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(72) Inventor: **ALONSO, Jose Luis**
08160 Montmeló (Barcelona) (ES)

(74) Representative: **Diaz Nunez, Joaquin**
J.D. Núñez Patentes y Marcas, S.L.
Rambla Catalunya 120
08008 Barcelona (ES)

(71) Applicant: **Tubing Food S.L.**
08160 Barcelona (ES)

(54) **SYSTEM FOR MONITORING AND CONTROLLING BEVERAGE DISPENSER INSTALLATIONS**

(57) Monitoring and control system applicable to beverage dispensing installations, namely installations equipped with: a dispensing unit (1) with several tanks (11, 12) for the beverage to be dispensed; a refrigeration unit (2) and a tank pressurization unit (3) (11, 12). The system comprises: a control unit (4) with a user interface (41) to control the operation of the system and wireless communication means (44); a control module (5) of the beverage dispensing installation (1) by means of elec-

trovalves, and for reception of data from a variable number of auxiliary modules (6) for telematic control of the monitoring and control of the installation that monitor and control the operating parameters of the system. The control unit (4), the control module (5) and the auxiliary modules (6) have an external power supply, and batteries (45, 57, 63) for power supply in case of failure of the external powersupply.

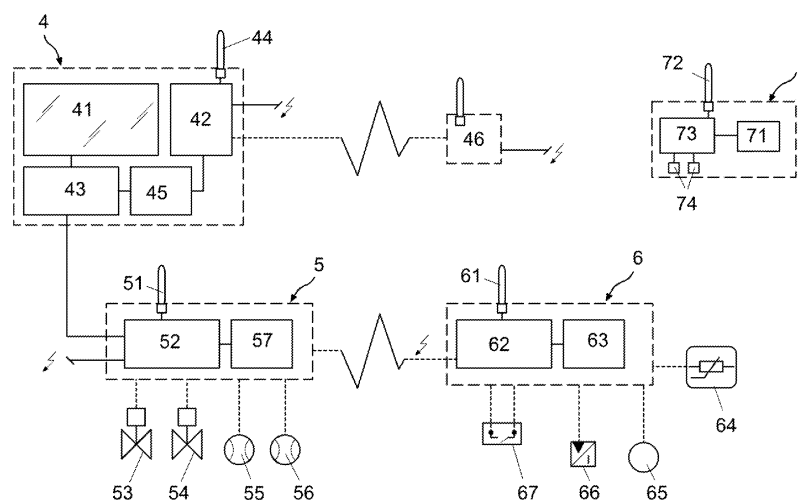


Fig. 2

Description

Object of the invention

[0001] The object of the present invention refers to a monitoring and control system of beverage dispensing installations, which provides a series of advantages and structural and constituent characteristics, which represent an improvement over the state of the art.

[0002] Specifically, the object of the invention is centered on a monitoring and control system applicable to beverage dispensing installations, preferably beer, to bars, restaurants and catering establishments; said installations having beverage dispensing equipment with several tanks containing the beverage to be dispensed and piping for distribution of the beverage from the tank in use to a dispensing tap; a cooling system of the beverage to be supplied, and pneumatic equipment responsible for pressurizing the tanks and pushing the beverage into the transport pipes.

Field of application of the invention

[0003] The field of application of the present invention is in the hotel and catering sector and in particular in the control of beer dispensing installations, or other refrigerated beverages, from large-capacity tanks located in the establishment itself.

State of the art

[0004] Installations used in hotels and restaurants for the supply of chilled beverages, such as beer, are well known in the market, said beverages being contained in large capacity tanks and served by one or more dispensing taps to said tanks.

[0005] These installations reduce the logistics and costs for establishments selling beer precisely because of the high capacity of the tanks located in those establishments where beer is to be consumed.

[0006] Obviously, these installations require a series of operations to guarantee the supply through the dispenser tap, such as changing the connection of the pipes from an empty tank to a full one when the beverage contained in the tank in use has been consumed.

