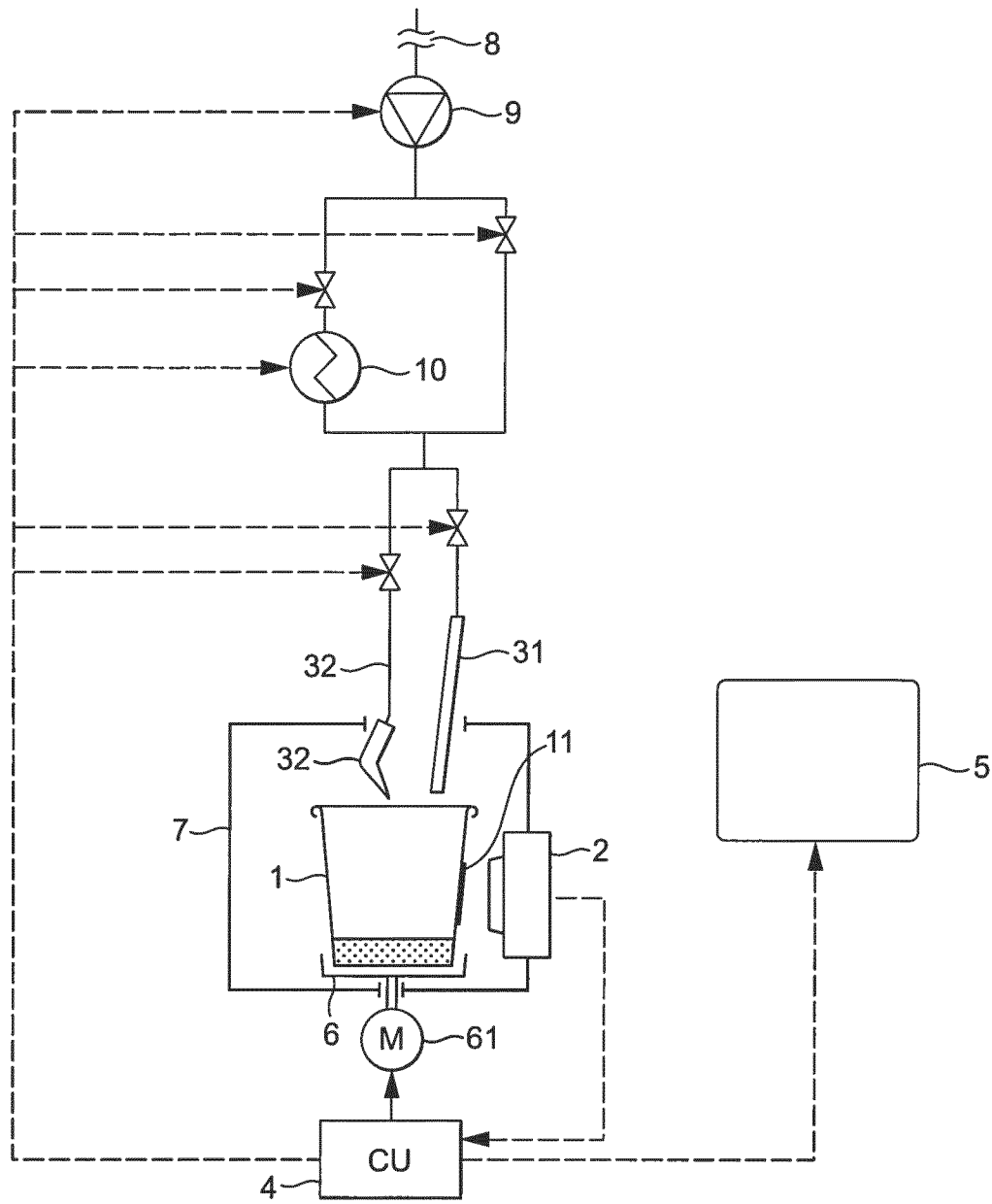


FIG. 4

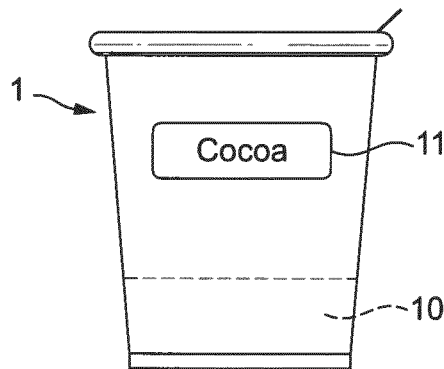


FIG. 5

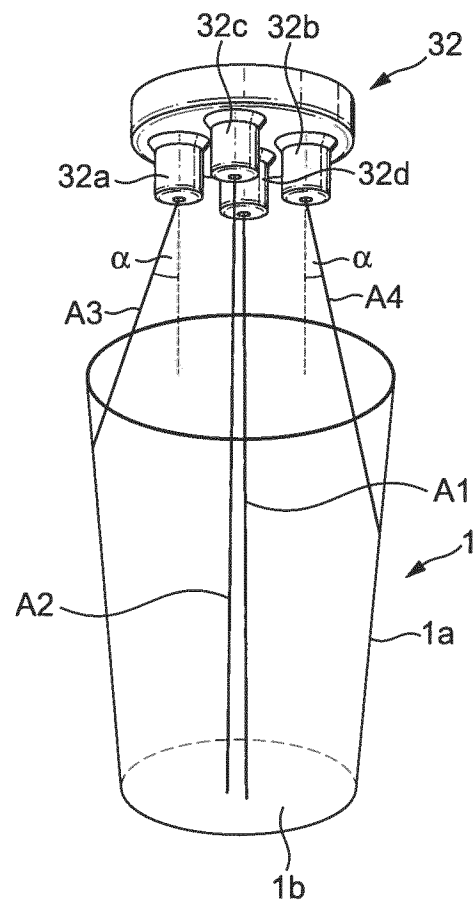


FIG. 6

Steps	Parameter	Data	Intensity
1st step	Temperature	85	
	Delay between subsequences	2	
	Pump	2	12[ml/s]
	Rotating jet		100%
2nd step	Temperature	85	
	Pump	1	6[ml/s]
	Rotating jet		0%
	Temperature	85	
3rd step	Pump	2	12[ml/s]
	Rotating jet		100%
	Temperature		
	Pump		
4th step	Rotating jet		
	Temperature		
	Pump		
	Rotating jet		
5th step	Temperature		
	Pump		
	Rotating jet		
	Temperature		

Final recipe layout	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Time line																													
Step 1																													
Step 2																													
Step 3																													

Delay between subsequences

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/077067

A. CLASSIFICATION OF SUBJECT MATTER		
INV. G06K7/14 B67D3/00	G06K19/06 B65B3/26	G06K19/067 B65D81/34
A47J31/44 B65D85/816	A23L1/01	
ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) G06K A47J A23L B67D B65B 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 practicable, 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.
X	EP 1 890 271 A1 (GRIMAC S R L [IT]) 20 February 2008 (2008-02-20) paragraph [0011] -----	1-10
X	US 2009/258115 A1 (MINFRAY FABIEN [FR]) 15 October 2009 (2009-10-15) paragraphs [0002], [0003], [0015]; figure 1 -----	1
X	US 2011/264285 A1 (MATTOS JR LOUIS [US] ET AL) 27 October 2011 (2011-10-27) paragraphs [0049], [0051]; figure 5 -----	1
X	US 2007/157821 A1 (PANESAR ET AL) 12 July 2007 (2007-07-12) paragraphs [0003], [0051], [0053], [0085], [0088], [0118]; figures 5,10 ----- -/-	1-10
☒ 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 application or patent 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 25 March 2014		Date of mailing of the international search report 02/04/2014
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Heusler, Nikolaus

