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(71) Applicant: **SOCIETE DES PRODUITS NESTLE S.A.** [CH/CH]; Av. Nestlé 55, 1800 VEVEY (CH).

(72) Inventors: **SIEGRIST, Peter**; Bachteleweg 6, 3303 Jegenstorf (CH). **PERENTES, Alexandre**; Chemin de l'Ecole 9, 1036 Sullens (CH). **KAESER, Stefan**; Goldernstrasse 6, 5000 Aarau (CH). **TEKLITS, Alain**; Ch. De Riant-Mont 2, 1804 Corsier (CH). **MOODIE, Simon**; 6 Old Road, High Peak, Whaley Bridge Aberdeenshire SK23 7HR (GB).

(74) Agent: **NAVARRO FERNANDEZ, Maria Isabel**; Av. Nestlé 55, 1800 VEVEY (CH).

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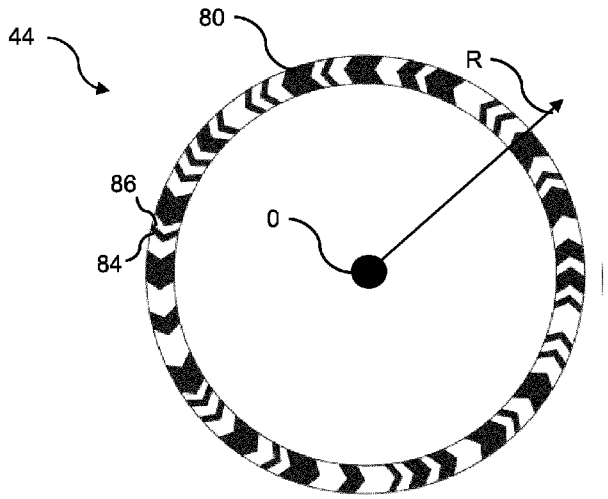

Figure 11

(57) Abstract: A container arranged for containing a precursor material for use with a machine for preparing a beverage and/or foodstuff, the container including a machine-readable code storing preparation information for use with a preparation process performed by said machine, the code comprising a plurality of elements, the elements of the code are arranged to be read sequentially as the container is rotated about an axis of rotation (0), wherein the elements are arranged to be asymmetric about an axis (R) that extends in a radial direction from the axis of rotation, the asymmetric arrangement to indicate a particular direction of rotation.

WO 2023/285548 A1

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BEVERAGE OR FOODSTUFF PREPARATION SYSTEM

TECHNICAL FIELD

The present disclosure relates generally to electrically operated beverage or foodstuff preparation systems, with which a beverage or foodstuff is prepared from a pre-portioned capsule.

BACKGROUND

Systems for the preparation of a beverage comprise a beverage preparation machine and a capsule. The capsule comprises a single-serving of a beverage forming precursor material, e.g. ground coffee or tea. The beverage preparation machine is arranged to execute a beverage preparation process on the capsule, typically by the exposure of pressurized, heated water to said precursor material. Processing of the capsule in this manner causes the at least partial extraction of the precursor material from the capsule as the beverage.

This configuration of beverage preparation machine has increased popularity due to 1) enhanced user convenience compared to a conventional beverage preparation machines (e.g. compared to a manually operated stove-top espresso maker) and 2) an enhanced beverage preparation process, wherein: preparation information encoded by a code on the capsule is read by the machine, and; the preparation information is used by the machine to optimise the preparation process in a manner specific to the capsule. In particular, the encoded preparation information may comprise operating parameters selected in the beverage preparation process, including: fluid temperature; fluid pressure; preparation duration, and; fluid volume.

Various codes have been developed, an example of which is provided in EP 2594171 A1, wherein a lower side of a flange of a capsule comprises a code arranged thereon. A drawback of such a code is that its encoding density is limited, i.e. the amount of preparation information that it can encode is limited.

Therefore, in spite of the effort already invested in the development of said systems further improvements are desirable.

SUMMARY

The present disclosure provides a container for containing a precursor material for use with a machine for preparing a beverage or foodstuff or a precursor thereof, the container including a machine-readable code storing preparation information for use with a preparation process

performed by said machine, in which the machine is controlled based on the preparation information to prepare the beverage and/or foodstuff or precursor thereof. In embodiments, the container includes: a storage portion, for storage of precursor material; a closing member (e.g. a membrane) for closing the storage portion, and; a flange connecting the storage portion and closing member. The code may be readable from a side of the flange that comprises a lower surface (e.g. the code is arranged on the lower side of the flange).

In embodiments, the code comprises elements, which are arranged to be read sequentially as the container is rotated about an axis of rotation O. By implementing the elements that form the code to be disposed for rotational reading, the container can be rotated relative the code reader to conveniently read the whole code. The container may be rotationally symmetric about said axis of rotation.

In embodiments, the elements of the code are arranged to be asymmetric about an axis R that extends in a radial direction from the axis of rotation. As used herein the term “asymmetric” in respect of the code elements may refer to there being no symmetry about any radially extending line that extends over the element. The asymmetric arrangement may be implemented to encode additional information compared to a symmetric arrangement. In particular, the asymmetric arrangement may be readable in the same way as regular rectilinear or arch-shaped elements on legacy machines, but provide additionally information for use on more sophisticated next generation machines.

In embodiments, the asymmetric arrangement indicates a particular direction of rotation and/or reading. By implementing the elements of the code in this manner, they can be read by the code reading system to determine a primary direction of rotation for containers that are directional, e.g. all or part of a preparation process requires execution in a specific direction of rotation.

In embodiments, the elements encode a data portion storing the preparation information, and encoding a finder sequence for locating the data portion. As used herein the term “element” in respect of the code may refer to a single, continuous, region, e.g. and not a composition of geometrically separate sub-elements.

In embodiments, the code elements are arrow shaped to indicate said direction of rotation. As used herein the term “arrow shaped” may refer to an arrangement with a leading edge that converges to a tip to indicate a direction. In embodiments, the leading edge of the arrow shape is linear and/or curved. In embodiments, a trailing edge of the arrow shape corresponds to the

leading edge. With such an arrangement, image processing of either the leading or trailing edge may be used to determined said direction of rotation.

In embodiments, the code elements are rhomboid shaped. As used herein the term “rhomboid” may refer to an arrangement with adjacent sides of unequal length and angles are non-right angled. The major sides may be angled with respect to the radial direction. The minor and/or sides may be linear or curved.

In embodiments, the elements are physically arranged as a numeral 1 or a 0 to encode a logical 1 or a 0. By implementing the elements of the code as a 1 or a 0 physically formed on the code, the encoding of a logical 1 or a 0 may be conveniently determined, for example, a physically written 1 may encode one of 1 or a 0 of a bit and a physically written 0 may encode the other of a 1 or a 0 of a bit. In embodiments, a top of the 1 includes an extension at a top end to provide said asymmetric arrangement.

The present disclosure provides a substrate for attachment to a container for containing a precursor material for use with a machine for preparing a beverage and/or foodstuff or a precursor thereof, the substrate comprising a code comprising any feature of the code of the preceding embodiments or another embodiment disclosed herein.

As used herein the term “substrate” may refer to any suitable carrier for the code that can be used to connect the code to a container, examples of which include: a sticker; a cardboard member to receive an adhesive strip, and; other suitable arrangements.

Examples of suitable closing members and substrates can be derived from the teachings disclosed herein and examples relating to the containers and/or closing members. Suitable constructional and/or operational details are for instance disclosed in EP2569230.

The present disclosure provides a system comprising the container of any preceding embodiment or another embodiment disclosed herein and a machine for preparing a beverage and/or foodstuff or a precursor thereof.

In embodiments, the machine includes: a code reading system to read the code of the container; a processing unit for processing the precursor material of the container, and; electrical circuitry to control the processing unit based on preparation information read from the code. In embodiments, the processing unit includes a container processing unit and a fluid processing system, and; the electrical circuitry is arranged to control the container processing unit and fluid processing system

based on the preparation information read from the code. In embodiments, the processing unit is arranged as a loose material processing unit, and; the electrical circuitry is arranged to control the loose material processing unit to process loose precursor material dispensed from the container or arranged in the container based on the preparation information read from the code.

In embodiments, the code reading system is arranged to read the code as the container is rotated about an axis of rotation, and the processing unit is arranged to process the precursor material as the container is rotated about said axis of rotation. Code reading and precursor material processing may be executed concurrently or consecutively.

The present disclosure provides use of the container of any preceding embodiment or another embodiment disclosed herein for a machine for preparing a beverage and/or foodstuff or a precursor thereof.

The present disclosure provides a method of reading preparation information for use in a preparation process, in which a machine is controlled based on the preparation information to prepare a beverage and/or foodstuff or precursor thereof.

In embodiments, the method comprises reading code elements in rotation, which are asymmetric about an axis R that extends in a radial direction from the axis of rotation, the asymmetric arrangement to indicate a particular direction of rotation, and; decoding the read code elements.

In embodiments, the method comprises reading code elements arranged physically as a 1 or a 0; identifying said code element as a 1 or a 0, and; assigning a logical 1 or a 0 to said element.

The method may be implemented as part of a method of preparing a beverage or foodstuff or a precursor thereof, in which a processing unit is controlled based on the preparation information to execute a preparation process on the precursor material. The method may implement the features of any preceding embodiment or another embodiment disclosed herein.

The present disclosure provides electrical circuitry to implement the method of the preceding embodiment or another embodiment disclosed herein.