[0007] The manual control of the beverage dispensing system is bothersome for the staff of the establishment concerned.

[0008] One solution to these drawbacks is to automate the operation of the installation. In particular, document ES 2 579 105 B1 describes automated equipment for beer dispensing installations with several tanks with outlets connected to refrigerated pipes which transport the beer to at least one tap; and with a series of pneumatic taps which make the necessary operations possible with the use of the tank from which the beer is to be dispensed.

[0009] The equipment object of said antecedent includes a control unit for each tank in the installation and

a main control unit responsible for controlling the operation of electrovalves and regulators, connected to pneumatic equipment, which perform the opening and closing of the beverage conduit and the pressurization of the tanks to push the beverage contained therein to the supply pipes.

[0010] This equipment allows one to know the temperature and pressure parameters of the beverage contained in each of the tanks by means of a series of sensors provided for this purpose in the tanks and connected to the control unit of the corresponding tank.

[0011] This equipment represents an important advance in terms of the handling and control of the installation which can be carried out automatically instead of manually; however, it has a number of drawbacks resulting in a low level of acceptance in the market.

[0012] One of the main drawbacks of this equipment is that it is extremely pricey, determined in large part by the structure of the equipment, which requires control units for each of the tanks, and additionally a main control unit.

[0013] Another disadvantage of this equipment is that the electronics are closed and limited to a series of control units, so it does not have the flexibility necessary to adapt to different installations and obtain data that can be essential to determine the content of each tank.

[0014] Therefore, the technical problem that arises is the development of a monitoring and control system for beverage dispensing installations, which is both economical and accessible for the market, and which allows the sending, to a remote center or terminal, of certain data relating to the installation and which allows the aforementioned problems to be resolved.

Description of the invention

[0015] The monitoring and control system of beverage dispensing installations, the object of this invention, is applicable to those dispensing installations which have:
- beverage dispensing equipment with several tanks containing the beverage to be dispensed and with pipes for the transport of the beverage from the tanks to at least one dispensing tap; - a refrigeration system for the beverage to be supplied, and - a pressurization system for the tanks.

[0016] This monitoring and control system has some construction features that significantly reduce the manufacturing and implementation costs with respect to the aforementioned antecedent, making it unnecessary to incorporate a control unit in each tank to determine the temperature, pressure and level of the beverage inside the corresponding tank.

[0017] Another of the objectives of the present invention is that the system has a modular configuration, in which the modules communicate wirelessly, minimizing in this way the installation of the system and making the expansion thereof more flexible.

[0018] These modules have suitable wireless commu-

nication means for communicating their status and values, as well as for receiving orders from a control unit wirelessly.

[0019] All modules are prepared to update their own firmware wirelessly, without intervention by an operator in the installation.

[0020] According to the invention, the system comprises: a control unit; a control of the beverage dispensing installation and; a variable and expandable number of auxiliary modules for telematic control of the beverage refrigeration and tank pressurization units.

[0021] The control unit is equipped with a user interface, a microprocessor and an electronic board to control the operation of the system; and radio frequency wireless communication means to receive different operating parameters of the system from the control module and the auxiliary telematic control modules, and to send certain data, e.g. the operating temperature of the refrigeration unit or the pressure supplied to the tanks; or the sending, to the beverage supplier, of the data relating to the quantity of beverage remaining in the tanks, which makes it possible to optimize the distribution and prevent the establishment's tanks from running out of beverage.

[0022] The control module of the beverage dispensing equipment is connected to the control unit, preferably by cable, and has wireless communication means for receiving data from the auxiliary telematic control modules of the installation.

[0023] This control module also has an electronic board that controls the opening and closing of the beverage outlet from each of the tanks to the beverage supply pipes by means of electrovalves.

[0024] This control module has flow meters that provide the system with information on the quantity of beverage supplied by each tank and allows one to determine the amount of beverage remaining in each of the tanks.