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/077067

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007/203587 A1 (ERLANDSSON JAN H [GB] ET AL) 30 August 2007 (2007-08-30) paragraphs [0004], [0005], [0011], [0012], [0023], [0024], [0026], [0027], [0043] -----	1
X	US 2003/006281 A1 (THOMAS KEVIN [US] ET AL THOMAS KEVIN R [US] ET AL) 9 January 2003 (2003-01-09) paragraphs [0056], [0058], [0064] -----	1
X	EP 0 972 481 A1 (THERMOPLAN AG [CH]) 19 January 2000 (2000-01-19) paragraphs [0011], [0012]; figure 3 -----	1
X	US 2006/108023 A1 (GREIWE HANSDIETER [DE] ET AL) 25 May 2006 (2006-05-25) paragraphs [0007], [0014], [0019] -----	1
A	DE 10 2005 040206 A1 (EGO ELEKTRO GERAETEBAU GMBH [DE]) 22 February 2007 (2007-02-22) paragraph [0052]; figure 1 -----	1-10
A	FR 2 947 655 A1 (RIMET FRANCOIS [FR]) 7 January 2011 (2011-01-07) page 4, line 5 - line 28; figure 2 -----	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2013/077067

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1890271	A1	20-02-2008	NONE
US 2009258115	A1	15-10-2009	AU 2007271316 A1 10-01-2008 CA 2652912 A1 10-01-2008 CN 101466619 A 24-06-2009 EP 2041003 A1 01-04-2009 JP 2009541168 A 26-11-2009 KR 20090026782 A 13-03-2009 US 2009258115 A1 15-10-2009 WO 2008003570 A1 10-01-2008
US 2011264285	A1	27-10-2011	AU 2011248843 A1 20-12-2012 CN 103003189 A 27-03-2013 EP 2563710 A1 06-03-2013 JP 2013540294 A 31-10-2013 US 2011264285 A1 27-10-2011 WO 2011139550 A1 10-11-2011
US 2007157821	A1	12-07-2007	AR 049470 A1 09-08-2006 AT 483384 T 15-10-2010 AU 2005215202 A1 01-09-2005 BR PI0507785 A 17-07-2007 CA 2555329 A1 01-09-2005 CN 1942125 A 04-04-2007 DK 1715778 T3 24-01-2011 EP 1715778 A1 02-11-2006 ES 2351796 T3 10-02-2011 GB 2411105 A 24-08-2005 HK 1095032 A1 15-04-2011 HK 1105089 A1 18-12-2009 JP 4701188 B2 15-06-2011 JP 2007522856 A 16-08-2007 KR 20060129474 A 15-12-2006 PE 10082005 A1 26-11-2005 PT 1715778 E 30-11-2010 RU 2355279 C2 20-05-2009 US 2007157821 A1 12-07-2007 WO 2005079638 A1 01-09-2005
US 2007203587	A1	30-08-2007	CN 1897853 A 17-01-2007 EP 1699327 A1 13-09-2006 JP 2007526025 A 13-09-2007 US 2007203587 A1 30-08-2007 WO 2005063091 A1 14-07-2005
US 2003006281	A1	09-01-2003	AR 034719 A1 17-03-2004 AT 406630 T 15-09-2008 AU 2002354823 B2 29-05-2008 EP 1405261 A1 07-04-2004 EP 1986150 A2 29-10-2008 ES 2312599 T3 01-03-2009 PT 1405261 E 09-10-2008 US 2003006281 A1 09-01-2003 US 2006108415 A1 25-05-2006 WO 03005295 A1 16-01-2003
EP 0972481	A1	19-01-2000	CA 2276927 A1 07-01-2000 EP 0972481 A1 19-01-2000

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2013/077067

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006108023	A1	25-05-2006	AT 335429 T 15-09-2006
			AU 2003258680 A1 30-04-2004
			DE 10239595 A1 18-03-2004
			EP 1531708 A1 25-05-2005
			HK 1074155 A1 19-01-2007
			JP 4273077 B2 03-06-2009
			JP 2005537113 A 08-12-2005
			US 2006108023 A1 25-05-2006
			WO 2004023949 A1 25-03-2004
DE 102005040206	A1	22-02-2007	NONE
FR 2947655	A1	07-01-2011	FR 2947655 A1 07-01-2011
			WO 2011000926 A1 06-01-2011