The present disclosure provides a computer readable medium comprising program code to implement the method of the preceding embodiment or another embodiment disclosed herein.

The present disclosure provides a method of encoding preparation information with a code with elements arranged to be read sequentially as the container is rotated about an axis of rotation O.

In embodiments, the method comprises arranging the elements to be asymmetric about an axis R that extends in a radial direction from the axis of rotation, the asymmetric arrangement to indicate a particular direction of rotation. In embodiments, the method comprises arranging a code element as a physical 1 or a physical 0 to encode a logical 1 or a 0. The method may implement the features of any preceding embodiment or another embodiment disclosed herein.

The preceding summary is provided for purposes of summarizing some embodiments to provide a basic understanding of aspects of the subject matter described herein. Accordingly, the above-described features are merely examples and should not be construed to narrow the scope or spirit of the subject matter described herein in any way. Moreover, the above and/or proceeding embodiments may be combined in any suitable combination to provide further embodiments. Other features, aspects, and advantages of the subject matter described herein will become apparent from the following Detailed Description of Embodiments, Brief Description of Figures, and Claims.

BRIEF DESCRIPTION OF FIGURES

Aspects, features and advantages of embodiments of the present disclosure will become apparent from the following detailed description of embodiments in reference to the appended drawings in which like numerals denote like elements.

Figure 1 is a block system diagram showing an embodiment system for preparation of a beverage or foodstuff or a precursor thereof.

Figure 2 is a block system diagram showing an embodiment machine of the system of figure 1.

Figure 3 is an illustrative diagram showing an embodiment fluid conditioning system of the machine of figure 2.

Figures 4A and 4B and 5 are illustrative diagrams showing an embodiment container processing system of the machine of figure 2.

Figure 6 is an illustrative diagram showing an embodiment machine of figure 2, which comprises a loose material processing unit.

Figure 7 is a block diagram showing embodiment control electrical circuitry of the machine of figure 2.

Figure 8 is an illustrative diagram showing embodiment container of the system of figure 1.

Figure 9 is flow diagram showing an embodiment preparation process, which is performed by the system of figure 1.

Figure 10 is a magnified view showing a code of the container of figure 8.

Figures 11 – 14 are views showing example elements configurations of the code of figure 10.

DETAILED DESCRIPTION OF EMBODIMENTS

Before describing several embodiments of the system, it is to be understood that the system is not limited to the details of construction or process steps set forth in the following description. It will be apparent to those skilled in the art having the benefit of the present disclosure that the system is capable of other embodiments and of being practiced or being carried out in various ways.

The present disclosure may be better understood in view of the following explanations:

As used herein, the term "**machine**" may refer to an electrically operated device that: can prepare, from a precursor material, a beverage and/or foodstuff, or; can prepare, from a pre-precursor material, a precursor material that can be subsequently prepared into a beverage and/or foodstuff. The machine may implement said preparation by one or more of the following processes: dilution; heating; cooling; mixing; whisking; dissolution; soaking; steeping; extraction; conditioning; infusion; grinding, and; other like process. The machine may be dimensioned for use on a work top, e.g. it may be less than 70 cm in length, width and height. As used herein, the term "**prepare**" in respect of a beverage and/or foodstuff may refer to the preparation of at least part of the beverage and/or foodstuff (e.g. a beverage is prepared by said machine in its entirety or part prepared to which the end-user may manually add extra fluid prior to consumption, including milk and/or water).

As used herein, the term "**container**" may refer to any configuration to contain the precursor material, e.g. as a single-serving, pre-portioned amount. The container may have a maximum capacity such that it can only contain a single-serving of precursor material. The container may be single use, e.g. it is physically altered after a preparation process, which can include one or more of: perforation to supply fluid to the precursor material; perforation to supply the beverage/foodstuff from the container; opening by a user to extract the precursor material. The container may be configured for operation with a container processing unit of the machine, e.g. it may include a flange for alignment and directing the container through or arrangement on said

unit. The container may include a rupturing portion, which is arranged to rupture when subject to a particular pressure to deliver the beverage/foodstuff. The container may have a closing member, e.g. a membrane, for closing the container. The container may have various forms, including one or more of: frustoconical; cylindrical; disk; hemispherical; packet; other like form. The container may be formed from various materials, such as metal or plastic or a combination thereof. The material may be selected such that it is: food-safe; it can withstand the pressure and/or temperature of a preparation process. The container may be defined as a capsule, wherein a capsule may have an internal volume of 20 - 100 ml. The capsule includes a coffee capsule, e.g. a Nespresso® capsule (including a Classic, Professional, Vertuo, Dolce Gusto or other capsule). The container may be defined as a receptacle, wherein a receptacle may have an internal volume of 150 - 350 ml. The receptacle is typically for end user consumption therefrom, and includes a pot, for consumption via an implement including a spoon, and a cup for drinking from. The container may be defined as a packet, wherein the packet is formed from a flexible material, including plastic or foil. A packet may have an internal volume of 150 - 350 ml or 200 - 300 ml or 50 – 150 ml.

As used herein, the term “**external device**” or "**external electronic device**" or “**peripheral device**” may include electronic components external to the machine, e.g. those arranged at a same location as the machine or those remote from the machine, which communicate with the machine over a computer network. The external device may comprise a communication interface for communication with the machine and/or a server system. The external device may comprise devices including: a smartphone; a PDA; a video game controller; a tablet; a laptop; or other like device.

As used herein, the term “**server system**” may refer to electronic components external to the machine, e.g. those arranged at a remote location from the machine, which communicate with the machine over a computer network. The server system may comprise a communication interface for communication with the machine and/or the external device. The server system can include: a networked-based computer (e.g. a remote server); a cloud-based computer; any other server system.

As used herein, the term “**system**” or "**beverage or foodstuff preparation system**" may refer to the combination of any two of more of: the beverage or foodstuff preparation machine; the container; the server system, and; the peripheral device.

As used herein, the term "**beverage**" may refer to any substance capable of being processed to a potable substance, which may be chilled or hot. The beverage may be one or more of: a solid; a liquid; a gel; a paste. The beverage may include one or a combination of: tea; coffee; hot chocolate; milk; cordial; vitamin composition; herbal tea/infusion; infused/flavoured water, and; other substance. As used herein, the term "**foodstuff**" may refer to any substance capable of being processed to a nutriment for eating, which may be chilled or hot. The foodstuff may be one or more of: a solid; a liquid; a gel; a paste. The foodstuff may include: yoghurt; mousse; parfait; soup; ice cream; sorbet; custard; smoothies; other substance. It will be appreciated that there is a degree of overlap between the definitions of a beverage and foodstuff, e.g. a beverage can also be a foodstuff and thus a machine that is said to prepare a beverage or foodstuff does not preclude the preparation of both.

As used herein, the term "**precursor material**" may refer to any material capable of being processed to form part or all of the beverage or foodstuff. The precursor material can be one or more of a: powder; crystalline; liquid; gel; solid, and; other. Examples of a beverage forming precursor material include: ground coffee; milk powder; tea leaves; coco powder; vitamin composition; herbs, e.g. for forming a herbal/infusion tea; a flavouring, and; other like material. Examples of a foodstuff forming precursor material include: dried vegetables or stock as anhydrous soup powder; powdered milk; flour based powders including custard; powdered yoghurt or ice-cream, and; other like material. A precursor material may also refer to any pre-precursor material capable of being processed to a precursor material as defined above, i.e. any precursor material that can subsequently be processed to a beverage and/or foodstuff. In an example, the pre-precursor material includes coffee beans which can be ground and/or heated (e.g. roasted) to the precursor material.

As used herein, the term "**fluid**" (in respect of fluid supplied by a fluid conditioning system) may include one or more of: water; milk; other. As used herein, the term "**conditioning**" in respect of a fluid may refer to a change in a physical property thereof and can include one or more of the following: heating or cooling; agitation (including frothing via whipping to introduce bubbles and mixing to introduce turbulence); portioning to a single-serving amount suitable for use with a single serving container; pressurisation e.g. to a brewing pressure; carbonating; fliting/purifying, and; other conditioning process.

As used herein, the term "**processing unit**" may refer to an arrangement that can process precursor material to a beverage or foodstuff. It may refer to an arrangement that can process a

pre-precursor material to a precursor material. The processing unit may have any suitable implementation, including a container processing unit or a loose material processing unit.

As used herein, the term "**container processing unit**" may refer to an arrangement that can process a container to derive an associated beverage or foodstuff from a precursor material. The container processing unit may be arranged to process the precursor material by one of more of the following: dilution; heating; cooling; mixing; whisking; dissolution; soaking; steeping; extraction; conditioning; pressurisation; infusion, and: other processing step. The container processing unit may therefore implement a range of units depending on the processing step, which can include: an extraction unit (which may implement a pressurised and/or a thermal, e.g. heating or cooling, brewing process); a mixing unit (which mixes a beverage or foodstuff in a receptacle for end user consumption therefore; a dispensing and dissolution unit (which extracts a portion of the precursor material from a repository, processes by dissolution and dispenses it into a receptacle), and: other like unit.

As used herein, the term "**loose material processing unit**" may refer to an arrangement that can process loose material of a pre-precursor material to a precursor material. The loose material processing unit may be arranged to process the pre-precursor material by one of more of the following: heating; cooling; grinding; mixing; soaking; conditioning; other processing step. The loose material may be supplied to the loose material processing unit in a container, from which it is extracted and processed.