[0025] As mentioned above, this system includes auxiliary modules for telematic control, the number of which can be increased by adapting it to each installation and depending on the parameters to be monitored therein.

[0026] These auxiliary telematic control modules have an electronic board and specific sensors that monitor the desired parameters of the installation, for example, of the cooling and tank pressurization units and they act on them maintaining these parameters within predetermined values; said auxiliary modules sending the corresponding information through wireless communication means to the control module that acts as a link between the control unit and said auxiliary modules.

[0027] Both the control unit and the control module and the auxiliary modules are equipped with an external power supply and batteries for power supply in case of failure of the external power supply. These batteries are capable of keeping the measuring system active autonomously, that is, in the absence of external power for a period of at least 8 hours, avoiding, moreover, the loss of information.

[0028] In the present invention it is foreseen that the

system will additionally comprise a remote control provided with an internal battery, a communication module, an electronic board and pushbuttons to stop and change operations of the tank in use by activating the output electrovalves of said tanks.

Description of the figures.

[0029] To complement the description being made and in order to facilitate the understanding of the characteristics of the invention, a set of drawings is attached to the present descriptive report in which, for illustrative purposes and without limitation, the following has been represented:

- Figure 1 shows a schematic view of the monitoring and control system, object of the invention, applied to a beverage dispensing installation.
- Figure 2 shows a block diagram of the different elements that comprise the monitoring and control system in the figure above.

[0030] Preferred embodiment of the invention.

[0031] As can be seen in the example shown in figure 1 the beverage dispenser installation comprises a dispensing unit (1) equipped, in this case, with two tanks (11, 12) containing the beverage to be dispensed, and the respective pipes (13, 14) distributing the beverage from these tanks to a dispensing tap (15).

[0032] This installation also includes a refrigeration system (2) for the beverage to be supplied, equipped with a refrigeration unit (21) and a pipe (22) for the recirculation of a refrigerated fluid responsible for cooling the beverage.

[0033] The installation also has a pressurization system (3) of tanks (11,12) that contain the beverage to be dispensed, provided with a compressor and pressure supply lines to the interior of the tanks.

[0034] In the example shown in figure 1, the monitoring and control system of the aforementioned installation includes a control unit (4), a control module (5), two auxiliary modules (6) for telematic control and one remote control (7).

[0035] Figure 2 shows a block diagram of the control unit (4), the control module (5), the remote control module (7) and an auxiliary module (6) for telematic control, since, as mentioned, the number of auxiliary modules (6) may vary depending on the number of parameters to be monitored.

[0036] In said figure 2 the control unit (4) has a user interface (41) which includes a touch screen and pushbuttons, a microprocessor (42) and an electronic board (43); wireless communication means (44). Said control unit (4) is connected to an external 24 V DC power supply and has an internal battery (45) for autonomous power supply in case of external power failure.

[0037] This control unit (4) also has a power supply

output connector for cascade connection of the control module (5) and the auxiliary modules, in this example of a single auxiliary module (6).

[0038] The control unit (4) has a communications port for connection to a Wi-Fi router (46) that allows data to be sent to a remote centre or terminal.

[0039] The control module (5) is connected by cable to the control unit (4) and has wireless communication means (51) for receiving data from the auxiliary module (6); an electronic board (52) controls the electrovalves (53, 54) which are responsible for opening and closing the beverage outlet of the tanks (11), (15, 12) to the respective pipes (13, 14).

[0040] The control module (5) is also equipped with flow meters (55, 56) which determine the quantity of beverage delivered from the tanks (11, 12) to the respective pipes (13, 14) and enable the system to determine the quantity of beverage remaining in each of the tanks.

[0041] The above mentioned control module (5) has a battery (57) to supply it with power for at least 8 hours, in case of external power failure.

[0042] The auxiliary module (6) has: wireless communication means (61), an electronic board (62) and a battery (63) to supply it with power in case of external supply failure.

[0043] These sensors can be of different types depending on the parameters to be monitored; they are represented in this example by: a temperature probe (64) responsible for detecting the temperature of the cooling liquid passing through the recirculation conduit (22) of the cooling system; a clamp meter (65) to detect the consumption of the refrigeration unit (21) and a pressure transducer (66) which detects the pressure applied by the pressurization unit (3) to the tanks (11, 12)

[0044] As shown schematically in the mentioned figure 2 this auxiliary module (6) also has means of control (67) to act on the monitored equipment, e.g. cooling system (2) and pressurization system (3) in order to keep the values captured by the sensors (65) within predetermined parameters.

[0045] These means of control (67) may be e.g., relays or any other means.

[0046] The remote control (7) has an internal battery (71), wireless communication means (72) and an electronic board (73) with pushbuttons (74) to stop and change operations of the tank (11, 12) in use by acting on the electrovalves (53, 54) associated with the control module (5).

[0047] Having sufficiently described the nature of the invention, as well as an example of the preferred embodiment, it is stated for the appropriate purposes that the materials, form, size and arrangement of the elements described may be modified, provided this does not entail an alteration of the essential characteristics of the invention claimed below.

Claims

1. Monitoring and control system applicable to beverage dispensing installations; in particular installations (1) equipped with

- beverage dispensing installation (1) with several tanks (11, 12) that contain beverage to be dispensed and pipes (13, 14) to distribute the beverage from a tank (11, 12) in use to a dispensing tap (15);
- a refrigeration unit (2) of the beverage to be dispensed and;
- a pressurization unit (3) for the tanks (11, 12);

characterized in that it comprises:

- a control unit (4) comprising: a user interface (41); a microprocessor (42) and an electronic board (43) for controlling the operation of the system; and radio frequency wireless communication means (44) for receiving different operating parameters of the system and sending data to a remote centre or terminal;
- a control module (5) for the beverage dispensing installation (1), connected to the control unit (4) and comprising: wireless communication means (51) for receiving data from auxiliary modules (6) for telematic control of the installation; and an electronic board (52) which controls by means of electrovalves (53, 54) the opening and closing of the beverage outlet from each of the tanks (11, 12) to the beverage supply pipes (13, 14);
- a variable number of auxiliary modules (6) for telematic control which, by means of an electronic board (62), specific sensors (64, 65, 66) and control modules (67) monitor the desired system parameters and act on the corresponding installation (1, 2, 3) by keeping these parameters within predetermined values; said auxiliary modules (6) sending the corresponding information via wireless communication means (61) to the control module (4);

and **characterized in that** the control unit (4), the control module (5) and the auxiliary modules (6) have an external power supply, and batteries (45, 57, 63) to supply them with power in case of external power failure.

2. System, according to claim 1, **characterized in that** it comprises a remote control (7) equipped with: a battery (71), wireless communication means (72) and an electronic board (73) equipped with pushbuttons (74) to stop and change operations of the tank

(11,12) in use.

3. System, according to claim 1, **characterized in that** the control module (5) has flow meters (55, 56) in the pipes (13, 14) which provide the system with information on the amount of beverage supplied by each tank (11, 12) and allows it to determine the amount of beverage remaining in each of the tanks (11, 12).