As used herein, the term "**preparation process**" may refer to a process to prepare a beverage or foodstuff from a precursor material or to prepare a pre-precursor material from precursor material. A preparation process may refer to the processes electrical circuitry executes to control the container processing unit to process said precursor or pre-precursor material.

As used herein, the term "**electrical circuitry**" or "**circuitry**" or "**control electrical circuitry**" may refer to one or more hardware and/or software components, examples of which may include: an Application Specific Integrated Circuit (ASIC); electronic/electrical componentry (which may include combinations of transistors, resistors, capacitors, inductors etc); one or more processors; a non-transitory memory (e.g. implemented by one or more memory devices), that may store one or more software or firmware programs; a combinational logic circuit; interconnection of the aforesaid. The electrical circuitry may be located entirely at the machine, or distributed between one or more of: the machine; external devices; a server system.

As used herein, the term "**processor**" or "**processing resource**" may refer to one or more units for processing, examples of which include an ASIC, microcontroller, FPGA, microprocessor, digital signal processor (DSP), state machine or other suitable component. A processor may be configured to execute a computer program, e.g. which may take the form of machine readable instructions, which may be stored on a non-transitory memory and/or programmable logic. The processor may have various arrangements corresponding to those discussed for the circuitry, e.g. on-board machine or distributed as part of the system. As used herein, any machine executable instructions, or computer readable media, may be configured to cause a disclosed method to be carried out, e.g. by the machine or system as disclosed herein, and may therefore be used synonymously with the term method, or each other.

As used herein, the term "**computer readable medium/media**" or "**data storage**" may include any medium capable of storing a computer program, and may take the form of any conventional non-transitory memory, for example one or more of: random access memory (RAM); a CD; a hard drive; a solid state drive; a memory card; a DVD. The memory may have various arrangements corresponding to those discussed for the circuitry.

As used herein, the term "**communication resources**" or "**communication interface**" may refer to hardware and/or firmware for electronic information transfer. The communication resources/interface may be configured for wired communication ("wired communication resources/interface") or wireless communication ("wireless communication resources/interface"). Wireless communication resources may include hardware to transmit and receive signals by radio and may include various protocol implementations e.g. the 802.11 standard described in the Institute of Electronics Engineers (IEEE) and Bluetooth™ from the Bluetooth Special Interest Group of Kirkland Wash. Wired communication resources may include; Universal Serial Bus (USB); High-Definition Multimedia Interface (HDMI) or other protocol implementations. The machine may include communication resources for wired or wireless communication with an external device and/or server system.

As used herein, the term "**network**" or "**computer network**" may refer to a system for electronic information transfer between a plurality of apparatuses/devices. The network may, for example, include one or more networks of any type, which may include: a Public Land Mobile Network (PLMN); a telephone network (e.g. a Public Switched Telephone Network (PSTN) and/or a wireless network); a local area network (LAN); a metropolitan area network (MAN); a wide area

network (WAN); an Internet Protocol Multimedia Subsystem (IMS) network; a private network; the Internet; an intranet.

As used herein, the term "**code**" may refer to storage medium that encodes preparation information. The code may be an optically readable code, e.g. a bar code. The code may be formed of a plurality of units, which can be referred to as elements or markers.

As used herein, the term "**preparation information**" may refer to information related to a preparation process. Depending on the implementation of the processing unit said information may vary. The parameters that may be associated container processing unit that comprises a fluid processing system, can include one or more of: fluid pressure; fluid temperature; mass/volumetric flow rate; fluid volume; filtering/purification parameters for the fluid; carbonation parameters for the fluid. The parameters that may be associated container processing unit that comprises a loose material processing unit, can include one or more of: grinding parameters, including intensity; heating temperature. More general parameters can include one or more: container geometric parameters, e.g. shape or volume; the type of precursor; phase identifier, for when a preparation process is split into a series of phases, whereby each phase comprises a set of one or more of any of the aforesaid parameters; duration, including phase duration (e.g. a duration for applying the parameters of a phase or any of the aforementioned parameters generally; and a container identifier, which may for example be used to monitor container consumption for the purpose of container re-ordering or look-up of information from the server system; an expiry date, a recipe identifier, which may be used to lookup a recipe stored on the memory of the machine for use with the container.

[General system description]

Referring to figure 1, the system **2** comprises a machine **4**, a container **6**, server system **8** and a peripheral device **10**. The server system **8** is in communication with the machine **4** via a computer network **12**. The peripheral device **10** is in communication with the machine **4** via the computer network **12**.

In variant embodiments, which are not illustrated: the peripheral device and/or server system is omitted.

Although the computer network **12** is illustrated as the same between the machine **4**, server system **8** and peripheral device **10**, other configurations are possible, including: a different computer network for intercommunication between each device: the server system communicates

with the machine via the peripheral device rather than directly. In a particular example: the peripheral device communicates with the machine via a wireless interface, e.g. with a Bluetooth™ protocol, and; the server system communicates with the machine via a via a wireless interface, e.g. with a IEE 802.11 standard, and also via the internet.

[Machine]

Referring to figure 2, the machine **4** comprises: a processing unit **14** for processing the precursor material; electrical circuitry **16**, and; a code reading system **18**.

The electrical circuitry **16** controls the code reading system **18** to read a code (not illustrated in figure 2) from the container **6** and determine preparation information therefrom. The electrical circuitry **16** uses the preparation information to control the processing unit **14** to execute a preparation process, in which the precursor material is process to a beverage or foodstuff or a precursor thereof.

[First example of Processing unit]

Referring to figures 2 and 3, in a first example of the processing unit **14**, said unit comprises a container processing unit **20** and a fluid conditioning system **22**.

The container processing unit **20** is arranged to process the container **6** to derive a beverage or foodstuff from precursor material (not illustrated) therein. The fluid conditioning system **22** conditions fluid supplied to the container processing unit **20**. The electrical circuitry **16** uses the preparation information read from the container **6** to control the container processing unit **20** and the fluid conditioning system **22** to execute the preparation process.

[Fluid conditioning system]

Referring to figure 3, the fluid conditioning system **22** includes a reservoir **24**; pump **26**; heat exchanger **28**, and; an outlet **30** for the conditioned fluid. The reservoir **24** contains fluid, typically sufficient for multiple preparation processes. The pump **26** displaces fluid from the reservoir **24**, through the heat exchanger **26** and to the outlet **30** (which is connected to the container processing unit **20**). The pump **26** can be implement as any suitable device to drive fluid, including: a reciprocating; a rotary pump; other suitable arrangement. The heat exchanger **28** is implemented to heat the fluid, and can include: an in-line, thermo block type heater; a heating element to heat the fluid directly in the reservoir; other suitable arrangement.

In variant embodiments, which are not illustrated: the pump is omitted, e.g. the fluid is fed by gravity to the container processing unit or is pressurised by a mains water supply; the reservoir is omitted, e.g. water is supplied by a mains water supply; the heat exchanger is arranged to cool the fluid, e.g. it may include a refrigeration-type cycle heat pump); the heat exchanger is omitted, e.g. a mains water supply supplies the water at the desired temperature; the fluid conditioning system includes a filtering/purification system, e.g. a UV light system, a degree of which that is applied to the fluid is controllable; a carbonation system that controls a degree to which the fluid is carbonated.

[Container processing unit]

The container processing unit **20** can be implemented with a range of configurations, as illustrated in examples 1 – 6 below:

Referring to figures 4A and 4B, a first example of the container processing unit **20** is for processing of a container arranged as a capsule **6** (a suitable example of a capsule is provided in figure 7, which will be discussed) to prepare a beverage. The container processing unit **20** is configured as an extraction unit **32** to extract the beverage from the capsule **6**. The extraction unit **32** includes a capsule holding portion **34** and a closing portion **36**. The extraction unit **32** is movable to a capsule receiving position (figure 4A), in which capsule holding portion **34** and a closing portion **36** are arrange to receive a capsule **6**. The extraction unit **32** is movable to a capsule extraction position (figure 4B), in which the capsule holding portion **34** and a closing portion **36** form a seal around a capsule **6**, and the beverage can be extracted from the capsule **6**. The extraction unit **32** can be actuator driven or manually movable between said positions.

The outlet **30** of the fluid conditioning system **22** is arranged as an injection head **38** to inject the conditioned fluid into the capsule **6** in the capsule extraction position, typically under high pressure. A beverage outlet **40** is arranged to capture the extracted beverage and convey it from the extraction unit **32**.

The extraction unit **32** is arranged to prepare a beverage by the application of pressurised (e.g. at 10 – 20 Bar), heated (e.g. at 50 – 98 degrees C) fluid to the precursor material within the capsule **6**. The pressure is increased over a predetermined amount of time until a pressure of a rupturing portion (not illustrated in figure 4A, 4B) of the capsule **6** is exceeded, which causes rupture of said portion and the beverage to be dispensed to the beverage outlet **40**.

In variant embodiments, which are not illustrated, although the injection head and beverage outlet are illustrated as arranged respectively on the closing portion and capsule holding portion, they may be alternatively arranged, including: the injection head and beverage outlet are arranged respectively on the capsule holding portion and closing portion; or both on the same portion. Moreover, the extraction unit may include both parts arranged as a capsule holding portion, e.g. for capsules that are symmetrical about the flange, including a Nespresso® Professional capsule.

Examples of suitable extraction units are provided in EP 1472156 A1 and in EP 1784344 A1, which are incorporated herein by reference, and provide a hydraulically sealed extraction unit.

Referring to figure 5, in a second example of the container processing unit **20**, the extraction unit **32** is as described for the first example, however the extraction unit **32** operates at a lower fluidic pressure and by centrifugation. In particular, the extraction unit **32** includes a rotation mechanism **33** that includes a capsule holing portion **34** to hold the capsule **6** and a drive system **37** to rotate said capsule holder **35**.

The outlet **30** of the fluid conditioning system **22** is arranged as on the closing portion **36** as an injection head **38** to inject the conditioned fluid into a centre of the capsule **6** through a closing member of the capsule **6** as will be discussed. The rotation mechanism **33** rotates the capsule to effect transmission of the conditioned fluid radially outwards through precursor material in the capsule **6** and out through peripheral arranged puncture points (not illustrated) in the closing member. An example of a suitable capsule is a Nespresso® Vertuo capsule. A suitable example is provided in EP 2594171 A1, which is incorporated herein by reference.

In a third example, (which is not illustrated) the capsule processing unit operates by dissolution of a beverage precursor that is selected to dissolve under high pressure and temperature fluid. The arrangement is similar to the extraction unit of the first and second example, however the pressure is lower and therefore a sealed extraction unit is not required. In particular, fluid can be injected into a lid of the capsule and a rupturing portion is located in a base of a containment portion of the capsule. An example of a suitable capsule is a Nespresso® Dolce Gusto capsule. Examples of suitable extraction units are disclosed in EP 1472156 A1 and in EP 1784344 A1, which are incorporated herein by reference.

In a fifth example, (which is not illustrated) the container processing unit is arranged as a mixing unit to prepare a beverage or foodstuff precursor that is stored in a container that is a receptacle, which is for end user consumption therefrom. The mixing unit comprises an agitator (e.g.

planetary mixer; spiral mixer; vertical cut mixer) to mix and a heat exchanger to heat/cool the beverage or foodstuff precursor in the receptacle. A fluid supply system may also supply fluid to the receptacle. An example of such an arrangement is provided in WO 2014067987 A1, which is incorporated herein by reference.

In a sixth example, (which is not illustrated) the container processing unit is arranged as a dispensing and dissolution unit. The dispensing and dissolution unit is arranged to extract a single serving portion of beverage or foodstuff precursor from a storage portion of the machine (which can include any multi-portioned container including a packet or box). The dispensing and dissolution unit is arranged to mix the extracted single serving portion with the conditioned fluid from the fluid conditioning system, and to dispense the beverage or foodstuff into a receptacle.

[Second example of Processing unit]

Referring to figure 6, in a second example of the processing unit **14**, said unit comprises a comprises a loose material processing unit **42**.

The loose material processing unit **42** is arranged to receive loose pre-precursor material from a container **6** and to process the pre-precursor material to derive the precursor material. The electrical circuitry **16** uses the preparation information read from the container **6** to control the loose material processing unit **42** to execute the preparation process.

A user presents manually the container **6** to a code reading system **18**, of the machine **4**, to read the code. The user then opens the container **6** and dispenses the pre-precursor material (not illustrated) arranged therein into the loose material processing unit **42**. The loose material processing unit **42** processes the loose pre-precursor material to the precursor material.

In a particular example, the pre-precursor material is coffee beans, and the loose material processing unit **42** is arranged to roast and/or grind the coffee beans to provide a precursor material.

In variant embodiments, which are not illustrated, the loose material processing unit is alternatively configured, including: with a dispensing system to open and dispense the pre-precursor from the capsule for subsequent processing (e.g. it may include a cutting tool to cut open the container and an extractor such as a scop to extract the pre-precursor material); the pre-precursor material may be processed in the container and either dispensed from the container by the aforedescribed example or provided to a user in the container.

[Code reading system]

Referring to figures 4A and 4B, the code reading system **18** is arranged to read a code **44** arranged on a closing member of the container **6**. The code reading system **18** is integrated with the extraction unit **32** of first example of the container processing unit **20**. The code **44** is read with the extraction unit **32** in the capsule extraction position (as shown in figure 4B).

The code reading system **18** includes an image capturing unit **46** to capture a digital image of the code **44**. Examples of a suitable image capturing unit **46** include a Sonix SN9S102; Snap Sensor S2 imager; an oversampled binary image sensor; other like system.

The electrical circuitry **16** includes image processing circuitry (not illustrated) to identify the code in the digital image and extract preparation information. An example of the image processing circuitry is a Texas Instruments TMS320C5517 processor running a code processing program.

Referring to figure 5, the code reading system **18** is arranged to read a code **44** from an underside of a flange of the container **6**. The code **44** is read based on rotation of the code **44** relative a code reader **46** of the code reading system **18**. The code **44** is read with the extraction unit **32** in the capsule extraction position (as shown in figure 5), with the rotation mechanism **33** rotating the container **6**.

The code reading system **18** includes a code reader **46** to capture a code signal of the code **44**. Examples of a suitable image code reader **46** include a photo diode or other electrical componentry that can distinguish between dark an light elements of the code. In variant embodiments, which are not illustrated, the code reader can be implemented as the image capturing unit, as discussed above, or with another suitable reading system.

In variant embodiments, which are not illustrated, the code reading system is separate from the container processing unit including: it is arranged in a channel that the user places the container in and that conveys the container to the container processing unit; it is arranged to read a code on a receptacle, which is positioned to receive a beverage from an beverage outlet of a dispensing and dissolution unit. In further variant embodiments, which are not illustrated, the code reading system is alternatively implemented, e.g. the code reading system is arranged on the machine to read a code of a container that a user manually presents to the image capturing device. In further variant embodiments, which are not illustrated, the code reading system is arranged to read a code at a different location of the container, e.g. on a storage portion.

[Control electrical circuitry]

Referring to figure 7, the electrical circuitry **16** is implemented as control electrical circuitry **48** to control the processing unit **14** to execute a preparation process. In the embodiment of figure 7, for illustrative purposes, the processing unit **14** is exemplified as the first example, which comprises a container processing unit **20** and a fluid supply unit **22**.

The electrical circuitry **16, 48** at least partially implements (e.g. in combination with hardware) an: input unit **50** to receive an input from a user confirming that the machine **4** is to execute a preparation process; a processor **52** to receive the input from the input unit **46** and to provide a control output to the processing unit **14**, and; a feedback system **54** to provide feedback from the processing unit **54** during the preparation process, which may be used to control the preparation process.

The input unit **50** is implemented as a user interface, which can include one or more of: buttons, e.g. a joystick button or press button; joystick; LEDs; graphic or character LDCs; graphical screen with touch sensing and/or screen edge buttons; other like device; a sensor to determine whether a container has been supplied to the machine by a user.

The feedback system **54** can implement one or more of the following or other feedback control based operations:

a flow sensor to determine a flow rate/volume of the fluid to the outlet **30** (shown in figure 3) of the fluid supply system **22**, which may be used to meter the correct amount of fluid to the container **6** and thus regulate the power to the pump **26**;

a temperature sensor to determine a temperature of the fluid to the outlet **30** of the fluid supply unit **22**, which may be used to ensure the temperature of fluid to the container **6** is correct and thus regulate the power to the heat exchanger **28**);

a level sensor to determine a level of fluid in the reservoir **24** as being sufficient for a preparation process;

a position sensor to determine a position of the extraction unit **32** (e.g. a capsule extraction position or a capsule receiving position).

It will be understood that the electrical circuitry **16**, **44** is suitably adapted for the other examples of the processing unit **14**, e.g.: for the second example of the container processing system the

feedback system may be used to control speed of rotation of the capsule; for the loose material processing unit the feedback system may be used to implement control of grinding rate and/or a heating temperature.

[Container]

Referring to figure 8, an example of a container **6**, that is for use with the first example or second example of the processing unit **14** comprises the container **6** arranged as a capsule. The capsule includes: a closing member **56**; a storage portion **58**, and; a flange portion **60**.

The storage portion **58** includes a cavity for storage of the precursor material (not illustrated). The closing member **56** closes the storage portion **58** and comprises a flexible membrane. The flange portion **60** is arranged integrally with the storage portion **58** and presents a flat surface for connecting the closing member **56** to the storage portion **58** to hermetically seal the precursor material. The capsule **6** has a diameter of 2 - 5 cm and an axial length of 2 - 4 cm.

In variant embodiments, which are not illustrated, the container can have various shapes including: hemispherical; curved; rectangular in section; frustoconical, and; other like shapes. The closing member may be arranged as a rigid member, rather than a membrane. The container may be formed of two similar or identical storage portions that are connected at a flange, hence the closing member can me omitted. The closing member may connect to the storage portion, hence the flange may be omitted.

Suitable examples of containers and/or closing members in terms of shapes, dimensions and/or materials are know from any of the cartridges, capsules and pods for portioned flavouring ingredients used by Nespresso™ (Original Line, Professional Line, Vertuo Line) and Nestle Dolce Gusto™ and Nestle Special-T™. The materials may thus include metal, for instance aluminium, plastic and/or paper. The materials are preferably biodegradable and/or recyclable. Suitable use, e.g. extraction, processes and systems are also known from Nespresso™, Nestle Dolce Gusto™ or Nestle Special-T™.

Constructional, manufacturing and/or (beverage) extraction details of containers and/or closing members are for instance disclosed in EP 2155021, EP 2316310, EP 2152608, EP2378932, EP2470053, EP2509473, EP2667757 and EP 2528485.

[Arrangement of Code]

Referring to figure 8, the code **44** code is arranged on an exterior surface of the container **6** in any suitable position such that it can be read by the code reading system **18**.