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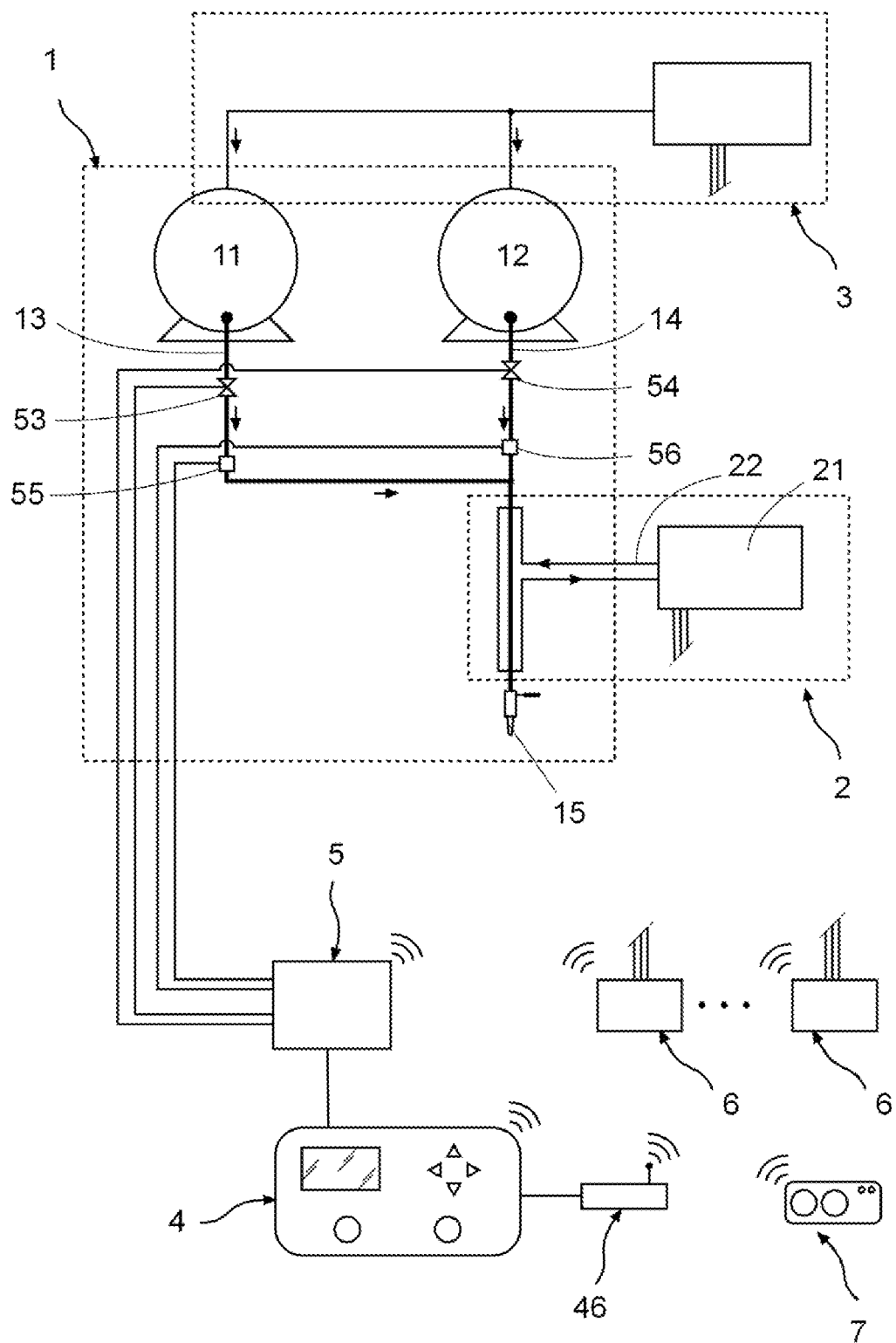