Referring to figure 8, the code **44** (not illustrated in figure 8) may be arranged on one or more of the following positions: the closing member **56**; a lower surface of the flange portion **60** that faces away from the closing member **56**; the storage portion **58**.

[Preparation Process]

Referring to figure 9, the execution of a process for preparing a beverage/foodstuff from precursor material is illustrated:

Block 70: a user supplies a container **6** to the machine **4**.

Block 72: the electrical circuitry **16** (e.g. the input unit **50** thereof) receives a user instruction to prepare a beverage/foodstuff from precursor, and the electrical circuitry **16** (e.g. the processor **52**) initiates the process.

Block 74: the electrical circuitry **16** controls the processing unit **14** to process the container (e.g. in the first or second example of the container processing unit **20**, the extraction unit **32** is moved from the capsule receiving position (figure 4A) to the capsule extraction position (figure 4B, figure 5)).

Block 76: the electrical circuitry **16** controls the code reading system **18** to read the code **44** on the container **6** and provide a digital image of the code or an code signal related to the code.

Block 78: the code processing circuitry of the electrical circuitry **16** processes the digital image to or code signal extract the preparation information.

Block 80: the electrical circuitry **16**, based on the preparation information, executes the preparation process by controlling the processing unit **14**. In the first example of the processing unit this comprises: controlling the fluid conditioning system **22** to supply fluid at a temperature, pressure, and time duration specified in the preparation information to the container processing unit **20**.

The electrical circuitry **16** subsequently controls the container processing unit **20** to move from the capsule extraction position though the capsule ejection position to eject the container **6** and back to the capsule receiving position.

In variant embodiments, which are not illustrated: the above blocks can be executed in a different order, e.g. **block 72** before **block 70** or **block 76** before **block 74**; some block can be omitted, e.g. where a machine stores a magazine of capsules **block 70** can be omitted; alternatively at blocks **70** to **76** a user presents the code of the container to the code reading system and after it is read opens said container and dispenses the pre-precursor material into the processing unit. Moreover, the container processing unit may be manually moved between the extraction position and capsule receiving position.

Blocks **76** and **78** may be referred to a code reading and processing process. Block **80** may be referred to as the preparation process. The electrical circuitry **16**, includes instructions, e.g. as program code, for the preparation process (or a plurality thereof). In an embodiment the processor **52** implements the instructions stored on a memory (not illustrated).

As part of the preparation process, the electrical circuitry **16** can obtain additional preparation information via the computer network **12** from the server system **8** and/or peripheral device **10** using a communication interface (not illustrated) of the machine.

[Code general description]

Referring to figure 10, the code **44** is formed of a plurality of elements **80**. The elements **80** are arranged on a surround **82**. The elements **80** are a dark colour (e.g. including one of the following: black, dark blue, purple, dark green) and the surround **82** is a comparatively light colour (e.g. including one of the following: white, light blue, yellow, light green) such that there is sufficient contrast for the image capturing unit **46** to distinguish therebetween. In variant embodiments, which are not illustrated: the elements are a light colour and the surround is a dark colour.

The elements **80** are formed by printing e.g. by means of an ink printer. As an example of printing the ink may be conventional printer ink and the substrate may be the container outer surface including one of the closing member, flange or storage portion , or a separate substrate, which is connected to the container. In variant embodiments, which are not illustrated, the elements are alternatively formed, including by embossing, engraving or other suitable means.

The elements **80** have various shapes as will be discussed. As used herein the term "shape" in respect of the elements may refer to an exact shape or an approximation of the actual shape, which can occur to a printing or other manufacturing variations in precision.

The elements **80** are arranged to be read sequentially when the container is rotated about an axis of rotation **100** (as also illustrated in figure 5). The elements **80** of the code **44** are arranged on a circumferentially extending virtual line **L**.

[Code encoding]

The elements **80** encode a data portion for storing the preparation information, and encode a finder sequence for locating the data portion. The elements **80** are encoded as a bit code, wherein the absence or presence of an element encodes a logical 1 or a 0.

The finder sequence (not illustrate) comprises a predefined reserved sequence of logical 1s and/or 0s, which is identifiable when processing the code. The data sequence is arranged at a known position with respect to the finder sequence, e.g. immediately after or distributed within the finder sequence. Hence with the finder sequence located, the data sequence can then be located read and decoded. The data sequence may be decoded based on a rule stored on the electrical circuitry **16** (e.g. via electronic memory) of the machine **2**. A specific example of such a code is provide in EP 2594171 A1.

[Code element formation]

Referring to figure 11, a code **44** that implements the features of the embodiments discussed in association with figures 8 and 10 comprises in a first example, the elements **80** that are arranged to be asymmetric about an axis **R** that extends in a radial direction from the axis **0** of rotation.

In the first example, the asymmetric orientation is achieved by orientating an element **80**, which has the shape of an arrow, to indicate/point in a particular direction of rotation. A leading edge **84** of the element has straight edges that converge at a vertex. A trailing edge **86** of the element has a corresponding shape. The minor adjoining edges are curved to correspond to the radii of the container.

Referring to figure 12, a second example that implements the features of the first example is provided. The elements **80** have a similar arrangement, however the leading edge **84** and trailing edge **86** are curved to form a wave shape.

In variant embodiments, which are not illustrated, the shape of the first or second example may be alternatively implemented, including: with a straight trailing or leading edge, and; with straight adjoining edges.

Referring to figure 13, a third example that implements the features of the first example is provided. The elements **80** are rhomboid in shaped. The rhomboid shape is implemented with a curved leading edge **84** and a curved trailing edge **86**. Minor adjoining edges are curved to correspond to the radii of the container. In variant embodiments, which are not illustrated, one or more edges of the rhomboid may be straight.

Referring to figure 14, a fourth example that implements the features of the first example is provided. The elements **80** are physically arranged as a numeral 1 or a 0 to encode a logical 1 or a 0. A top of the 1 includes an extension **88** to provide said asymmetric arrangement.

The asymmetry of the code can be used to determined a primary direction of rotation for use in machines with more advanced container processing units that can rotate the container in both directions as part of a more sophisticated preparation process. For example, directional containers may include interior elements to direct the fluid in a particular path through the precursor material for improved preparation, which is dependent on the rotation direction. As an example the interior elements may be arranged as radial swirls or steps so as to create a path that is directionally dependent. Less sophisticated machines can read the asymmetric code as would be the case for a regular recliner or arch-shaped element, hence the asymmetric code is retro compatible on legacy machines.

A method of processing the code **44** comprises the following steps:

Step 1: reading the positions associated with the elements **80** to determine the absence of presence of and element as a logical 1 or a 0. Where the elements are encoded as for the fourth example, the physical presence of a 1 or a 0 is alternatively determined as a logical 1 or a 0.

Step 2: optionally determining a direction of reading/rotation from the orientation of the asymmetric elements.

Whilst the code is illustrated herein as being arranged on the container, it will be appreciated that the code can be formed integrally on the container or formed on a separate substrate (not illustrated) which can be attached to the container.

It will be appreciated that any of the disclosed methods (or corresponding apparatuses, programs, data carriers, etc.) may be carried out by either a host or client, depending on the specific implementation (i.e. the disclosed methods/apparatuses are a form of communication(s), and as such, may be carried out from either 'point of view', i.e. in corresponding to each other fashion). Furthermore, it will be understood that the terms "receiving" and "transmitting" encompass "inputting" and "outputting" and are not limited to an RF context of transmitting and receiving radio waves. Therefore, for example, a chip or other device or component for realizing embodiments could generate data for output to another chip, device or component, or have as an input data from another chip, device or component, and such an output or input could be referred to as "transmit" and "receive" including gerund forms, that is, "transmitting" and "receiving", as well as such "transmitting" and "receiving" within an RF context.

As used in this specification, any formulation used of the style "at least one of A, B or C", and the formulation "at least one of A, B and C" use a disjunctive "or" and a disjunctive "and" such that those formulations comprise any and all joint and several permutations of A, B, C, that is, A alone, B alone, C alone, A and B in any order, A and C in any order, B and C in any order and A, B, C in any order. There may be more or less than three features used in such formulations.

In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. The word 'comprising' does not exclude the presence of other elements or steps then those listed in a claim. Furthermore, the terms "a" or "an," as used herein, are defined as one or more than one. Also, the use of introductory phrases such as "at least one" and "one or more" in the claims should not be construed to imply that the introduction of another claim element by the indefinite articles "a" or "an" limits any particular claim containing such introduced claim element to inventions containing only one such element, even when the same claim includes the introductory phrases "one or more" or "at least one" and indefinite articles such as "a" or "an." The same holds true for the use of definite articles. Unless stated otherwise, terms such as "first" and "second" are used to arbitrarily distinguish between the elements such terms describe. Thus, these terms are not necessarily intended to indicate temporal or other prioritization of such elements. The mere fact that certain measures are recited in mutually different claims does not indicate that a combination of these measures cannot be used to advantage.

Unless otherwise explicitly stated as incompatible, or the physics or otherwise of the embodiments, example or claims prevent such a combination, the features of the foregoing embodiments and examples, and of the following claims may be integrated together in any

suitable arrangement, especially ones where there is a beneficial effect in doing so. This is not limited to only any specified benefit, and instead may arise from an "ex post facto" benefit. This is to say that the combination of features is not limited by the described forms, particularly the form (e.g. numbering) of the example(s), embodiment(s), or dependency of the claim(s). Moreover, this also applies to the phrase "in one embodiment", "according to an embodiment" and the like, which are merely a stylistic form of wording and are not to be construed as limiting the following features to a separate embodiment to all other instances of the same or similar wording. This is to say, a reference to 'an', 'one' or 'some' embodiment(s) may be a reference to any one or more, and/or all embodiments, or combination(s) thereof, disclosed. Also, similarly, the reference to "the" embodiment may not be limited to the immediately preceding embodiment.

As used herein, any machine executable instructions, or compute readable media, may carry out a disclosed method, and may therefore be used synonymously with the term method, or each other.

The foregoing description of one or more implementations provides illustration and description, but is not intended to be exhaustive or to limit the scope of the invention to the precise form disclosed. Modifications and variations are possible in light of the above teachings or may be acquired from practice of various implementations of the present disclosure.

LIST OF REFERENCES

2 System

4 Machine

14 Processing unit

20 Container processing unit (first/second example)

32 Extraction unit

34 Capsule holding portion

36 Closing portion

38 Injection head

40 Beverage outlet

33 Rotation mechanism

37 Drive system

22 Fluid conditioning system

24 Reservoir

26 Pump

28 Heat exchanger

30 Outlet

42 Loose material processing unit

16 Electrical circuitry

48 Control electrical circuitry

50 Input unit

52 Processor

54 Feedback system

18 Code reading system

46 Image capturing unit

6 Container (Capsule)

56 Closing member

58 Storage portion

60 Flange portion

44 Code

80 Elements

84 Leading edge

86 Trailing edge

88 Extension

L Virtual line

82 Surround

0 Axis

R Radial direction

8 Server system

10 Peripheral device

12 Computer network

CLAIMS

1. A container arranged for containing a precursor material for use with a machine for preparing a beverage and/or foodstuff, the container including a machine-readable code storing preparation information for use with a preparation process performed by said machine, the code comprising a plurality of elements,

   the elements of the code are arranged to be read sequentially as the container is rotated about an axis of rotation (0),

   wherein the elements are arranged to be asymmetric about an axis (R) that extends in a radial direction from the axis of rotation, the asymmetric arrangement to indicate a particular direction of rotation.

2. The container of claim 1, wherein the code elements are arrow shaped to indicate said direction of rotation.

3. The container of claim 2, wherein a leading edge of the arrow shape is either linear and/or curved.

4. The container of claim 3, wherein a trailing edge of the arrow shape corresponds to the leading edge.

5. The container of claim 1, wherein the code elements are rhomboid shaped.

6. The container of claim 5, wherein a leading edge of the rhomboid is curved or is linear.

7. The container of claim 1, wherein the elements are physically arranged as a numeral 1 or a 0 to encode a logical 1 or a 0, wherein a top end of the 1 includes an extension to provide said asymmetric arrangement.

8. The container of any preceding claim, wherein the container includes a storage portion and a closing member, which are connected at a flange, wherein the code is readable from a side of the flange that comprises a lower surface.

9. A substrate for attachment to a container for containing a precursor material for use with a machine for preparing a beverage and/or foodstuff, the substrate comprising a code of any of claims 1 to 8.

10. A system comprising the container of any of claims 1 to 9 and a machine for preparing a beverage and/or foodstuff, the machine including:

    a code reading system to read the code of the container;

    a processing unit for processing the precursor material of the container, and;

    electrical circuitry to control the processing unit based on preparation information read from the code.

11. The system of claim 10, wherein the code reading system is arranged to read the code as the container is rotated about an axis of rotation, and the processing unit is arranged to process the precursor material as the container is rotated about said axis of rotation.

12. Use of the container of any of claims 1 to 9 for a machine for preparing a beverage and/or foodstuff or a precursor thereof, the machine including:

    a code reading system to read the code of the container;

    a processing unit for processing the precursor material of the container, and;

    electrical circuitry to control the processing unit based on preparation information read from the code.

13. A method of encoding preparation information with a code with elements arranged to be read sequentially as the container is rotated about an axis of rotation (O), the method comprising:

    arranging the elements to be asymmetric about an axis (R) that extends in a radial direction from the axis of rotation, the asymmetric arrangement to indicate a particular direction of rotation.

14. A method of reading preparation information for use in a preparation process in which a machine is controlled based on the preparation information to prepare a beverage and/or foodstuff or precursor thereof, the method comprising:

    reading code elements in rotation, which are asymmetric about an axis (O) that extends in a radial direction from the axis of rotation (R), the asymmetric arrangement to indicate a particular direction of rotation;

    decoding the read code elements.