Fig. 1

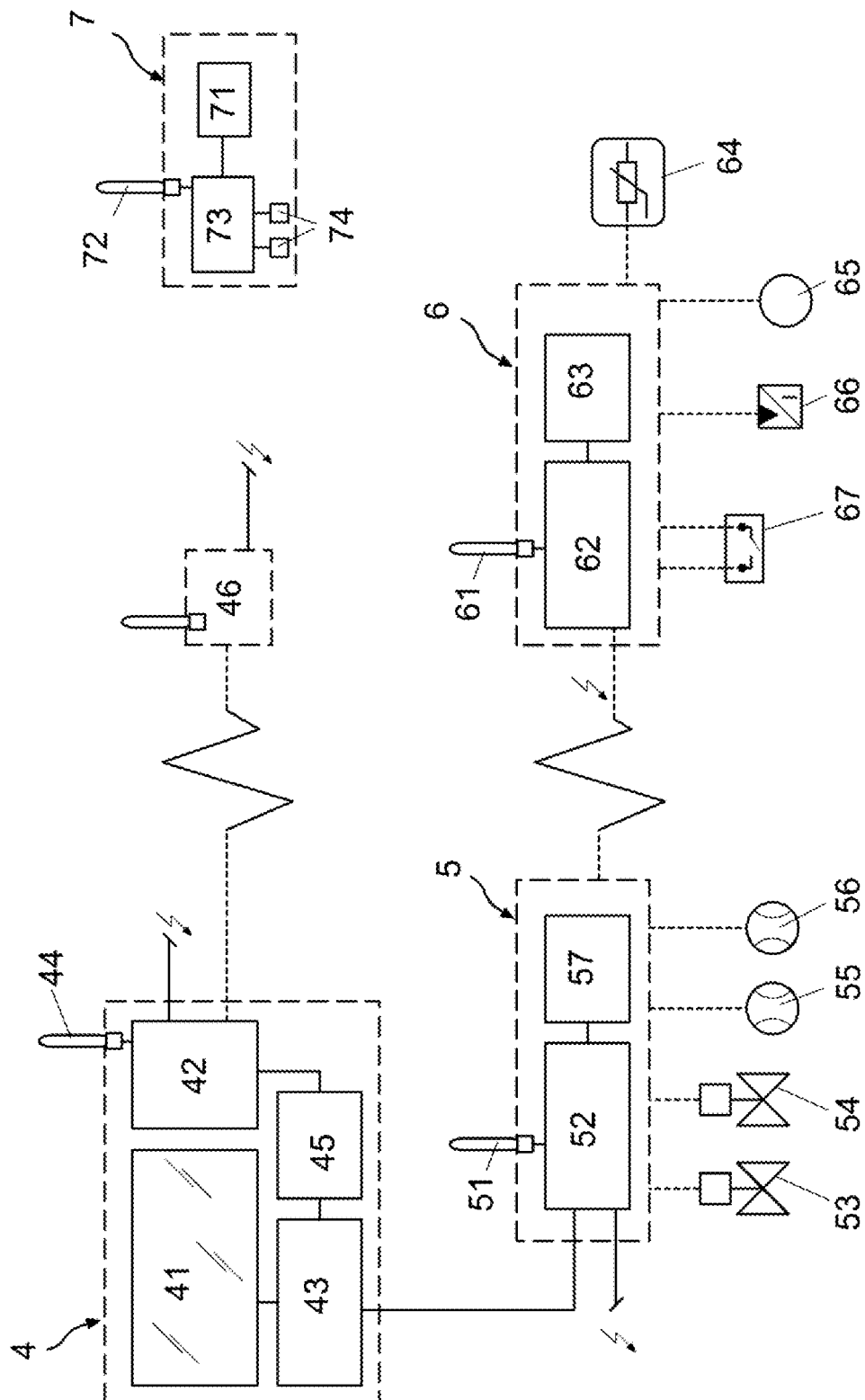


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2018/070546

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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)
B67D

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)

EPODOC, INVENES, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	WO 2004096694 A1 (AUTOMATED BEVERAGE TECHNOLOGIE ET AL.) 11/11/2004, description; figures.	1-3

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:	"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
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"E" earlier document but published on or after the international filing date	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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
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"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

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Date of mailing of the international search report
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Name and mailing address of the ISA/

Authorized officer
I. Rodríguez Goñi

OFICINA ESPAÑOLA DE PATENTES Y MARCAS
Paseo de la Castellana, 75 - 28071 Madrid (España)
Facsimile No.: 91 349 53 04

Telephone No. 91 3493447

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EP 3 835 255 A1

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CLASSIFICATION OF SUBJECT MATTER

B67D1/04 (2006.01)

B67D1/08 (2006.01)

B67D1/12 (2006.01)

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REFERENCES CITED IN THE DESCRIPTION

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