15. Electrical circuitry to implement the method of either of claim 14.

16. A computer readable medium comprising program code to implement the method of claim 15.

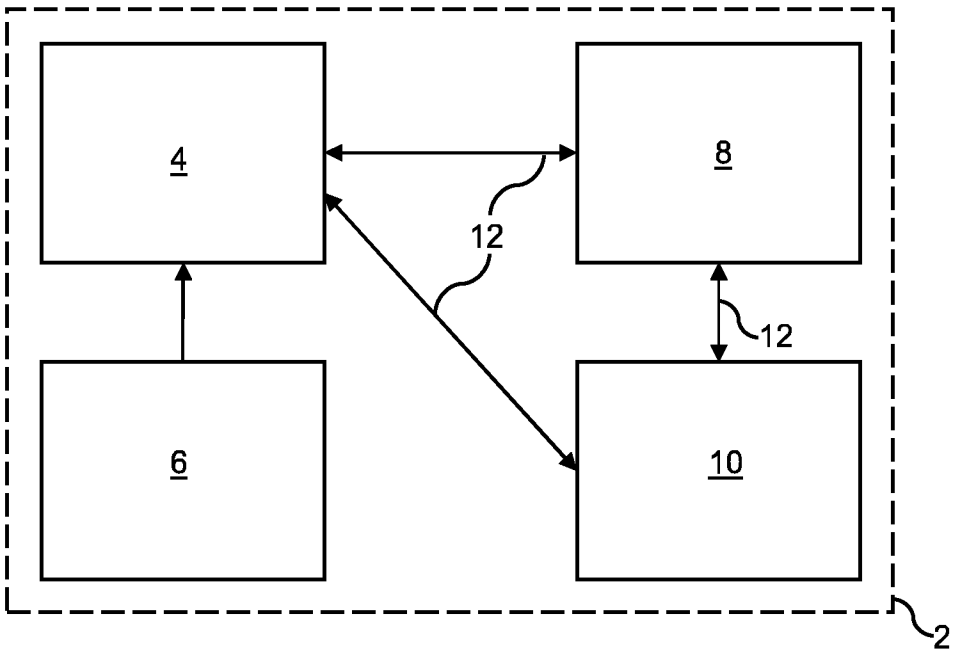

Figure 1

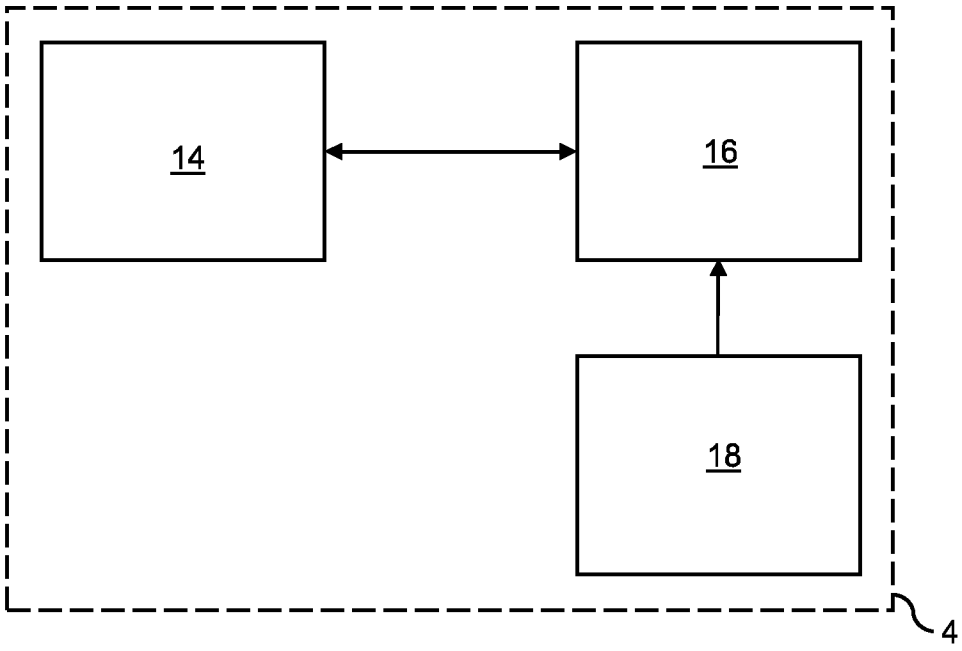

Figure 2

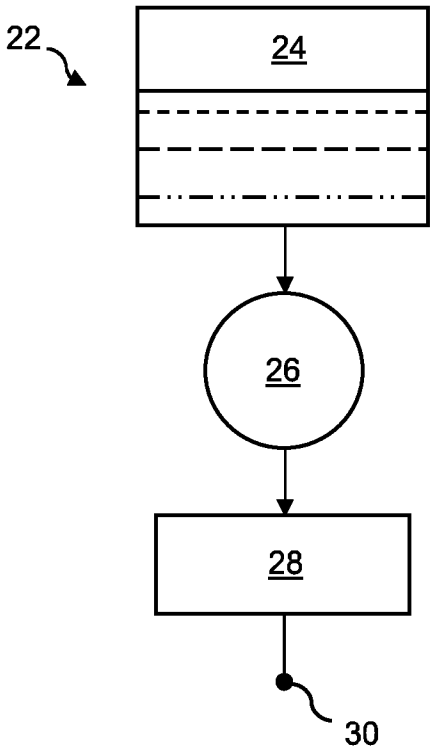

Figure 3

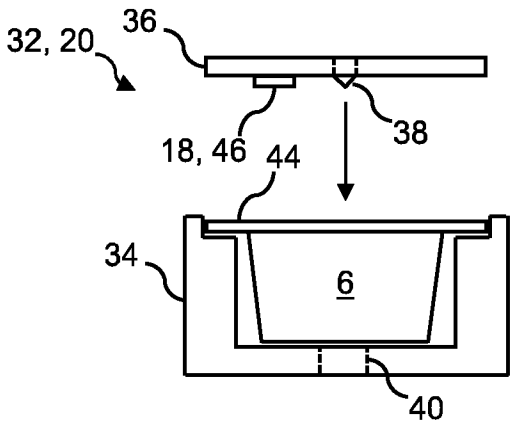

Figure 4A

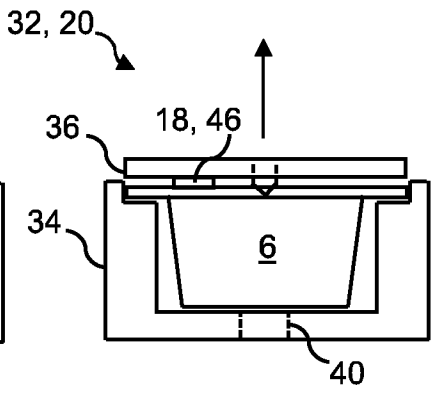

Figure 4B

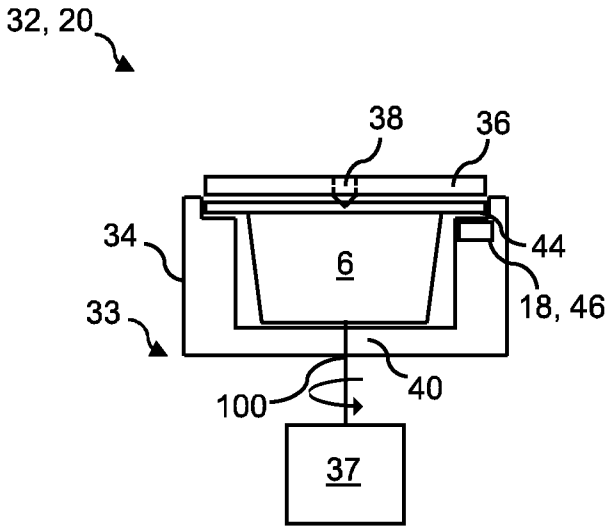

Figure 5

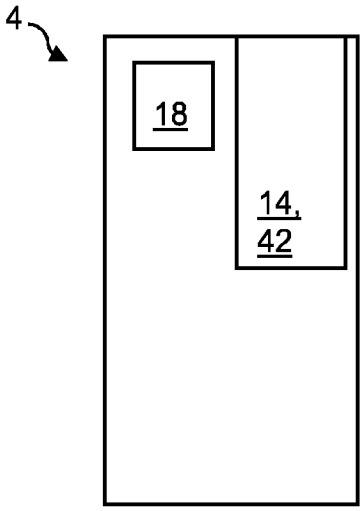

Figure 6

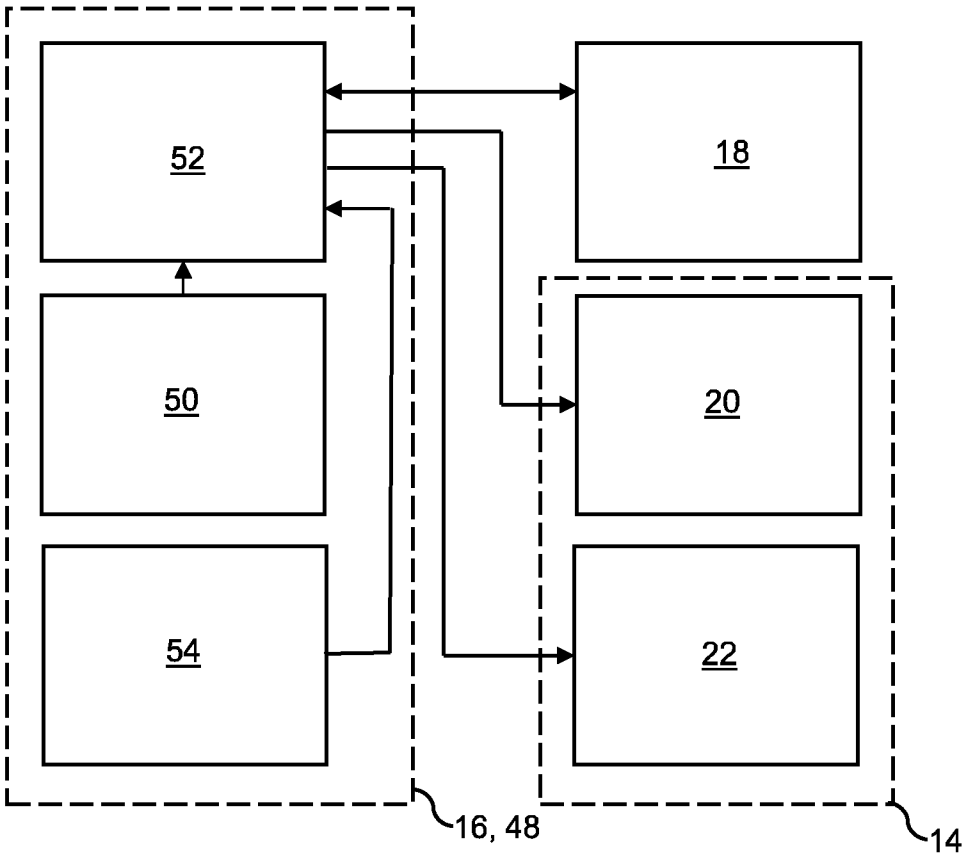

Figure 7

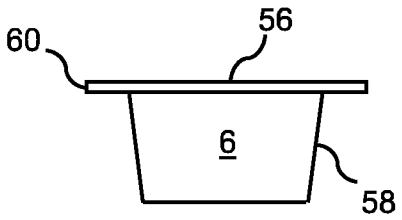

Figure 8

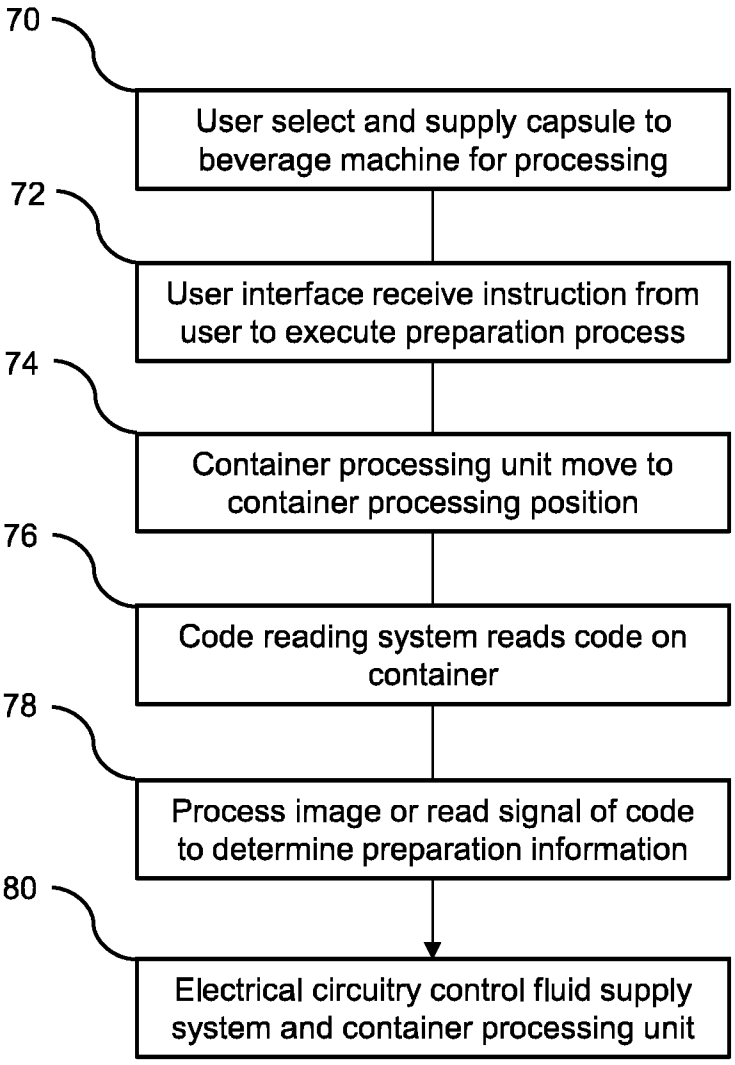

Figure 9

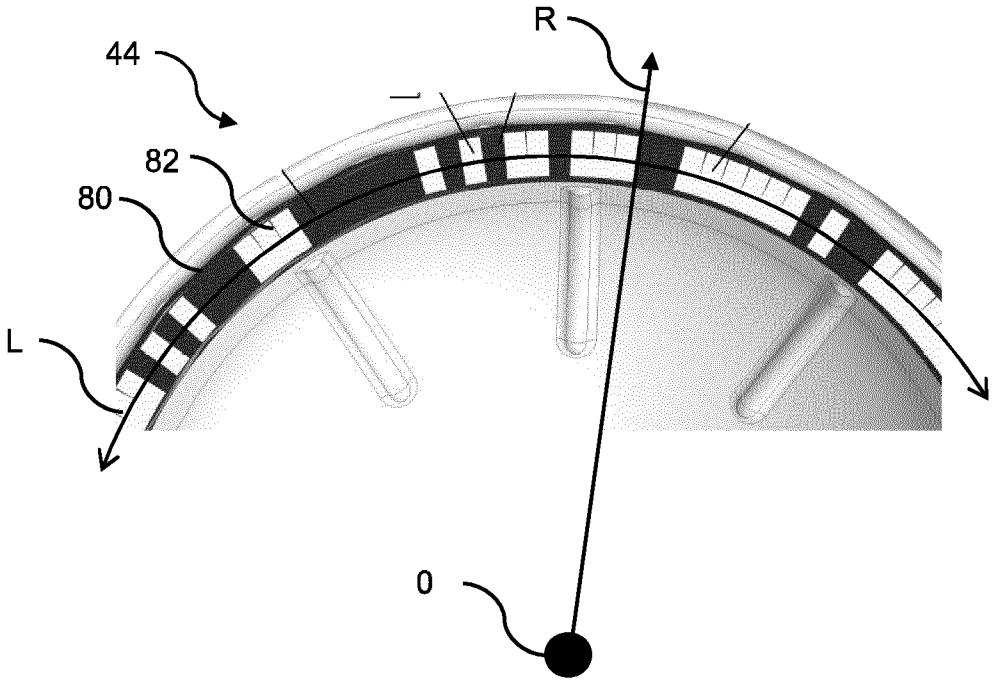

Figure 10

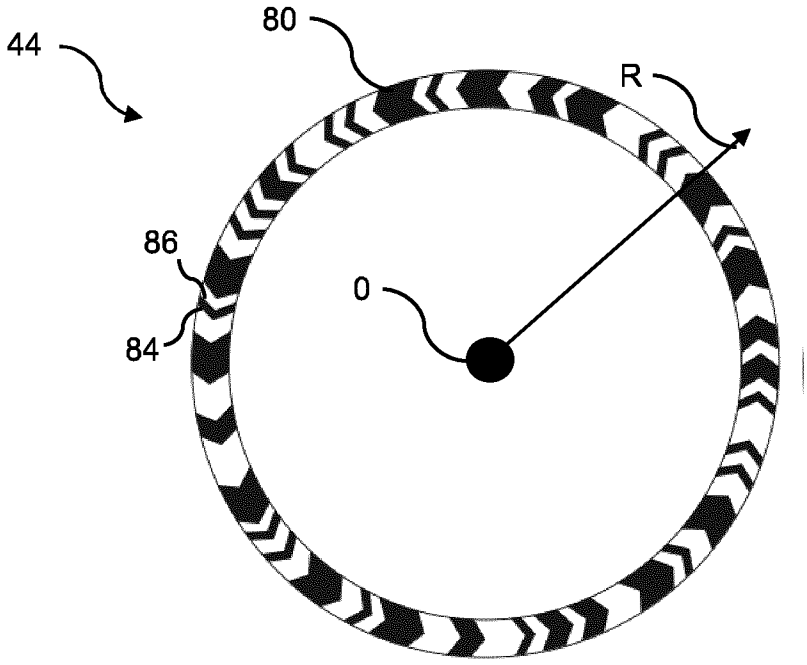

Figure 11

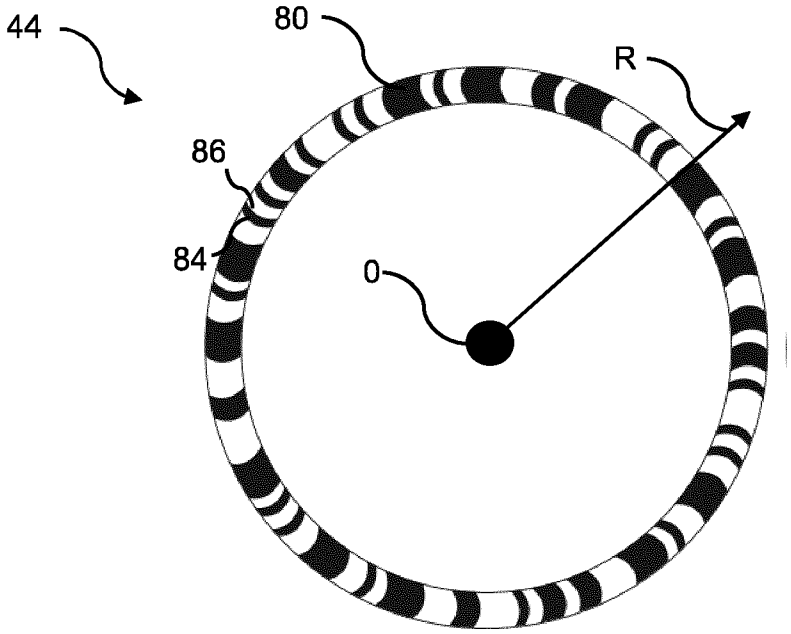

Figure 12

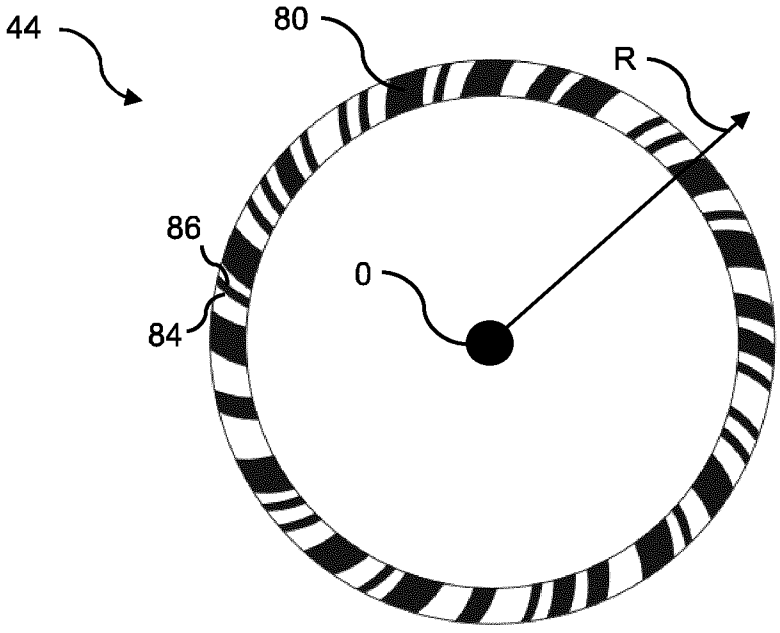

Figure 13

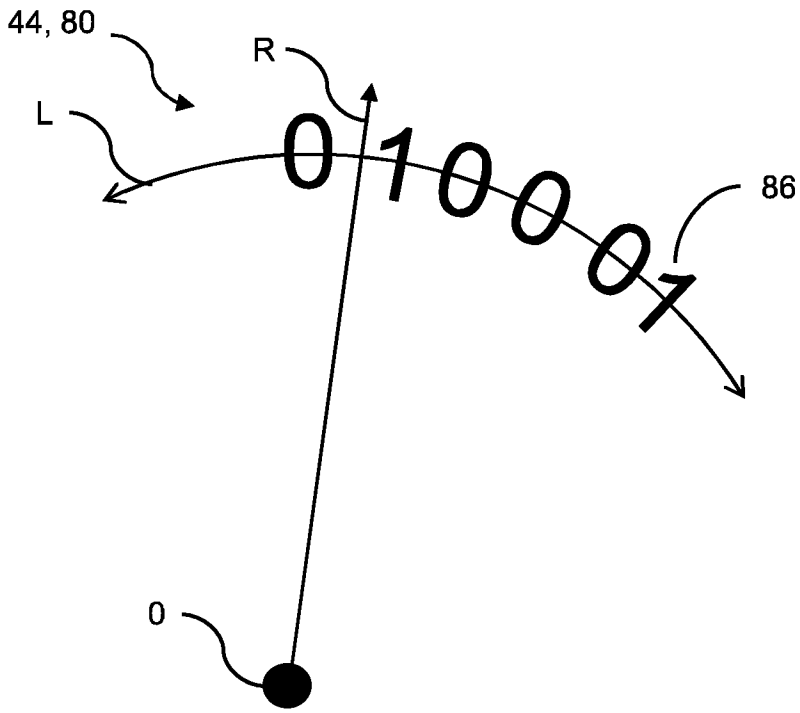

Figure 14

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2022/069633

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47J31/22 A47J31/44 B65D85/804
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)
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 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	WO 02/28241 A1 (BOYD COFFEE CO [US]) 11 April 2002 (2002-04-11) abstract; figures 1-4 page 6, line 21 - line 23	1-4,7,8, 10,12, 15,16
X	US 2016/242594 A1 (EMPL GUNTER [DE] ET AL) 25 August 2016 (2016-08-25) abstract; figures 2a,2b,4a,4b	1,10,12, 15,16
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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
22 August 2022	02/09/2022

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, Fax: (+31-70) 340-3016	Tempels, Marco

1

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2022/069633

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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1

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